October, 1947
35 Cents

QST

devoted entirely to

amateur radio

IN THIS ISSUE—A LOW-COST IMPEDANCE-MATCH INDICATOR

NEW ITEMS AT

New designs and products are in continuous development at the U.T.C. Research Laboratory. While most of these items are specific to customer's unusual requirements, units having general application are added to the New U.T.C. catalogue.

UNIVERSAL RESONANT EQUALIZER

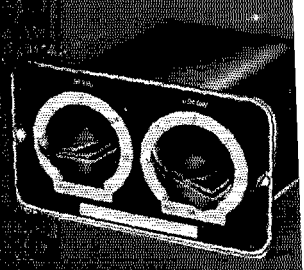


PHOTO FLASH TRANSFORMERS

United Transformer Corp

HUNT DX ECONOMICALLY

with a pair of GL-8005's!

FALL'S HERE, and doubtless you're weighing your rig's DX possibilities. How about a real try for overseas areas that you haven't been able to work in the past?

Your power tubes need consideration first. Possibly their replacement is called for. If so, may we suggest GL-8005's in push-pull—in case you want plenty of dependable watts per dollar, and your rig is in the medium-power class.

CW input for a pair of GL-8005's is 600 w. Phone input is 475 w. Two of these distance-spanning triodes cost no more than one typical 500-w tetrode, and you have greater reliability because triodes don't need "babying along". That's vital when you're out after DX.

A single GL-8005 can, of course, be used for the final stage, with input one-half of the figures above, but we recommend two tubes . . . and not just because of the higher input with a pair. For with GL-8005's in push-pull, you (1) reduce second-harmonic radiation which today should be all but eliminated in ham transmitters, and (2) enjoy a better-balanced circuit and layout.

Max ratings apply up to 60 mc frequency, or well beyond the 6-meter band. And drive requirements are low—15 w for a pair in CW operation, 18 w phone—so that replacing your present tubes with GL-8005's usually means little, if any, change in your rig.

Ask your G-E tube distributor for prices and other up-to-the-minute information on Type GL-8005. Or write *Electronics Department, General Electric Company, Schenectady 5, N. Y.*

See your G-E tube distributor for the latest copy of *Ham News*. 8 pages—fully illustrated—jam-packed with helpful hints toward better ham transmission and reception . . . and FREE!

ELECTRICAL CHARACTERISTICS

Filament voltage	10 v
current	*3.25 amp*
Interelectrode capacitances:	
grid-plate	5 mmfd
grid-filament	6.4 mmfd
plate-filament	1 mmfd

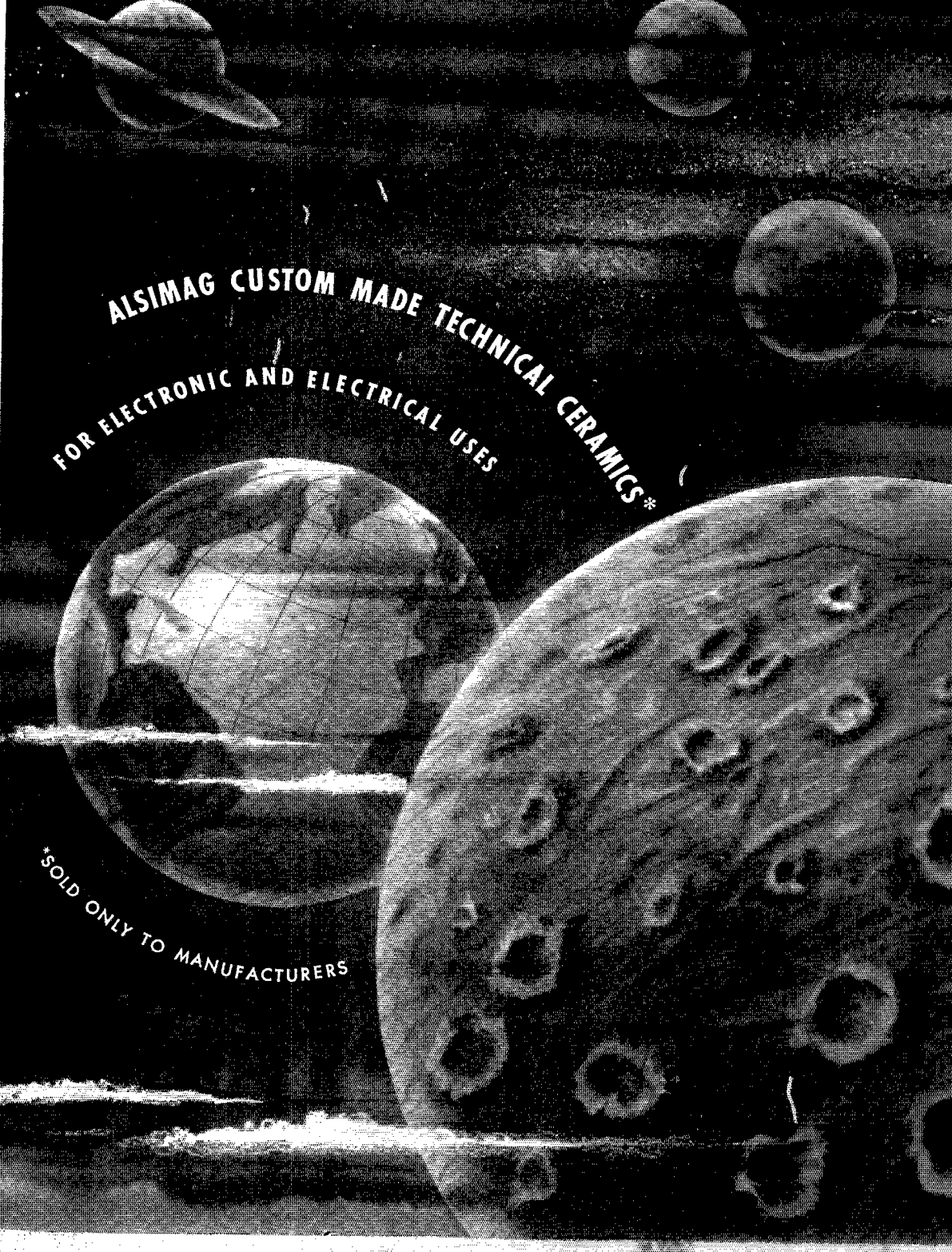
RATINGS (ICAS) FOR TYPICAL OPERATION

	Class C telephony	Class C telegraphy
Plate voltage	1,250 v	1,500 v
current	190 ma	200 ma
Driving Power	9 w	7.5 w
Power input	235 w	300 w

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL ELECTRIC

161-F20-8850



46TH YEAR OF CERAMIC LEADERSHIP

AMERICAN LAVA CORPORATION

CHATTANOOGA 5, TENNESSEE

QST

OCTOBER 1947

VOLUME XXXI • NUMBER 10

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West Hartford 7, Connecticut

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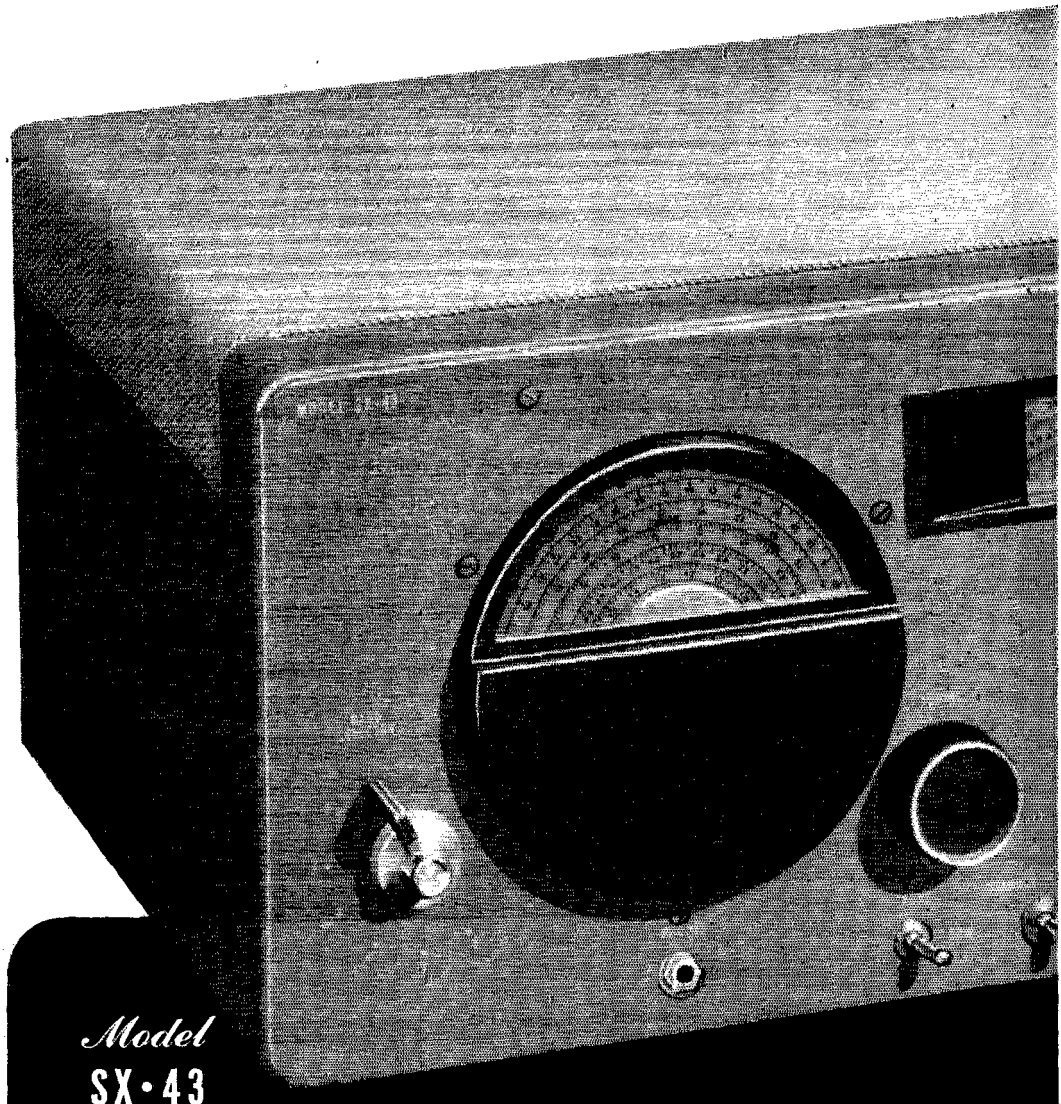


Model
SX•43

"The hottest ham performance ever at this price . . ." That's the verdict of amateurs who have had a chance to try Hallicrafters new Model SX-43.

This new member of the Hallicrafters line offers continuous coverage from 540 kilocycles to 55 megacycles and has an additional band from 88 to 108 megacycles. AM reception is provided on all bands, except band 6, CW on the four lower bands and FM on frequencies above 44 megacycles. In the band of 44 to 55 Mc., wide band FM or narrow band AM just right for narrow band FM reception is provided.

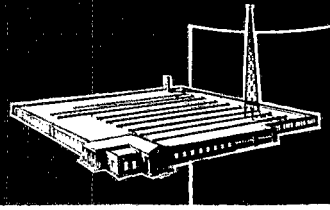
One stage of high gain tuned RF and a type 7F8 dual triode converter assure an exceptionally good signal-to-noise ratio. Image ratio on the AM channel on band 5 (44 to 55 Mc.) is excellent as the receiver is used as a double superheterodyne. The new Hallicrafters dual IF transformers provide a 455 kilocycle IF channel for operating frequencies below 44 megacycles and a 10.7 megacycle IF channel for the VHF bands. Two IF stages are used on the four lower bands and a third stage is added above 44 megacycles. Switching of IF frequencies is automatic. The separate electrical bandspread dial is calibrated for the amateur 3.5, 7, 14, and 28 megacycle bands.

Every important feature for excellent communications receiver performance is included in the SX-43.

$169.50

FEATURES FOUND IN NO OTHER RECEIVER AT THIS PRICE

- ALL ESSENTIAL AMATEUR FREQUENCIES FROM 540 kc TO 108 MC
- AM - FM - CW RECEPTION
- IN BAND OF 44 TO 55 MC: WIDE BAND FM OR NARROW BAND AM . . . JUST RIGHT FOR NARROW BAND FM RECEPTION
- CRYSTAL FILTER AND EXPANDING IF CHANNEL PROVIDE 4 VARIATIONS OF SELECTIVITY ON LOWER BANDS
- TEMPERATURE COMPENSATION FOR FREEDOM FROM DRIFT
- SERIES TYPE NOISE LIMITER
- PERMEABILITY ADJUSTED "MICROSET" INDUCTANCES IN THE RF CIRCUITS
- SEPARATE RF AND AF GAIN CONTROLS
- EXCEPTIONALLY GOOD SIGNAL-TO-NOISE RATIO
- SEPARATE ELECTRICAL BANDSPREAD CALIBRATED FOR THE AMATEUR 3.5, 7, 14, AND 28 Mc BANDS



hallicrafters RADIO

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Section Communications Managers of the ARRL Communications Department

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

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In the ST-202-A, STANCOR engineers have pooled valuable ideas gleaned from years of pre-war amateur kit design as well as war-time transmitter production to create a versatile combination of features which every amateur desires.

Integrated in a compact unit of pleasing appearance, a transmitter has evolved incorporating substantial power output, separate high and low voltage power supplies, a highly novel, but simple, exciter band switching arrangement and extreme ease of adjustment and operation.

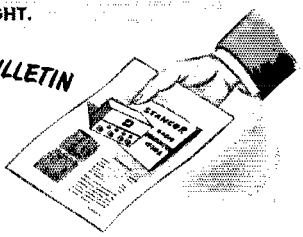
Every consideration was given to the ultimate user of this piece of equipment . . . the amateur; that is why a choice is given of several different R. F. output tubes . . . that is why the circuit design is straightforward and reliable . . . that is why the ST-202-A is properly priced.

See your STANCOR dealer for the ST-202-A descriptive bulletin.

Amateur net price of ST-202-A transmitter, less accessories..... $92.80

- 100-125 WATTS INPUT TO FINAL AMPLIFIER.
- COVERS ALL AMATEUR BANDS BETWEEN 3.5 AND 30 MCS.
- THREE STAGE R. F. CIRCUIT.
- BAND SWITCHING OF EXCITER STAGES.
- ONLY TWO TUNING CONTROLS *(EXCITER AND AMPLIFIER).*
- SELECTION OF SIX CRYSTAL POSITIONS.
- ADJUSTABLE LINK OUTPUT CIRCUIT.
- TWO SEPARATE POWER SUPPLIES INCLUDED.
- EASE OF CONSTRUCTION *(CABLED WIRING HARNESS SUPPLIED).*
- SMALL SIZE—APPROXIMATELY 14" x 13" x 9".
- PROVISIONS FOR USE WITH AM OR FM MODULATOR.
- PRICED RIGHT.

SEE YOUR AUTHORIZED STANCOR DEALER FOR DISCRIPTIVE BULLETIN



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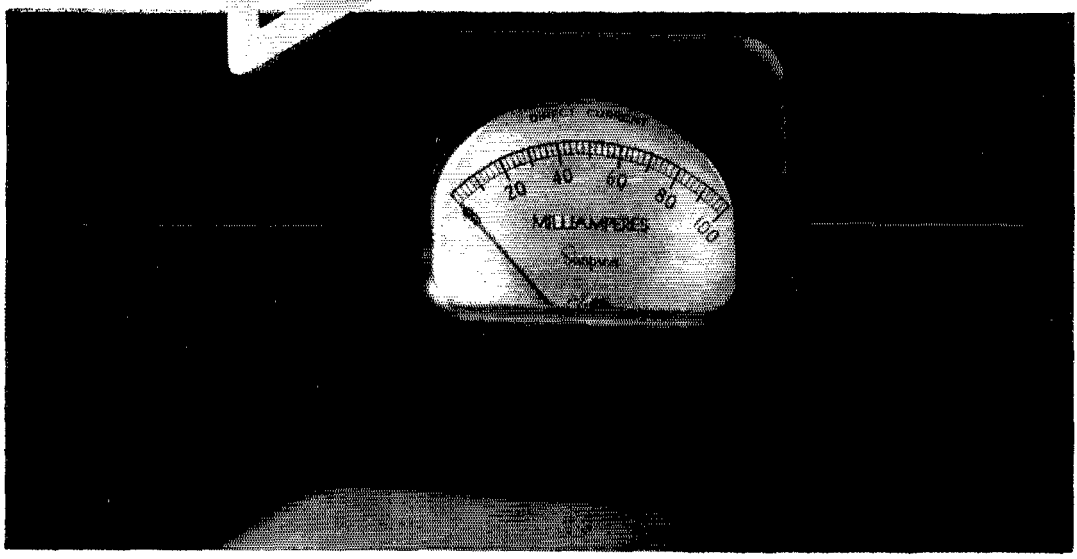
LIGHT ON THE DIAL FACE

——— not through it!



This kind of meter illumination is important to you — and only in Simpson Meters can you get it because it is Simpson patented.

Translucent dials fade and discolor, making accurate reading difficult. They warp and buckle causing pointers to stick and distorting readings. With our method of lighting we can use the standard Simpson dials. The illumination comes from a recessed bulb at the back of the instrument and is carried through an ingeniously shaped lucite cone whose front edge entirely surrounds the dial. Result: a full and even radiance over the whole scale—and without a spot of shadow. Incidentally, the bulb may be easily replaced by removing the bulb socket. No need to open the instrument at all.

Of course, no method of illumination alone should make you buy a certain meter. We offer this new and different illumination merely as a refinement on the basic goodness that makes Simpson meters preferred. It is just another contribution to the high quality which is the indispensable component of every Simpson instrument.

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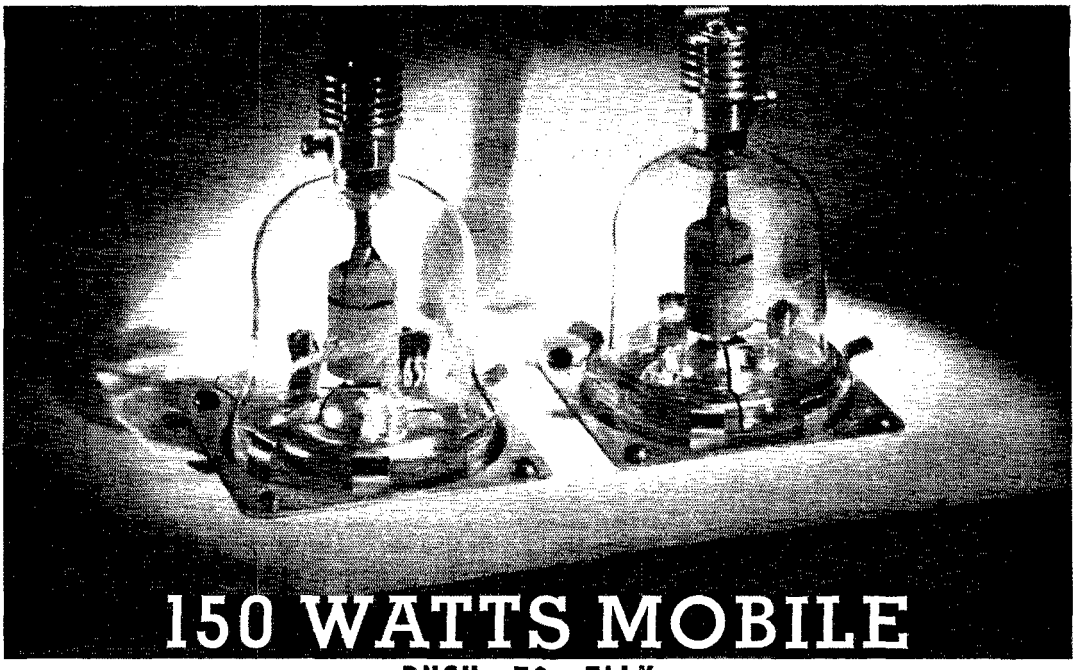
Simpson

INSTRUMENTS THAT STAY ACCURATE

ASK YOUR JOBBER

3" Rectangular Case. Width, 3"; height, 3⅛". Mounts in round hole. Body diameter, 2¾".

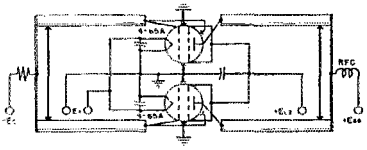
2" Rectangular case. 2⅜" square. Mounts in round hole. Body diameter, 2-3/16".



150 WATTS MOBILE

PUSH TO TALK

With the announcement of the new Eimac Tetrode type 4-65A, satisfactory high-power mobile transmission became a reality. Designed as a transmitting tube, with the transmitter man's problems in mind, the 4-65A provides stable operation over a voltage range of from 400 to 3000 volts. This characteristic alone enables continuity of system design, using the same vacuum tubes in the final stage of both the mobile and fixed station (two 4-65As will handle 150 watts input with 600 plate volts in the mobile unit, and operating at 3000 plate volts, in the fixed station, two 4-65As provide ½ kilowatt output).



SIMPLIFIED CIRCUIT FOR USE ABOVE 100-MC.

The tube is a "natural" for the 152-162 Mc. band. Its low interelectrode capacitances, compact structure, short electron transit time, high transconductance, together with being a tetrode allows simplification of circuit. Operation of the 4-65A can be continued up thru the 225-Mc. amateur band in either FM or AM service.

The 4-65A incorporates an instant heating thoriated tungsten *filament, processed grids—controlling primary and secondary* emission, and a processed metal plate—enabling momentary *overloads without affecting tube life. All of the internal elements* are self supporting without the inclusion of insulating hardware. Neutralization is normally unnecessary since practical isolation of the input and output circuits is achieved by the screen grid and its supporting cone. No special gear is required for installation, as the five pin base fits available commercial sockets.

In typical operation, class-C-telegraphy or FM-telephony, one 4-65A with a plate voltage of 600 volts, 125 milliamperes of plate current, and a plate power input of 75 watts will provide 50 watts of output with less than 2 watts of grid drive. In 1500 volt operation with an input of 190 watts, the output is 140 watts. With the plate voltage increased to 3000 volts and an input of 325 watts, an output of 265 watts per tube is obtained.

The 4-65A is amazingly versatile, being ideally suited for audio, television, r-f heating, and communication applications, stationary or mobile. It is priced at $14.50 each. Additional data may be had by writing to:

EITEL-McCULLOUGH, Inc.
181 San Mateo Ave., San Bruno, California

Follow the Leaders to

Eimac TUBES

The Power for R-F

Export Agents: Frazar & Hansen, 301 Clay Street, San Francisco, 11, California

To insure performance of the 4-65A . . . severe mechanical tests are conducted—from withstanding a bump test to holding up under excessive vibration. Tests are carried even further . . . satisfactory shipment of the tube is insured by package drop tests.

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 Secretary at the administrative headquarters at West Hartford, Connecticut.

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427 Lincoln Ave., Avon-by-the-Sea, N. J.
Alternate: Robert A. Kirkman W2DSY
1910 Oak Drive, West Belmar, N. J.

Midwest Division
C. A. COLVIN . . . . . WØVHR
c/o Omaha & Council Bluffs St. Railway Co., Omaha 2, Nebr.
Alternate:

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

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

Pacific Division
WILLIAM A. LADLEY W6RBQ
200 Naylor St., San Francisco 12, Calif.
Alternate: Elbert J. Amarantes W6FBW
1675 Dale Ave., San Jose, Calif.

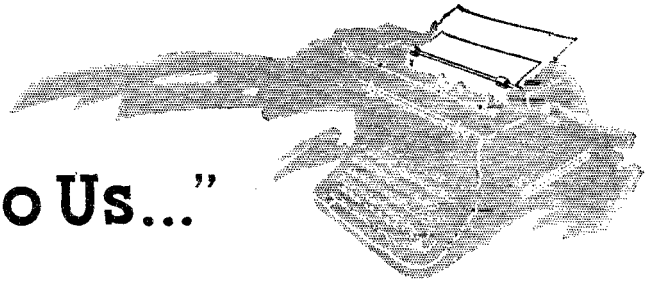
Roanoke Division
H. L. CAVENESS W4DW
2607 Vanderbilt Ave., Raleigh, N. C.
Alternate: J. Frank Key W3ZA
Box 707, Buena Vista, Va.

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

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

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

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



"It Seems to Us..."

LONG FACES

The other evening on 14-Mc. 'phone one of the boys was grousing about the eventual cut of 50 kc. in our 20-meter band. So far, so good — we've done some grousing about it ourselves. But he was remarking what a bunch of lunkheads the people at the conference must be for dipping into the crowded amateur bands. He wondered why they didn't take away from some other service.

"Why didn't they take away from some other service?" That's a good question. And perhaps it deserves more detailed discussion than we have heretofore given. In *QST*'s pages we have talked mostly about the amateur service frequencies — gains, losses and relocations — because that's what principally interests you and us. What, then, happened to some of the other services?

Well, there are a number of pretty long faces among the U. S. radio service representatives now leaving Atlantic City. Like the amateur service, they had appeared at the 1944 FCC hearings which furnished the background for formation of the American position at the coming world meeting. Like the amateur service, they had been pleased at some of the results of those hearings, very disappointed in others — but found themselves generally satisfied, as were amateurs, that the U. S. position was as fair to all services as was possible. Like the amateur service, they went to Atlantic City committed to work with each other, and us, in support of the U. S. Government delegation and its formulated policies. And like the amateur service, they found that many times the necessity for compromise in the face of entirely opposite viewpoints existing in the delegations of other countries made it impossible for the U. S. A. to achieve all its wishes.

The fixed service (government, commercial and military point-to-point) is taking by far the most severe cut. Estimates of its actual losses run from 20 to 33 per cent (the difference results principally from divergent opinions on the value to fixed of the frequencies it presently shares with mobile under the Cairo, 1938, regulations). The U. S. proposals for fixed were appreciably less than under Cairo, and Atlantic City cut them back further. On the effective date of the new conference regulations, though perhaps two years away, the fixed service is just going to have to give up a most uncomfortable percentage of its present channels. And this in spite of the fact that the expanding aeronautical service will have many requirements for point-to-point service which must also come out of these bands.

One of the particularly long faces belonged to a Government official. He was concerned over the problems that the expanded maritime-mobile service is going to have to solve to operate successfully in the bands it is getting out of Atlantic City.

"Well," you ask, "who's getting all the gravy? Fixed, maritime mobile and amateurs seem to be the losers. Where are these frequencies going, anyway?" That's another good question, to which the answer is mainly twofold: high-frequency broadcasting, and the aeronautical mobile service.

The latter, of course, needs more frequencies. The rapid expansion of airlines, both domestic and international, caused by the world's greatly-increased interest in aviation, has resulted in a huge need for more channels. Because the safety of life and property are involved, no one can challenge the need for radio service and the frequencies required to furnish it. (However, aeronautical mobile by no means had a blank check; it had to make intensive studies and surveys of actual operation, and demonstrate its frequency needs in terms of the number of planes in the air at any one time in any one area, the proximity of routes, the distances at which propagation studies indicated duplicable use of channels was feasible, and so on.) While many of the new channels for aeronautical mobile are in the v.h.f.-u.h.f. regions, as are ours, it did indeed have an urgent need for space in the long-distance bands much greater than the admittedly limited facilities provided under Cairo.

International high-frequency broadcasting? (Proofreader: Be on your toes to cut out any improper language we may use!) We've said on this page before what we think of the justification for this service in h.f. bands: there ain't any. The U. S. A.'s official position at the world conference was for modest assignments to h.f.

broadcasting. But there were a great many foreign countries who wanted more and more and more space for it. After weeks of discussion, it being obvious that compromises were necessary, our Government was obliged to agree to broadcasting assignments far greater than U. S. A. wishes — although considerably less than the wishes of many of the other countries.

These are but the highlights of the manner in which some of the other services are being affected. Radio communication, on DX frequencies at least, is an international matter on which there must be agreement among the nations of the world; otherwise, chaos would result. On the lower and higher frequencies where regional deviations are reasonably feasible, the countries of the American region have insisted upon the full width of our present bands — such as 3.5 and 50 Mc., and even 7 Mc., even though those bands were cut in Europe — because our governments know the amateur service in our two countries is extremely crowded in our present assignments.

But to the question, "Why didn't they take away from some of the other services?" the answer can be simply stated: they did!

—*J. H.*

RESERVE DRILLS

From the Naval Reserve article in this issue, we are glad to see the Navy retaining its postwar policy of not congesting the amateur bands with reserve drill networks, even though the participants are amateur licensees.

Under the crowded conditions existing in our bands today there is no room for the successful operation of military-reserve networks by enrolled amateurs, a fact the Navy well recognizes. Such drills really do not belong in the amateur bands; they are specialized training operations and should be so provided for. FCC allocations to amateurs are not made with considerations of possible use by these nets. Military services receive their frequencies by Executive Order, which is perhaps as it should be; and although we are quite aware of the extensive frequency needs of the U. S. services we fully agree with USN that provision should be made therein for reserve drill networks. That is, in fact, a standing policy of the ARRL Board of Directors.

Of course we amateurs support these communications reserves. We've often pointed out the value of the amateur service as a reserve of trained personnel — by no means only for military purposes but basically for all the U. S. radio needs. So when military communications reserve stations are to be used in amateur bands, it should be, as the Navy provides, strictly in amateur status. As such we welcome them. —*J. H.*

A.R.R.L. CONVENTIONS

New England Division

Boston, Mass., October 18th

When the Eastern Massachusetts Amateur Radio Association and the South Shore Amateur Radio Club pool their efforts in sponsoring an amateur gathering, you can be assured of a bang-up affair! This year the 10th Annual Boston Hamfest is being combined with the New England Division Convention. The date: Saturday, October 18th. The place: Where else but the Mechanics Building? The program: Bigger and better than ever, of course. Registration: $1, plus $3 for those wishing to attend the banquet. Extra prize stub for those buying combination tickets before Oct. 1st. Write Frank Baker, W1ALP, 91 Atlantic St., North Quincy 71, Mass.

Southwestern Division

Phoenix, Arizona, October 18th–19th

Beginning with a preregistration party Friday evening, the Radio Club of Arizona has a full program planned for the Southwestern Division convention, to be held this year at the Hotel Adams and the Shrine Auditorium, Phoenix, over the October 18th week-end. Technical demonstrations by men such as John Reinartz, contests, ARRL representative, plenty of prizes, movies, dancing, banquet, special events for the gals — these will make your trip worth while. Make reservations early to the Radio Club of Arizona, Box 3751, Phoenix. Registration: $5.00.

New Hampshire State

Manchester, October 4th

It's Manchester again this year for the New Hampshire State Convention (New England Division), to be held October 4th at the Masonic Temple on North Elm Street. Anyone who has ever attended one of these affairs knows what a good time he can expect. Anyone who has never been to Manchester should come this time and enjoy a grand program, lots of prizes, good speakers, and a family-style banquet. Registration is $4.00. Write J. Henry Izart in care of the Manchester Radio Club.

OUR COVER

Uncovering performance data for a 16-element array is a cinch when you're working with the compact dimensions of 420 Mc. This month's cover shows (l. to r.) "Pete" Morrow, W1VG (ex-W9VKF), Jack Paddon, VE3BLZ, and Vern Chambers, W1JEQ, checking Ed Tilton's gain figures on a Hq. lawn test set-up. W1HDQ promises a full report on the interesting possibilities of this band, to appear in an early issue.

Exit Heterodyne QRM

Selectable Single-Sideband Reception Up-to-Date

BY J. L. A. McLAUGHLIN*

THE need for improved means of receiving signals through heterodyne beat-note interference has in the last few years become increasingly apparent.

During the war the writer designed and built for the Federal Communications Commission and the Office of Strategic Services a receiving system that enabled them to copy 'phone and c.w. transmissions through terrific heterodyne QRM that made reception hopelessly impossible on the best conventional receivers.

The FCC first employed this communications aid as far back as the summer of 1941. The June, 1941, issue of *QST* contained an article by this author describing this communications development.[1] Mr. George Sterling, then chief of the Radio Intelligence Division of the FCC, was quick to recognize the importance of this invention[2] to the highly specialized work in which the Commission was engaged. The Commission immediately purchased the original development model and subsequently ordered units for all primary monitoring stations throughout the country. Because of Mr. Sterling's foresightedness, when war came one Government agency, at least, was capable of carrying on radio intelligence work in the face of malicious or accidental interference. When the communications division of the OSS was set up, shortly after the start of the war, it, too, promptly ordered similar equipment for its services.

The first war model supplied the OSS and the FCC was similar to the early models used by the FCC. Later, a second war model was designed for the OSS; it was a decided improvement over earlier models both in performance and design. It was more compact, for one thing, and it was self-contained and could be connected to any of the standard communications receivers in use by the OSS, without modification or circuit changes in the attached receiver. Because this later model lends itself more to present-day amateur requirements, this article will be devoted to an explanation of its performance characteristics in the presence of strong heterodyne interference.

Heterodynes

How this new heterodyne-eliminating receiver operates will perhaps be made clearer if we take up first the causes of beat-note interference and the inherent weakness of today's communications receivers in the presence of such interference.

The single heterodyne audio beat note, the product of one off-frequency carrier beating with the carrier of the desired signal, is well understood, but the audio beats produced by multiple off-frequency carriers are not clear to many.

Fig. 1 will help to form a picture of just what takes place after rectification of two or more carriers. Fig. 1-C indicates that when four carriers are present six principal audio beat notes are produced by rectification.

The removal of *one* heterodyne beat note can be achieved either before or after rectification by some form of phasing device; that is, some scheme

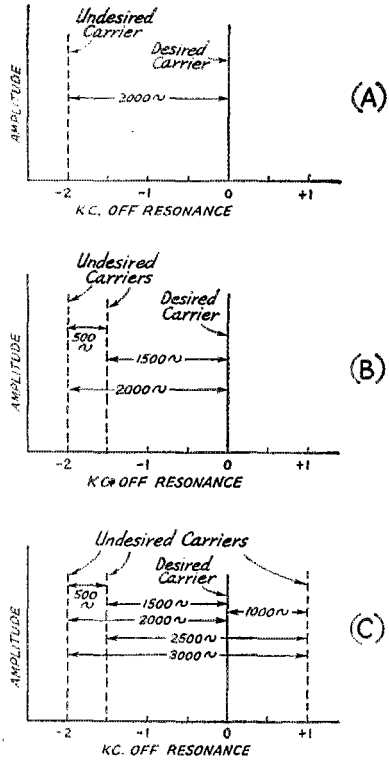


Fig. 1 — Audio beats produced by rectification of two or more carriers. When four carriers are present, as in C, there are six beat frequencies. Removing the two carriers on the lower side of the desired carrier, before detection, will eliminate all but the beat between the desired carrier and the one on the high-frequency side.

* Box 529, La Jolla, Calif.

[1] McLaughlin, "The Selectable Single-Sideband Receiving System," *QST*, June, 1941.

[2] U. S. Patent No. 2,364,863.

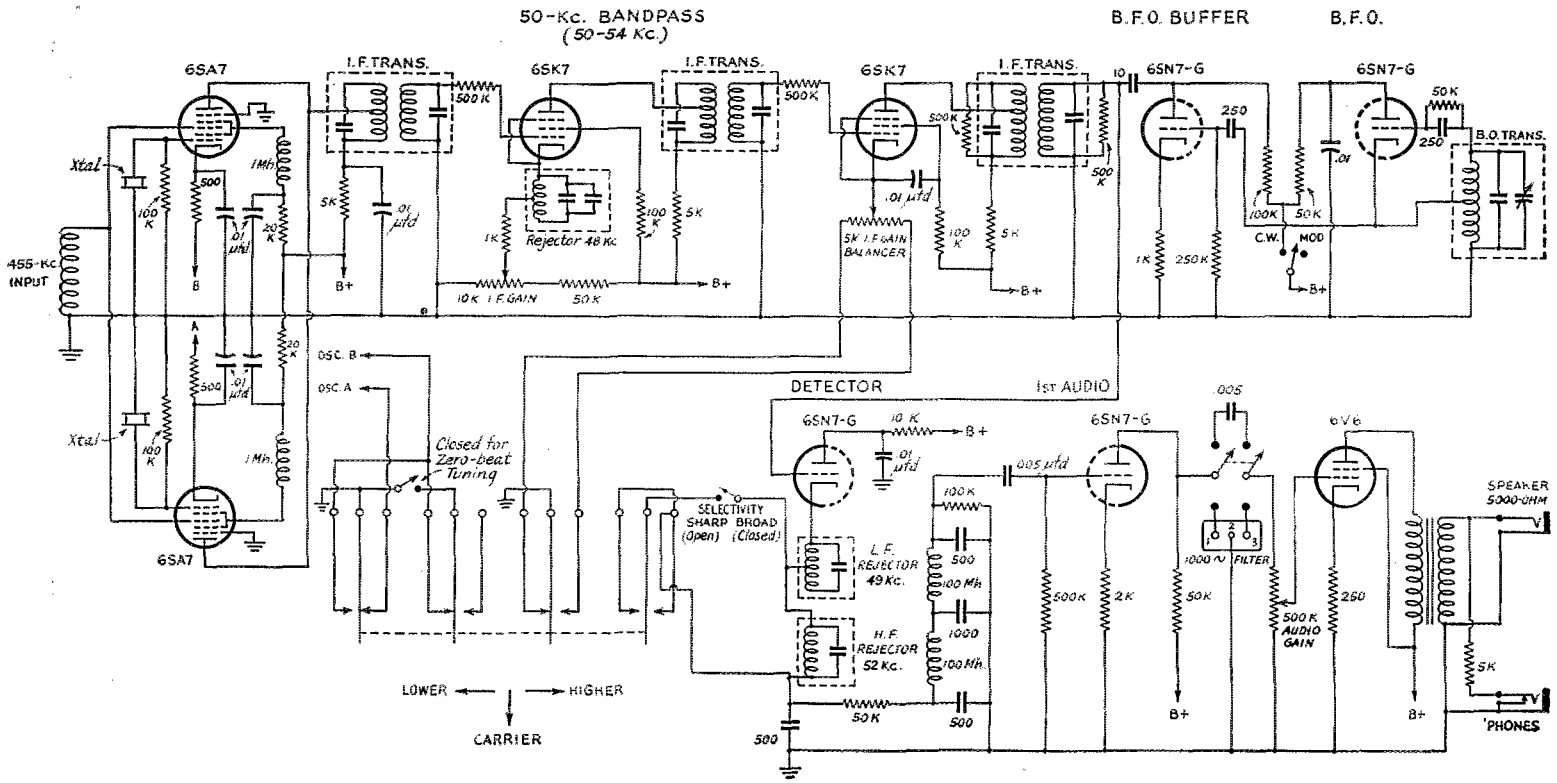


Fig. 2 — Circuit diagram of an adapter unit for working with a conventional communications receiver. The i.f. output from the receiver is introduced to the two 6SA7 converter tubes at the left. The oscillator of "A" is on 405 kc., and oscillator "B" is on 505 kc. Only one 6SA7 is in operation at any time, as determined by the position of the switch. In either case the resultant beat with the *desired* signal is 50 kc., which passes on through the 50-kc. bandpass amplifier. However, the interference appears on the high-frequency side or the low-frequency side of the 50-kc. signal, depending on its initial relation and which converter tube is in use. The unsymmetrical 50-kc. channel has high attenuation for frequencies below 50 kc. and rejects the interference and sideband on one side of the signal.

• Here is a simplified and improved version of the receiving system first introduced in *QST* just before the war. A thorough trial in wartime radio intelligence work proved the worth of the system — a system that can go a long way toward eliminating QRM i. oth 'phone and c.w. reception.

capable of putting a variable rejection notch in the response curve of either the i.f. or a.f. amplifiers. Schemes such as these have been mentioned in the pages of *QST* by this and other authors. The rejection of a single interfering carrier can be demonstrated quite beautifully in the laboratory, but under normal communications operations, when complex heterodynes are present, these systems fail to generate any great enthusiasm in the operator. The reason for this coolness can be found in an inherent weakness in all such devices — that is, in the presence of heterodyne interference the beat-note tone seldom will give any clue as to whether or not it is being produced by only two carriers, or by more than two. If there are more than two carriers present this sort of rejector falls down. Instead of being an aid the adjustable rejection becomes a nuisance, and distracts the operator's attention from the real job at hand — i.e., the message being received — and forces his attention on the beat notes.

It is obvious that to be useful under present-day crowded band conditions any practical system of heterodyne elimination must first of all be rapid in operation, suppressing all the interference that it is capable of suppressing under the particular receiving conditions in a minimum of operating time. It must not introduce any new operating techniques alien to the normal training of the operator — rather it must permit the operator to concentrate on the signal being received, *not on the interference.*

The system developed by this author (Fig. 2), which is the subject of this article, satisfies these conditions. It is fast and effective, being semiautomatic in eliminating multiple-heterodyne QRM both on 'phone and c.w.

Operating Principles

The receiver is fundamentally a triple-detector superheterodyne. The desired signal in the first i.f. system (455 kc.) is converted to a new intermediate frequency of 50 kc. This 50-kc. i.f. system differs from the conventional in that the response curve is unsymmetrical (Fig. 3). All frequencies below the carrier (50 kc.) are greatly attenuated, giving the amplifier the characteristics of a high-pass filter.

On 'phone reception this unsymmetrical selectivity of the 50-kc. i.f. system permits single-sideband reception. Since both sidebands contain identical intelligence, we can sacrifice the one containing the undesired signal without reduction of intelligibility or naturalness.

The manner in which the desired single sideband is selected is as follows: Two crystal-controlled oscillators are used, one ("A") on 405 kc. and the other ("B") on 505 kc. Either will convert the 455-kc. carrier to 50 kc. Although the desired carrier remains the same in both cases, all *other* frequencies converted will be transposed when switching from oscillator "A" to oscillator "B." "A" converts the 455-kc. signal to 50 kc. and all the side frequencies in the same numerical order, hence the *upper* single-sideband frequencies are selected in this case. Oscillator "B" converts the 455-kc. signal to 50 kc. and inverts the numerical order of the sideband frequencies, hence the *lower* sideband frequencies are selected in this case.

Assuming that an undesired carrier happens to be 456 kc., "A" will convert this "side" frequency of 456 kc. to 51 kc., and oscillator "B" will convert the same frequency to 49 kc. In other words, we have here a system in which we can switch undesired carriers from a frequency on one side of the desired carrier to a new frequency on the other side. Since the 50-kc. i.f. is of the high-pass single-sideband type, this switch permits placing the undesired carrier either in or out of the passband frequencies. In the case of the

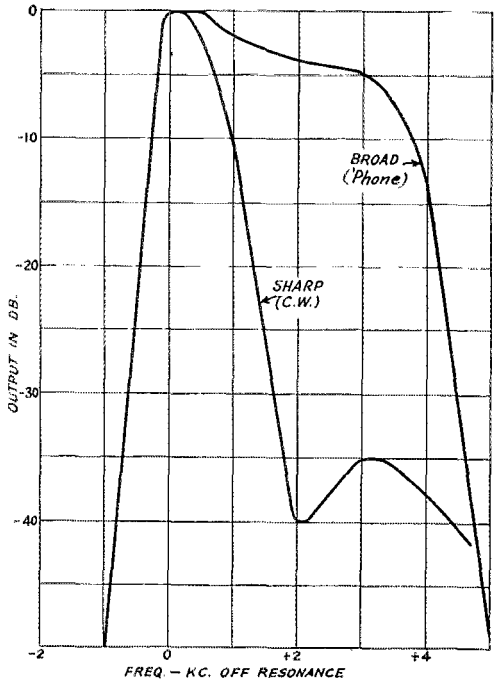


Fig. 3 — Selectivity curve of the 50-kc. i.f. amplifier, with and without the 52-kc. rejector circuit.

The heterodyne eliminator is a small unit that can easily be set on top of a communications receiver. This model was built for the OSS for wartime radio intelligence work.

♦

456-kc. interference, oscillator "B" would be selected to eliminate the 1000-cycle beat note; "B" converts the signal to 49 kc., which frequency is attenuated 50 db. in the 50-kc. i.f. filter. If "A" had been used instead, the undesired signal would have been converted to 51 kc., resulting in no attenuation at all.

C.W. Reception

The selectable single-sideband system of heterodyne elimination is an obvious improvement in the reception of 'phone signals. At first glance its value in c.w. operation may not be so apparent. The improvements, though not obvious, are nevertheless present. The unsymmetrical filter (50-kc. i.f.) cuts off very sharply at the edge of the signal carrier's frequency; it is similar to a crystal filter with the rejection notch set about 1000 cycles below resonance. It differs from the crystal curve, however, in that it cuts off a wide *band* of frequencies rather than putting a notch at one particular frequency in the resonance curve. By means of the sideband selector switch we can flip an undesired carrier to the low-frequency side of the unsymmetrical filter. It should be obvious that throwing a switch that removes a whole band of frequencies is faster and easier to do than adjusting a critical phasing control, as is the practice in crystal-filter operation.

The second point in favor of this system over the crystal filter is that the objectionable "ping" of the high-Q crystal circuit is absent. A final improvement in the reception of c.w. signals is achieved by use of a sharply-tuned 1000-cycle filter in the audio circuit. This filter, together with the unsymmetrical response-curve switching system, makes for very easy c.w. operation even in the presence of tough QRM. In c.w. work the b.f.o. is left fixed at the correct frequency to produce a 1000-cycle beat note with the desired signal. The operator merely tunes for maximum signal strength.

Tuning the Carrier

A prime requisite of single-sideband 'phone operation is placing the desired carrier correctly in the bandpass filter of the second i.f. In the model described earlier a visual system of tuning was employed, using a tuning meter connected to the output of a sharply-tuned 50-kc. amplifier.[1]

In the later system this extra equipment has been eliminated and an accurate aural system substituted. The center position of the sideband selector switch is marked "carrier." In this position oscillators "A" and "B" are both operating, and the correct tuning is indicated aurally when the signal is tuned to zero beat with itself. (The two i.f. signals produced by the beats between the desired carrier and the two oscillators move in opposite directions as the receiver is tuned.) Further help in aural carrier positioning is achieved by narrowing the bandwidth of the high-pass filter in the "carrier" position of the switch. This bandwidth is made only a few hundred cycles wide and peaked sharply at 50 kc. When the sideband control switch is flipped either to the upper or lower sideband the original bandwidth of the high-pass filter is restored and one oscillator is disconnected. This improved aural tuning system permits normal tuning by ear of a 'phone signal in the presence of extreme interference.

For c.w. reception as well as 'phone the FCC and the OSS found this system far superior to the conventional communications receivers. These units made it possible to copy signals through heterodyne interference that otherwise would have made them unintelligible.

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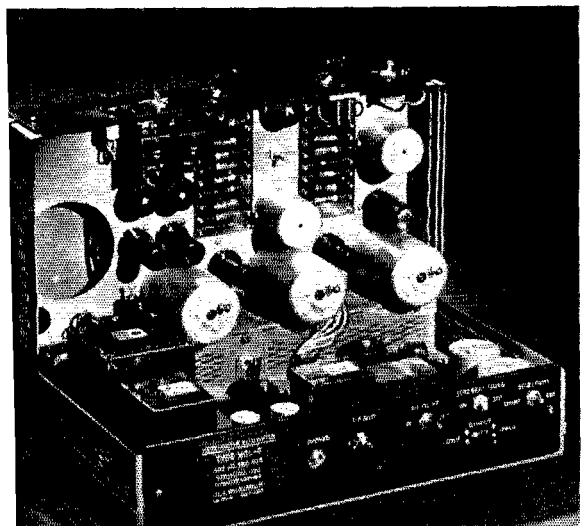
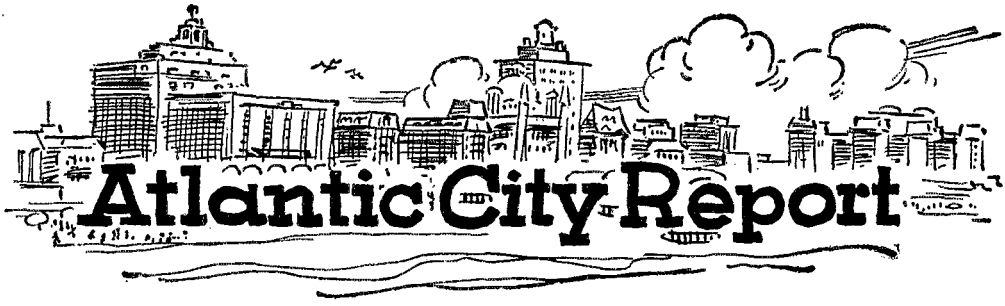


An inside view of the unit. The 50-kc. i.f. amplifier is mounted under the hinged lid.



AUGUST IN REVIEW

Last month we expected that the allocations work at Atlantic City would be concluded in late August, so that we could give you a final report in this issue. Progress has been slower than hoped and it is now apparent that the work will run far enough into September to make it impossible to report it — at least in detail — in this number. So there will be at least one more installment of this temporary *QST* department. The opening of the International High-Frequency Broadcasting Conference — the third and last of the Atlantic City conferences — in August has further reduced the rate of accomplishment of the radio conference. Both in allocations and in the organizational and political matters the problems this month have been the harder ones that did not yield easily. Yet actually a great deal has been accomplished, solutions are now being found for all the major difficulties, and most of the committees are approaching the end of their work. Then will come the editing and assembling of the conference work into a formal document and its ultimate formal approval by plenary meetings — meaning yet some weeks of painstaking work before A.Cy. begins to become but a memory.

At the moment of writing, a partial allocation table has been adopted by the main allocations committee from 10 kc. to 2850 kc. and another one from 25 Mc. to 10,500 Mc. Except for some of the maritime bands and the amateur 14-Mc. band the table for 2.85 to 25 Mc. has not yet been adopted, although a draft exists which has tentative acceptance in most respects. We shall follow our practice of previous months and give you below the current situation on each of our bands as it appears to us at the end of August:

1.75 Mc.: The provisions we outlined in this column last month have now been accepted and approved by the allocations committee. As we said then, they do not, for the present, offer anything to American and Canadian amateurs.

3.5 Mc.: The tentative agreement we reported last month still awaits formal adoption by the committee. In the American Region it repeats the Cairo arrangement — what we have now, the same as all the world conferences have provided since 1927 — and lists 3500–4000 kc. as shared between amateur, fixed and mobile, subject to later regional determination. The amateur proposal for Europe and most of the rest of the world is 3500–3800, shared on a mixed basis with three other services, and with the rest of the band up to

Allocations Committee Completes Amateur Assignments!

On September 8th, after this article was written, the Atlantic City allocations committee completed its adoption of a frequency table, including provisions for amateur bands at 3.5 and 7 Mc. and a new 21-Mc. band, precisely as previewed in this article except for slight modifications in regions outside the Americas which we shall report next month. The effective date has not yet been decided but it is believed it will be some time in 1949.

These allocations are not final until they are approved by the plenary sessions and the documents signed but it is now possible to say that, barring unexpected changes in final plenary meetings, the allocations of U.S. and Canadian amateurs for the next interval between world revisions of regulations will be:

3500–4000 kc.	(available under regional arrangement as at present)
7000–7300 kc.	
14,000–14,350 kc.	
21,000–21,450 kc.	
26,960–27,230 kc.	(shared with ISM)
28,000–29,700 kc.	

and allocations from 50 to 10,500 Mc. in exact accord with present assignments except that 1215–1295 Mc. is expanded to 1215–1300 Mc. The band 220–225 Mc. will temporarily remain 235–240 Mc. Final details will appear in our next issue.

4000 kc. assigned in small slices to other services, sometimes two or more of them sharing. Australia, however, has put in for 3500–3800 exclusively for amateurs, and China and New Zealand have said they desire the whole 500 kc. for amateurs.

7 Mc.: The tentative agreement we reported last month is still pending before the committee. For Europe this plan yields only a hundred kilocycles exclusively to amateurs, plus another 50 shared with broadcasting under the condition of no interference to the latter, while broadcasting gets the rest exclusively. This arrangement would apply also in India, the Netherlands Indies and the British colonies and protectorates outside the American Region. Australia and South Africa desire to divide the band into two exclusive halves, 7000–7150 amateur, 7150–7300 broadcasting, avoiding any shared use. For the whole American Region and for New Zealand (and for most other parts of the world not yet specially listed) the plan calls for the whole band, 7000 to 7300, remaining exclusively amateur.

14 Mc.: The sole assignments so far adopted by the Allocations Committee in the range from 2.85 to 25 Mc. are three maritime-mobile bands and the amateur 14-Mc. allocation, which theretofore were joined in a deadlock that endured from early July until August 23rd. We hope that you have read, for background, our report on this band on page 34 of last month's *QST*. Space does not permit its repetition here; we can only pick up the story at that point and carry it to its end. When we last wrote, both the committee and its working group were at an impasse in the matter of this band. The WG could get no agreement; in the committee the forces were about evenly divided between the countries that wanted to continue the whole 400-kc. band for amateurs and those that wanted to reduce it to 300, assigning the remaining 100 kc. to fixed. After seven weeks of study and debate, including two lengthy sessions of the main committee, the band was decided as 14,000 to 14,350 kc., on an exclusive worldwide basis except that U.S.S.R. is to be permitted to make a shared use with the fixed service in the last 100 kc., 14,250 to 14,350 kc., for domestic use only, pledging itself to employ all necessary technical measures to reduce harmful QRM to amateurs to a minimum. The remaining 50 kc. (14,350–14,400) are now to be assigned to the fixed service. This decision, of course, was a compromise between the two opposing viewpoints. It means that we have lost 50 kc. from our best DX band but that, except for the special case of U.S.S.R. territory, we have kept the band on a worldwide basis rather than one on which part of the world might have had 400 kc. but the other part would have had only 300. It is bad enough to have this kind of mutilated assignment at 7 Mc.; it would be much less desirable at 14. The major nations, including the United States and Canada, felt that regional sharing was impracticable at such frequencies and that it was imperative to set the bandwidth at the maximum figure to which worldwide agreement could be got. Both our countries did their absolute utmost to maintain the old bandwidth for us. They kept the matter open these many weeks, they made many speeches in defense of the 400 kc., they engaged in extensive private negotiations on the matter. No item before this conference has been discussed so long and so exhaustively. For whatever consolation it may be to us, we can believe that every last thing possible was done. The trouble, of course, is that it has been necessary to increase the allocations to h.f. broadcasting by several hundred kilocycles, and inevitably this increase has had to be taken from the assignments of other services. Most of the services have had to yield something, most of them consider themselves rather badly hurt; and the point was repeatedly made that all services had to share the "cost" of broadcasting and that the amateurs could not be an exception. When the subject came up in committee the second time, only nine countries, led by U.S. & Canada, were willing to take an outright stand for a 400-kc. band. Led by France & U.K., the others quickly aligned themselves for the 350 compromise, they consisting in about half of the cases of countries that had previously desired only 300 and in the other cases countries that preferred 400 but admitted willingness to take 350 if it were necessary to get unanimous agreement. (The first group, by the way, included Mexico, who said that she preferred 300 and was consenting to 350 reluctantly, and that if all the countries did not agree to 350 the most that she would accept would be 300.) The spokesmen for U.S., New Zealand, Canada, China and Venezuela repeatedly pleaded for the retention of the full band, some of the talks being superb expositions of the value of the amateur service. They did not yield until the last moment but finally, after nearly three hours of this further debate in the large committee, they had to acknowledge defeat. Without a roll call it was then agreed, without further dissenting voice, that our band would be 350 kc., the other 50 kc. fixed. Amateurs everywhere will join with us in feeling it is a great pity that the amateur service, with its extremely small holdings in the DX part of the spectrum, should have been obliged to make this contribution to world readjustments. Our friends here have pointed out that with our new 21-Mc. band (which at this writing seems assured) we'll still show a substantial gain in this region, and the spokesman for one of the major powers congratulated us after the meeting for having pulled a worldwide exclusive band of 350 kc. up from a much lower figure; but, so far as we are concerned, no matter how you cut it. . . ! We do want to say, however, that the result is not for lack of superb backing and generalship on the part of the United States spokesmen, and

that it wasn't for lack of discussion — our matter was "worked on" for seven weeks as no other amateur matter (and almost no other allocations matter) ever was, with every possibility of effecting world agreement on a wider band thoroughly explored and exploited.

21 Mc.: The tentative agreement we reported last month is still pending before the committee. It provides for a new band, 21,000 to 21,450 kc., on a world-exclusive basis.

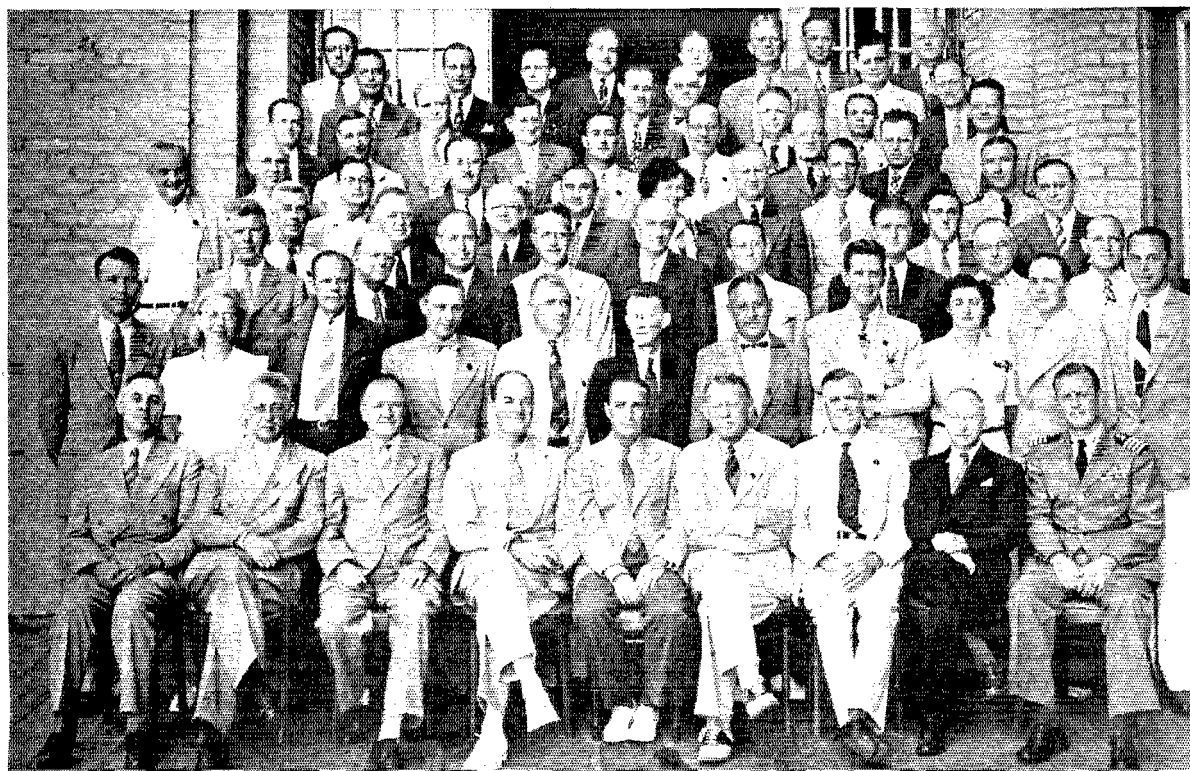
27 Mc.: Throughout all of the American Region and in Australia, New Zealand and South Africa we have a new international band as a result of the acceptance by these countries of the U.S. proposal to get recognition for our 11-meter band sharing frequencies with industrial, scientific and medical apparatus. To recognize the ISM problem and implement its control it was found desirable to set up a worldwide ISM frequency (one of several), and this has now been done, by decision of the allocations committee — at a figure slightly different than that heretofore used here, namely 27.12 Mc. This will result later in a slight shift in our 11-meter assignment to the new band 26.96 to 27.23 Mc., subject to ISM QRM as before. It is probable that other countries will join their amateurs into this arrangement later.

28 Mc.: The U.S. proposal for the 10-meter band has been approved and adopted, as a result of which it has been decided that this band will be 28 to 29.7 Mc. on a worldwide exclusively-amateur basis, no longer shared with experimental stations.

50 Mc.: It should be recalled to mind that the Cairo amateur band in this part of the spectrum is at 56 to 60 Mc. and in some regions is only 58½ to 60 Mc. Our present assignment of 50–54, differing from Cairo, is a recent matter and has been pretty well confined to the U.S. & Canada. The proposal of our two countries to assign 50–54 Mc. as an exclusive amateur band has now been adopted for the whole American Region, Australia, New Zealand, South Africa, and for all of Asia except U.S.S.R. We regret to report that there is to be no regularly-assigned 5- or 6-meter band in the European region except for the tiny segment 72 to 72.8 Mc. which has been reserved for that purpose by France and U.S.S.R. (including Asiatic U.S.S.R.). The United Kingdom has set up its television system in the range 41 to 66½ Mc. and, although it now has amateurs at 58½–60 per Cairo, it refused to consider a definite allocation for them in or near this range, and its influence controlled the allocation column for the European-North African region. However, we understand that it is the intention of U.K. and several other European countries to permit amateur operation somewhere in the 50–60 Mc. area in the television channels, as a domestic matter on the condition of no interference to other services. The 800 kc. at 72–72.8 in two European countries is not regarded as a general amateur assignment.

144 Mc.: Even the v.h.f. portion of the spectrum is congested with problems. Regional allocations have grown up with differing practices in different parts of the world and for a while it looked as though we were going to have three different "2-meter" bands around the earth: 144–148 in the Americas, 154–156 in Europe, 166–170 in Australasia. An adroit bit of negotiating by U.S. eventually resulted in their consolidation

The Government and industry representatives comprising the United States Delegation to the Atlantic City radio and telecommunications conferences.



Midway through Atlantic City, ARRL gave a dinner for all the licensed amateurs registered at the radio conference. The invitation list included C1KT, C9NHT, CE3HC, CX1CC, D4AAA-WØSWV, G6LJ, HB9DB, HC1FG, HC1HM, HK3CN, HK3SQ, HP1A, LU2CR, LU5AQ, Autelli of R.C.A., PY1AX, VE3AC, VE9CW, W1BUD, W1EH, W2KH, W3GG, W3KDT, W3ZM, W4KBI, W4KS, W4LDR, W5EUE, XU2RT, YV5AC, YV8AE, ZL2AZ and ZL2XL. Sixteen countries were represented. Eight additional amateurs had already left for home, representing CO, G, LA, PA and XE, except for which our dinner could have embraced amateurs from twenty countries, to a total of 41 hams. It was a night of rare international fellowship in the best amateur tradition.

at our part of the spectrum and in the earmarking of half of the band on a world-exclusive basis. It has now been decided that 144–146 shall be worldwide amateur. That is the size of the band in Europe and Africa. However, the remaining two megacycles, 146–148, are additionally assigned to amateurs in the American Region, Australia, New Zealand and Asia-except-U.S.S.R. We also understand that if ZS amateurs later find that they need this additional half of the band and request it of their PMG, it can probably be arranged.

220 Mc.: You must remember that our real assignment in this range is 220–225 and that it is only on a temporary basis that we occupy our present frequencies of 235–240. The U.S. proposal of 220–225 for amateurs has been adopted for the American Region, China and South Africa. In the American Region the navigational aid known as DME operates on these frequencies until Jan. 1, 1952, under a special treaty which temporarily puts us on 235–240. Europe and the other British dominions, because of their concern with DME, did not find it possible to go along on an amateur assignment in the 200-Mc. range.

420 Mc.: This is the band which we temporarily share with altimeters, under a power restriction that recognizes that such an "AeNA" must not be interfered with by another service. The U.S. proposal has been generally accepted and as a result we have 420–450 as a worldwide band except in U.S.S.R., not exclusive but shared with aero navigation aids, which maintain priority as at present. A footnote adds that in this region the AeNA will be confined to altimeters only and is only a temporary assignment. The band is to be eventually exclusively ours in this region. In Europe (except U.S.S.R.) and in Africa, the band runs up to 460 Mc. instead of 450.

Above 1000 Mc.: The pattern for microwave allocations here has closely followed the pioneering assignments of the U.S. and we are happy to report that in every case the present U.S. amateur allocations have been adopted as exclusive amateur bands in at least the American Region. As the proposals were studied and more countries found they could accept them, it gradually became possible to make some of our allocations uniform around the world. In one case we have a small gain. Thus 1215–1300 Mc. has been agreed to as worldwide except in U.S.S.R., an extension (proposed by U.S.) of 5 Mc. over our present assignment. Similarly 2300–2450 has been made worldwide. As at present in this country, 2450 Mc. has been agreed to as an ISM frequency in some regions, and the band is subject to ISM QRM within 50 Mc. of this figure in the American Region, Australia, New Zealand, South Africa and U.K. In the American Region we retain 3300–3500; and something of the sort is arranged for Australia, New Zealand and Asia-except-U.S.S.R., where amateurs are to be admitted in the band 3300–3900 marked shared between amateurs, fixed, mobile and navaids — but probably to be divided into exclusive segments. For long we here have had a band at 5650–5850 and recently it has been expanded to 5650–5925 because of the establishment of an ISM assignment at 5850. At Atlantic City the world went along with the first part but not the expansion. As a result, 5650–5850 is now a worldwide amateur assignment, subject to ISM QRM within 75 Mc. of 5850 in this region, Australia, N.Z., South Africa and U.K. Then 5850–5925 is an additional amateur allocation in the American Region only, again subject to ISM QRM. Finally, our present 10,000–10,500 was accepted as worldwide. Allocations stop at that figure in the A.Cy.

Table but it may be assumed that our present assignment of 21,000–22,000 Mc. endures as a domestic matter.

General Regulations

So much for allocations up to the moment. We can now give you the text of the general regulations adopted for the control of amateur stations. This is a rewrite of the Cairo text of Article 8, to precisely the same effect except for one substantive change in giving countries permission to waive the code test for amateur operators in the case of stations using frequencies exclusively above 1000 Mc. The text:

Amateur Stations

§1. Radio communications between amateur stations of different countries shall be forbidden if the Administration of one of the countries concerned has notified that it objects to such radiocommunications.

§2. (1) When transmissions between amateur stations of different countries are permitted they must be made in plain language and must be limited to messages of a technical nature relating to tests and to remarks of a personal character for which, by reason of their unimportance, recourse to the public telecommunications service is not justified. It is absolutely forbidden for amateur stations to be used for transmitting international communications on behalf of third parties.

(2) The preceding provisions may be modified by special arrangements between the countries concerned.

§3. (1) Any person operating the apparatus in an amateur station must have proved that he is able to transmit, and to receive by ear, texts in Morse code signals. Administrations concerned may, however, waive this requirement in the case of stations making use exclusively of frequencies above 1000 (one thousand) Mc/s.

(2) Administrations shall take such measures as they judge necessary to verify the qualifications, from a technical point of view, of any person operating the apparatus of an amateur station.

§4. The maximum power of amateur stations shall be fixed by the administrations concerned, having regard to the technical qualifications of the operators and to the conditions under which these stations must work.

§5. (1) All the general rules of the Convention and of the present Regulations shall apply to amateur stations. In particular, the transmitting frequency must be as constant and as free from harmonics as the state of technical development for stations of this nature permits.

(2) During the course of their transmissions amateur stations must transmit their call sign at short intervals.

Call Signs

The list of three-letter call blocks, CAA to ZZZ, from which the nations choose calls for their commercial stations and prefixes for their amateur stations, has been expanded to run from AAA to ZZZ and has been considerably altered. There will be some changes to learn when the new list takes effect. Germany is to be allowed only half of the old D series, the rest being whacked up among countries that are short of calls. There are quite a few rearrangements, and some new countries to take care of, including the Republic of the Philippines, Outer Mongolia, the Indian dominion and Pakistan. There are some rather extensive alterations in the rules controlling the formation of calls for various services. The world in fact finds itself fresh out of call signs. One significant action is the extension of the AAA–ZZZ series into a numeral series, 2AA to 9ZZ. In this extension the Philippines find themselves assigned 4DA to 4IZ, the United Nations 4UA to 4UZ, as their only call series — and other nations have similar assignments to supplement their previous holdings. In these calls the digit is to be regarded the same as if it were a letter. That is to say, additional letters may be added to make ship or aircraft calls, and any first two characters may be used as a prefix in amateur calls. To illustrate by a purely hypothetical example, KA1HR might now become 4DHR, the 4D being the Philippine prefix. It will be a little hard to adjust ourselves to the thought that there isn't a prefix missing from a call that begins with a digit. The Philippine Republic isn't very happy over this arrangement and has promoted the adoption of a resolution recommending that future conferences dealing with the call problem study the desirability of doing away with the present arbitrary division of the alphabet and establish two-letter prefixes for everybody, the letters being chosen from the name of the country, as, for example, US, GB, FR, etc. Well, that's not to worry about at this conference, anyway.

The Atlantic City documents are going to be formidable — long, complicated, detailed, and offering many changes from previous world practice that will interest the well-rounded amateur. There is a vast expansion in the scope of the new International Telecommunications Union and the activities planned for it, constituting formidable changes to readjust mechanisms to deal with the rapid expansion of communication problems. It will take a long time for us amateurs to digest all the implications of the new set-up but *QST* will report the pertinent parts as rapidly as possible, probably with a general outline in our next issue. And then too (we hope,) we'll have the conclusion of the story of amateur allocations at A.Cy.

Strays

The American section, International Scientific Radio Union, and the Washington section, IRE, will hold a second meeting this year in Washington on Monday, Tuesday and Wednesday, October 20th, 21st and 22nd, in the auditorium of the new Interior Department Building, C Street between 18th and 19th Streets, N.W. The program will, as usual, be devoted to the more fundamental and scientific aspects of radio and electronics. The program of titles and abstracts will be available in booklet form before the meeting. Correspondence should be addressed to the Institute office, or to Dr. Newbern Smith, Secretary, American Section, URSI, National Bureau of Standards, Washington 25, D. C.

The "Twin-Lamp"

The Poor Man's Standing-Wave Indicator

BY CHARLES WRIGHT,* W4HVV

• One of the most popular indicating devices ever to grace a ham shack is the old familiar loop and flashlight bulb. Rather than relegate it to the junk box, W4HVV has made a twin out of it, and thus gives us a clever tool to cope with our new-found standing-wave consciousness. And don't pass it up just because it looks so simple!

WHEN it was found that none of the standing-wave meters so far described in amateur publications [1,2] would operate satisfactorily on my 300-ohm lines at 50 and 144 Mc., it was decided to search elsewhere for ideas for something that would do the job. Only two informative articles were found in the literature on directional couplers, and both dealt primarily with instruments for use in wave guides. The problem was then one of simplification and adaptation for use with two-wire lines.

The first article [3] described directional couplers made entirely of distributed constants which, in effect, sampled the line current at quarter-wave intervals. After several weeks of experimenting with various lengths of 72-ohm line (the XYL called them "snakes"), light bulbs and various other gadgets, this idea was given up. The indicators were good only for one frequency, and were so massive that when they were attached to the line they caused more standing waves than were present to begin with.

The second,[4] though it seemed completely irrelevant at first, held the real answer to my problem. The indicator to be described was evolved by considering the electrostatic and electromagnetic components of the traveling wave in a wave guide analogous to the voltage and current relations in a two-wire line.

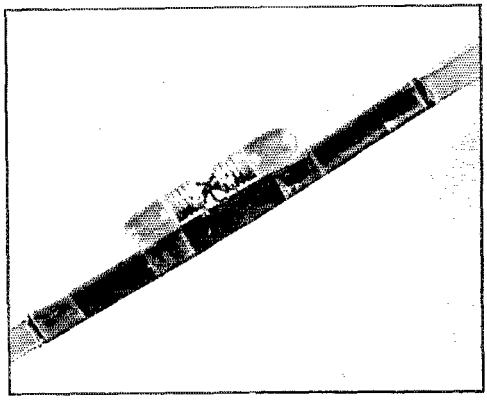
* 2012 Reaves Drive, Raleigh, N. C.

[1] Jones, M. C., and Sontheimer, Carl, "The Micromatch," *QST*, April, 1947.

[2] Patterson, H. O., Morris R. M., and Smith, J. W., "A Standing-Wave Meter for Coaxial Lines," *QST*, July, 1947.

[3] Mumford, W. W., "Directional Couplers," *IRE Proceedings*, Feb., 1947.

[4] Early, H. C., "A Wide-Band Directional Coupler for Wave Guide," *IRE Proceedings*, Nov., 1946.



The "Twin-Lamp" standing-wave indicator consists of two small flashlight bulbs and an extra length of 300-ohm line, but it is the most convenient gadget imaginable for checking standing waves on a length of 300-ohm Twin-Lead.

The Theory

Referring to Fig. 1-A, a current, I_L, in the line would induce a current, I_1, in a loop near the line, as shown. If the reactance of the loop is small compared to the resistance of the bulbs A and B, the current I_1 will lag I_L by 90°. This current will, of course, be the same through lamps A and B, and will cause them to burn with equal brightness if they are identical.

Now from Fig. 1-B, we see that bulbs A and B are across the line and in series with a small capacity C. This capacity is, of course, the distributed capacity between the loop and the line. If the reactance of this capacity is large compared to that of A and B the current I_2 will flow and will lead the voltage across the line by 90°. If A and B are identical the current will divide equally between them.

Since I_1 lags I_L by 90° and I_2 leads E_L by 90°, it is apparent that if I_L and E_L are in phase with each other, I_1 and I_2 will be exactly out of phase.

Fig. 1-C is a combination of the circuits explained above. Condenser C is the capacity between the wires of the loop and the line. Currents I_1 and I_2 are shown as they appear in Figs. 1-A and 1-B. It is now evident that bulb A will light from the sum of I_1 and I_2 and bulb B will light from the difference between these two currents. This is the case for a wave traveling toward the right. In the case of a wave traveling toward the left, the currents will add in bulb B and tend to cancel in bulb A. Thus the device is a form of "directional coupler." When the line is terminated on the right-hand side (marked "load" in Fig. 1-C)

by a resistance equal to the characteristic impedance of the line, there is no reflected wave and only bulb *A* will light. If the load is something different, there will be some reflected energy, and lamp *B* will burn along with *A*, the relative brilliance depending upon the relative magnitudes of the transmitted and reflected energy. These facts are what make the device so useful as a standing-wave indicator.

In the foregoing discussion, three conditions were set up: bulbs *A* and *B* should be identical; the reactance of the loop should be small compared to the impedance of *A* and *B;* and the reactance of the coupling capacity should be high compared to the bulb impedance. To satisfy the first, bulbs of the same characteristics were used, and in the interests of sensitivity, these were 2-volt 60-ma. flashlight bulbs. For the second and third considerations, the length of the coupling loop must be kept short compared to a wavelength. It was found that, for 50-Mc. operation and a transferred power of about 20 watts, a loop length of about 4 inches was a good compromise between sensitivity and the satisfaction of the above conditions. For 28 Mc. it can run a few inches longer, and at 144 Mc. an inch or so shorter. In any event, the length is not critical.

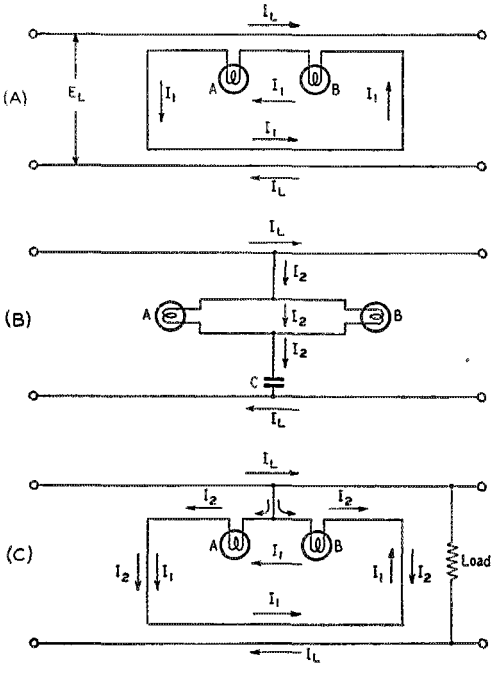


Fig. 1 — A simple representation of the operation of the "Twin-Lamp" standing-wave indicator. The sketch at A shows the current inductively-coupled in the loop, for a wave traveling from left to right, and B shows the current that is capacitively-coupled into the loop. C shows how the currents combine to light lamp *A* and not lamp *B*.

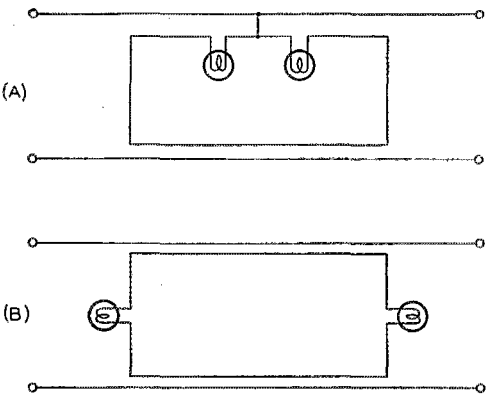


Fig. 2 — Two practical circuits of the "Twin-Lamp" for use with 300-ohm line. The circuit at A is more sensitive and is the one illustrated in the photograph.

Building a "Twin-Lamp"

The construction of a "Twin-Lamp" indicator is about the easiest thing you'll run into in amateur radio. Two possible circuits are shown in Fig. 2. The circuit of Fig. 2-A is more sensitive than that of 2-B, but it requires opening the line to connect it into the circuit. The circuit of Fig. 2-B is convenient to use in initial work, but the final touching-up at my shack is always done with the more sensitive indicator of Fig. 2-A.

The photograph shows how simple the gadget of Fig. 2-A is to build — the construction of the Fig. 2-B type will then be obvious. A short length of Amphenol 300-ohm Twin-Lead that is to be used as a test section has its insulation removed from one wire for a distance of about ¼ inch, just enough to permit soldering a lead to the wire. Another piece of Twin-Lead, from 4 to 10 inches long (depending on the frequency and the power level), is short-circuited at each end. One wire is cut, in the exact center of this loop, and the wire peeled back on either side just far enough to provide leads to the flashlight bulbs. The short lead from one side of the test section is then soldered to the tips of the flashlight bulbs, and the leads from the loop are soldered to the threaded sides of the flashlight bulbs. A few pieces of tape can then be wrapped around the test section and the coupling loop, to hold them together.

If one has several hundred watts of power available, the coupling loop can be made small, on the order of 4 or 5 inches for 28 Mc. This is preferable to using a larger loop with larger flashlight bulbs. In any event, it is highly advisable to be careful when first applying power, since the lamps can burn out fast. Adjustable coupling at the transmitter, or other means for controlling the r.f. power in the line, will avoid any burn-out difficulties.

(*Continued on page 110*)

A "Halo" for Six Meters

Horizontal Polarization for 50-Mc. Mobile

BY FRANCIS H. STITES,* W1MUX/3

• With horizontal polarization practically standard on 50 Mc. these days, the mobile enthusiast has been left more or less out in the cold. His vertical whip, the customary antenna for mobile use, has been relatively ineffective, and any sort of horizontal antenna system has been thought to be cumbersome and poorly adapted to mobile operation. Borrowing an idea from commercial practice, W1MUX here presents a compact and effective antenna system which not only solves the polarization problem, but eliminates that other hugbear — directivity.

BEFORE the war little thought was given to mobile antennas for use on the old 5-meter band. A simple quarter-wave whip was convenient and unobtrusive; it worked fairly well, and so was almost always used. But now, with horizontal polarization nearly universal at home stations, the vertical whip antenna has lost much of its efficiency. The loss in signal strength resulting from crossed polarization, and the additional noise picked up because of the vertically-polarized character of ignition noise, combine to reduce the performance of the mobile station.

The antenna described herein was designed to cure the ills associated with the whip antenna. It does this and more, introducing only one new problem of importance: how to convince the XYL that it should be put on the family car. The antenna *is* unusual looking, but its exceptional performance more than makes up for all the questions people ask about it.[1]

Design

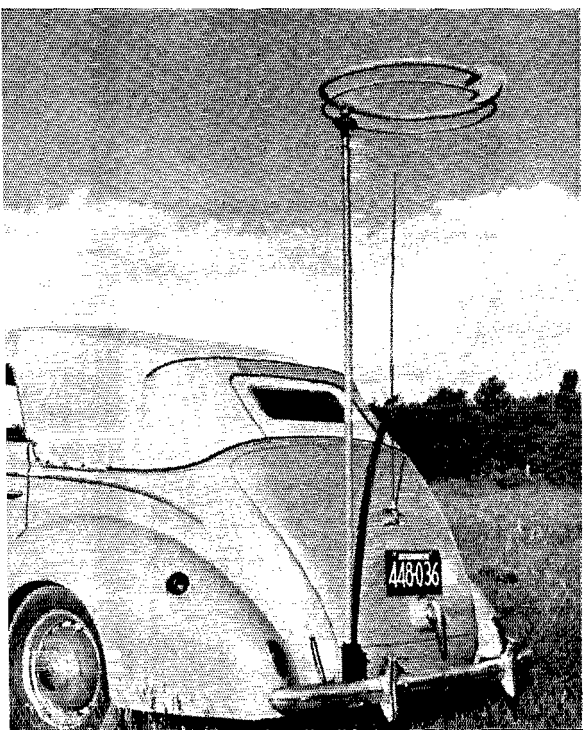
In line with current 50-Mc. practice, a first-class antenna must be horizontally-polarized. For mobile use it should also have a circular radiation pattern. In addition it should tune broadly, be easy to feed, and work well close to the ground or automobile body. It must be reasonably compact and rugged enough to withstand mobile service with little or no maintenance.

The only horizontal antenna that is small enough to warrant consideration for mobile use is the doughnut type of horizontal loop. Fortunately this antenna meets all the requirements and has several additional advantages.

The loop, if sufficiently small in diameter, has a radiation pattern identical to that of a vertical dipole. This means that the pattern will be circular and the antenna will perform well in the region between one-quarter and one-half wave above ground. In a practical antenna the minimum diameter is limited, since a very small loop has an unreasonable radiation resistance, very high Q, and excessive resistance loss during transmission. This antenna is large enough to give a feed resistance of 50 ohms, is broad enough to cover the whole band, and radiates almost equally in all directions.

Perhaps the simplest way of understanding the operation of the antenna is to visualize it as a folded dipole bent around and end-loaded. The folded section is needed to compensate for the reduction in impedance caused by the end loading.

♦



The 50-Mc. halo used by W1MUX is mounted atop a pipe mast, the base of which is bolted to a metal angle plate welded to the rear bumper.

* % Sound Division, Naval Research Laboratory, Washington, D. C.

[1] e.g.: "Is it really a shower bath?" or "That's a funny place for a basketball hoop."

Performance

To determine as accurately as possible the performance of the loop and the improvement it gives over a vertical whip, a number of its characteristics were measured. Radiation patterns as shown in Fig. 1 were taken of the loop and a conventional quarter-wave vertical antenna mounted on the same car. These curves were made with considerable care. A calibrated receiver with a horizontal antenna sixteen miles from the mobile transmitter was used to measure signal strength. The transmission path was close to line of sight, with the car on an airfield reasonably free from near-by reflecting objects. Input power was kept constant during tests. A point of maximum field strength was found for each antenna, and the car rotated about this point.

The curves show the considerable improvement the loop gives over a conventional whip. The radiation field of the loop, with its center 8 feet above the earth, is practically independent of the automobile. The ratio of maximum to minimum strength in the horizontal plane is only 2.7 db., or less than half an S-unit. Opening the car doors, or even lifting the trunk lid directly beneath the loop, affects neither the loading on the transmitter nor the received signal.

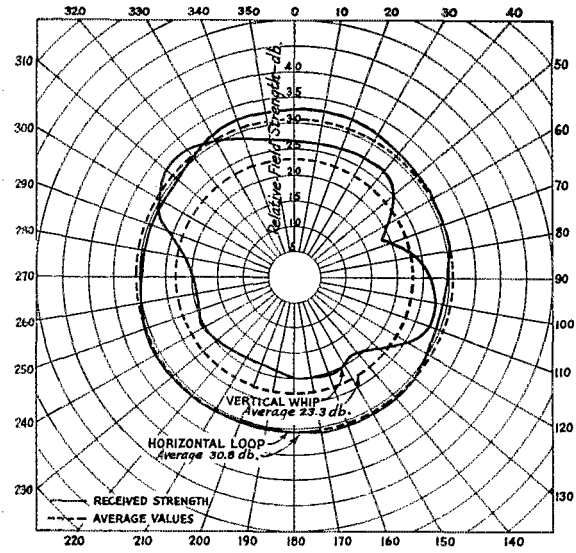


Fig. 1 — Comparison of the field strengths of the halo and the vertical whip, as received on a horizontal antenna at a distance of 16 miles. Note that the pattern of the loop is essentially circular, averaging 7.5 db. above that of the whip.

The vertical antenna, however, is another story. With the current maximum of the whip a few feet above the ground, the car body is in the center of the radiated field. The steel body and other antennas seriously distort the field. This particular whip had a maximum-to-minimum ratio of 14 db. Changing the mounting point of the whip or moving other car antennas will affect the shape and maximum-to-minimum ratio of the whip but will not materially change the average value of field strength.

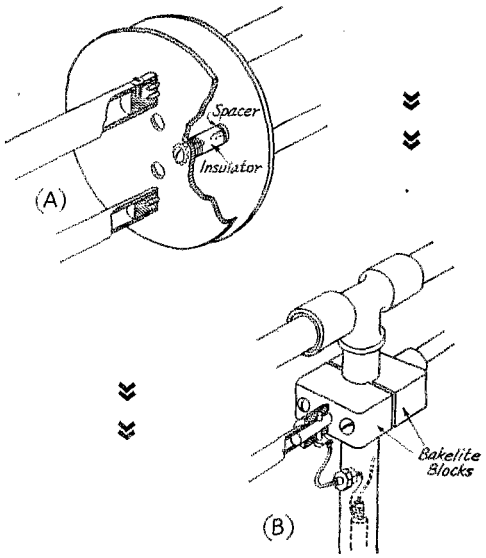
The difference between the average field strengths of the two antennas was found to be 7.5 db. This means that the loop gives an immediate power gain of 5½ times, equivalent to boosting the transmitter power from 25 watts to 137 watts. With the whip at its poorest angle it would take 450 watts to equal the average signal delivered by the loop-equipped 25-watter.

The measured impedance of the antenna at resonance is 58 ohms. A second similar antenna had an impedance of 57 ohms. Fifty-ohm coaxial cable provides a good match when used for the feedline. Since the bandwidth at the 3-db. points is about 7 Mc., the loop can be resonated at 50.5 Mc. and still be reasonably efficient at 54 Mc.

Theory indicated that the loop might be more subject to fading than the usual vertical antenna, but it did not work out that way in practice. Working both strong and weak stations while in motion indicated less fading with the loop, both on transmission and reception. In order to measure and compare the fading characteristics of the two antennas, an Esterline-Angus graphic recorder was modified to pull the recording paper at a relatively high speed. The recorder was connected to a receiver and calibrated in terms of signal strength. Runs were made at different speeds, distances and directions, for each antenna. The recordings showed signal strength plotted against distance.

A study of these recordings revealed several interesting things, the most evident being the increase in average signal when using the loop. The amplitude of the smaller variations (fading) averages about the same for the two antennas. The severe fading so often observed on mobile signals appears to be caused by reflections from buildings, water tanks, and similar objects rather than ground reflections. Cars passing by have no noticeable effect, but reflections from aircraft appear quite serious. The signal fluctuations resulting from a single object reflection begin with rapid small amplitude variations, building up to large amplitudes at a lower frequency and finally returning to the earlier small, rapid fluctuations. Both antennas showed this same characteristic.

No accurate measurements have been made using the loop for receiving. Listening tests indicate excellent receiving performance, however. Skip stations come in very strongly even in poor locations, and ground-wave stations have been heard and worked from a surprising distance. The



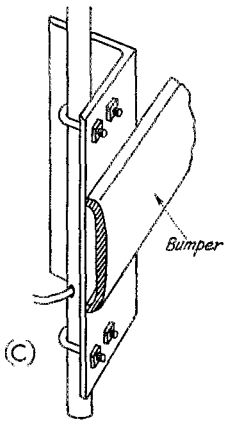


Fig. 2 — Detail drawings of the various assemblies used in the halo installation. A is a cutaway view of the end-loading capacitor assembly. B shows the method of attaching the coaxial feedline and insulating the center of the fed section of the dipole. The method of attaching the mast to the rear bumper is shown at C. The angle plate is welded to the bumper assembly at three points.

mobile receiver consists of a sensitive low-noise converter operating with a standard automobile receiver modified to include a good series-diode noise limiter. Filters in the receiver power wires restricted noise pick-up to the antenna alone.

With the loop antenna in use, and with no shielding, suppressors, or filtering on the engine, almost any signal that is readable with the engine off will still be readable with the engine running. Ignition and generator noise are audible, but do not override the tube hiss from the first 6J6 r.f. stage. With the whip antenna connected, ignition noise from the car's engine drowns out tube noise and weaker signals, and other cars can be heard some distance away. In one case, with the car parked at the edge of the road, a weak signal received on the whip was drowned out by each passing car in turn, while the same signal was noticeably stronger and passing cars were inaudible after connecting the loop antenna.

This particular antenna has been in use for several months and has required no adjustment or maintenance. It does not vibrate excessively, and what movement there is seems to have no effect on performance. Because the loop antenna seemed so independent of objects beneath it, a test was made to determine the effect of a close reflecting surface. While measuring the antenna impedance, a large aluminum sheet was brought up under the loop. No change in impedance could be observed with six-inch or greater spacing from the antenna. Reassured by this measurement, Mel Wilson, W1DEI/3, mounted his six-meter halo above the metal roof of his sedan. Supported by suction cups and twelve-inch insulating spacers, the antenna appears to function normally and Mrs. Wilson will still ride in the car with him.

Construction

A general idea of the construction of the antenna can be gained from the photograph. Details of the condenser plates, antenna mounting, and mast mounting are shown in the drawings in Fig. 2.

Care should be taken, in the construction of anything as prominent as this antenna, to do a neat, workmanlike job. Bending the large 7/8-inch aluminum tubing is the most difficult part. It should be tightly filled with fine sand and carefully bent around a rigid object about 18 inches in diameter. The final hoop diameter should be about 20 inches. Small dents can often be removed by coaxing through the tubing a cylindrical steel plug on the end of a rubber hose. Dents and creases can sometimes be filled in with aluminum solder and filed smooth. The small 3/8-inch diameter tubing can be formed with the fingers to the same curve as the larger tubing and mounted 2½ inches below it. A ¾-inch standard plumber's tee is convenient for supporting the antenna. The 7/8-inch o.d. tubing fits such a tee and should be securely soldered to it with aluminum solder. Be sure to use an iron when tinning the aluminum. A torch can be used on the bronze fitting. The mast is ¾-inch water pipe, threaded at the top to screw into the bronze fitting.

The condenser plates can be any convenient shape, with an average diameter of about 5 inches. A detail drawing of the condenser assembly is shown in Fig. 2-A. The plates are screwed to plugs in the ends of each element. The large-diameter plugs have two tapped holes in one end for attaching the condenser plates, and three holes in the sides for securing the plugs to the ends of the 7/8-inch tubing. The small plugs each have a small hole in one end for attaching the condenser plates, and are a drive fit into the ends of the 3/8-inch tubing. Two access holes are needed in one of the condenser plates to loosen the screws in the other one. The plate spacing is critical and must be rigidly fixed. A tapped spacer

of good insulating properties is used with several thin washers to fix the spacing. Washers can be added or removed to tune the antenna.

Final tuning of the completed antenna can be done by adjusting the condenser-plate spacing carefully to give maximum loading on the transmitter.

An insulator of some type is needed to support the ends of the small tubing near the mast. Any easy-to-work insulating material is suitable. For this antenna a block of bakelite was cut to clamp around the supporting pipe, and holes were drilled to accept the ends of the small-diameter tubing. Two screws tapped into plugs in the tubing ends hold the element securely and also provide convenient connections to the feedline. Insulated bushings mounted in the supporting pipe protect the short insulated wires connecting the antenna to the coaxial feedline. If desired, a "bazooka" line balancer can be incorporated by merely grounding the outer conducter of the co-ax to the inside of the pipe at a point a quarter wave below the antenna.

The ¾-inch pipe mast must be very securely fastened at its base. This mounting is extremely rugged and consists of a section of 4-inch angle iron welded in three places to the bumper assembly. The pipe is fastened to the angle iron by two ⅜-inch "U" bolts. The cable is brought out through a hole two inches above the base of the pipe to protect it in case the base of the pipe rubs against anything.

Other sizes of tubing may be used for the antenna, the only requirement being that the ratio of tubing diameters and the element spacing be chosen to provide the necessary step-up to match the radiator impedance and the transmission-line impedance. The main radiating element has an impedance determined primarily by its over-all diameter. In this particular antenna, the 20-inch diameter loop has a measured impedance of about 9.3 ohms. Many combinations of tubing sizes and spacings can be chosen to give the desired impedance step-up of 5½ times. If 70-ohm co-ax is available instead of 50-ohm, other combinations can be chosen to provide the needed step-up of approximately 7½ times. A nomogram [2] has been constructed to show the relation between element size, spacing, and impedance step-up. The nomogram, shown in Fig. 3, is precise for large ratios of D/R_2, but may be used with reduced accuracy at closer spacings. If, for example, the desired step-up is known, the necessary spacing can be found for any combination of element sizes.

The exact procedure is as follows:

1) Divide the radius (or diameter) of the larger pipe by that of the smaller to get R_2/R_1.

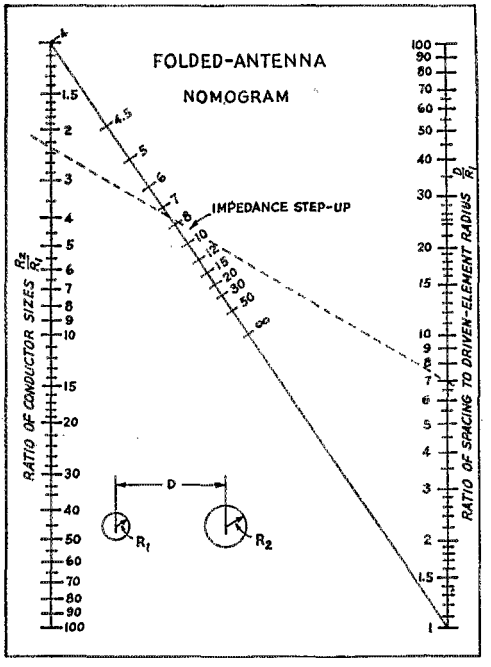


Fig. 3 — The impedance step-up resulting from the use of various conductor sizes and spacings in a folded dipole may be obtained from this nomogram. At the left is the ratio of conductor sizes, R_2/R_1. The line at the right is the ratio of the spacing (center-to-center) and the driven-element radius, D/R_1. The solid slanting line is the impedance step-up. Laying a straightedge between any two known quantities will give the value of the third. The dashed line shows how the W1MUX halo with its conductor ratio of 2.3 to 1 (⅞- and ⅜-inch tubing) could be modified to match a 72-ohm coaxial feedline. The greater impedance step-up of between 7 and 8 times is obtained by reducing the center-to-center spacing to 1.3 inches. This nomogram may be used in designing folded-dipole radiators of all types.

2) Lay a straightedge between this value of R_2/R_1 and the desired step-up ratio M, found on the solid diagonal line.

3) Read the value of D/R_1.

4) Multiply this ratio by the *radius* of the smaller conductor (R_1) to find the center-to-center spacing required.

Using the nomogram to find what spacing would be required to match the 20-inch loop and a 70-ohm line, the ratio $R_2/R_1 = 2.3$ is first determined and located on the left-hand scale. The desired step-up ratio of 7.5 is located on the diagonal scale, and a line drawn through these two points, intersecting the right-hand scale at 7 to give the necessary ratio of spacing to the smaller radius. The center-to-center spacing will then be 7 × 3/16 or approximately 1.3 inches. (See dashed line on nomogram.)

This nomogram may be used with any folded antenna.

[2] Formula obtained from W. Van B. Roberts, "Input Impedance of a Folded Dipole," *RCA Review*, Vol. VIII, No. 2, June, 1947.

A Sturdy 55-Ft. Skyhook

BY CORLISS B. GARDNER,* W1ALJ

THE MAST shown below was described by the author several years ago in *QST*. Judging from the letters received, it has been duplicated widely. Since then, improvements have been made to permit easier erection.[1]

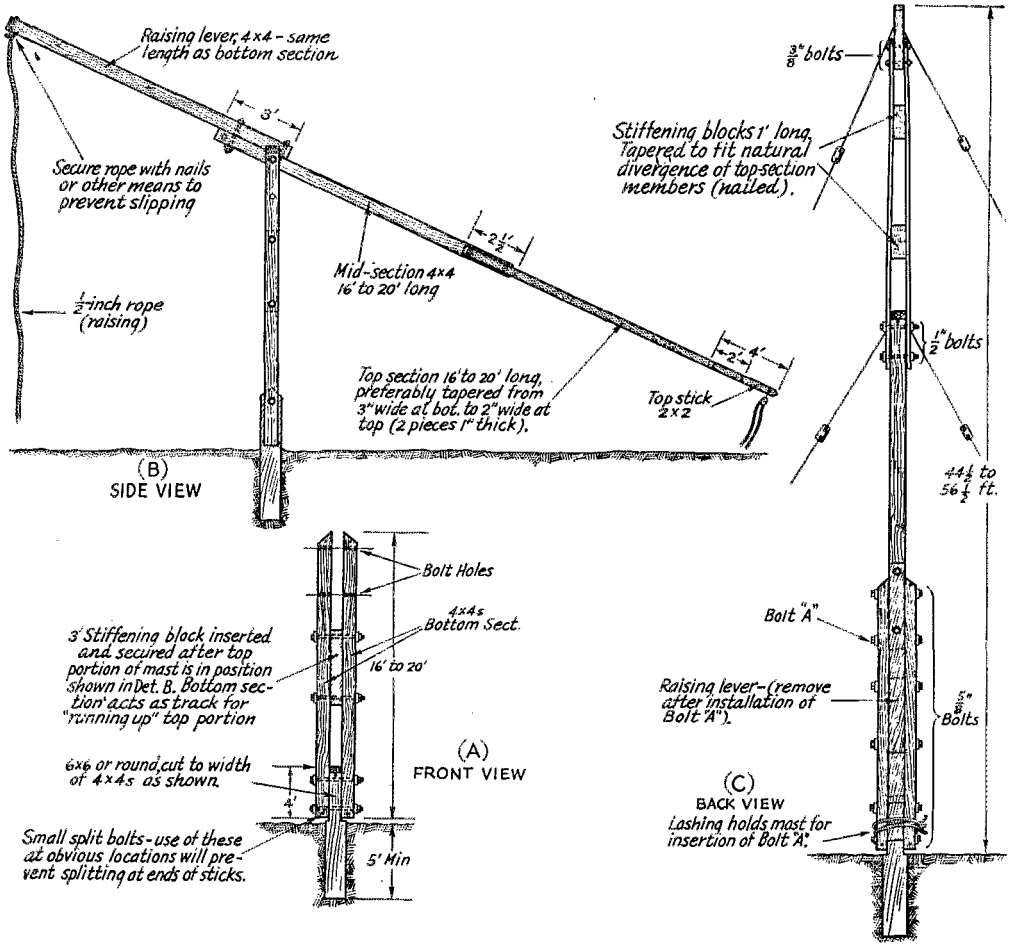
The sketches show complete details. The bottom section, minus the 3-ft. stiffening block, should be set in place first, as shown at A. The top section then is slid between the two uprights, with the raising lever on the upper side. The bottom end of the top section then is pulled up and the two sections lined up so that the bolt can be put in place, as shown at B.

By pulling downward it is not difficult to swing the top section up into vertical position. Bolt "A" is then slipped into place and the stiffening block inserted.

For masts up to 45 feet, only two guys at the top will suffice. For greater heights, two at the top and three at the midjoint in the top section are recommended, as indicated in C.

* 19 Sweet Fern Lane, Peace Dale, R. I.

[1] Method devised by W1BXZ, Wakefield, R. I.



A Pretuned Bandpass Frequency Multiplier

80 to 6 Meters with a Single Control

BY McMURDO SILVER*

• The greater the number of bands to be covered by a transmitter, the greater are the complexities involved in providing a convenient and rapid means of changing the transmitter from one band to another. Especially is this true ordinarily if tuning controls are to be held to a minimum. The principle of reducing these complexities through the use of broad-band fixed-tuned circuits is a relatively new idea in amateur transmitters. In this article it is applied to a frequency-multiplier unit which requires only the addition of a VFO or crystal oscillator to drive it to an output of 40 watts on all bands from 80 to 6 meters. Once adjusted properly, only the output-stage tuning needs touching up occasionally for operation at any frequency in any band.

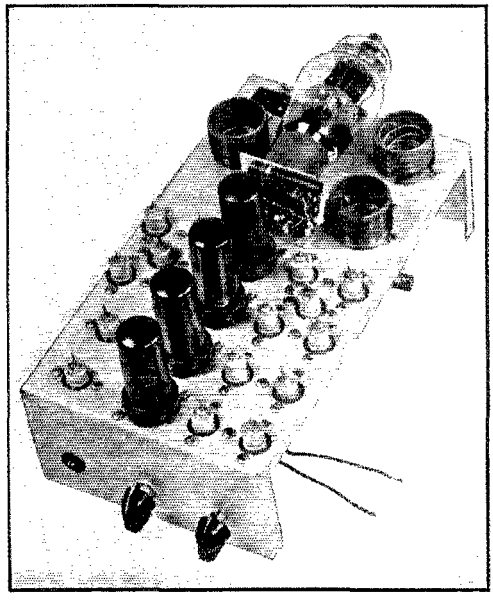
SINGLE-DIAL control for receivers has been an accomplished fact for such a long time now that it is becoming difficult for even old-timers to realize that there was a time when a half-dozen controls had to be set critically before a signal could be heard on a superheterodyne receiver.

The development of transmitters with the same objective in mind has lagged, probably for the simple reason that it has not always been considered important to shift transmitter frequency at will. But within the past few years, amateur operating technique has been gradually changing in a direction that is beginning to date the plug-in-coil type transmitter.

Several years ago a beginning was made in the form of ganged tuning for multistage transmitters and few of those who have built and operated transmitters of this type would ever consider anything less. However, while ganged tuning reaches the objective of rapid change of frequency within a band, it does not lend itself well to switching circuits for changing from band to band.

More recently,[1] attention has been turned toward the possibilities offered by broad-band transmitter stages to eliminate the necessity for ganging several condensers and switching padder and tracking condenser connections in addition to the tube connections. There is more than one way of obtaining the required amount of broad-banding in transmitter stages, depending upon such factors as how simple the circuit must be, the efficiency required and to what degree undesired multiplication must be suppressed in the doubler or tripler stages. The use of bandpass filters as coupling devices between stages seems to offer the best possibilities of a compromise of these factors.

Although bandpass filters do not lend themselves to the efficient generation of power in significant quantities, they can be made to perform quite satisfactorily in circuits where power output is of secondary importance. Used as coupling agents between almost zero-power driven 6AG7 tubes they give that highly-desirable operating convenience of a series of frequency multipliers



Top view of the bandpass frequency multiplier, showing the mounting of the tubes and the various padder and trimmer condensers. The plate coils for the output stage are at the far end.

* % McMurdo Silver Co., Inc., 1249 Main St., Hartford, Conn.

1 Harms, "Single Control in the Bandswitching Transmitter," *QST*, December, 1946, p. 19.

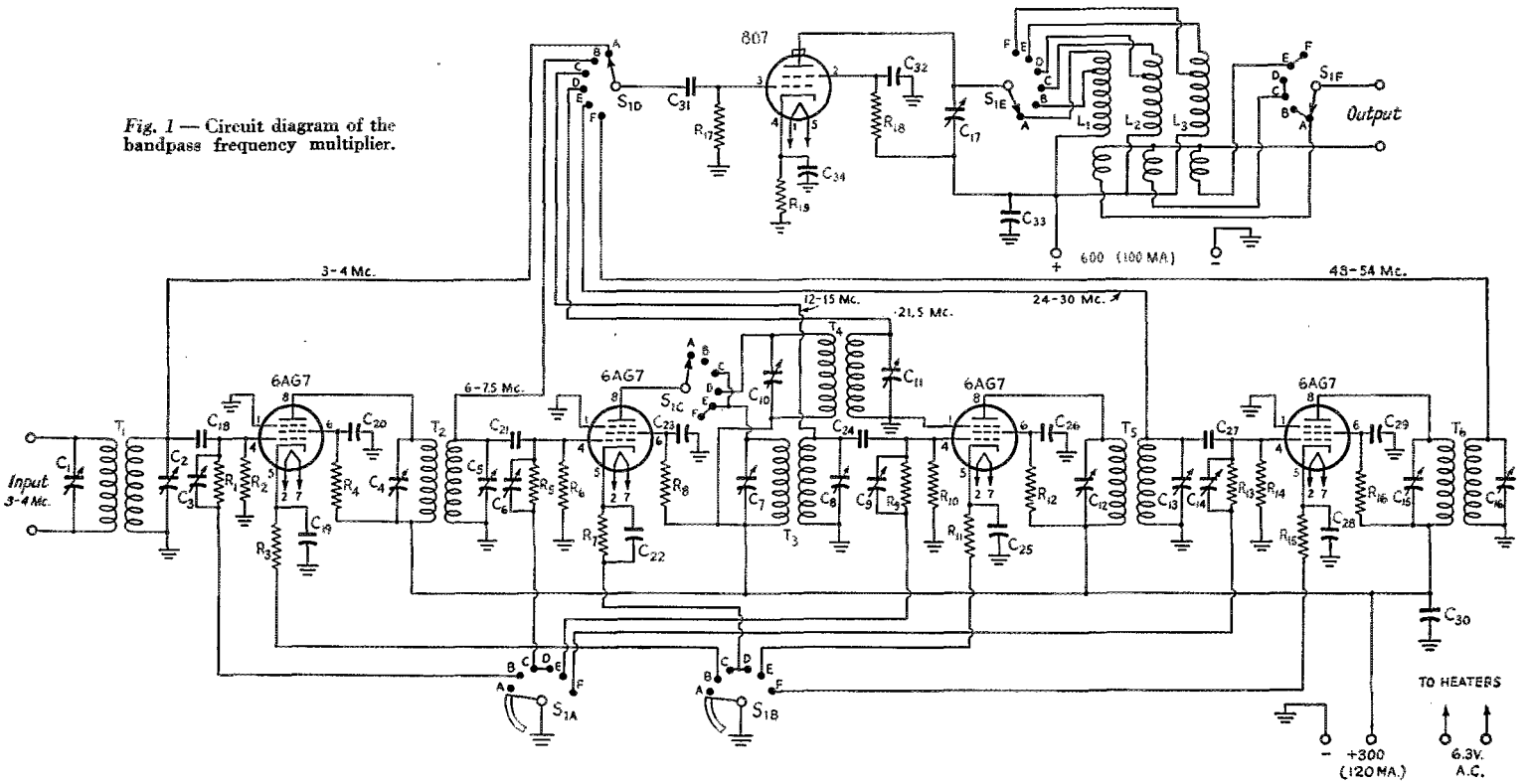


Fig. 1 — Circuit diagram of the bandpass frequency multiplier.

C_1–C_{16} — 3–30-$\mu\mu$fd. air trimmer (Silver 619).
C_{17} — 100-$\mu\mu$fd. variable, double-spaced.
C_{18}, C_{21}, C_{24}, C_{27}, C_{31} — 100-$\mu\mu$fd. mica.
C_{19}, C_{20}, C_{22}, C_{23}, C_{25}, C_{26}, C_{28}, C_{29}, C_{30}, C_{34} — 0.02-μfd. 400-volt paper.
C_{32}, C_{33} — 0.0022-μfd. mica.
R_1, R_5, R_9, R_{13} — 2700 ohms, ½ watt.
R_2, R_6, R_{10}, R_{14} — 0.1 megohm, ½ watt.
R_3, R_7, R_{11}, R_{15} — 270 ohms, 1 watt.
R_4, R_8, R_{12}, R_{16} — 10,000 ohms, 2 watts.
R_{17} — 10,000 ohms, ½ watt.
R_{18} — 13,500 ohms, 4 watts (two 27,000 ohms, 2 watts, in parallel).
R_{19} — 82 ohms, 2 watts.
L_1 — 3.5, 7 Mc. (Silver 125-G1).
L_2 — 14, 21, 28 Mc. (Silver 125-G2).
L_3 — 27, 28, 50 Mc. (Silver 125-G3).
S_1 — 6-gang 6-position ceramic rotary switch, progressively shorting (Centralab).
T_1 — 3–4-Mc. filter (Silver 110).
T_2 — 6–7.5-Mc. filter (Silver 111).
T_3 — 12–15-Mc. filter (Silver 112).
T_4 — 21–21.5-Mc. filter (Silver 113).
T_5 — 24–30-Mc. filter (Silver 114).
T_6 — 48–54-Mc. filter (Silver 115).

broad enough to cover many amateur bands without retuning during operation.

It was determined that the maximum required passband — 3 to 4 Mc. — could be covered by two tuned and appropriately-coupled circuits. It is perhaps convenient to think of the filters in terms of dual-tuned receiver i.f. transformers. That is what they look like diagrammatically and is what they are electrically, except that the two coils of each transformer are at somewhat above critical coupling in order to obtain the double-humped selectivity curve typical to two overcoupled tuned circuits. Each coil is tuned by a very small shunt air capacitor.

Turning to Fig. 1, T_1 is the first such filter. Two tuned circuits are overcoupled to just the degree necessary to get a "sway-backed" selectivity curve 1 megacycle broad. The range 3 through 4 Mc. is covered with output power flat within 20 per cent. Since each successive frequency-multiplying stage is essentially only a duplication of the first stage, examination of this individual stage will make clear the character of all succeeding stages.

Following T_1 is the first 6AG7 multiplier tube — or the 807 output amplifier. Considering first the condition when the bandswitch is in position A, we find that S_{1D} connects the 807 grid to the secondary of T_1. In this condition the only active tube is the 807, all four 6AG7 cathode circuits being opened by S_{1B}. S_{1E} and S_{1F} select the plate and output link coils appropriate for 3.5- through 4-Mc. output in the 807 plate circuit. The output of the multiplier is now at the frequency of the driving exciter.

If we turn S_1 to position B we find that several circuit changes have occurred. S_{1B} has closed the cathode circuit of the first 6AG7 so that it is powered and operating to yield twice the input frequency across the secondary of T_2. The grid of the 807 has been shifted to the T_2 secondary, and its plate circuit changed to the 7-Mc. band. Something else quite important has happened — S_{1A} has added capacitor C_3 (in series with C_{18}) across the secondary of T_1, and has also connected R_1 in parallel with R_2. The grid input capacitance of each 6AG7 is significantly lower than that of the 807 output amplifier. Therefore this compensation is required to keep the transformer secondaries properly tuned whether feeding the following 6AG7 or the 807. S_{1A} does this by progressively adding C_3 across T_1, C_6 across T_2, C_9 across T_3 and C_{14} across T_5. In the cases of 21-Mc. transformer, T_4, and 50-Mc. transformer, T_6, which always feed the 807, switching compensation is not necessary.

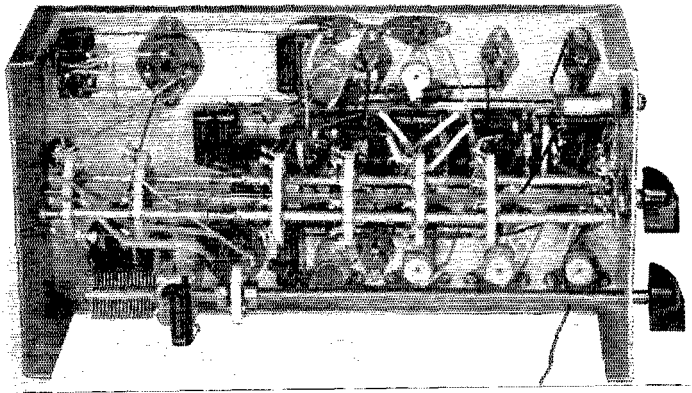
Returning to the discussion of the first stage, R_2 is the grid leak while R_3 provides protective cathode bias, assuming probable keying of the oscillator. A portion of the operating bias is provided by R_3 (and similar cathode resistors in following stages), the balance being derived from the grid leak.

Because even overcoupled broad-band filter circuits cannot be made as broad as desired without sacrificing considerable in uniformity of output over a band, it becomes necessary to broaden them by adding resistors across the secondaries of T_1, T_2, T_3 and T_5. By careful choice of L/C ratio, transformer coupling and circuit loading, it becomes possible to obtain a passband as wide as desired in each successive filter — a passband having steep skirts immediately beyond its high- and low-frequency limits, yet exhibiting a power-output variation within each passband of not more than a ratio of 8 to 10.

At first glance it may appear that the only difficult filter to design is T_1, covering, as it does, the range of 3 to 4 Mc. — that each succeeding filter need cover only a lesser percentage frequency bandwidth because of the successive narrowing of the spread required at the higher frequencies. And this is true if the use of the multiplier is to be limited to a highest frequency of 30 Mc. But when the 50-Mc. band is added and if it is desired to get output usefully multipliable to 144 Mc., some of the stages must be designed to pass frequencies outside the band normal to the stage.

The plate circuit of the 807 uses a special wide-spaced tuning capacitor of small physical dimensions — so that it won't turn into an inductance at high frequencies. Its coil arrangement is dictated by convenience, with due regard to efficiency and output. It has been found that almost any two successive amateur bands may be covered quite satisfactorily indeed by a single inductor having a tap for the higher-frequency band. This is a distinct convenience in saving space — and avoiding stray resonances in a multiplicity of idle coils. Thus, all of L_1 is included in the 807 plate cir-

(Continued on page 118)



Bottom view of the band-pass frequency multiplier, showing the bandswitch and coils. The single tuning condenser for the output stage is in the lower left-hand corner.

Happenings of the Month

NEW F.C.C. AMATEUR DIVISION

In reorganizing its engineering department under its new chief engineer, George E. Sterling, W3DF, FCC has set up a division on amateur affairs on the same level as its other engineering divisions. The new unit is entitled the "Radio Operator and Amateur Division," and is headed by George K. Rollins, W3GA. Another "George" was named to fill the vacancy caused by the promotion of Mr. Sterling — George S. Turner, a former W9, as assistant chief engineer.

W3GA

The new division will handle regulatory matters and licensing procedures for amateurs, commercial operators, and the Citizens Radio Service. FCC has thus again shown its genuine interest in the amateur service, not only by creation of its new division but also by continuing to have amateur regulatory affairs administered by persons who are themselves members of the fraternity.

George Rollins built his first ham station, a Ford spark coil and a crystal receiver, from the *Boy Scout Manual* in 1919, operating from Springfield, Mass., as 1CHO. Then came 8HW and a ¾-kw. spark, and a c.w. rig later; W8JO and W8BWR at Michigan State College; W9GR; a W4 call he can't remember; and upon release from the Navy in 1945 as a Lieut. Commander, W3GA with a bandswitching rig on 40–20–10 meters. Right now he is interested in n.b.f.m., so that he will have experience of his own when this type of emission on the lower-frequency amateur bands comes up for reconsideration next year. George has been with FCC since 1939.

C.A.R.L. SHOW

Sometime in May, 1948, the Chinese Amateur Radio League will hold another amateur radio exhibition in Nanking, the first since 1942. To provide a true international flavor, they would like to receive from amateurs all over the world photographs of stations, QSL cards, club emblems or banners, and the like. Such items can be sent, not later than March 15th of next year, to CARL, 40 May Yuan Villa, Kuo Fu Road East, Nanking (2), China.

Although with very limited means, CARL contributed tremendously during the late war. The society is very active at present, with 36 local chapters and with student chapters in 13 universities. It would welcome the help of American amateurs as supporting members. Such members will receive the League's emblem, membership card, and circular. Membership dues are $5.00 for the first year, and $1.00 for succeeding years. Applications should include name, age, nationality, address, profession, and amateur call.

ARE YOU LICENSED?

• When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

SPECIAL TEMPORARY AUTHORITY

FCC has recently been receiving requests for special temporary authority from amateur licensees without observance of the required 10 days notice. While FCC is willing to consider telegraphed applications in emergencies, they state that requests for special temporary authority should be filed with the Commission at least 10 days previous to the date of the proposed operation.

PROPOSED CHANGES, 42–88 MC.

We reported in August *QST* an informal engineering conference held by FCC in June in an attempt to solve some of the problems of interference being caused television broadcasting by the fixed and mobile services, and amateurs. FCC has now issued a proposal to make certain changes in this portion of the spectrum which would eliminate present sharing of television assignments by other services, and withdraw the 44–50 television assignment (Channel 1) and make it available to former users of the sharing arrangement.

The 50–54 Mc. band remains amateur, in the FCC proposal. The Commission has this to say about interference from causes other than sharing

(Continued on page 116)

A Compact and Inexpensive Superhet for 144 Mc.

A Step Up from the "Rush-Box" for Mobile or Fixed-Station Use

BY BASIL C. BARBEE,* W5FPJ

• We are prone to think of superhet receivers in terms of gang-tuned circuits and their associated tracking problems, so we build superregens instead, putting up with their well-known inefficiencies rather than face the electrical and mechanical problems normally connected with superhet receiver design. On 144 Mc. ordinary tuned circuits are sufficiently broad to permit fixed-tuning at the middle of the band without appreciable loss in performance. Here is a simple receiver incorporating this technique, with a degree of complication only slightly exceeding that of the simplest rush-box jobs. Its selectivity and audio quality are more than worth the difference.

Of the amateur bands presently available for mobile communication, probably the 144-Mc. band is the best suited, particularly if we exclude the DX possibilities of the 28- and 50-Mc. bands. The antenna need not be of unwieldy size, the equipment may be built compactly and efficiently without resorting to expensive special components and tubes, and the band is wide enough to provide plenty of room for hundreds of stations to operate simultaneously, if only the stability of the equipment were improved. At the present state of the art, however, most mobile 144-Mc. amateur stations use equipment all of a pattern: a modulated oscillator for transmitting and a superregenerative detector for receiving. Many even use "transceivers," which combine the functions, with detriment to both.

The few who have crystal-controlled mobile rigs still, for the most part, use superregenerative receivers, although they would probably prefer to use converters ahead of the broadcast receivers in their cars, as is common on 28 and 50 Mc., if a higher proportion of the other stations on the band were crystal-controlled. Unfortunately the selectivity of any broadcast receiver is too great to pass some of the signals at present heard on 2 meters. The only satisfactory way to achieve improved reception appears to be the construction of a good superheterodyne receiver especially designed for the 144-Mc. band.

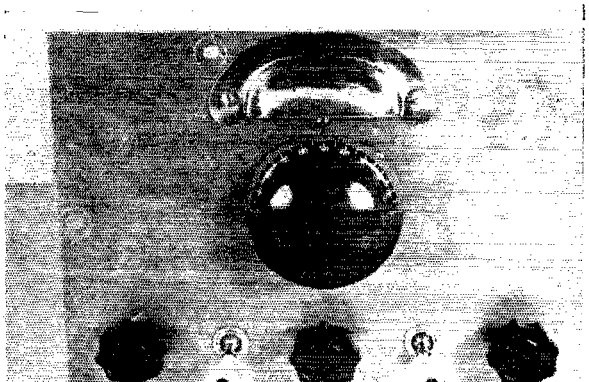
The receiver to be described, although intended primarily for mobile use, serves equally well as a fixed-station receiver when provided with a suitable a.c. power supply. It is a superheterodyne of nine tubes, including the voltage regulator, all of which are miniature types. The entire unit is constructed on a chassis $4\frac{1}{2} \times 7\frac{1}{2} \times 2$ inches, while the over-all dimensions of the cabinet are only $4\frac{3}{4} \times 6\frac{1}{4} \times 8\frac{3}{4}$ inches. Most of the components not regularly found about the ham shack may be obtained at low cost from war-surplus equipment outlets.

Although the sensitivity has not been measured, it compares favorably with that of the average superregenerative receiver, and the background noise in the absence of signal is considerably less than in a superregen. Installed in a car, in conjunction with a quarter-wave vertical antenna, this receiver pulled in signals from a radius of 200 miles around New York City. The bandwidth was intentionally made fairly broad (120 kc.) in order to accept not only crystal-controlled signals, but also the better class of MOPAs and the more stable modulated oscillators. Nevertheless, the selectivity is adequate to "dig out" many more stations from a crowded band than can the ordinary superregen.

Circuit Details

The circuit line-up consists of a 6AK5 t.r.f. stage, 6J6 push-push mixer, 6J6 push-pull oscillator, two stages of 6-Mc. i.f. using 6AK5s with a.v.c., a 6AL5 as detector, a.v.c. rectifier and series-valve noise limiter, 6C4 first a.f., 6AK6 second a.f., and 0A2 voltage regulator on the

* Nacogdoches, Texas.



Front view of the 2-meter mobile receiver built by W5FPJ. The vernier dial was removed from a BC-375 tuning unit, and the dial-light hood is a chromium-plated drawer pull.

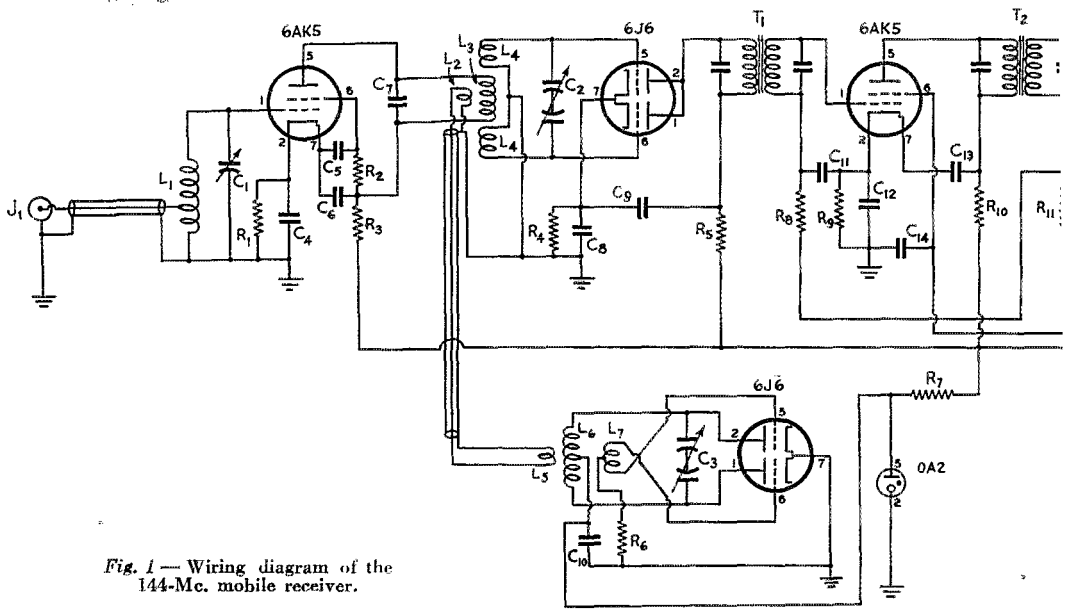


Fig. 1 — Wiring diagram of the 144-Mc. mobile receiver.

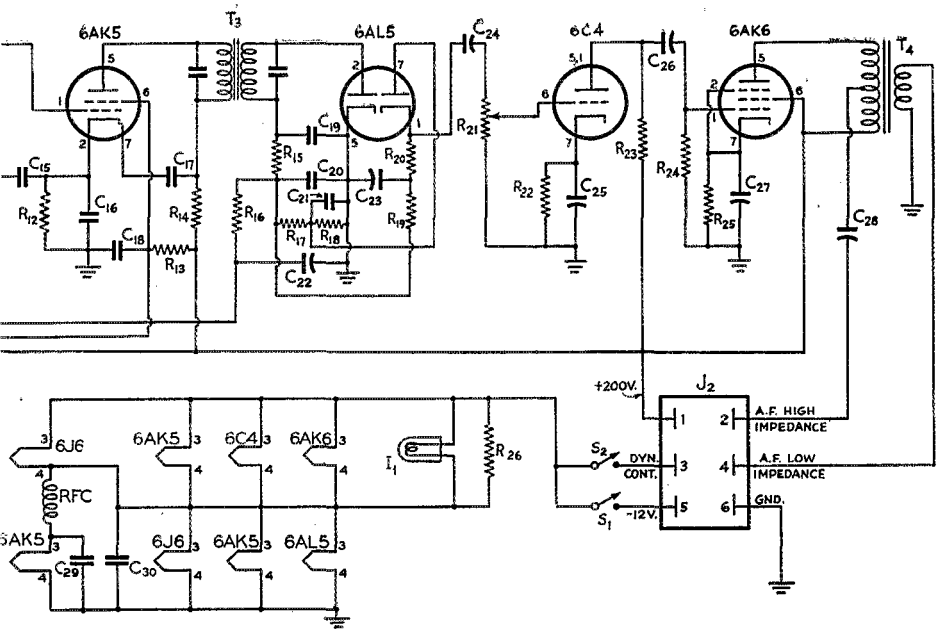
C_1 — 4-$\mu\mu$fd. variable (surplus).
C_2 — 12-$\mu\mu$fd.-per-section split-stator (made from APC-25; see text).
C_3 — 11.5-$\mu\mu$fd.-per-section split-stator (surplus).
C_4, C_8, C_9, C_{11}, C_{13}, C_{14}, C_{15}, C_{17}, C_{18}, C_{30} — 560-$\mu\mu$fd. mica.
C_5, C_6, C_{10}, C_{29} — 220-$\mu\mu$fd. mica.
C_7 — 5-$\mu\mu$fd. Erie Ceramicon.
C_{12}, C_{16} — 0.0033-μfd. mica.
C_{19}, C_{20}, C_{21} — 82-$\mu\mu$fd. mica.
C_{22}, C_{24}, C_{26} — 0.02-μfd. 200-volt paper.
C_{23} — 0.05-μfd. 200-volt paper.
C_{25}, C_{27} — 10-μfd. 25-volt electrolytic.
C_{28} — 0.1-μfd. 600-volt paper.
R_1, R_9, R_{12} — 220 ohms.
R_2 — 47,000 ohms.
R_3, R_5, R_{10}, R_{14}, R_{22} — 5600 ohms.
R_4, R_8 — 10,000 ohms.
R_7 — 3300 ohms, 2 watts.
R_8, R_{11} — 0.1 megohm.
R_{13} — 33,000 ohms, 1 watt.
R_{15} — 47,000 ohms.
R_{16} — 2.2 megohms.
R_{17}, R_{18} — 0.33 megohm.

oscillator plate supply. The "B" supply, 200 volts at 60 ma., is obtained from a dynamotor which also supplies the low-power stages of the transmitter, while the heaters are supplied from a 12-volt battery consisting of the car's regular battery plus an additional 6-volt battery in series. By connecting all heaters in parallel instead of series-parallel, a single 6-volt battery may of course be used. Two audio outputs are provided, one at voice-coil impedance (4 ohms) so that the voice coil of the broadcast-receiver 'speaker may be switched over to the 144-Mc. receiver if desired; and the other at 2500 ohms for the operation of a handset, the microphone of the latter being used in conjunction with the 144-Mc. transmitter.

The r.f. stage is an ordinary t.r.f. pentode amplifier. Originally a 6J4 grounded-grid stage was tried, but because of difficulties with oscillation it was abandoned in favor of the present arrangement. No doubt the 6J4 could have been made to work with the proper shielding, but because of the necessity for rapid completion the 6AK5 pentode was hastily substituted.

Push-push mixers are not uncommon, but although mentioned in the *Handbook* theory section, they are seldom seen in amateur apparatus. The split-stator tuning condenser for this stage was made from an APC-25 by sawing loose, with a jeweler's saw, half the stator plates from one stator terminal and the other half of the plates from the other stator terminal. The two halves of the mixer grid coil are spaced $\frac{5}{16}$ inch to admit the primary winding, which is of the same diameter. The oscillator-injection coupling link is a single turn over the center of the primary winding, supported by a pillar insulator. A short length of RG-58/U concentric line connects this link to the link at the oscillator coil; this latter link is formed by looping the center conductor back upon itself to form a single-turn coil and soldering it to the outer conductor. At this point the link and the line are supported by another pillar insulator.

The push-pull tuned-plate oscillator circuit is not unusual. The untuned grid coil is supported around the plate coil by the grid leak and the leads to the tube socket. The remainder of the



R_{19} — 1 megohm.
R_{20} — 0.82 megohm.
R_{21} — 1 megohm potentiometer, audio taper.
R_{23} — 0.27 megohm.
R_{24} — 0.47 megohm.
R_{25} — 560 ohms.
R_{26} — 220 ohms.

Note — Resistors ½ watt unless otherwise specified.

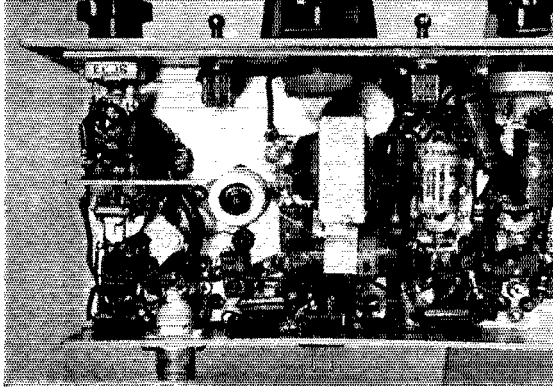
L_1 — 3 turns No. 18, ½-inch i.d., ¾ inch long, tapped at ½ t.
L_2 — 1 turn No. 18, 1 3/16-inch diameter, around L_3.
L_3 — 7 turns No. 18, ½-inch i.d., close-wound.
L_4 — 4 turns No. 18, ½-inch i.d., c.t., 5/16-inch space in center.
L_5 — 1 turn formed from end of center conductor, RG-58/U cable.
L_6 — 4 turns No. 18, ½-inch i.d., c.t.
L_7 — 2 turns No. 18, ⅞-inch i.d., c.t., around L_6.
I_1 — No. 47 Mazda lamp.
J_1 — SO-239 co-ax connector (surplus).
J_2 — Jones P-306-AB connector.
RFC — 45 turns No. 36 in 3 pies on IRC BT-½ resistor.
S_1, S_2 — S.p.s.t. toggle switch.
T_1, T_2, T_3 — Midget 6-Mc. i.f. transformers, No. 278-0011-00 (surplus).
T_4 — Midget universal push-pull output transformer.

receiver circuit follows usual receiver practice and needs no explanation here. No switch was provided for disabling the series-valve noise limiter because the limiter is almost always useful in mobile operation and its slight impairment of audio quality is of no importance for communication purposes.

No attempt was made at ganging the tuning controls. Instead, the main tuning dial controls only the oscillator, while the mixer grid circuit is fixed-tuned at the center of the band, and the antenna trimmer on the front panel resonates the grid circuit of the t.r.f. stage, requiring very infrequent adjustment. Thus single-dial control is achieved without the loss of stability and gain that usually results from ganging. Since the width of the 144-Mc. band is somewhat less than 3 per cent of the center frequency, and since the Q of the mixer grid circuit is not likely to be greater than 35 with ordinary circuit components, the variation in gain over the entire band with this arrangement would be expected to be only about 3 db. (½ S-unit), an assumption that was verified in practice.

As reception of 'phone and m.c.w. signals only was contemplated, a.v.c. was applied to the two i.f. stages, and only one gain control, in the a.f. circuit, was provided. One toggle switch is used to turn on the heaters, while another turns on the plate dynamotor, but only when the heaters have been turned on. A dial light, situated above the main tuning dial under a reflector made from a chrome-plated drawer pull, illuminates the panel and serves as an indicator that the heaters are on. The whine of the dynamotor, which is mounted "aft," indicates that the plate switch has been turned on.

The chassis was made of scrap ⅛-inch aluminum from the panel of a TU-5B tuning unit, from which came also the compact but excellent vernier tuning dial. The chassis is supported by the panel, which was made of a scrap of 5/32-inch dural for stiffness. The cabinet was made of scraps of 1/16-inch aluminum, and provided with six 8-32 elastic clinch-nuts to which the panel is secured with 8-32 oval-head rack screws and cup washers. Two holes were cut in the rear of the cabinet to pass the antenna and power connec-



Bottom view of the mobile receiver. The coil and condenser at the left side comprise the tuned circuit of the r.f. stage. In back of this are the split coil of the mixer and its tuning condenser, which is the screwdriver-adjustment type. I.f. circuits are arranged along the back of the chassis, with audio components on the right.

♦

tors, which are fastened to the chassis rear wall. Mounting in the vehicle is by means of four Lord rubber mounts which support the cabinet and protect the receiver from mechanical shock.

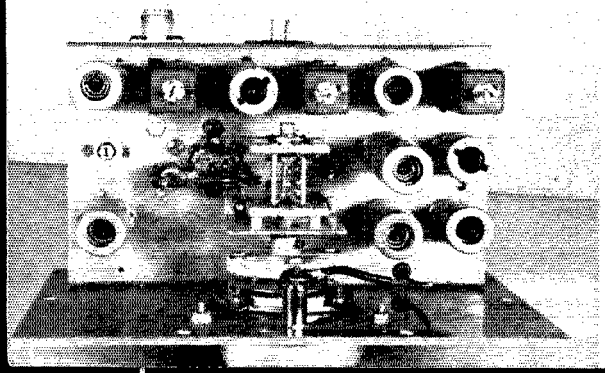
Layout of parts is straightforward and compact. Looking down on the chassis, the 6AK5 r.f. tube may be seen in the left-front corner. Behind it is the mixer grid tuning adjustment, while on the left-rear corner may be seen the 6J6 push-push mixer tube. Along the rear edge of the chassis, from left to right, may be seen next the input i.f. transformer, the 6AK5 first i.f. tube, the interstage i.f. transformer, the 6AK5 second i.f. tube, and the output i.f. transformer. The 6AL5 detector, a.v.c., and a.n.l. tube stands just in front of the output i.f. transformer, with the 6C4 first a.f. tube at the right-hand front corner of the chassis. To the left of the 6C4 is the 6AK6 second a.f. tube, behind which is the 0A2 regulator tube. The 6J6 oscillator tube is mounted upside down under the oscillator coil, which is rigidly supported by the oscillator tuning condenser in the center of the chassis.

No mention has hitherto been made of the function of the potentiometer situated at the bottom center of the panel. It was originally intended as a squelch control, but since the squelch circuit failed to live up to expectations, it was removed from the circuit. Maybe someday we'll get around to hooking it up again and make it perform.

No particular wiring precautions need be observed, other than that all r.f. and i.f. leads should be as short and direct as possible. Any amateur who has successfully built low-frequency superhets and v.h.f. superregens should have no difficulty in getting a receiver of this type to work. For mobile use, the coils in the r.f. circuits, particularly the oscillator, should be constructed and mounted as rigidly as possible, to avoid the ill effects of vibration. An aluminum baffle shield between r.f. and mixer stages is advisable to prevent intercoupling.

Alignment procedure is simple, as no tracking problems are involved. First a signal generator is connected to the grid circuit of the mixer by ungrounding the center-tap of the grid coil and connecting the signal generator between the center-tap and ground. An output meter should be connected to the high-impedance a.f. output or a d.c. vacuum-tube voltmeter connected to the a.v.c. line. In the former case, a modulated signal generator will be required. With the signal generator tuned to 6 Mc., the two tuning slugs on each i.f. transformer are adjusted for peak output, the input signal from the generator being kept as low as possible, consistent with a usable reading on the meter. The oscillator is adjusted to tune from 138 to 142 Mc. (with a little overlap) by means of Lecher wires or a wavemeter or receiver. L_6 is squeezed or spread as necessary until the proper frequency range is obtained.

After the i.f. stages and the oscillator have been aligned, a signal at 146 Mc. is introduced into the antenna input. If a signal generator is used, a dummy antenna must be inserted between the generator and the input of the receiver to simulate whatever type of antenna and transmission line is to be used. Since few hams have signal generators for 146 Mc., it is recommended that the radiation from a "rush-box" be used, in which case the signal may conveniently be introduced simply by connecting the antenna with which the receiver is to be used, thus eliminating the necessity for a dummy antenna. Having tuned in the signal by means of the main tuning dial (oscillator frequency control), the mixer grid circuit is tuned for maximum output as indicated on the meter. Then the r.f. grid coil is squeezed or spread as necessary until the antenna trimmer peaks at about midrange. Finally, the amount of oscillator injection should be adjusted by varying the coupling of the link coil to the oscillator coil until maximum gain is obtained.



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The 144-Mc. mobile receiver is built on a chassis only 4½ × 7½ × 2 inches in size. The oscillator tube is mounted below the chassis, with its coil and tuning condenser above. Only the oscillator is tuned by the vernier dial, eliminating tracking problems.

Element Spacing in 3-Element Beams

Tests on Parasitic Arrays, with Particular Reference to Optimum Element Lengths for Various Spacings

BY PHILIP C. ERHORN,* W2LAH

• **The results of this series of tests brings out the desirability of actual tuning of an array as compared to putting it up "by formula." A tuning procedure that has led to consistently good performance also is described.**

THE remarkable efficiency of the simple two-element parasitic beam antenna has been proven by thousands of hams. Ask the man who owns one! But when you do, you'll probably find that he is experimenting with a three- or four-element array, and is having a lot of trouble answering the questions that seem to multiply with each additional element. First and foremost, what are the optimum spacings for a three-element beam? What formula should be used in setting up the element lengths? What can be gained by tuning?

All these questions and more remained to be answered, and so, spurred on by many QSOs on the subject, the literature was thoroughly culled for concrete information in an effort to find a starting point for setting up the dimensions of a three-element ten-meter array. The various formulas were set down and the element lengths figured out so that they could be compared and perhaps averaged. But it was immediately found that there was little similarity from one set of formulas to another.

And what about the new trend toward wide spacing? What about front-to-back ratios? Since the questions were still piling up, it seemed that the only way to find out some of the answers was to set up an experimental three-element array, make careful tests for all of the commonly-used spacings, and then be governed by the results. The procedure employed in these tests and the results are here presented in detail.

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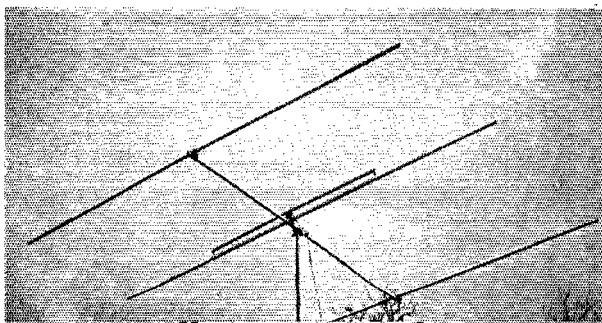
Equipment Used in Tests

All of the arrays were of "plumber's-delight" construction, as shown in the photograph, utilizing 1½-inch 24ST dural tubing for the elements, supporting boom and "T"-match. The dural tubing was obtained cheaply from a junk dealer in 12-foot lengths, with 4-foot inserts for each end that fitted like a glove yet could be moved smoothly for adjustment of element length. With the help of a friend, and using the shop facilities of a local high school, several dural castings were made to be used in securing the elements to the tubular boom. These castings were formed so that the elements could be removed easily, or the casting and inserted element slid along the boom and locked for spacing adjustments. Mechanically, everything turned out to be simple, rigid and strong.

A portable transmitter, whose input was variable from a few watts up to 40 watts, was used with a feeder-matching unit to facilitate loading changes. This feeder or antenna tuning unit was simply an impedance-matching device between the final tank and a so-called flat line. It proved to be very worth while in transferring power efficiently from the final tank to the line. The circuit is given in Fig. 1.

A sketch of the field-strength antenna is shown in Fig. 2. The method used in setting up the field-strength antenna served a double purpose. The length of a resonant half-wave antenna was first determined by erecting the three-element array on its mast, roughly tuning it by formula, and using it to excite a single half-wave element (also 1½-inch dural), and then tuning the half-wave for maximum current. Since the element could not be broken in the middle, the thermo-milliammeter was inserted at the center of a simple "T"-match made of wire, and tapped out equally near the ends of the element. Tuning this half-wave to resonance was rather critical, in that the resonant point was extremely sharp.

With this half-wave antenna mounted on a



The all-metal array used in the tests. The spacings shown are those determined by the author to be the optimum compromise: reflector 0.2 wavelength and director 0.15 wavelength from the driven element. The shorting clamps on the "T"-match were finally positioned eight inches either side of center to give the lowest standing-wave ratio (1.75 to 1) with 70-ohm transmitting Twin-Lead.

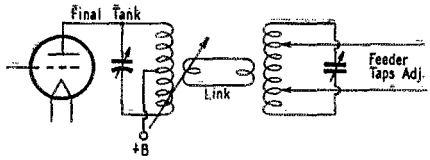


Fig. 1 — Feeder-matching unit used in the tests. Loading is determined by adjustment of link coupling and feeder taps, as described in the *Handbook*.

short wooden 2 × 4, a close-spaced director was added to it and tuned to give maximum current through the thermomilliammeter. The forward sensitivity was increased thereby, and this makeshift array was used as a field-strength indicator at a distance of about a full wave from the beam array.[1] It was impractical to increase this distance because the writer had to work alone and several thousand readings were to be taken. The addition of the director to the field-strength antenna also helped to make it relatively insensitive to reflections from near-by trees or buildings. All measurements were made with the beam and field-strength antenna 20 feet above sandy ground and 7 feet above a wooden roof. Finally, the new Micromatch [2] circuit was constructed and tested, and proved to be an excellent indicator of standing-wave ratios.

Tuning Procedure

Because the length of the boom was 12 feet over all, the first set-up used took full advantage of this length, with the reflector spaced 0.2 wavelength and the director 0.15 wavelength from the driven element, or symbolically R-0.2-A-0.15-D. The driven element of the array was set at the just-determined resonant length and left at that length for all subsequent measurements. The parasitic-element spacings were based upon this length for two operating frequencies, 28.6 and 29.2 Mc.[3]

[1] The validity of measurements made this close to the antenna may be questioned, in view of the fact that the induction field is not negligible at this distance, the behavior of the ground-reflected wave is uncertain, and there is a distinct possibility that the pick-up antenna tends to become part of the antenna array being tested. To offset one of these factors, it may be observed that the use of a director with the pick-up antenna will tend to discriminate against the ground-reflected ray, and also that the inherent directivity of the beam under test will tend to reduce the amplitude of the reflected ray at such a short distance. Also, coupling between the pick-up antenna and the beam under test presumably would be detectable by a change in the input impedance of the beam when the pick-up antenna is removed, and the author states that the presence or absence of the pick-up antenna caused no observable change in the standing-wave ratio. The adjustments achieved by the procedure outlined have led to good results in actual communication. — *Editor*

[2] Jones and Sontheimer, "The Micromatch," *QST*, April, 1947.

[3] The usual method is to calculate the spacings on the basis of free-space wavelength, since all theoretical studies and calculations, as well as published data, are on this basis. The author's spacings are about 4 per cent less than the free-space values. — *Editor*

The reflector was first detuned by removing the sliding inserts in each end of the 12-foot center section, and the director was set at the same length as the driven element and pointed at the field-strength antenna. With power applied a field-strength reading was noted. The director length was then shortened inch by inch until the maximum reading was obtained (about double the reference value) and then fell off as the length was reduced past the optimum point. The length for maximum gain was not too critical.

With the director left at the adjustment for maximum forward gain, the reflector was set at the same length as the driven element. As the field-strength meter immediately went off-scale, power was reduced until the meter read about half-scale. The reflector length then was increased inch by inch but showed no increase in field strength, gradually falling off as the length was increased. The optimum length was coincidental with the driven-element length, and was definitely not critical. It was then found that the director could be lengthened slightly to produce a small increase in gain.

Next, with the beam reversed so that the reflector faced the field-strength indicator, the reflector was again lengthened, until a *minimum* reading was reached. Lengthening past this point caused the reading to increase again. Incidentally, it was necessary to practically quadruple the power input to the transmitter to get any reading at all off the back of the array for adjustment of the front-to-back (F/B) ratio. The F/B ratio was excellent even with the reflector set for maximum forward gain, and adjusting the reflector for best F/B ratio reduced the forward gain reading by only a small amount.

It was now found that lengthening the director gave a small increase in forward gain, but the F/B ratio was completely ruined. It was also found that the forward gain could be slightly increased by shortening the driven element and retuning the director. However, the F/B ratio was again ruined. These increases in forward gain were so small as not to be worth while, in view of the much-poorer F/B ratio which ensued.

An alternative method of tuning was tried which has been widely advocated. The reflector was turned to face the field-strength antenna and detuned by removing the sliding end inserts. The driven element was set to the determined resonant length and the director tuned for minimum field strength. The director length was considerably shorter with this method. Rotating the array 180 degrees disclosed an exceptionally poor F/B ratio, particularly when the director was spaced at 0.2 wavelength. But by tuning the reflector to the previously-determined length for best F/B ratio, the forward gain was greatly increased and the F/B ratio was also greatly improved. Then increasing the short director to the previously-found optimum length again greatly increased the

forward gain and had an extremely small effect upon the F/B ratio. Now the lengths of all the elements were at the settings found in the first procedure, and the alternative procedure was obviously not ideal.

Both the R-0.2-A-0.15-D and the R-0.15-A-0.2-D spacings were checked at 28.6 Mc. and at 29.2 Mc. and the values found at one frequency with a given spacing followed closely in pattern for the other frequency. Here note that the *spacing* figures for the lower frequency were also used at the higher frequency. This saved a lot of time, particularly as the difference was very slight and was compensated for in the element tuning. However, once the array was tuned up at either frequency, it was found that sliding the parasitic elements toward or away from the driven element produced an immediate and radical drop in field strength, this showing that the tuning was optimum for a given spacing only. No unusual effects were noted except in two cases to be pointed out later.

The standing-wave ratio (s.w.r.) was measured by means of the Micromatch and was found to be almost 100/1 with 300-ohm Amphenol Twin-Lead for the line. No amount of adjusting of the "T"-match could alter it, with the "T"-tubing the same diameter as the driven element, spaced 2 inches between adjacent surfaces. However, changing over to 70-ohm transmitting Twin-Lead brought it down to 20/1, and it was finally reduced to 1.75/1 by easy changes in the positions of the shorting bars. The element lengths were then checked again, but no revisions were necessary.

There was still one more method of tuning that had not been tried, but that was used by some of the stations worked. In this case the transmitter was tied to the field-strength array, and it was used to excite the beam, with the thermomilliammeter connected in the center of the beam "T"-match. The transmitter power had to be considerably reduced to get usable readings with this method. The driven-element length was left unchanged, and the director tuned for maximum current through the meter, with the beam facing the exciting antenna. Strangely, the director was lengthened to slightly more than the driven-element length! The reflector length remained unchanged for either maximum forward gain or best F/B ratio. The F/B ratio was very poor.

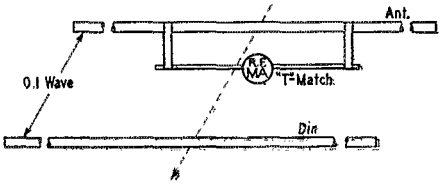


Fig. 2 — The field-strength indicating array. The elements are 1½-inch diameter tubing.

It was felt that this method was also not ideal.[4]

Close Spacing

The next spacing to be tried was the popular close spacing, R-0.15-A-0.1-D. It was decided that the original method of tuning the director with the reflector detuned completely was not necessary and wasted some time, so all elements were set to the same length as the driven element to start.

The director length was very critical. A change of only two inches made a big difference in the field-strength reading, and the optimum director length was considerably greater as compared to the wider spacings. The optimum reflector length also was somewhat greater than any of the previous lengths, and the length for maximum forward gain was also the correct length for best F/B ratio. Shortening or lengthening the reflector immediately ruined the excellent F/B ratio. Any attempt to retune the director showed a definite decrease in forward gain.

Now with the spacings reversed — that is, R-0.1-A-0.15-D — the same procedure was used, with all elements set at the same length for the start. The director length was found to be fairly critical and the reflector length very critical. A change of only two inches produced a large change in both forward gain and F/B ratio. The length of the reflector was slightly greater for maximum F/B ratio than for maximum gain, but again the loss in forward gain at the setting for maximum F/B ratio was small. The director length remained unchanged after the reflector was tuned, and the length was fairly critical.

It was decided to see what unusual figures might evolve with a spacing of 0.1 wavelength for both director and reflector. Again, all lengths were initially set at the length of the driven element. The director could be shortened a few inches for a worth-while increase in gain, and the length was fairly critical. Increasing the reflector length by several inches also gave a good increase in gain, and the setting was not very critical. It was then found that the optimum director length, although unchanged, was now quite critical. The F/B ratio at this point was excellent. However, increasing the reflector length gave a slight improvement in the F/B ratio and had an unmeasurable effect upon the forward gain.

At the higher frequency, where the spacings were slightly greater, in terms of wavelength, the director could be shortened to a point where the field strength appeared maximum, and then

[4] Adjusting the beam while using it as a receiving antenna is based on the assumption that the tuning conditions for optimum gain and front-to-back ratio are the same for receiving as for transmitting. This is true only when the antenna is delivering maximum power to a load — i.e., is terminated in a resistance equal to its own impedance. Since this impedance varies with different tuning conditions the necessary readjustments for maximum output after each change become rather tedious. — *Editor*

further large decreases did not seem to have any effect upon the forward gain. But after the reflector was tuned, the director assumed a more natural length. This seemed to indicate that the spacing figures for such close relative spacings should be figured carefully for optimum results.[5]

Broad-Banding

According to the *Handbook*, an array can be broad-banded by tuning the director to a frequency differing from that of the other elements. So with the R-0.2-A-0.15-D spacing, the array was tuned to resonance at 28.6 Mc. and the director was then detuned to the length determined for 29.2 Mc. — 600 kc. higher in the band. The field strength dropped off only about ⅛ of the reference value and the F/B ratio was apparently unchanged.

However, with the R-0.15-A-0.1-D spacing, it was found that this type of broad-banding seriously affected the forward gain, dropping the field strength to almost half the reference reading. With the reverse spacing, R-0.1-A-0.15-D, the drop in gain was also serious, but somewhat less.

Combined Spacing

The recent trend toward wider spacing of parasitic elements has also produced arrays using combined close and wide spacing. The next logical step was to try some such beam, and the following statements pertain to a spacing of R-0.25-A-0.1-D. This particular set-up brought out some very interesting facts, since these spacings happen to be the optimum for self-resonant parasitic elements used singly.

With all the elements set at self-resonance, it was found that the director could be *increased* in length about one-half inch for a very small increase in forward gain. This made it just longer than the driven element. The gain dropped rather rapidly as the length was varied either way from this setting. The reflector length was increased only two inches for a slight increase in forward gain. The F/B ratio was rather poor, although increasing the reflector length another six inches improved the F/B ratio somewhat. But it was still not as good as all other spacings so far checked. The forward gain was not affected by the adjustment for best F/B ratio. With the reflector tuned for maximum F/B ratio, the director then peaked at "self-resonance."

The reverse spacings, R-0.1-A-0.25-D, were the next to be checked, and it was immediately noticed that with the elements all set to the same length as the driven element, the wider-spaced element was automatically the reflector, until detuned. However, progressive shortening of the director gradually increased the forward gain, with the adjustment very uncritical over an unusually wide range. On the other hand, the reflector length needed to be increased only two inches for maximum forward gain and the peak was quite critical, the field strength dropping off rapidly on either side. The director could now be lengthened by several inches for a fair increase in forward gain. However, the F/B ratio was poor. Retuning the reflector for best F/B ratio unfortunately resulted in a very serious drop in forward gain. Splitting the difference between the two reflector lengths was only a fair compromise.

Wide Spacing

All the spacings in more or less common use, and that could be accommodated in the 12-foot boom length, had now been tested, but one outstanding set of spacings was yet to be investigated: the all-wide-spaced array R-0.25-A-0.25-D. This might give results quite different from any yet observed. So, with no little difficulty, the boom was extended to allow an over-all spacing from reflector to director of 16 foot 6 inches. Wooden props had to be used to keep the elements from sagging out of line in the experimental set-up. The elements were all set at the same length as the driven element in the first step of the now-standardized tuning process. The director then had to be shortened considerably to give the maximum increase in field strength over the reference value. The optimum point was reasonably critical. Now it was found that although the reflector length was not critical, it coincided with the driven-element length as an optimum.

At this point the F/B ratio was excellent, but a definite decrease in back radiation could be secured by increasing the reflector length a few inches. The forward gain dropped somewhat with the reflector adjusted for maximum F/B ratio, and continued to drop gradually as the reflector length was increased considerably past this setting. The F/B ratio was so good, however, that this large increase in reflector length failed to affect it measurably.

In order to check the s.w.r., the "T"-match was tentatively set at the position found to give the lowest s.w.r. for the other wide-spaced arrays, R-0.2-A-0.15-D and reverse. The Micromatch was inserted in the line, and lo, the s.w.r. was only 1.1/1 without any further adjustment! The s.w.r. was checked again during a heavy rainstorm, and although the 70-ohm Twin-Lead was soaked for half its 50-foot length, the s.w.r. was unchanged at 1.1/1. With this all-wide-spaced array, the only critical adjustment was the length of the director, and the only undesirable feature was the ungainly length of the supporting boom.

Borrowing an idea from a well-known demon-

[5] An alternative explanation is that at such close spacing the coupling between elements is so tight that tuning of one has a large pulling effect on the tuning of the other. It is worth noting that in the two-element case the director gain shows a marked peak at 0.1-wavelength spacing and the radiation resistance has a similarly sharp minimum. Both gain and resistance are less critically a function of spacing at wider spacings. — *Editor*

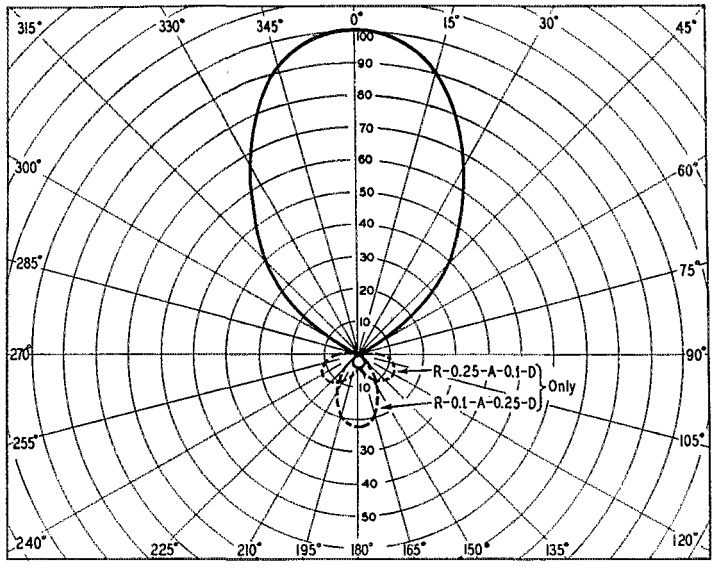


Fig. 3 — The forward field pattern shown is typical of all the three-element arrays tested. The solid line is the pattern for the R-0.2-A-0.15-D antenna. On the relative scale, with the forward field represented by 100, the rear lobe with this antenna had a value of 2. Except for the two dotted-line patterns, the rear radiation with all the antennas was below 5. All arrays were adjusted for best front-to-back ratio in making the patterns.

stration on v.h.f. beams, a large window screen, 7 by 8 feet, was moved about between the array and the field-strength antenna. Only when the screen was within 6 inches of the elements of either array and parallel to them was any change in the field-strength reading observed. On the other hand, interposing a resonant half-wave element anywhere between the two arrays caused the field-strength meter to swing crazily.

Field Patterns

Although the forward gains of the various arrays can be rather roughly compared by field-strength measurements in the plane of the antenna, the gain of the beam at operating angles above the horizon can only be determined by methods beyond the scope of most amateurs. The height above ground can be as important to the vertical directivity as the yet-to-be-found optimum spacing. In comparing the forward gains by field-strength measurements, many errors can be introduced by low radiation resistance and high s.w.r.s. Simply having the same transmitter input for each comparison is far from enough.[6] It was therefore decided to make final comparisons of the various arrays by taking field patterns of the direct radiation, adjusting the transmitter loading so that each array gave the same reference reading on the field-strength indicator. In this way no one array could have an unseen advantage over another.

A circle was drawn on a piece of cardboard, with radials for every 15 degrees of arc. This was slit and fitted around the pipe mast and secured to the edge of the convenient rooftop. After the beam had first been aimed for maximum forward gain, an indicator was attached to the mast and the compass card orientated. When the mast was turned, the 15-degree divisions could be read off with good accuracy. Field-strength readings were taken around the compass for each array and the points then plotted on polar graph paper so that a pattern could be read. See Fig. 3.

Because the peak readings were the same for each array, the major lobes were much the same in shape. There was enough variation to be indicative of which was the sharpest and which was broadest. Also the backward lobes, if any, were directly comparable in extent. See Table I.

These field patterns crystallized the findings of most of the previous tests. Several important facts were quite obvious:

1) No one pattern was greatly superior to the others, when the main lobes were compared for general sharpness.

2) Only the combination wide- and close-spaced arrays had a noticeable backward lobe, with R-0.25-A-0.1-D showing a double lobe to the rear.

3) The R-0.1-A-0.1-D spacings had the broadest front lobe.

4) The most widely-used close spacings, R-0.15-A-0.1-D, had the best F/B ratio.

5) The wide-spaced arrays, R-0.25-A-0.25-D and R-0.2-A-0.15-D, had patterns that compared with the best of the others.

6) The director should be spaced closer than the reflector for best F/B ratio and highest forward gain, no matter what the relative spacings.

[6] This same statement is also true, of course, of measurements made on a given antenna when the tuning is varied by adjusting element lengths, because the tuning varies the impedance of the driven element. To be certain that the same power is going into the antenna under all conditions it would be necessary to rematch (at the antenna) so that the s.w.r. is the same at every measurement. Otherwise considerable error may be introduced. — *Editor*

7) And according to (6) above and using (4) as a pattern, increases over the basic R-0.15-A-0.1-D close spacing might well be made in steps of 0.05 wavelength each, such as R-0.2-A-0.15-D and R-0.25-A-0.2-D.

could be broad-banded or used at frequencies widely separated from resonance without serious losses, was easier to feed in regard to a really low s.w.r., and the over-all supporting boom length was not ungainly.

TABLE I

Experimentally-Determined Element Lengths for Various Spacings

All elements are 1½-inch diameter dural tubing. Element spacings are based on the length of the driven element at 28.6 Mc.; i.e., 0.1 wavelength = 3'3½"; 0.15 wavelength = 4'11"; 0.2 wavelength = 6'7"; 0.25 wavelength = 8'3".

Parasitic-Element Spacings	*Freq.*	*Director Length*	*Driv. Elem. Length*	*Reflector Length*	*Comparative Ratings*	
					F/B Ratio	*Gain **
R-0.1-A-0.1-D	28.6 Mc.	16' 2"	16' 6"	17' 2" Max. gain or 17' 6" Max. F/B	5th	6th
	29.2 Mc.	15' 10"	16' 0"	16' 8" Max. gain or 16' 10" Max. F/B		
R-0.15-A-0.1-D	28.6 Mc.	16' 2"	16' 6"	17' 2" Max. gain and F/B	1st	2nd
	29.2 Mc.	15' 10"	16' 0"	17' 0" Max. gain and F/B		
R-0.1-A-0.15-D	28.6 Mc.	15' 8"	16' 6"	16' 10" Max. gain or 16' 11" Max. F/B	3rd	4th
	29.2 Mc.	15' 4"	16' 0"	16' 5" Max. gain or 16' 6" Max. F/B		
R-0.2-A-0.15-D	28.6 Mc.	15' 10"	16' 6"	16' 6" Max. gain or 17' 0" Max. F/B	2nd	1st
	29.2 Mc.	15' 4"	16' 0"	16' 0" Max. gain or 16' 8" Max. F/B		
R-0.15-A-0.2-D	28.6 Mc.	15' 3"	16' 6"	16' 6" Max. gain or 17' 0" Max. F/B	6th	3rd
	29.2 Mc.	14' 9"	16' 0"	16' 0" Max. gain or 16' 8" Max. F/B		
R-0.25-A-0.1-D	28.6 Mc.	16' 6"	16' 6"	16' 8" Max. gain or 17' 2" Max. F/B	8th	7th
	29.2 Mc.	15' 10"	16' 0"	16' 2" Max. gain or 16' 8" Max. F/B		
R-0.1-A-0.25-D	28.6 Mc.	15' 8"	16' 6"	16' 8" Max. gain or 17' 2" Max. F/B	7th	8th
	29.2 Mc.	14' 6"	16' 0"	16' 2" Max. gain or 16' 6" Max. F/B		
R-0.25-A-0.25-D	28.6 Mc.	14' 10"	16' 6"	16' 6" Max. gain or 16' 10" Max. F/B	4th	5th
	29.2 Mc.	14' 8"	16' 0"	16' 0" Max. gain or 16' 4" Max. F/B		

* With beam adjusted for best F/B ratio.

Conclusions

Because only the direct radiation could be measured, it is not possible to specify which set of spacings is best for low-angle radiation. But the data brought out (and verified by the field patterns) did help to settle the question of spacing from other viewpoints. In general, it was felt that while the close-spaced beams exhibited excellent gain and F/B ratios, the low center impedance, narrow frequency characteristics and feeding difficulties made a compromise spacing more desirable, particularly the R-0.2-A-0.15-D spacing. This wider spacing retained an excellent F/B ratio with no measurable sacrifice in forward gain.

No one formula was universally applicable in determining element lengths. Variable factors such as tubing size and mode of construction made it necessary to establish, by separate excitation, the resonant length of a half-wave as a working reference. This was verified in attempting to tune a neighbor's close-spaced beam of entirely different construction and element sizes. There was no critical adjustment and no real gain apparent when the driven-element length was set by formula. The beam just wouldn't seem to tune. Then the parasitic elements were removed in order that the driven element could be tuned to the operating frequency by separate excitation.

(Continued on page 116)

A Simple Volume Compressor

BY JULES DEITZ,* W3FPD

•Volume compressors for 'phone transmitters are standard equipment these days for in-the-know hams who want to hold their modulation percentage high without danger of overmodulation. Here is a simple circuit that requires only three tubes and will fit into almost any existing speech amplifier.

NOWADAYS it is becoming standard practice to include a compressor circuit in the speech amplifier of a rig. If you haven't already done so, a few hours of work and an investment of less than five dollars will give you the indisputable advantages of volume compression. Many circuits can be devised that will do the trick, but the one to be described seems to be quite simple, and there is no doubt about its effectiveness. It uses only three tubes and a few other parts.

The Circuit

The circuit, shown in Fig. 1, uses a triode-connected 6AB7 as the compressor tube. This 6AB7 should be located somewhere along the line in your speech amplifier, preferably ahead of the driver or the amplifier's output stage. It is shown as it would be connected in a resistance-coupled circuit, but it should be possible to substitute transformer coupling instead of R_2 and C_3, inasmuch as the 6AB7 is connected as a triode. At W3FPD, the lead marked "from output of speech amplifier" is connected to the hot side of the 500-ohm line connecting the speech amplifier to the modulator. If your arrangement is different, you can bridge a low-impedance tap of your modulation or output transformer with a plate-to-line transformer (its quality is unimportant, but the insulation must be adequate).

*% Technical Information Division, Federal Communications Commission, Washington 25, D. C.

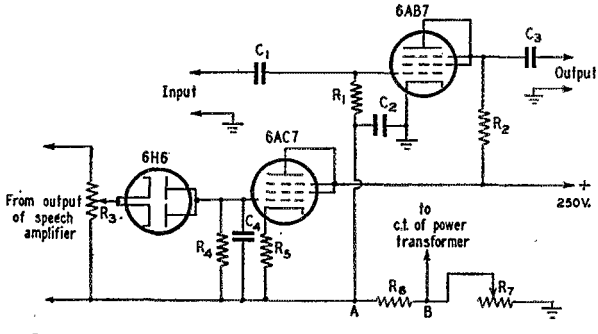


Fig. 1 — Wiring diagram of the simple audio volume compressor.
C_1, C_3 — 0.1-μfd. 400-volt paper.
C_2, C_4 — 0.25-μfd. 400-volt paper.
R_1, R_4 — 0.22 megohm.
R_2 — 22,000 ohms.
R_3 — 50,000-ohm potentiometer.
R_5 — 470 ohms.
R_6 — 10,000 ohms, 10-watt wire-wound.
R_7 — 1000 ohms, 10-watt adjustable wire-wound.

A potential of roughly 3 to 5 volts is needed at R_3 for control.

When there is no audio voltage at the output of the amplifier, the triode-connected 6AC7 bias generator has a small amount of self-bias developed across R_5. When audio voltage appears across R_3 (from the output of the speech amplifier), it is rectified by the 6H6 and applied to the grid of the 6AC7 across R_4. It appears as a negative voltage that increases with the speech-amplifier output. Hence the 6AC7 cathode current will decrease, depending upon the developed bias and the 6AC7 characteristic. Thus far we have a positive voltage with respect to ground appearing at point A, and this voltage will decrease as the output of the speech amplifier increases. But there is a (practically) constant negative voltage to ground at B developed by the steady bleed current through R_7. This voltage should always be higher than the voltage developed across R_6 by the 6AC7 current. A strong audio voltage appearing across R_3 will reduce the 6AC7 cathode current and hence the net voltage at A becomes more negative. This negative voltage, applied to the 6AB7 grid through resistor R_1, decreases the gain through the speech amplifier. The decrease in amplifier gain is proportional to the speech-amplifier output, and the desired volume-compressor action is readily accomplished.

The triode-connected 6AB7 retains the remote cut-off characteristic to a degree that is satisfactory for this application. The time delay of the circuit is determined by the combination C_4 and R_4. Capacitor C_2 should be located close to the grid of the 6AB7, to minimize coupling by the loop to extraneous noise and fields. It was also found advisable to locate the input circuit of the 6AC7 close to its source of audio drive. By observing these simple precautions, no difficulty should be experienced in adapting this device to a 'phone transmitter.

(Continued on page 120)

Come Aboard, OM!

Radio Amateurs and the New Naval Reserve

BY D. S. WICKS,* W3JDK/W1IZO

THE Navy's plan for the Electronic Warfare component of the new Naval Reserve has been realized to date by an active and fast-growing organization throughout the U.S.A.

Backing up this training plan, the Navy is providing each of its more than 300 Reserve Armories with a radio station, complete with radioteletype facilities, radars, direction finders and a well-equipped electronics laboratory. In addition to the large stocks of gear set aside from war surplus the Navy has purchased test equipment, television kits, tools and other items necessary for complete electronics training. For localities where no armory is to be established, similar equipment installations are being provided for some 400 Electronic Warfare Drill Quarters, which are facilities smaller than the armories and exclusively for electronic-warfare training. Approximately 175 seagoing Navy ships, including destroyer escorts, submarines and smaller craft, have been stationed on both coasts, in the Great Lakes and along the Mississippi River to augment the Reserve training facilities ashore. A maximum of 5000 small radio stations are planned for Electronic Warfare platoons in towns too small to support either an armory or an Electronic Warfare drill quarters.

All personnel of the Reserve whose naval duties will involve research, design, production, installation, maintenance, and operation of the equipment and techniques of modern electronics are included in the Electronic Warfare component of the Reserve. The training program has been broken into three general fields:

1) Technical Electronics (training of Electronics Technicians Mates, Fire Control Technicians, Electronics Officers)

2) Combat Information Center (training includes Radarmen, Sonarmen, Telemen, CIC Officers)

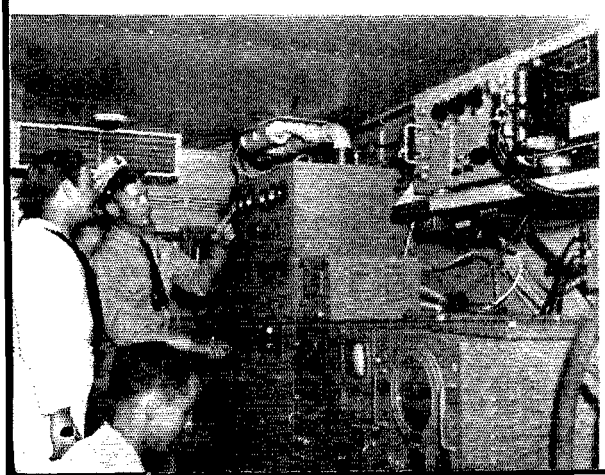
3) Operational Communications (training of Radiomen, Signalmen, Communications Officers)

At the present time, Naval reservists who come under the Electronic Warfare program are either enrolled as members of the divisions of the Organized Reserve using the armories as meeting places, or are assigned to Electronic Warfare companies and platoons of the Volunteer Reserve, and in the latter event they may use either the armories or the Electronic Warfare drill quarters. In very small communities even the home of a reservist may occasionally be utilized as a temporary meeting place.

As was expected, some of the most interested and enthusiastic members of the Electronic Warfare component of the new Naval Reserve are amateurs. A considerable number of amateurs who were members of the prewar Naval Communication Reserve are now enrolled in Organized or Volunteer Reserve Electronic Warfare units and usually form the active nucleus of such units.

One of the outstanding operating activities is the Naval Reserve Communication Network, which is a comprehensive network of armory, drill quarters and individual reservists' radio stations throughout each Naval district. Several hundred such radio stations are now in operation, and true to Navy and amateur tradition have already served the public on many occasions by providing emergency communications, the Texas City and

* Commander, USN, Naval Reserve Planning Officer (Electronic Warfare); Room 3062, Arlington Annex, Navy Dept., Washington 25, D. C.



In the new Naval Reserve, particular emphasis is placed on instruction in the use of new electronic devices. Here a chief explains the workings of a mobile air-search radar.

• **"The continuing coöperation of radio amateurs with the United States Naval Reserve is gratifying to the Navy Department. Geared as it is to the many advances in the electronics field, the Electronic Warfare component of the new Naval Reserve merits the interest being shown by the skilled operators and technicians of whom amateur radio is comprised. The U.S. Navy is indebted to the thousands of licensed amateurs, who, as Naval Reservists, served faithfully in the prewar Naval Communication Reserve and as technicians, operators and officers during the past war."**

T. L. SPRAGUE
Rear Admiral, USN
Chief of Naval Personnel

Texas-Oklahoma tornado disasters being notable in this connection. To facilitate emergency communications, in addition to the transceivers and gas-engine generators supplied to all radio stations, more than 50 mobile radio stations complete with five kw. of independent power have been strategically placed throughout the continental U.S.A.

Realizing that Naval Reserve radio drills might cause undesirable congestion on the ham bands, it has been directed that only Navy frequencies may be used for such purposes. A recent letter signed by the Chief of Naval Communications allocated these Navy frequencies for the Naval Reserve Communication Network and set forth the conditions under which Naval Reserve radio stations would operate, as follows: ". . . Amateur radio call signs, frequencies and operating techniques will be used for the usual amateur radio type operations as well as to provide emergency communications to localities in the event of disasters such as storms, floods and fires, including practicing therefor. When operating on amateur frequencies, FCC amateur radio rules and regulations will be complied with. Only those reservists who are also licensed by the FCC as amateur radio operators may operate Naval Reserve radio equipment on amateur radio frequencies. Amateur frequencies will *not* be used for

♦

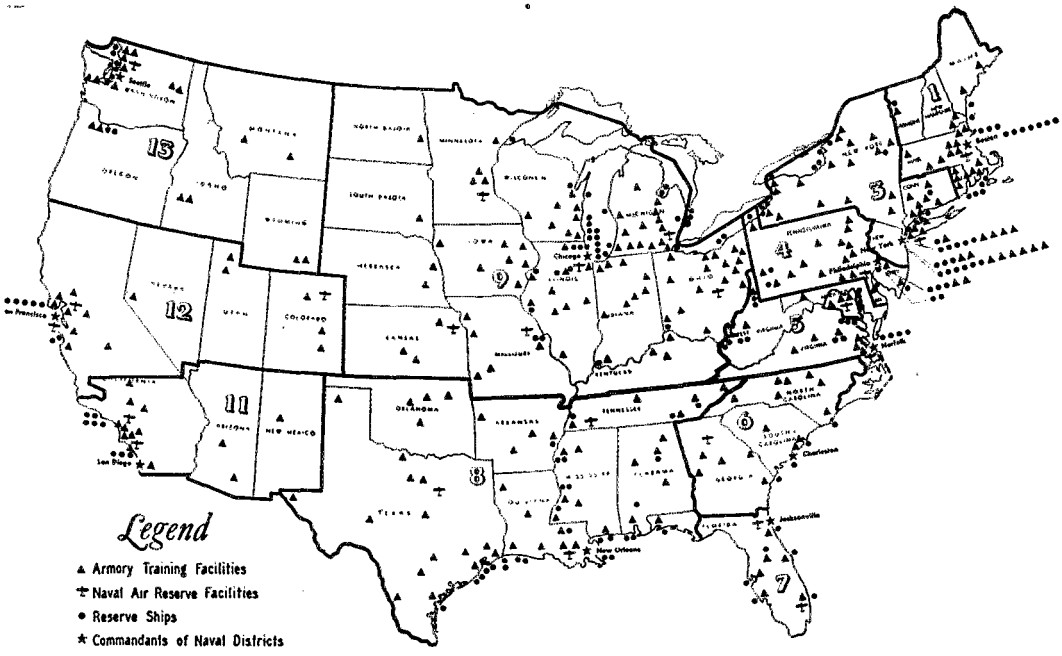
"Only those Reservists who are licensed by FCC as amateurs may operate Navy gear on amateur frequencies." This installation participated in the recent Texas-Oklahoma disasters.

♦

Distinctive "K" amateur calls already assigned to Naval Reserve units, and their locations:

K1NR Providence, R. I.
K1NRA Lynn, Mass.
K1NRB Boston, Mass.
K1NRC Portland, Maine
K1NRD Noroton Hts., Conn.
N1NRE New Haven, Conn.
K1NRH Hartford, Conn.
K1NRI Woonsocket, R. I.
K1NRR Worcester, Mass.
K1NRS Squantum, Mass.
K1NRU Springfield, Mass.
K1NRV Hingham, Mass.
K1NRW Fall River, Mass.
K1NRX New Bedford, Mass.
K1NRY Bangor, Maine
K2USN Jersey City, N. J.
K2NR Navy Yard, N. Y.
K2NRB Whitestone Landing, N. Y.
K2NRC Tompkinsville, N. Y.
K2NRD Ft. Schuyler, N. Y.
K2NRE Rochester, N. Y.
K2NRF U.S.S. *Prairie State*, N. Y.
K2NRG Glens Falls, N. Y.
K2NRH Yonkers, N. Y.
K2NRI Newburgh, N. Y.
K2NRN Niagara, N. Y.
K2NRR Camden, N. J.
K2NRS Perth Amboy, N. J.
K2NRU Hackensack, N. J.
W3USN Naval Gun Factory, D. C.
K3USN Navy Yard, Phila., Pa.
K3NRB Ft. McHenry, Md.
K3NRC Chester, Pa.
K3NRE Erie, Pa.
K3NRP Phila., Pa.
K3NRR Reading, Pa.
K3NRW Navy Dept., Wash., D. C.
W4USN Norfolk, Va.
K4NR Jacksonville, Fla.
K4NRA Miami, Fla.
K4NRB Pensacola, Fla.
K4NRC Tampa, Fla.
K4NRD Tallahassee, Fla.
K4NRE De Land, Fla.
K4NRF Key West, Fla.
K4NRO Orlando, Fla.
K4NRV Memphis, Tenn.
K4NRY Louisville, Ky.
K4NRZ Lexington, Ky.
W5USN New Orleans, La.
K5NRA Sabine, Texas
K5NRB Fort Worth, Texas
K5NRC Abilene, Texas
K5NRE El Paso, Texas
K5NRI Oklahoma City, Okla.
K5NRJ Stillwater, Okla.
K5NRK Tulsa, Okla.
K5NRL Little Rock, Ark.
K5NRM Pine Bluff, Ark.
K5NRN Fort Smith, Ark.
K5NRQ Lafayette, La.
K5NRR Baton Rouge, La.
K5NRS Shreveport, La.
W6USN San Diego, Cal.
KH6NR Pearl Harbor, H. I.
*K6NRA Santa Barbara, Cal.
K6NRB Long Beach, Cal.
K6NRC Santa Ana, Cal.
K6NRH Hollywood, Cal.
K6NRL Los Angeles, Cal.
K6NRO Stockton, Cal.
K6NRP Sacramento, Cal.
K6NRQ Treasure Island, Cal.
K6NRR Oakland, Cal.
K6NRS Fresno State College, Cal.
K6NRV Vallejo, Cal.
W7USN Seattle, Wash.
K7NRA Walla Walla, Wash.
KL7NR Kodiak, Alaska
K7NRB Gray's Harbor, Wash.
K7NRR Cheyenne, Wyo.
K7NRW Salt Lake City, Utah
K8USN Cleveland, Ohio
K8NR Detroit, Michigan
K8NRB Battle Creek, Mich.
K8NRJ Jackson, Mich.
K8NRL Lansing, Mich.
K8NRO Youngstown, Ohio
K8NRP Lima, Ohio
K8NRQ Mansfield, Ohio
K8NRS Cincinnati, Ohio
K8NRT Toledo, Ohio
K8NRW Warren, Ohio
K8NRX So. Charleston, W. Va.
K9NR Indianapolis, Ind.
W9NR Chicago, Ill.
K9NRA Quincy, Ill.
K9NRJ Green Bay, Wisc.
K9NRK Manitowoc, Wisc.
WØUSN Sioux City, Iowa
KØUSN Minneapolis, Minn.
KØNRC Denver, Col.
KØNRD Des Moines, Iowa
KØNRE Cedar Rapids, Iowa
KØNRH St. Louis, Mo.
KØNRI Kansas City, Mo.
KØNRT Fargo, N. Dakota
KØNRW Wichita, Kans.
KØNRX Winfield, Kansas

* First amateur radio "K" issued in the continental U.S.A.



Naval Reserve facilities are nation-wide. This map shows the approximate locations of present and planned armory and supplementary facilities. There is one near you.

Naval Reserve communications drills or regular Naval Reserve traffic. . . ." The Navy Department assures amateurs that the amateur bands will be used for amateur radio purposes only and never encroached upon for official Naval Reserve usage.

In addition to the Navy call signs which are used when drilling on the Naval Reserve Communication Network, arrangements have been made with the FCC to issue amateur call signs to all Reserve radio stations. About 300 of these amateur calls will be of distinctive letter combinations with the prefix "K." QSL cards are being procured for use of these stations when working in the amateur bands.

To assist the Planning Officer for this Naval Reserve program, a number of reservists are maintained on active duty in the various Naval districts. Their job is to organize and administer the Electronic Warfare program at the district level of command. There follows a list of the amateurs presently filling such positions throughout the country: *Boston:* Cmdr. Kaulback, ex-W1LV; Cmdr. Coleman, W1NK; Lt. Cmdr. Slavin, W1FGC; RM1/c Gagnon, W1LQQ; ETM1/c Ajootian, W1QIE. *New York:* Lt. Cmdr. Fischer, W2LA; CETM Philactos, W2IWH; *Philadelphia:* Cmdr. Martin, W3QV; Cmdr. Williams, W3ZAE; *Norfolk:* Cmdr. Colbert, W6ADG; *Charleston:* Cmdr. Dean, W4DAW; Cmdr. Stewart, W4CE; Lt. Cmdr. Bowden, W1AVG; *Jacksonville:* Lt. (jg) Fletcher, W4AEF; CETM Cunningham, W4SQ; CRM Wilson, ex-W4AT; *New Orleans:* Cmdr. Binford, W5MBC; Cmdr. McCoy, W4OI; Lt. Cmdr. Zammit, W5HKP; Lt. Cmdr. Powell, W5IZJ; CRM Edmiston, W5GRG; ACETM Schleiff, W5JKT; ACETM Lee, W5GCJ; *Chicago:* Cmdr. Wahl, WØFED; Lt. Cmdr. Tucker, W9HF; Lt. Cmdr. Larkin, W9RKV; ACETM Bobo, W8PYZ; ETM2/c Baney, WØZZA; *San Diego:* Cmdr. Lowe, ex-W9NP; Lt. Cmdr. Estep, W6DEQ; Lt. Cmdr. Wagar, ex-W2AQ; CRM Starge, W6HKX; *San Francisco:* Cmdr. Shields, W9PWO; Lt. Cmdr. Gibson, W6HTY; Lt. (jg) Twomey, W2TBF; Ens. Ashe, W7OVQ; CETM Huckaby, W6VWF; *Seattle:* Lt. Cmdr. Tatro, W7EKW; Lt. (jg) Smith, W7BKW; ACETM Leonard, W7DPU; *Washington:* Lt. Rigor, W3QL; CETM Carreras, W3EC; RM1/c Warner, W3MYM.

The Electronic Warfare Plan specifies the maintenance of close liaison between the Planning Officer and the ARRL and Institute of Radio Engineers. Currently, this liaison is maintained for coöperation in the many phases of Naval Reserve activities with Mr. George Bailey, W2KH, who is executive secretary of IRE as well as president of ARRL.

(Continued on page 122)

ARRL's 14th Sweepstakes

Medallions to Section Leaders — C.W. and 'Phone Certificates to Each Club — Use Any Ham Band(s) — Nov. 15th–17th, 22nd–24th

BY F. E. HANDY,* W1BDI

CONTEST PERIODS

Time	*Start*	*End*
	Nov. 15th & 22nd	Nov. 17th & 24th
EST	6:00 P.M.	3:01 A.M.
CST	5:00 P.M.	2:01 A.M.
MST	4:00 P.M.	1:01 A.M.
PST	3:00 P.M.	12:01 A.M.

THIS annual competition, one of ARRL's "big three," is for the individual operating leadership of each ARRL section. "SS" operators on c.w. compete with other telegraphing operators; those using 'phone compete only with other voice operators having similar geographical advantages and handicaps. A contestant [1] is regarded as *one* person, with no help permitted by any other person during the contest. The Sweepstakes is operating fun, tests stations and is a builder of operator confidence and ability. New records are piled up in each SS.

Exchanges between stations (proof of QSO) follow the order of message parts. The aim is to work as many stations as possible. Points derived from such work are multiplied by the number of *different* ARRL sections worked, i.e. sections with which you have had at least a one-way exchange in the contest. The contest information is like a message preamble, but for city and state we substitute the name of the ARRL section.[2] At the end of the activity each operator merely totals or summarizes his points and sends them in for cross-checking. Mimeographed contest forms will be sent gratis, on receipt of radiogram or postcard request; however, the sheets are not required, nor is any advance entry. You can follow the form shown with this announcement or ask for the mimeographed forms to make it easy to forward your record of exchanges to ARRL.

You can operate a total of 40 hours in the two contest periods, dividing time between week-ends as you wish. Every licensed amateur in every section is urged and invited to take part. On 'phone use "Calling any Sweepstakes station." On c.w. the general call is "CQ SS CQ SS CQ SS de W . . . W . . . W. . . ." Sometimes a *single* snappy 'CQ SS" will net several exchanges.

Awards

Medallions for this year's SS winners, two *in each section*, will go to the c.w. and radiotelephone winners. Certificates will recognize competitive effort within clubs, where three or more club members submit logs identifying their work with one particular club. *At least three* stations must compete *and report*, to rate either a club-'phone or a club-c.w. SS certificate. The *three or more* individual club members, or new hams invited and reported by such a club, in addition to sending a contest report must have their club secretary write Hq. listing their individual calls and scores and the total of such scores. *Only the aggregate of*

This medallion will be presented to c.w. and 'phone winners in the 14th ARRL Sweepstakes. It provides dignified and lasting proof of individual accomplishment in one of the most popular of operating contests.

HOW TO SCORE

All contacts count:

One point for each QSO when "receipt" is completed for an exchange one way.

Two points for each QSO when the required information is exchanged both ways.

For final score: Multiply totaled points by the number of *different* ARRL sections worked, that is, the number in which at least one bona fide SS point or exchange has been made.

Multiply this by 1.25 if you used 100-watts-or-less transmitter input *at all times*.

*Communications Mgr., ARRL.

[1] The highest individually-attained score of any *one* of the operators of amateur stations having more than one operator is the official score for such a station. Circle any entries of stations and/or sections that cannot count in the official total. Awards will be made to the individual operator accredited with this total.

[2] See page 6.

EXPLANATION OF "SS" CONTEST EXCHANGES

Send Like a Standard Msg. Preamble, the . . . . . NR		*Call*	*CK*	*Place*	*Time*	*Date*
Exchanges	Contest info. numbers, 1, 2, 3, etc., for each station worked	Send your own call	CK (RST report [3] of station wkd.)	Your ARRL section [2]	Send time of transmitting this NR	Send date of QSO
Purpose	The QSO NR tells how you are doing; aids Hq. in checking	Identification	All stations exchange complete reports	Establishes locations	Time and date in the contest periods prove claims	

scores confirmed by receipt at ARRL of individual contest logs shall count for the club.

To encourage as many locally-competing operators as possible, and the fostering of individual's operating achievement by clubs, ARRL presents a gavel for the greatest aggregate club-member scores ('phone and c.w.) for which logs are actually submitted to Headquarters. Club officers' claims require at least three 'phone *or* c.w. entries to validate our receipts for the aggregate score. In addition, some clubs, to equalize differences of either size or geographical location, sometimes make private wagers under their own supplementary arrangements.

The handsome medallion to be presented c.w. and 'phone winners is shown in the photograph. It provides dignified and lasting proof of individual accomplishment.

[3] Send CK and numerals or just the three-number RST report. In 'phone exchanges only two numerals need be used. In 'phone reports say "*Readability . . . Strength. . . .*" This avoids confusing abbreviations. The state is the same as the Section in some cases, but see *QST*, p. 6, and identify your ARRL section as, for example, Eastern Mass., R. I., W. N. Y., Neb., E. Bay, N. Y. C.-L. I.

STATION W. . . . —SUMMARY OF EXCHANGES, FOURTEENTH A.R.R.L. ALL-SECTION SWEEPSTAKES

Freq. Band (Mc.)	*Time On or Off Air*	*Sent (1 point)*				*Time*	*Date (Nov.)*	*Received (1 point)*				*Time*	*Date (Nov.)*	*Number of Each Different New Section as Worked*	*Points*
		NR	*Stn.*	*CK-RST*	*Section*			*NR*	*Stn.*	*CK-RST*	*Section*				
3.5	On 6:10 P.M.	1	W1AW	589	Conn.	6:12 P.M.	15	7	W8JIN	589	Ohio	6:14 P.M.	15	1	2
"	"	2	"	589	"	6:15 "	15	6	W1BFT	599	N. H.	6:17 "	15	2	2
"	"	3	"	579	"	6:20 "	15	6	W1BJP	579	Vt.	6:21 "	15	3	2
7	"							24	W5KIP	479	Ark.	8:05 "	15	4	1
"	"	4	"	479	"	9:15 "	15	38	W5HJF	579	N. Mex.	7:15 "	15	5	2
"	"	5	"	579	"	9:28 "	15	45	W7KEV	479	Nev.	6:20 "	15	6	2
"	"	6	"	589	"	9:33 "	15	59	W8RSP	589	Ohio	9:34 "	15	..	2
"	Off 9:35 P.M. Time 3 hrs. 25 min.														
	On 6:45 P.M.														
14	"	7	"	569	"	7:15 P.M.	16	94	KL7AD	569	Alaska	2:18 P.M.	16	7	2
"	"	8	"	569	"	7:25 "	16	127	W7ZN	569	Idaho	5:28 "	16	8	2
"	"	9	"	469	"	7:35 "	16	114	W7HRM	569	Utah-Wyo.	5:30 "	16	9	2
3.5	"	10	"	579	"	9:10 "	16	130	WØLHS	579	N. D.	8:05 "	16	10	2
"	Off 9:15 P.M. Time 2 hrs. 30 min.														

Total Operating Time: 5 hrs. 55 min. 3.5, 7 and 14 Mc. used. 10 Sec., 21 Pts. 85 Watts Input Power

Number and names of operators having a share in above work.....

Claimed score: 21 points × 10 sections = 210 × 1.25 (85 watts input) = 262.5

I hereby state that in this contest I have not operated my transmitter outside any of the frequency bands specified on my station license, and also that the score and points set forth in the above summary are correct and true.

Signature .....

Address.....

Tube Line-Up.....

Number Different Stations Worked.....

Exchanges by Radio

Before points or sections can be claimed, at least a one-way six-part exchange must be completed and acknowledged between two stations as "proof of QSO." [4] (It is not essential that each station worked be taking part to make points that count. Ask the operator to take your preamble and come through with like information. Refer to this announcement.)

More Rules

1) Contest exchanges must be sent in the order indicated, that of ARRL message preambles. Incomplete exchanges or wrong order of sending justifies disqualification.

2) Entries are (a) in the low-power class, or (b) high-power class. Any work on high power places all the score in the high-power class. Show power used for each QSO or groups of QSOs.

3) Show operating time for each period on the air in the SS, and the total of such operating time.

4) Mark logs for "'phone" or "c.w." entry. Group work by either method.

5) All work must fall in the contest periods.

6) Award Committee decisions shall be accepted as final.

7) Reports from all stations must be postmarked no later than December 8, 1947, to be considered for awards.

Report Results

Report to ARRL, West Hartford, Conn., as soon as the contest is over. Use the log form shown in the example. List all persons [1] who were at your station and responsible for any part of the score, indicating any part they played. All hams are requested to submit lists (even if scores are small) to help support claims from other stations. *Mail your contest report immediately to insure that your results are credited.*

---

[4] There is no point in working the same station more than once in the contest after two points have been earned. If but one point is made the first time, you can add a point by working this station again for exchange in the opposite direction.

Silent Keys

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

W4ECB, Major Frank C. Ziglar, Charlotte, N. C.

W5CAS, James A. Carney, San Antonio, Texas

W5KUU, ex-W9HO, L. H. Weeks, Dallas, Texas

W6EJZ, Charles M. Feay, South Gate, Calif.

W7FDL, Charles A. Lynch, Rosalia, Washington

W7KTA, Raymond H. Butler, Pheonix, Arizona

Ex-W8BXZ, Robert B. McIntyre, Warren-Niles, Ohio

W9JTE, Stanton E. Kirk, Adams, Indiana

VE7HA, Fred Taylor, New Westminster, B.C.

Associate Member Roland S. Davidson, West Lynn, Mass.

Engineer-in-Charge Forest Redfern, FCC Eastern Division

RECEIVERS — improved Reinartz tuners, Armstrong superregenerators, and multistage t.r.f. jobs with crystal detector and a.c. filament supply — continue to be lively topics for discussion, we glean from our October 1922 *QST*. The trend is certain — there will be rebuilding aplenty this fall in preparation for the 1922 Transatlantics, scheduled for December. Two-way work is the goal this year, and already English, French, and Dutch amateurs have signified their intention of participating.

John L. Reinartz, 1QP, tells in this issue how to add selectivity and audio regeneration to his popular tuner. And from England we learn of superior performance with the Reinartz circuit when r.f. preamplification is added. Reporting on "Another Month of Superregeneration," Editor Warner writes that amateur experience with E. H. Armstrong's new invention continues to be disappointing as concerns reception of c.w. and DX, although many persons claim sensational results in receiving local radiophones. For the amateur interested in the receiver refinements of extra stages and batteryless operation, we have articles by M. C. Batsel, "Multistage Amplifiers," and by P. D. Lowell, "Amplifier Operation from A.C. Supply."

The whys and wherefors of the electric wave filter, a newly-developed device, are thoroughly discussed by Dr. Frank B. Jewett of the Western Electric Company. Design formulas, circuits, and applications for both high- and low-pass filters are treated in detail. Also along mathematical lines is Paul G. Watson's excellent article on "Power Factor Applied to Radio Condensers." Further timely offerings are Boyd Phelp's "Break-In for C.W.," Alpha A. Learned's (1AAU) "A Calibrated External Heterodyne and Wave Meter," and LeRoy Moffett's (5ZAV) "A 122-Foot Tower."

The rudiments of operating a 3-circuit tuner and reading a hydrometer are outlined in a new department, "The Junior Operator." And to add light touch to this issue, we have "The Prophet's" parable on radiophones and the amateur.

From the Midwest Division comes word that George S. Turner, 9ZAD, has been elected division manager, replacing L. A. Benson, resigned because of business pressure. August divisional reports show c.w. still outrunning spark in traffic-handling volume, responsible for 63% of the total.

Two s.y.t.s — Misses Winifred Dow, 7CB, and Marion Garmhausen, 3BCK — grace the pages of the "Who's Who" section this month. Featured in station descriptions are 4BQ, Rome,

(Continued on page 122)

Using Selenium Rectifiers

A Symposium

S.R. Circuits and Their Applications

BY RALPH BERKMAN,* W7HWY

To many, the new selenium rectifiers are just a substitute for the rectifier tube of the more common a.c.-d.c. sets, but to those who have investigated their possibilities, they represent the heart of an ideal power supply for many of the

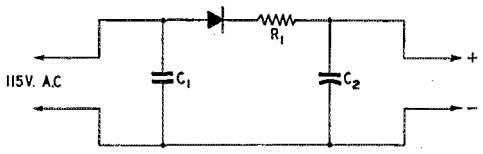


Fig. 1 — A simple half-wave circuit.
C_1 — 0.05-μfd. 600-volt paper.
C_2 — 40-μfd. 200-volt electrolytic.
R_1 — 25 to 100 ohms.

pieces of gear that the ham, for one reason or another, is continually acquiring. Using a rectifier of this type, the power supply will require very little space as compared to the more conventional type, and components may be placed wherever convenient. If operated within their limits, rectifiers of this type will give off very little heat. No warm-up period is required, as in the case of the filaments of tube rectifiers. In VFOs, converters and receivers, heat has always been a problem and in these applications the dry rectifier with its low heat radiation merits special consideration.

Construction of the selenium cell varies with the various manufacturers, but all are basically the same in that the selenium is placed on one electrode and then crystallized. The plate is then formed and the barrier film forms on the surface of the selenium. Against this the other electrode is pressed, making up the cell. Cells are stacked to produce the desired current and voltage rating, making up what is known as the selenium rectifier. Rectification action takes place in much the same manner as in any other rectifier. In the forward direction there is good conductivity but in the back direction there is not perfect cutoff, and, as a result, there will be some a.c. ripple content.

These units come in the 100-, 150- and 200-ma. sizes and the additional cost of the larger sizes is very little. The efficiency of rectifiers of this type run high. The voltage drop across a unit averages about 5 volts. The critical temperature of these units is very close to 155° F. Therefore, protective resistors should be installed in series with them to limit the condenser charging current to a safe value. Temperatures may be kept down by not trying to push the unit to its full capacity, and then some. Give it a little safety margin and you will get longer life and have a trouble-free power supply.

All selenium rectifiers mount with a No. 6 screw and the unit is insulated from the mounting hole. This permits mounting directly to any metal surface, which will help to dissipate some of the heat. It will be found that mounting the unit in a vertical position will provide better air circulation. If these few precautions are observed, up to 450 volts at 200 ma. is available with standard component parts and you won't have a supply that is several times heavier than the rig it powers.

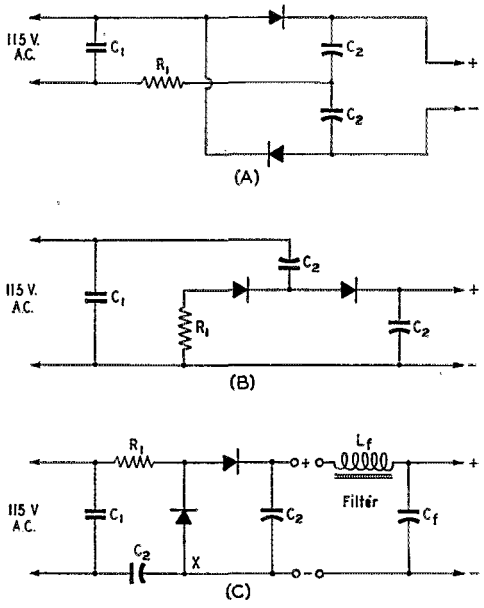


Fig. 2 — Voltage-doubling circuits.
C_1 — 0.05-μfd. 600-volt paper.
C_2 — 40-μfd 200-volt electrolytic.
C_f — Filter condenser.
R_1 — 25 to 100 ohms.
L_f — Filter choke.

* 6864 Holly Park Drive, Apt. 506, Seattle, Washington.

Transformerless Circuits

Although selenium rectifiers may, of course, be used in any of the standard transformer-rectifier-filter systems, it is natural to associate their advantage of compactness and light weight with transformerless supplies. Fig. 1 is a straightforward half-wave rectifier circuit which may be used in applications where 115 to 130 volts d.c. is desired. It makes an ideal bias supply, for instance. In this, as well as other circuits, it will be observed that the negative side of the output is common with one side of the a.c. line and it is suggested that this side be fused with a ½-ampere fuse.

Fig. 2 shows several voltage-doubler circuits. Of the three, the one shown at B is the most desirable since there is no series condenser. It is a full-wave circuit and there will be very little ripple voltage appearing at the output. On the other hand, the circuit of C has one very desirable feature in that point *X* is common to both condensers in the rectifier and also to the first condenser in the filter. This means that a single-unit three-section condenser may be used, saving space. If less than 100 ma. is being used, this, in the author's opinion, is the best circuit. The ripple content under these conditions, and the leakage between sections, will not be excessive. These three circuits will find ready application in communications receivers, converters, VFOs, test equipment, etc., and especially in cases where heat has been a problem.

Fig. 3-A and -B shows voltage-tripler and quadrupler circuits respectively, for use where higher voltages are desired. They are ideal for powering the small portable or fixed-station rig and the compactness and light weight will be appreciated. The writer uses the tripler circuit for powering a small 'phone-c.w. rig where the weight of a comparable conventional power supply would make portable operation prohibitive.

All components are standard. C_1 in all circuits is for "hash" filtering and its value is not critical. A 0.05-μfd. 600-volt-working condenser should serve. All other condensers should be 40-μfd. 200-volt units, except those in the tripler and quadrupler circuits. Those in the circuit of Fig. 3 should have a rating of 450 volts working. In the

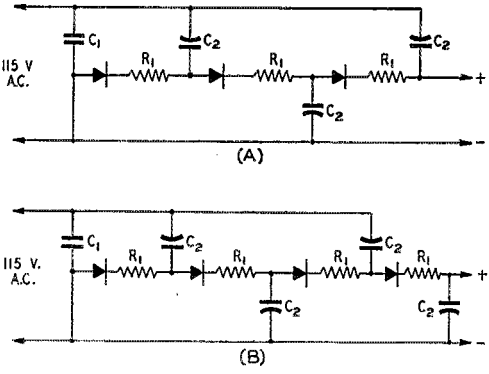


Fig. 3 — Voltage-tripling and quadrupling circuits.
C_1 — 0.05-μfd. 600-volt paper.
C_2 — 40-μfd. 450-volt electrolytic.
R_1 — 25 to 100 ohms.

voltage multipliers and in other circuits where a condenser is passing the full current, good condensers should be used because the a.c. ripple mentioned above appears across the condenser and increases as the load increases. If the current is allowed to become too high, it will cause heating and deterioration of the condenser. This can be kept to a minimum by using a capacitor of high value and making sure it is of good make. Aside from this, no particular difficulties should be encountered even when using voltage-tripler and quadrupler circuits. R_1 should be 25 ohms, but if it is found that the rectifier units are running a little too warm, this value may be increased to as high as 100 ohms, with a corresponding drop in output voltage, of course.

A single-section filter, as shown in Fig. 2-C, will provide sufficient smoothing for most applications.

At W7HWY the circuit of Fig. 3-A is being used for powering a BC-474 and the circuit in Fig. 1 for the receiver portion. The transmitter is running 15 watts on 75 'phone and 18 watts on 80 c.w., while on the road, and in my estimation it's tops.

Summing it all up, for the guy who is looking for a lot out of little things, this is economical power in a mighty small package.

A Portable-Emergency S.R. Power Supply

BY R. F. KNOCHEL,** W9CO

THE compactness of selenium rectifiers and the fact that they do not require filament voltage make them particularly suited to power supplies for portable-emergency work.

Fig. 4 shows the circuit of a vibrator pack which will deliver an output voltage of 400 at 200 ma. It will work with either 115-volt a.c. or 6-volt battery input. The circuit is that of the familiar voltage tripler whose d.c. output voltage is, as a rough approximation, three times the peak voltage delivered by the transformer or line. An

** 602 Wyatt Avenue, Lincoln, Ill.

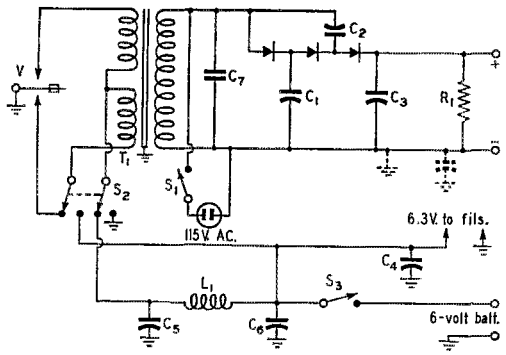


Fig. 4 — Circuit diagram of a compact vibrator-a.c. portable power supply.

C_1 — 60-μfd. 200-volt electrolytic.
C_2 — 60-μfd. 400-volt electrolytic.
C_3 — 60-μfd. 600-volt electrolytic.
C_4 — 25-μfd. 25-volt electrolytic.
C_5, C_6 — 0.5-μfd. 25-volt paper.
C_7 — 0.007-μfd. 1500-volt paper.
R_1 — 25,000 ohms, 10 watts.
L_1 — 25-μhy. 20-amp. choke.
S_1 — 115-volt toggle switch.
S_2 — D.p.d.t. heavy-duty knife switch.
S_3 — 25-amp. switch.
T_1 — See text.
V — Heavy-duty vibrator.

interesting feature of the circuit is the fact that the single transformer serves as the vibrator transformer when operating from 6-volt d.c. supply and as the filament transformer when operating from an a.c. line. This is accomplished without complicated switching.

The vibrator transformer, T_1, is a dual-secondary 6.3-volt filament transformer connected in reverse. It may also consist of two single transformers of the same type with their primaries connected in series and secondaries in parallel, both windings being properly polarized. In either event, the filament windings must have a rating of 10 amperes if the full load current of 200 ma. is to be used. Some excellent surplus transformers that will handle the required current are now available on the surplus market. The vibrator also must be capable of handling the current. The hash-filter choke, L_1, must carry a current of 20 amperes.

The following table shows the output voltage to be expected at various load currents, depending upon the size of condensers used at C_1, C_2 and C_3.

C_1, C_2, C_3 (μfd.)	Output Voltage at 50 ma.	100 ma.	150 ma.	200 ma.
60	455	430	415	395
40	425	390	360	330
20	400	340	285	225

In operating the supply from an a.c. line, it is always wise to determine the plug polarity in respect to ground. Otherwise the rectifier part of the circuit and the transmitter circuit cannot be connected to actual ground except through bypass condensers.

Navy Day Receiving Competition

To Be Held on October 27th

A MESSAGE to radio operators from the Secretary of the Navy will be transmitted on Navy Day, October 27th. In connection with this message ARRL will conduct its nineteenth Navy Day Receiving Competition. All amateurs are invited to take part in this activity, which constitutes Amateur Radio's participation in the celebration of Navy Day.

Two messages will be transmitted, one from Radio Washington (NSS), the other from Radio San Francisco (NPG). These messages will be substantially the same in thought but will vary slightly in wording. A letter of appreciation from the Navy Department will be sent to *every person* who makes perfect copy of the text of one message. Should characters for any reason be transmitted with improper spacing such as from tape-punching errors, words containing such characters will not be counted in the grading of papers. Both messages may be copied, but only the best copy should be submitted in the competition. It is not necessary to copy both stations, and no extra credit is given for so doing. However, if both stations should be copied, please mention the fact when submitting your *best* copy so that the number of operators copying each station may be ascertained. Only the *text* (including any punctuation therein) of each message will count (not the preamble, break, signs, and the like). Copy what you hear. Do not guess! Credit will of course be deducted for logging anything that was not actually transmitted!

Mail copies for grading to the ARRL Communications Department, West Hartford, Conn. Send your original copies — recopying invites errors. An honor roll of letter winners and all other participants will appear in *QST*. In submitting copy please mention if you are, or have been, a member of the Naval service.

Transmissions will be approximately 25 words per minute and will be preceded by a five-minute CQ call on the following schedule: From Washington: NSS, 9:00 P.M. EST (0200 GCT), simultaneously on 122, 4390, 9425 and 12,630 kc. From San Francisco: NPG, 7:30 P.M. PST (0330 GCT), simultaneously on 115, 4390, 9255 and 12,540 kc.

I.A.R.U. News

QSL BUREAUS

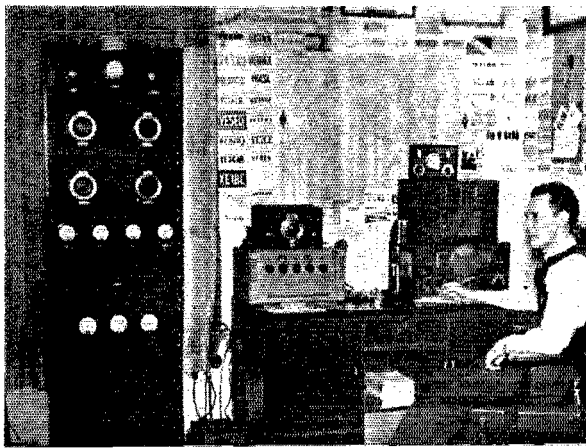
Here's how to get best service on delivery of your QSLs to foreign stations: Simply mail cards directly to the bureau of the proper country, as listed below. Do not send foreign cards via ARRL except those for which no bureau is here listed.

Alaska: J. W. McKinley, Box 1533, Juneau.
Algeria: Via France.
Antigua: A. Tibbits, 27 St. Mary's St., St. Johns.
Argentina: R.C.A., Av. Alvear 2750, Buenos Aires.
Australia: W.I.A., Box 2611 W, G.P.O., Melbourne.
Austria: O.V.S.V., Kierlingerstrasse 10, Klosterneuberg.
Azores: Via Portugal.
Belgium: U.B.A., Postbox 634, Brussels.
Bermuda: J. A. Marr, R.N., W/T Station, Daniel's Head, Somerset.
Bolivia: R.C.B., Casilla 15, Cochabamba.
Brazil: L.A.B.R.E., Caisa Postal 2353, Rio de Janeiro.
British Honduras: D. Hunter, Box 178, Belize.
Burma: Via Great Britain.
Canal Zone: Signal Officer, KZ5AA, Quarry Heights.
Chile: Luis M. Desmaras, Casilla 761, Santiago.
China: K. L. Koo, P. O. Box 409, Shanghai.
Colombia: L.C.R.A., P.O. Box 584, Bogota.
Costa Rica: F. Gonzalez, Box 365, San Jose.
Cuba: James D. Bourne, Lealtad 660, Habana.
Czechoslovakia: C.A.V., P.O. Box 69, Prague I.
Denmark: E.D.R., Box 79, Copenhagen K.
Egypt: Box 360, Cairo.
Eire: R. Mooney, "Eyrefield," Killiney, Co. Dublin.
Fiji: S. H. Mayne, VR2AS, Victoria Parade, Suva.
Finland: P.O. Box 306, Helsinki.
France: Service QSL, R.E.F., 6 rue du Pont de Lodi, Paris 6.
Germany: (D2 calls only) Capt. J. S. Howe, Entries and Exits Branch, 100 Hq. CCG (BE), Bad Salzuflen, B.A.O.R.
Germany: (D4 calls only) Radio Branch, Communications Division, OCSigo, HQ EUCOM, APO 757, c/o Postmaster, New York, N. Y.
Greece: C. Tavaniotis, 17-A Bucharest St., Athens.
Great Britain (and British Empire): A. Milne, 29 Kechill Gardens, Hayes, Bromley, Kent.
Guam: G.R.A.L., APO 234, c/o Postmaster, San Francisco.
Guatemala: Manuel Gomez de Leon, P.O. Box 12, Guatemala City.
Haiti: Roger Lanois, c/o RCA, P.O. Box A-153, Port-au-Prince.
Hawaii: A. H. Fuchikami, 2543 Namauu Dr., Honolulu.
Hungary: A. Sass, Dohany-u 1/c, Budapest.
Iceland: Islenzkir Radio Amatorar, P.O. Box 1080, Reykjavik.
India: J. Nicholson, c/o Kanan Devan Mills Produce Co., Munnar P.O., Travancore.
Italy: A.R.I., Via San Paolo 10, Milano.
Jamaica: Thomas Meyers, 122 Tower St., Kingston.
Japan: Maj. Lloyd D. Colvin, Hq. 71 Sig. Ser. Bn., APO 500, c/o Postmaster, San Francisco.
Luxembourg: W. Berger, 20 Louvigny St., Luxembourg.
Malta: Via Great Britain.
Mauritius: V. de Robillard, Box 155, Port Louis.
Mexico: L.M.R.E., Apartado Postal 907, Mexico, D. F.
Morroco: C. Grangier, Box 50, Casablanca.
Morroco: Tangier International Zone Only: EK1MD, Box 57, British Postoffice, Tangier.
Netherlands: V.E.R.O.N., Postbox 400, Rotterdam.
Netherlands Indies: Via Netherlands.
Newfoundland: N.A.R.A., Box 660, St. Johns.
New Zealand: N.Z.A.R.T., P.O. Box 489, Wellington, C.1.
Nicaragua: L. B. Satres, Bolivar Ave. 106, Managua.
Norway: N.R.R.L., P.O. Box 898, Oslo.
Panama: R. D. Prescott, P.O. Box 32, Panama City.
Paraguay: R.C.P., Palma 310, Asuncion.
Peru: R.C.P., Box 538, Lima.
Philippine Islands: G. L. Rickard, 48 Ortega, San Juan, Rizal.
Puerto Rico: E. W. Mayer, P.O. Box 1061, San Juan.
Portugal: R.E.P., Travessa Nova de S. Domingos, 34-1°, Lisbon.
Roumania: Nestor, Box 326, Bucharest.
Salvador: J. F. Mejia, 7ª Calle Poniente #76, San Salvador.
South Africa: S.A.R.L., P.O. Box 3037, Capetown.
Sweden: S.S.A., Stockholm 8.
Switzerland: U.S.K.A., Postbox, Berne.
Uruguay: R.C.U., Casilla 37, Montevideo.
U.S.S.R.: Central Radio Club, Postbox N-88, Moscow.
Venezuela: R.C.V., Apartado 1247, Caracas.
Yugoslavia: H. Oton, Ljubljana-Povsetova No. 1.

Following usual custom, the May and October issues of *QST* each year will carry the above list, with revisions and additions as necessary.

JAPAN

The *Far East Amateur Radio League* welcomes applications for affiliation from amateur radio clubs in sections of Japan outside Tokyo, whose members find it inconvenient to attend monthly meetings of F.E.A.R.L. This is another movement in implementation of the plan of the organization to render all assistance possible to amateurs in the theater and to act as liaison between the radio amateur and the military authorities.



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It is a mystery how QSL managers find time to get on the air, but W. R. Savage, VE6EO, demonstrates that he is able to take time off from his duties as VE6 QSL manager. His transmitter is a conventional c.w.-'phone 200-watt job. His interests also include frequency measurements.

Practical Crystal Control for 144-Mc. Mobile Work

Using the New V.H.F. Crystals To Simplify the Mobile Rig

BY PAUL H. HERTZLER,* W3HWN

TECHNIQUES employed on the 2-meter band have advanced so rapidly in recent months that it is now difficult for the mobile station using the modulated-oscillator type of transmitter to get in many good contacts. The simplest sort of gear still has its place, of course, but the fellow who is after DX and solid QSOs must now go to crystal control, or its equivalent, as a great majority of the receivers now used for home-station work are of the more selective variety. Practically all superhets make the going difficult for the modulated oscillator, and many are so selective that it is utterly impossible to make anything intelligible out of the signals such rigs radiate.

This is all to the good, as far as the home-station set-ups are concerned, for there can be little argument against the use of the most effective gear on any band, and the release of several types of transmitters on the surplus market has made it a simple and economical procedure to set up a 144-Mc. crystal-controlled station for home use. The rub comes, however, when one tries to use these rigs for mobile work — their numerous tubes place a drain on the battery and power supply far in excess of the capabilities of the usual mobile power sources.

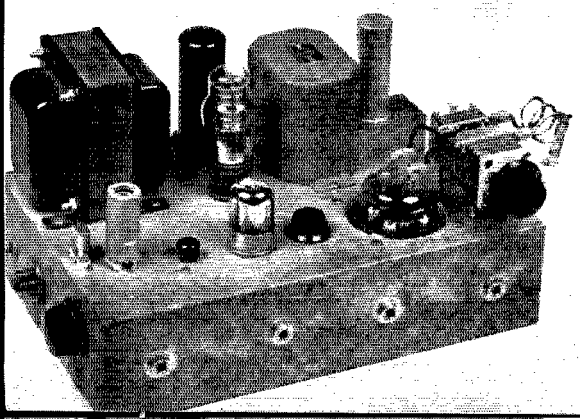
The solution lies in the designing of mobile gear especially for amateur use, incorporating new tubes and crystals that make it possible to run inputs of 15 to 25 watts, and yet stay within the limitations imposed by the average vibrator or generator supply. One of the new 48-Mc. crystals with a 6C4 triode oscillator, and a 7F8 dual triode operating as a push-pull tripler, will provide sufficient grid drive for an 832-A final stage; yet the total drain of the two exciter stages is only about 25 ma. from the plate supply and 0.45 amp. from the storage battery. Contrast this with the drain imposed by the string of 6V6s or similar tubes required when lower-frequency crystals are used!

Aside from the use of the 48-Mc. crystal, the design of the transmitter is not unusual. This particular unit was to be used for both fixed-station and portable work, so a built-in power supply was included. In the case of mobile installations this would, of course, be omitted, and the unit could be made much smaller physically. The inclusion of the VR-150 regulator tube in the unit is recommended, however, as the plate potential on the oscillator should not be permitted to exceed 150 volts.

Experimentation with the 48-Mc. crystals has shown that best results are obtained with triode oscillators, the 6C4 providing very satisfactory performance when used as shown in Fig. 1. The grid coil, L_1, is wound to be self-resonant at a frequency just higher than that of the crystal. It is one of two critical elements in connection with the use of the high-frequency crystals, and should be adjusted by removing turns one at a time, until the 6C4 oscillates only when the crystal is in the socket. Loading of the oscillator is somewhat more critical than with low-frequency crystals, so coupling between the oscillator and tripler stages is made inductive, to provide a means of adjustment. The two coils are mounted parallel to one another, the spacing center to center being about 1½ times the coil diameter. The actual spacing should be adjusted to the point giving maximum grid drive to the tripler, as read in J_2, without pulling the 6C4 out of oscillation.

The 7F8 tripler should have approximately 275 volts on its plates. If the supply voltage is higher than this value the dropping resistor, R_7, should be inserted in series with the r.f. choke at the center-tap of L_4, as shown. A value of 1000 ohms is suitable for a supply voltage of 300, but if a higher voltage is used the value of R_7 should be increased. The tripler cathode is not by-passed,

* % Standard Piezo Co., Box 164, Carlisle, Penn.



A three-stage transmitter for 144 Mc., using the new 48-Mc. crystals. Across the front part of the chassis are the 6C4 oscillator, 7F8 tripler, and 832-A final. Components at the back comprise the built-in power supply, which may be omitted if the unit is to be used for mobile work only.

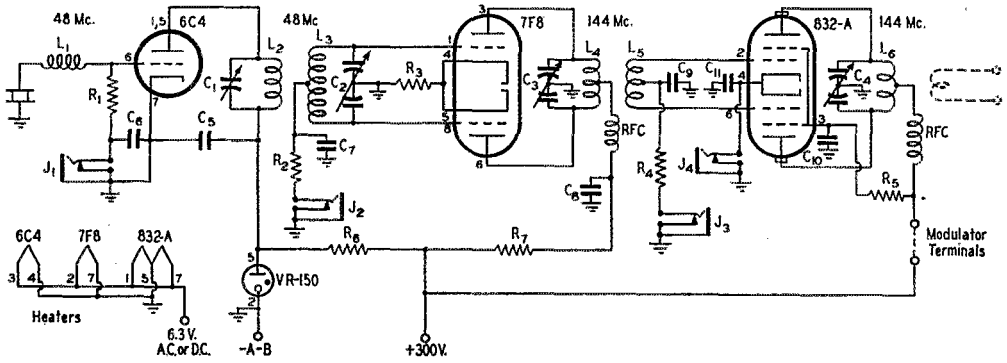


Fig. 1 — Schematic diagram of the r.f. portion of the 2-meter transmitter using 48-Mc. crystals.

C_1 — 15-$\mu\mu$fd. variable.
C_2, C_3 — 10-$\mu\mu$fd. per section, butterfly type.
C_4 — 10-$\mu\mu$fd.-per-section split-stator.
C_5, C_6, C_7 — 0.0047-μfd. mica.
C_8, C_9, C_{10}, C_{11} — 470-$\mu\mu$fd. mica.
R_1, R_2 — 33,000 ohms, 1 watt.
R_3 — 470 ohms, 1 watt.
R_4 — 22,000 ohms, ½ watt.
R_5 — 12,000 ohms, 10 watts.
R_6 — 5000 ohms, 20 watts.
R_7 — 1000 ohms, 1 watt (see text).
L_1 — 12 to 16 turns, No. 28 d.c.c., close-wound, ¼-inch dia. (see text).
L_2 — 8 turns, No. 3003 B & W Miniductor.
L_3 — 12 turns, No. 3003 B & W Miniductor, center-tapped.
L_4, L_5 — 2 turns No. 14 enameled, 1¼ inches dia., spaced dia. of wire, center-tapped.
L_6 — 3 turns No. 12, 1-inch dia., 1 inch long.
J_1, J_2, J_3, J_4 — Closed-circuit jack.
RFC — Ohmite Z-0.

permitting some regeneration. It was found that slightly greater output could be obtained by inserting a small winding between the cathode and resistor R_3, and the builder may wish to experiment further along this line. It was possible, however, to obtain satisfactory grid drive for the 832-A with the circuit as shown.

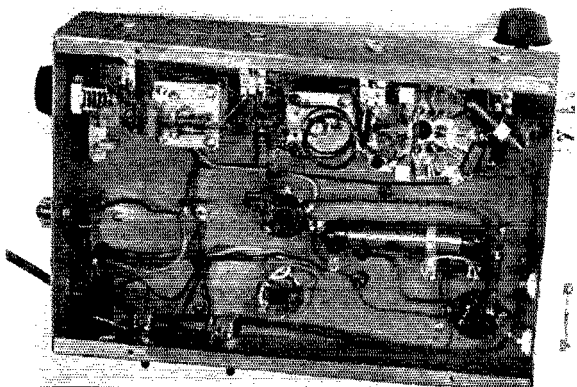
The grid circuit of the final is untuned, consisting of two turns the same diameter as the tripler plate coil, and closely coupled to it. Once this coil is adjusted, by moving its turns and setting its position for maximum grid current in J_3, it requires no adjustment for other frequencies within the band. It is suggested that, if more than one crystal is to be used, the adjustment be set for approximately the middle of the band.

It should be noted that the final plate circuit is completely isolated from all other circuits. With the shielded socket used there was no necessity for neutralization, but if the ordinary type of socket is employed for the 832-A it may be necessary to employ a very small neutralizing capacity. This could be supplied by the neutralizing wires so often used in layouts employing 815, 829, and 832 tubes.

No modulator is shown, since any combination capable of delivering 10 to 15 watts of audio is satisfactory. The modulator output should be connected to the feed-through bushings shown in the lower right portion of the bottom view of the unit. These terminals are shorted out when the transmitter is used without modulation. It may be keyed for c.w. operation by plugging a key into the final-stage cathode jack, or the cathode of the tripler may be keyed, provided fixed bias is inserted in series with J_3, to hold the final plate current to a safe value when the excitation is removed.

The writer has used this rig extensively in portable and mobile work, and also as an exciter for a higher-powered home station. In field service it is operated at 20 to 25 watts input, and in conjunction with a portable beam antenna it has provided contacts with stations in the first call area, at distances up to 250 miles. Its performance on the air, with any of several crystals, has been comparable to that of transmitters using twice the battery drain to achieve an equivalent power-output level.

♦



Bottom view of the W3HWN 2-meter rig. Note the placement of the oscillator plate and tripler grid coils at the upper left, providing inductive coupling between stages. The tripler and final are also coupled inductively. Use of a shielded 832-A socket does away with the necessity for neutralization.

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

THAT 27th again! For the fourth consecutive month, the lead paragraphs of this department are being rewritten to report extraordinary happenings on the 27th of the month. This is an important date to remember, because it gives a good indication of the period to watch each month, for DX opportunities through the fall season. Between the 25th and the 27th of August there were at least three events that are front-page news to v.h.f. enthusiasts: the first two-way work between Australia and the Hawaiian Islands on 50 Mc., the first Mexico-Argentina 50-Mc. QSO, and a new DX record for home-station work on 144 Mc.

The 50-Mc. record passed 5000 miles at 1700 Hawaiian Time, on August 25th, when W7ACS/-KH6 at Pearl Harbor worked VK5KL, Darwin, Australia, a distance of 5350 miles (5349.8, according to W7ACS!). Details are incomplete at this writing, as the information above was received through the coöperation of numerous relaying stations. To KH6GQ, W5NCH and W1EYP, particularly, our thanks for your help!

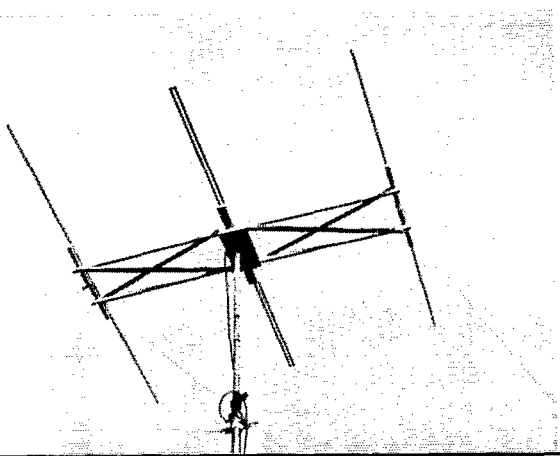
On the 27th (exact time unknown) XE1KE, Mexico City, worked LU6DO, Temperley, Argentina, on 6. The QSO lasted 35 minutes, most of which was spent by XE1KE in trying to convince LU6DO that he actually was in contact with an authentic Mexican station. The distance is about 4400 miles.

The 27th made history on 144 Mc. also, and provided your conductor with a thrill equaled only by the trans-Atlantic QSOs on 50 Mc. last fall. At 10 P.M. we signed with W1SE, making a QST regarding the nightly schedule of VE1QZ (reported in detail elsewhere in this department). Exhorting the gang along the Coast to look for VE1QZ on 144.3 Mc., we did likewise — and there he was rolling in S8! The first call established contact, with S7–9 signals each way, a distance of 480 miles.

The QSO was terminated immediately, to give VE1QZ every opportunity to set a new world's record, as we felt certain that his signal would be heard by hundreds of stations, many of them much farther south than West Hartford. Such was not the case, however, and it was some time before W1HDF, Elmwood, Conn., only two miles from W1HDQ, was worked. Then followed a period of about 15 minutes, during which VE1QZ made several calls before raising W1CTW, Arlington, Mass. His next (and last) contact was W1OSQ, Milford, Conn., a 520-mile QSO that was possible only through the use of *straight c.w.* by both parties. This deserves recognition as a record, as it is by far the greatest distance ever covered on 144 Mc. by two stations operating from home locations. VE1QZ was using an ARC-5, running 30 watts to the 832-A final, a 16-element vertical array (just completed that day), and a VHF-152 feeding into an HQ-129. W1OSQ runs 120 watts. His antenna is also a 16-element array, and the receiver employs two stages of grounded-grid r.f., with lighthouse tubes, ahead of a VHF-152.

At frequent intervals during the time that VE1QZ was in, the writer and W1OSQ made QST transmissions directed to W2 and W3, in the hope of running the record down the Atlantic Seaboard. For nearly four hours the signal from Halifax was S7 or better at West Hartford, often peaking well over S9, until the fade-out just before 2 A.M.; yet he was heard only weakly by other stations, and the few other signals heard at Halifax were weak and unstable. Whatever caused this amazing disparity in signal strengths can only be guessed, but it completely reversed previous experiences, when the writer has heard stations all along the Coast working DX that is inaudible at West Hartford. It seems hard to account for a skip

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



The coaxial-fed 3-element beam (0.2-wavelength spacing) at VK5KL, the station of Clarence H. Castle, Darwin, Australia, who set a new 50-Mc. record of 5350 miles on August 25th, working W7ACS/ KH6 at Pearl Harbor. The transmitter runs 100 watts to a pair of 834s in the final, on 'phone, c.w., or m.c.w.

effect in tropospheric propagation, but such certainly existed in this instance. Scores of well-equipped stations in the vicinity of Boston were unable to hear VE1QZ, yet the path from Halifax to West Hartford passes directly through the Boston area, with the latter 100 miles closer and separated only by water from the Nova Scotian Peninsula.

It is expected that a period of clear warm weather will reverse the field again, and we feel confident that another new record will soon be set by W2s or W3s who will ride the coastal inversion to Halifax, perhaps before this appears in print.

Inland Record Passes 400 Miles!

But for the international 50-Mc. DX reported earlier, the phenomenal openings of the 2-meter band would have taken first place in the news for August. Probably no one who works on 144 Mc. needs to be told the story of July and August, 1947; but for those who still think of the 2-meter band as a portion of the spectrum where archaic gear is used for backyard gossip, the doings on 144 Mc. in recent weeks will be quite enlightening. Part of the story was told in the late insertion in this department last month.

Ever since the first days on 144 Mc. the boys in the Middle West had been watching the record distance worked on the band stretch out, always well beyond the best they could manage. Many became convinced that the curving stretch of Atlantic Seaboard from Cape Cod to Cape Hatteras had Nature's blessing to such an extent that they would never equal the feats performed there on the v.h.f. bands. They knew that the caliber of equipment used in W8 and W9 was equal to the best employed elsewhere, but would the weatherman ever give them the breaks that seemed so frequent along the Coast?

This summer's openings have served to show that the Great Lakes is quite capable of providing long-distance propagation, too. Contacts beyond 300 miles were made by scores of 144-Mc. stations in the states along or near the Lakes on July 31st, August 7th and the early morning hours following both these dates. Here are a few representative reports:

W8UKS, Lakewood, Ohio, worked W9s BBU, PK, ZHB, BJH, RIW, JPK, PZS, WWH, SOW and ESE, all over 300 miles, on July 31st and August 1st. Between 1 and 4 A.M. on August 9th he added W9s IOD, GGH, AGV and IPO. W8WJC, Everett, Ohio, worked most of the above and added W9s NFK, BOR, MTC and IHR on the July 31st opening. His list for the 7th-8th session included W9s WOK, IOD, MGP, NQS, AGV, YQI, GGH, CFM and IPO. These contacts, and others totaling 67 different stations, helped W8WJC to rack up a score of 2640 points in the July 16th–Aug. 15th Marathon period, the highest one-month score ever recorded in Marathon history.

Standings as of August 30th

W3CIR/1	42	W5ML	38	W9ZHB	41
W1CLS	42	W5AJG	38	W9JMS	36
W1LLL	40	W5VV	36	W9ALU	32
W1HDQ	39	W5FSC	34	W9UIA	27
W1HMS	33	W5JLY	38	W9FKI	26
W1CGY	32	W5ZZF	29	W9HSB	26
W1JLK	30	W5ESZ	28	W9AB	22
W1AEP	30	W5LIU	24		
W1CLH	29	W5GNQ	21	WØUSI	45
W1AF	24			WØQIN	43
		W6OVK	29	WØZJB	43
W2BYM	37	W6ANN	28	WØDZM	42
W2AMJ	37	W6WNN	24	WØTQK	42
W2QVH	36	W6BPT	23	WØSV	42
W2RLV	33	W6HZ	16	WØCXB	41
W2IDZ	21	W6BWG	11	WØHXY	41
W2PWP	29			WØINI	40
		W7BQX	37	WØYUQ	39
W1KMZ/3	31	W7FDJ	36	WØJHS	38
W3RUE	31	W7FFE	35	WØDKS	36
W3CGV	25	W7ERA	33	WØYKX	36
W3OR	23	W7QAP	26	WØBJV	35
		W7ACD	19	WØDYG	33
W4GJO	45	W7TXM	17	WØDNW	32
W4QN	40	W7JPN	12	WØKYF	32
W4GIY	40	W7DTB	11	WØVIK	20
W4DRZ	35				
W4EQR	34	W8RFW	25	VE1QY	20
W4EID	33	W8TDJ	22	VE1QZ	19
W4FBH	31	W8QQS	20	VE3ANY	16
W4WMI	29			VE2GT	14
W4HVV	28	**W9DWU**	**46**	XE1KE	12
W4EMM	25	W9PK	43		
W4AVT	26	W9ZHL	42		

The big doings of the 7th and 8th extended as far east as Erie, Penn., that we know of. W3QKI and W3GV of that city worked W9BBU, Elgin, Ill., just shading the W1MNF–W3KUX record of 425 miles. W9BBU, incidentally, now uses a 30-element horizontal array! W3GV, with 300 watts input and a 12-element horizontal array, was heard by W9AGV, Rockford, and W9ZHB, Zearing, Ill., both about 475 miles distant, but no contact was made. Signals were heard both ways over the W9ZHB–W3GV path. W9s worked by W3GV included IPO, GGH, MTC, IOD, WOK and BBU. W8s AKR, HDM, DIV and CVQ, also worked by W3GV, would have been considered hot DX, had they not arrived in the midst of the W9s. Unfortunately, all this happened just about 24 hours *after* the W3EKK/1–W3KUX record reported briefly last month, so the Middle West missed holding the world's record by that brief margin!

The night of August 5th and the morning following provided some long-haul work along the East Coast. W1SF, Branford, Conn., who uses a 32-element vertical array, worked W3EIM, Baltimore, W4JAZ, Arlington, Va., W3GKP, Silver Spring, Md., W3KUX and W3ENZ of Washing-

(Continued on page 126)

Versatile Control Systems for Transmitters

Building Safety and Convenience into Your Transmitter Power-Switching Circuits

BY LEWIS KANOY,* W4DCW

A CONTROL SYSTEM is probably the last thing the average ham thinks about when he builds his transmitter, and yet it is a factor that requires considerable thought and planning if the rig is to be operated with convenience and safety to the operator and equipment. In designing a control circuit for the half-kilowatt 'phone-c.w. transmitter at W4DCW, several requirements were set forth:

1) A single switch must perform all the functions of changing from transmit to receive.

2) A single switch must shift from c.w. to 'phone.

3) A safety interlock should remove all dangerous voltages when the transmitter enclosure is opened.

4) It should be impossible to turn on plate or bias voltages until filament voltage has been applied, and impossible to turn off filaments without also turning off plate voltage. It is also desirable to have an automatic time delay between the applications of filament and plate voltages.

5) Indicator lamps should show which supplies are on and indicate blown fuses.

6) The system should be readily adaptable to either 115- or 230-volt lines.

7) Provision should be made for shifting to reduced power for tuning up without a Variac.

8) The remote-control wires to the operating position should not have to carry heavy current.

The systems shown in Figs. 1 and 2 meet all of these requirements. Referring to Fig. 1, the control system starts out with a polarized plug, P_1, for the line connection. The side of the line indicated should be grounded. One or more utility outlets, which are not affected by the switching, may be connected at J_1. The line-fuse indicator lamp, I_1, should not light unless the line fuse, F_1, is blown.

Turning on S_1 at the transmitter or S_2 at the operating position turns on all r.f. and r.f. power-supply filament transformers, which are connected in parallel at T_1, and the indicator lamp, I_2, lights. If the 'phone-c.w. switch, S_3, is thrown to the 'phone position, all audio and a.f. power-supply filament transformers, which are connected in parallel at T_2, will also be turned on by S_1, and the 'phone-indicator lamp, I_3, will light. If S_3 is in the c.w. position, the c.w. indicator lamp, I_4, will light, but the a.f. supplies will be

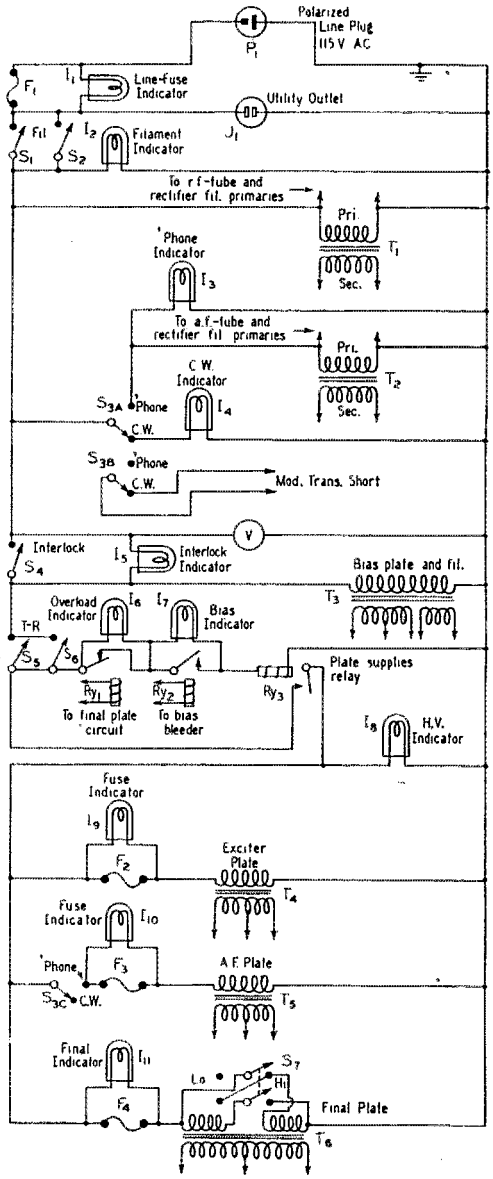


Fig. 1 — 115-volt control circuit. All switches, except S_3 and S_7, may be 5-amp. S_7 should be 10-amp, and S_3 a ceramic rotary. The lamps are ⅜-inch panel type.

* 114 Idlewilde Drive, Winston-Salem, N. C.

out off. A third section of S_3 shorts the modulation-transformer secondary, T_5, when using c.w.

If the safety interlock switch, S_4, is closed, the bias-supply plate and filament voltages (T_3) will be turned on. As soon as the rectifier of this supply (an indirectly-heated rectifier such as a 6X5G) warms up and the supply delivers full voltage, the time-delay relay, Ry_2, will close, extinguishing the bias-indicator lamp, I_7, and setting up the circuit for the plate-supply relay, Ry_3. The time that the bias rectifier takes to come up to temperature provides the required delay between the application of filament voltage and the time when it becomes possible to turn on the plate voltages on the r.f. and a.f. tubes.

With the contacts of Ry_2 closed, the plate-supply relay, Ry_3, can be operated by closing the transmit-receive switch, S_5, or its extension, S_6, at the operating position. Ry_3 turns on all plate voltages, lights the high-voltage indicator, I_8, and the transmitter is then ready for operation.

Should interlock S_4 be open, the indicator lamp, I_5, will light. This lamp, in series with the primary of the bias-supply transformer, has sufficient resistance to prevent voltage output from the bias pack, and therefore Ry_2 does not close so that Ry_3 cannot be operated and the transmitter is safe so long as the interlock switch is open.

Ry_1 is an overload breaker which breaks the line to the plate-supply relay whenever the plate current to the final amplifier exceeds a value to which it has been set. The winding of this relay is in the filament center-tap of the final-amplifier tubes. It should be of the reset type so that it will not continue to close and open repeatedly until S_5 is opened, as it would do if it were not. I_9, I_{10} and I_{11} are fuse-indicator lamps which light when their associated fuses blow. S_7 is a switch for changing to low power for tune-up. This system is, of course, applicable only to transformers with dual primaries. With single-primary transformers, a 150- to 200-watt lamp, with a switch to short it out, can be connected in series with the primary for reducing power. Power-amplifier high voltage may be removed for neutralizing by taking out F_4.

The only switch that need be thrown for stand-by is S_5. Only S_3 need be manipulated in changing from 'phone to c.w.

Fig. 2 shows the same system applied to a 3-wire 220-volt line, the only difference being that the filament and bias transformers are operated from one side of the line, while the plate supplies are operated from the other.

All indicator lamps and panel switches should be marked plainly so that there will be no question as to which circuit each belongs.

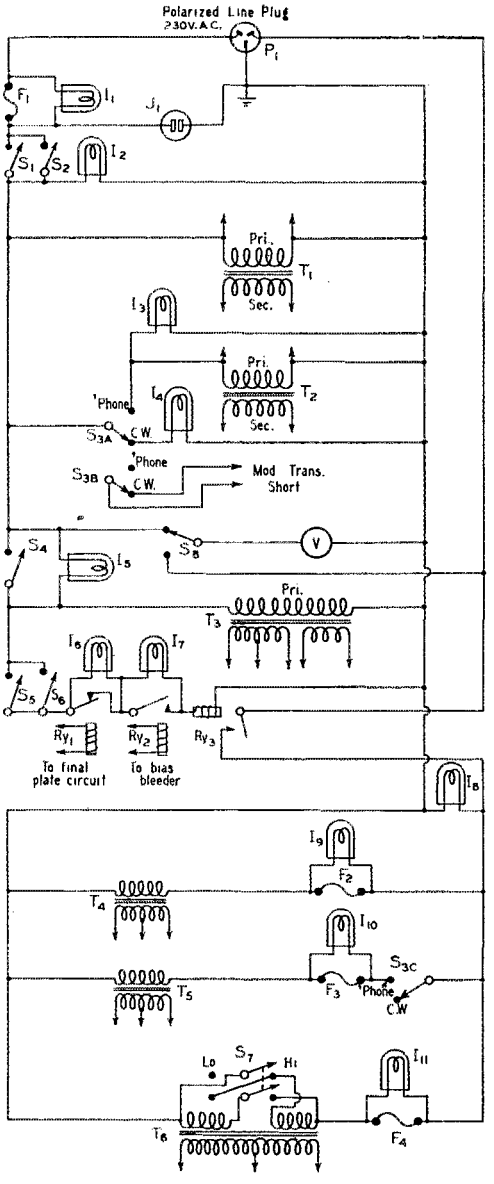


Fig. 2 — 230-volt control circuit. Ry_1 is an overload type, Ry_2 is a light-current relay, and Ry_3 is a 115-volt a.c. relay with heavy contacts.

About the Author

• The inspiration for the shipshape control circuit that Lewis Kanoy describes can be traced to one influence: Naval radio-technician training. Signing W4DCW since 1934, our author has in the meantime acquired not only his Class A ticket but also radiotelephone first-class and radiotelegraph second-class tickets. Lew has been a technician at b.c. station WSJS for a number of years.

How's DX?

CONDUCTED BY JOSEPH E. GRAHN,* W1CH

How:

What with rather poor conditions for DX and heat waves that don't make operating much of a pleasure, the past month was best spent with a glass of cold stuff and a few speculations on where the antenna for 21 Mc. would go. Stacking a 6 over 10 over 14 over 20 is going to make the shack look like the newest in helicopter designs, unless some budding genius comes up with a better solution. The lucky fellows with the rhombic farms have little to worry about, but the average guy who has cracked a clavicle getting up a rotary for 20 is going to have a tough time with another beam for 21 Mc. Maybe we should decline to accept the band. [Come on, boss, get back in here out of the sun. — *Jeeves*]

What:

W3KJJ insists there is plenty of DX on 7 Mc. and proves it by working ZS5FE, ZL1IB, ZL2MN, ZL1BY, VK2AX, VK2JY, VK2OY, F8ZW, F3MA, PY2QW, XE1DA, KZ5FS, EI9Q, OZ5HQ, G2HCA, G2ADJ, G3AEP, G3AYL, G3AGP, G3BAQ, G3TO, G4CP, G4QC, G5KT and G8VG . . . . . W8YGR, with 23 watts on his crystal 6L6G, got **VP9E** (7191), **KZ5CB** (7104), **KH6IV** (7025) and **KL7AF** (7020).

As usual, 20 turns up the best ones. W6QJI/Ø picked up **C1JC** (14,082), **OK1ZM** (14,120), **FA8BG** (14,000), **UAØKQA** (14,039), **KS4AC** (14,044), **UA3DQ** (14,022), **HB9X** (14,005), **VS6AZ** (14,022) and **OI2KAA** (14,039) . . . . . The latest at W2BRV are CR6AI, VR5PL, EK1AJ, TA1BB, PX1V, UI8AA, ZM6AF and KP6AB, bringing his postwar tally to 118 . . . . . At KP4KD the newest include I1AHC/I6, UB5BD, PK6HA, ZD4AI, ZD6DT, VS7DR, UA6AE, UG6WD, ZC6DD, PK2ML, EP2DS, and KG6AG . . . . . W6TKX, with a new rotary on a steel tower, is elated over working **VS1CA** (14,025), **C7MK** (14,022), **VQ2GW** (14,105), **CP1AT** (14,000), **VU2BX** (14,040), **VS2AL** (14,108), **CN8BK** (14,008), **UA1AB** (14,000), **OZ7UU** (14,002), **FT4AN** (14,000) and **SM5UN** (14,000) . . . . . W4CWH took a breather from business and came out with **VU7JU** (14,100), **VS6AY** (14,085), **UJ8AD** (14,080), **VU2GJ** (14,100), **ST2AM** (14,170), **YI2AM** (14,120), **UG6AB** (14,130), **UO5AD** (14,125) and **VS7ES** (14,060), all of which he calls the "garden variety." Yeah! . . . . . W7KIL, complaining of poor conditions, grabbed G8SI, OK1CX, G8PT, F8EO, OX3GE, OK1ZBX and LU8AK . . . . . W1JYH, still plugging, snagged **VS1AQ** (14,045), **TA1B** (13,990), **ET1JJ** (14,000), **VR6AA** (14,330), **KG6AD** (14,040) and **VK9BI** (14,035) . . . . . Since being licensed in January, 1917, W9PSR has a total of 74 countries, some of the new ones being UA3BD/UC2, UH8AF, I6USA, GI5UW, HB9AW, EI9N, CN8EG, VQ3HJP, UR2KAA, UA1PA, LA7N and GW2HIR . . . . . A letter from VU2BX acknowledges contacts with W2AGW, W6BGF, W6RDR, W6WKU, W4BPD, W6CBP, W6SA, W6ZCY, W4FU, W6MHH, W6SZY, W7FZA, W6PNQ and W6TKX. His full QTH appears later on in this column . . . . . W2HZY's folded dipole in the attic helped raise his postwar total to 119, with J9SIR, FQ3AT, W2WMV/C9, J9AAM, EP3D, ZS3D, CR7BC and VU2BG . . . . . Back on the air just a short while, W6BIL is warming up on stuff like G2LC, G2HX, G5LI, G2HCP, ON4CD, ON4XA, PAØYQ, SM6ID, D2KW, UA3KBC, UA3AG, HB9X, ZS6CT, ZS6JL, ZS1FA, ZS2CM, ZS5U, VS1AX, C1ZC, J4AAV and TF3EA, plus plenty of VKs and ZLs . . . . . W2BHM is now up to 106 postwar with EP2DS, VU2FJ, PK6WS, KM6AB; also AC4BR, who is S9 at W1CH with the beam on Europe — so-o-o-o! . . . . . W4MBA gets a big kick out of DX with his little 50-watter, sneaking up on RAEM, D4AUK, ON4CO, G3BTA, F3RA, VK3KX, GI4UR, GW4CW and PY7AN . . . . . The pick of the latest at W6OBD are UA1KEB, VP5AK, PK5LK, OH6NZ, OX3GG,

*53 Quinapoxet Lane, Worcester, Mass.

With the always-popular W.I.A. International DX Contest scheduled for four week-ends in October (see page 63, September *QST*), we should be hearing and working many of these jovial Tasmanians. Left to right, back row, VK7s NL, AL, RF, YY; middle row, VK7s LL, OM, JP, KA, TR, CW; front row, VK3CN (ex-VK7CH), VK7s CT, LJ, BJ.

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J8ACS, CT1A, I6USA, VO2RM and HB9AW, bringing his postwar pile to 85 . . . . . W1ME grabbed VR2AO, VR2AM, ZS3D, AR1YL, J8AAF, VS6AD and ZD4AD, boosting him to 146 postwar . . . . . A fine letter and report from G6RH tell of contacts with **HP4Q** (14,095), **W6YAW/J8** (14,052), **PK6NC** (14,105), **CP1AX** (14,150), **VQ5DES** (14,395), **YS3PL** (14,330), **XE1BC** (14,060), **CR7AD** (14,020) and **VK9BI** (14,056). With a total of 78 postwar, W2UFT has been averaging two new ones a day with stuff like UAØKQA, UA9CB, FG8D, W8LXN/KG6, W2WMV/C9, UG6WD, W6WDN/KW6 and KP6AB . . . . . W6ZZ says after much labor he managed to reach his 80th postwar, the new ones being HS1SS, VS6AY, VR5PL and PK1RI. Some of the other sleep-robbing ones are J5AAH, G3BHE, ON4QF, G3AMG, ON4CD, ZS6LW and G6IG, plus VKs and KHs by the hatful . . . . . W9NDA, with a smashed index finger and a new wide-spaced beam, swapped signals with VQ3HJP, OU5AD, UB5BD, UQ2AB, YO2F, HA5VV, VK7RK, VS6AC, ET1IR, UI8AA, UJ8AC, FT4AN and VR5IP . . . . . On 20-meter 'phone, W2MPA has raised his postwar figure to 119. Part of his swell list includes **KG6AV/VK9** (14,250), **VR6AA** (14,335), **FP8AA** (14,350), **ZD6DT** (14,310), **EK1AS** (14,390), **J2AAU** (14,150), **J2CAL** (14,230), **OK4IDT** (14,140), **KG6AG** (14,300), **MD5AL** (14,320), **LX1SI** (14,310), **ZC6AH** (14,245), **VK6HT** (14,330), **YS1MK** (14,320), **PAØFB** (14,310), **OZ5BW** (14,150), **W3JRF/KG6** (14,150), **J2JCQ** (14,150) and **KL7HQ** (14,250) . . . . . A new three-element beam at W1KLE netted him OX3GG, F8NT, OZ7GB, GD6IA, KP6AD, VU2BQ, ZS1BD, J2ACW, UA3CA, KL7KR, VK5CB, ZL4AR, GW2HIR and CE4BP . . . . . Switching to 'phone, W9NDA chinned with VR6AA, ZE1JX, OZ7EDR, OH6NS, CR4HT, FF3GW, KA1FH, CT1QN, VP3LF and MB9AD.

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Just because a fellow manages to get 167 countries confirmed postwar is no indication that the guy is worn out and a has-been. As evidence, here is a shot of the special QSL sent to Charlie Mellen, W1FH, for his No. 168. The QSL is hand-painted in several colors on two delicate tropical leaves, and is a real memento of many solid QSOs.

October 1947

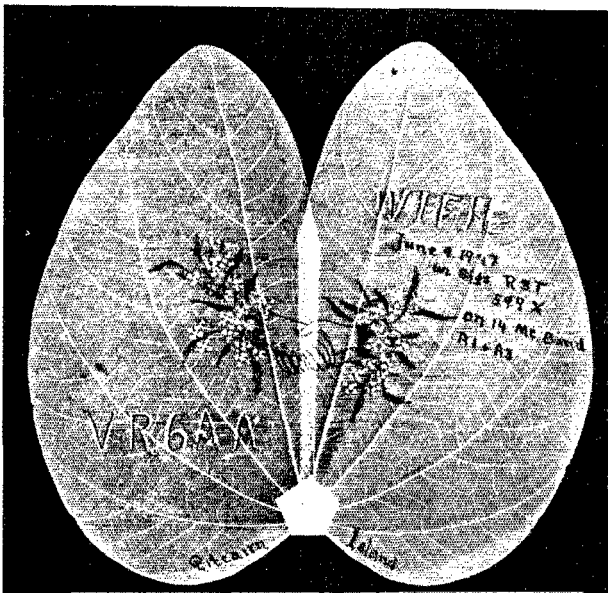
Replacing a long wire with a closed-spaced four-element "plumber's delight" on 28 Mc., W6ZFL came up with ZL1MR, PY2AJ, OA4BC, CE1AH, W5MQB/KH6, ZK1AA, KJ6AA, J9KC, LU8EE, VR6AA, VK7JT and some VK8s, which isn't bad for the condition 28 Mc. is in at present . . . . . KP4AM chinned with PK1MF, KH6FD, SU1WS, ZS4L, ZS6EG, ZS5BZ, CX1DB, G2AFR, OA4AQ and LU2DM.

Where:

A revised listing of QSL bureaus of the world is published in the I.A.R.U. News section of this *QST*. For the benefit of those who like to put on the pressure direct, here are a number of choice ones:

CR8AC, Box 4A, Panjim, Goa, Portuguese India
ZE2JH, Box 659, Bulawayo, Southern Rhodesia
ET4Z, Box 1636, Addis Ababa, Ethiopia
FG8D, Box 39, Lwonte, Guadeloupe
GD6DF, c/o Ronaldsway Airport, Isle of Man
J5AAG, 19th Inf., APO 24, Unit 2, c/o PM, San Francisco, Calif.
W3KXO/J, 624 ACWS, APO 86, c/o PM, San Francisco, Calif.
J8ACS, Kimpo Air Base, Korea, 59 Det., 139 AACS Sqdn., c/o APO 712, San Francisco, Calif.
J9SIR, D. C. Fugman, Tech. Rep. 145th AACS, Det. 36, Navy 824, c/o FPO, San Francisco, Calif.
KB6AA, H. C. Robinson, Canton Island, Phoenix Group, South Pacific.
LX2DN, Rue Robert 46, Vianden, Luxembourg
MD1D (ex-LI2CL), Officers' Mess, RAF El Adem, British Forces, MEF 7

(*Continued on page 140*)



Hints and Kinks For the Experimenter

ANOTHER USE FOR THE CRYSTAL WAVEMETER

FOR those who have built the crystal-diode absorption wavemeter described in the *Handbook*, Fig. 1 shows a method of using it as a sensitive r.f. indicator for tuning antenna systems. The plug-in coil of the wavemeter is removed from its socket and in its place a plug made from an old tube base is inserted. The plug is connected to any convenient length of 72-ohm Twin-Lead.

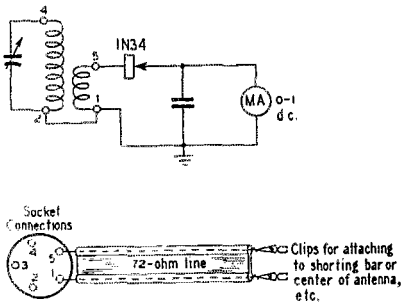


Fig. 1 — A method of using the sensitive crystal wavemeter as an r.f. indicator for antenna adjustments. The tuned circuit of the wavemeter is replaced by any convenient length of 72-ohm line. No internal changes are required.

Battery clips may then be used to tap the line across the shorting bar of a stub or at the center of the antenna. The antenna being adjusted should then be loosely coupled to a nearby dipole that is connected to the transmitter. Very little power will be required to get a usable indication on the milliammeter. Matching adjustments on the antenna may then be made, observing the results on the meter. It should be noted that the indicator should never be connected to a portion of the antenna that is above r.f. ground potential, as it would then add capacitance and unbalance, destroying the meaning of any reading obtained.

— *George S. Woods, W2SWN*

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VERSATILE ANTENNA COUPLER

THE combination tank circuit and antenna coil shown in Fig. 2 permits working into either a single wire or a balanced line. The only extra part required is the loading condenser C_2. When the switch is open, and a single-wire antenna is connected to terminal *B*, the output circuit is a

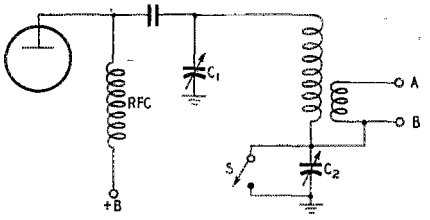

Fig. 2 — A versatile antenna-coupling system that permits working into a single-wire antenna or a low-impedance line. The switch is made by bending one rotor plate of the antenna condenser C_2 as described in the text.

single-ended pi network. When the switch is closed, the circuit is the usual link-coupled output arrangement, and is suitable for working into a low-impedance line.

The switch is made by bending an end plate on the rotor of the loading condenser so that it shorts to the stator when turned to minimum capacitance. Both C_1 and C_2 are 250 $\mu\mu$fd. and the tank coil is a standard 75-watt 5-prong plug-in coil with an end link. A shorting jumper was connected between the cold end of the coil and the link.

The arrangement permits use of a 14-Mc. doublet on 7 Mc. as a single wire, and has been used successfully for several months.

— *Lyman C. Millard, jr., W3DQB/4*

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DEVICE FOR BREAKING ARCS IN TRANSMITTERS

FIG. 3 shows the circuit of a device used to stop instantaneously any arc-over that occurs in the final-amplifier tank circuit of a 'phone transmitter. The coil of a relay that will "throw" when passing slightly more current than that drawn by the final amplifier under normal operating conditions is inserted between the center-tap of the high-voltage transformer and ground. The contacts of the relay (normally closed) are arranged to break the primary circuit of the transformer when the relay is energized.

Once the relay has tripped, it resets itself automatically and closes the primary circuit. The entire break-and-make cycle takes only an instant, thus maintaining continuity of the transmitted signal except for an instant so brief that the receiving station often will not even know

(Continued on page 144)

"Doghouse" in the Sky

BY BROTHER MARCELLUS, C.F.X.,* W3KBF

A WAR-SURPLUS inspired version of an old idea — locating the transmitter up in air with the antenna to eliminate feed lines and their losses — is being employed successfully at W3KBF, thanks to wholehearted contributions of brain and brawn by W3FAM, W3IJE and W3MCI. Although in this instance the undertaking proved to be a major constructional project, as is evidenced by the photographs of the hoisting and installing operations, the improved 2-meter performance of the station has been deemed well worth the outlay of months of planning and work. The installation is perched 120 feet above ground atop its mast on the roof of Mt. St. Joseph High School, Baltimore.

A lucky windfall in the form of a surplus radar pedestal from a Cruiser gave incentive to the project. The mount weighed 450 pounds and was equipped with rotator motor, Selsyns, collector rings and various other fittings. With such a favorable start, our little group enthusiastically went to work. A 16-element beam of the familiar eight half-waves, center fed, with half-wave reflectors, was decided on for an antenna. Suitable means for sheltering the transmitter presented a problem for some time; finally, however, a watertight two-story housing was agreed on and built. Dubbed a "doghouse" by the gang, it is made of a varnished plywood case wrapped in surplus Army canvas, with the seams sealed with liquid polystyrene. Three outside coats of varnish complete the covering. A roof ventilator and a rubber gasket for the cover combine to make the interior of the "doghouse" weatherproof, come rain or shine. The antenna, and the "doghouse" with its tenant 2-meter transmitter and power supplies, rotate as a unit atop the pedestal.

Except for a 4-inch coaxial section connecting the p.p. 24-G final to the antenna stub, feed lines for transmitting have been completely eliminated. Plans are now under way to install the superhet receiver in the "doghouse" alongside the transmitter, to eliminate the receiving-antenna feed lines. The receiver will be tuned from the shack below by means of synchros.

* Mt. St. Joseph High School, Baltimore 29, Md.

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Highlights of the station-raising. In the mast close-up, Ray Smith, W3FAM, is the brave one. W3KBF is at the left, and Brother Joel, C.F.X., W3MCI, is at the right.

Correspondence From Members-

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

SOLIDARITY

University of Minnesota, Minneapolis, Minn.

Editor, *QST:*

During these hectic days of unrest amongst members of our world-wide fraternity, we must, more than ever, maintain a united front of international coöperation and understanding, and continue to develop trustworthiness and loyalty to each of us and to our League.

— *Arthur M. Monsees, W6HJP*

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75 Hallock Street, Jamestown, N. Y.

Editor, *QST:*

An amateur friend of mine (a 'phone ham temporarily off the air) tells me that he heard a friend of his on the 75-meter band chewing the rag with someone. He turned on a low-powered signal-shifter he happened to have handy and gave them a short call on c.w. One of them heard him and forthwith began a lengthy discourse about the "pump-handle operators who, although in the minority, held the most frequencies and still could not stay within their own limits," and much more. Neither of the stations bothered to give their old friend a call.

It does not seem to me as though this is the spirit of amateur radio. If it is, there is no room in it for me. My friend was contemplating moving back into the c.w. band as soon as contact had been established. Another thing: how did these two rag-chewers know that the station calling them was not in dire need of assistance? The least they could have done was to have given him a chance to explain his reason for calling.

Personally, I feel that this bitterness on the part of many 'phone men is very uncalled for. They forget that they started with c.w. once upon a time. I have talked to men who have tried 'phone and gone back to c.w. because they got disgusted with this high-and-mighty attitude on the part of some 'phone operators.

I don't see why we can't get together and enjoy our hobby without fighting each other. Let's bury the hatchet!

— *Cecil Logan, W2PNW*

SCHEMATIC SHORTHAND

2 Congress St., Newburyport, Mass.

Editor, *QST:*

What's so hard about reading a schematic diagram? Why complicate matters by using such junk as the shorthand suggested on page 46 of the August issue of *QST*? I'm sure it's much easier to count grids than it is to count sides on a "crazy-gon," as those optical illusions are.

— *Milton Kalashian, W1NXT*

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250 Homestead Avenue, Hartford, Conn.

Editor, *QST:*

The original purpose of schematic diagrams was to make it possible to show a circuit without drawing illustrations of the various components. Therefore, symbols were used, the configuration of which was descriptive of some feature of the components they represented. Thus, a zig-zag line was used to represent resistances, most of which originally were lengths of resistance wire-wound in a zig-zag form on strips of bakelite; the symbol for a capacitor clearly represents the opposed plates of same, the looped line of the inductance symbol represents the convolutions of a coil. But these new British symbols are in no way descriptive of the components they represent. Indeed, they would be most misleading to the novice who did not know the true construction of the parts.

Again, the tube circuits give no inkling as to the construction of the tubes they are intended to represent. The sides of a triangle do not demonstrate the placement of the grid of a triode between the filament and plate. Also, whereas it is possible in the conventional diagram to bring a grid lead out of either side of the circle representing the envelope of the tube, as convenience might dictate, it is in no wise possible to do this with the shorthand symbol. Thus, it is necessary that a diagram be cluttered with leads circumscribing the tube just in order to reach the necessary facet of the polygon representing the element. Incidentally, those regular polygons needed for the diagrams of multielectrode tubes are not easy to draw; therefore, it is very difficult to achieve a neat circuit diagram.

For the aforementioned reasons, I sincerely hope that the shorthand schematic symbols will never be adopted for use in the U. S.

— *Martin H. Francis*

[Editor's Note: The shorthand method looked odd to us, too, until we started to work with it. We were amazed at the speed it permits in representing familiar circuits; the English author used his shorthand system to speed up his lecture work. It is quite unlikely that it will be adopted as a U. S. standard in publications, however.]

BOUQUET

E. 7 Walton Ave., Spokane, Wash.

Editor, *QST:*

I would like to state that I have been in radio since 1934, and find *QST* a very excellent magazine. It is nicely put up and consistently comes out with the latest ideas on a variety of subjects of special interest to all amateurs.

In passing, I wish to remark also that the *Handbook* is quite a remarkable book in its own right. The information therein contained is concise, to the point, and written in simple language easily understood by the average amateur. In fact the *Handbook* is used quite often by commercial engineers, as it is about the only book containing all the information that is needed at various times. I have seen it used in preference to engineering handbooks.

I think you're doing a swell job, and thanks a lot.

— *R. O. Daly, W7ETY*

PORTABLE PROCEDURE

301 W. Penn. St., Baltimore, Md.

Editor, *QST:*

I should like to call attention to a consistent violation of one of our regulations which is most prevalent in the hidden-transmitter hunts that take place at hamfests and the like. This violation, which also may be observed on any of our 'phone bands at almost any time, is the business of a 'phone station signing, "this is W3XXX operating portable in the third call area."

FCC Regulation 12.82(b) states specifically "an announcement of the geographical location in which the portable or mobile station is being operated." In evidence of my contention that a call-area designation does not comprise such "geographical location," witness the example that is included in the FCC regulations as published on page 27 of May, 1946, *QST*.

— *Albert Hayes, jr., W3LVY*

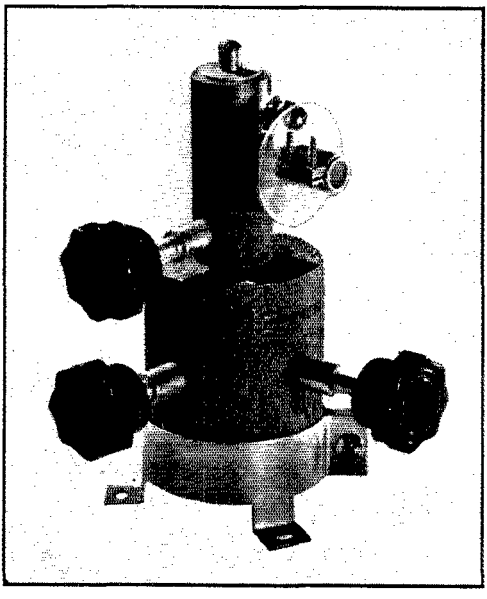
(*Continued on page 148*)

New Apparatus

A 2400-Mc. Oscillator Cavity

VERY few amateurs have had an opportunity to explore the bands above 420 Mc., and one reason is the lack of suitable equipment for these frequencies. The newly-announced DM-240-A oscillator seems to be a "natural" for the amateur who wants to get a rig going on 2400 Mc. with a minimum of effort.

The DM-240-A is an oscillator cavity for use with the 2C40 "lighthouse" tube. It can be used as an oscillator for transmission, a superregenerative detector for reception, or as the high-frequency oscillator for a superheterodyne receiver. To use it for transmission, it requires only a 250-volt power supply and a 6V6 (or similar tube) for the modulator. When used as a superregenerative detector, a separate "quench" tube and sufficient audio are needed. For superheterodyne reception, the 1N21B-type crystal detector is recommended for use as the mixer, and the mixer output is then fed into a broad-band i.f. amplifier. The i.f. can be 30 to 70 Mc.



As can be seen in the photograph, the DM-240-A has three control knobs on it. These knobs control plate tuning, cathode tuning, and feedback. The r.f. output is taken out through a piece of RG-8/U coaxial cable. The entire unit is well-built, with a silver-plated cavity and silver-plated spring finger contacts for the tube; the exterior is finished in brown crackle enamel.

A 14-page instruction book is furnished with each cavity, and the book gives full information for using the cavity in any of its several applications. Complete details are included for building a crystal mixer and a typical i.f. stage, if one wants to use a superheterodyne type of receiver, and circuits for a superregenerative receiver and for a modulator are also given. Several types of antennas are described, including a simple parabolic reflector made from wire screen and bits of wood.

The DM-240-A is made by Decimeter, 742 Colfax Ave., Denver, Colo., and sells for $15.

—*B.G.*

'Phone-Band Phunnies

Coy Cuthbert

HERE we have a character who is just too cute for words. His specialty is an "I'll-bet-you-can't-guess-who-this-is" routine. The way he works it is to screw his VFO down on top of a QSO and then to inject bright remarks into the conversation, preferably while the transmitting station is trying to get across some pertinent information.

When the stations politely call "QRZ?" and stand by on the frequency, our hero makes like a mouse; but as soon as they resume their contact, he is right in there pitching again. Finally, after they stand by for the umpth time, he relents enough to go on the air with a falsetto voice or with the mike held against his Adam's apple and demand that the stations guess who he is. He would probably get a much more enthusiastic answer if he requested them to tell him *what* he is.

If they finally succeed in guessing his identity — and that is not so terribly hard, for, Allah be praised, there are not too many of this type of moron running loose — he promptly loses all interest in the contact and is off to repeat his endearing little performance elsewhere, leaving the other two stations to gather up the bits of their shattered QSO as best they can.

It is most heartening to learn that the FCC is grimly eager to play Cuthbert's little game with him; and just as soon as they guess right, they will send him a billet-doux for going on the air without giving his call. There *is* an even-handed justice! — *John T. Frye, W9EGV*

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
J. A. MOSKEY, W1JMY, Asst. Comm. Mgr.
A. E. HAYES, JR., W3LVY, Natl. Emerg. Coördinator

GEORGE HART, W1NJM, Communications Asst.
A. F. HILL, JR., W6JQB, Communications Asst.
LILLIAN M. SALTER, Communications Asst.

Activity at New Highs. Postwar your Communications Department has been up to its ears — and then some — to keep up with the rush of amateur radio activity. The high demand for Code Proficiency, WAS, RCC, OTC and DXCC certifications, extreme interest in emergency organizing and tests, station appointments, contests, message-handling information, Training Aids, new-club affiliations, code-practice information, SCM nominations and elections, FD-DX-SS Contest rules, simulated-emergency planning, and other activities have kept the pot boiling. But there have been progress and activity on an expanding scale . . . no summer slump at all!

The new season should see even more progress: We'll soon know just how we will be fixed internationally as a result of Atlantic City; we have NBFM on an experimental basis for one year with ample space for test use (minimizing BCI, etc.) in all A3 bands; and by extending programs started last year we shall go much further with reactivation of all ARRL trunk lines.

Emergency-Leadership Progress. The number of section emergency coördinators, responsible for arranging emergency *leadership* in all towns and cities in each section, doubled between 1945 and 1946. More than half our ARRL sections now have such coverage. The number of individual communities covered by emergency coördinators increased in the same period — about 500 are reactivating their groups through activities this fall. SCMs (see page 6) request reader recommendations of more ECs for additional cities and towns, where amateur-service planning for emergencies should be beneficial. Needed are good qualified leaders to plan soundly and inspire amateurs to give full support to the AEC; experienced amateurs to represent us in liaison with other services. Please recommend men of action for this organization work. We must not rest on our laurels.

Recommendations for the EC post in major towns and cities will be appreciated especially by the SCMs and SECs of the following sections: Western New York, Arkansas, Tennessee, Kentucky, Rhode Island, Santa Clara Valley, San Joaquin Valley, Sacramento Valley, Alabama, San Diego and Oklahoma. As an indication of the close tie-in between affiliated radio clubs and ARRL emergency organization, close to 50% of the affiliated clubs have either an ARRL emergency coördinator or assistant coördinator in the club group. Nearly 1000 AEC forms were sent reporting clubs at the time of the annual club survey to permit them to get started on an emergency program. Coördinators may have emergency stations themselves (good example); but it is more important that they be *active organizers* with interest and initiative.

Code-Proficiency Transmitting Stations Wanted. At least one West Coast amateur station, as well as a Central U. S. station, having equipment for automatic transmissions at 15, 20, 25, 30 and 35 w.p.m. (using Klein/Creed or Wheatstone perforated tapes), is desired to transmit *at the same time* as W1AW on monthly *qualifying runs* for the purpose of extending opportunity to qualify for certificates to the stations in their areas. Any volunteers please get in touch with ARRL.

Do You Identify Correctly? Attention is again invited to the fact that FCC regulations state than when transmitting, identifying call signals should come last! All amateur stations must identify themselves at the beginning and end of each transmission by transmitting "the call letters of the station called or being worked *and* the call letters assigned the station which he is operating." W2SJV says he has been monitoring the bands and notes many offenders in this detail of operating procedure. The station transmitting should give its call last when "turning it over" to another station. One should *not* say "W2SJV over to W1BDI" when correct procedure calls for "W1BDI *from W2SJV*." To disturb this order may cost us some "heard" reports. Likewise, we risk conflict with the FCC regulation on station identification.

The proper order of calls is just as necessary on the air as the proper placing of the address at the beginning, and the signature at the end, of a letter. *To* and *from* should follow in a natural sequence. The *last* call heard in a QSO thus always identifies the station transmitting.

It is a matter of good etiquette, as well as a practical necessity for identification, that your call comes *last* when you send a sequence of calls on the air. It is confusing in voice when the call of the station worked is put at the end, violating these principles.

Most of the foregoing applies specifically to voice work. For all who take pride in the fine points of amateur operating something further should be added about c.w. operation. From ARRL literature we have it that "$\overline{VA}$ (end of work) shall be used by each c.w. station when signing off, this followed by your own call sent once for identification purposes." Note that the $\overline{VA}$ (or $\overline{SK}$) doesn't come at the end of the transmission but at the end of the message or discussion. *The identifying call* comes at the very end, as before noted, in compliance with the FCC regulation.

Radio-Club Trends. One-third of our reporting affiliated clubs now have club-owned emergency power supplies, an increase of 28% from last year. After VJ-Day many amateur radio clubs reorganized and held meetings monthly. In the last year considerable club growth is indicated. The average club membership is about 42. A few clubs meet irregularly, 47% about *twice* a month, 36% once a month and 13% weekly.

QSL Percentages. G6CB writes to plead that our stations, especially those in the "more difficult" states, adopt a policy of 100% QSL to first contacts, at least when requested! Though conceived originally as a domestic achievement, working for WAS is an increasingly popular activity with all Gs. The net return from all Ws contacted by G6CB is reported in this case to be 50%. In Michigan, Connecticut and New York his returns are reported to run 30 to 40%. In Indiana, Illinois and Southern States the cards sent brought a 75% return. Let's each try to raise the "standing" of our own states for friendliness by 100% coöperation in QSLing!

Here is a good slogan that reached us from W8UUS, via W1AW: "*The QSL is the final courtesy of a QSO.*"

CD Staff Notes. Since we lost one of our top staff men when Ev Battey (now W4IA) went back to the Navy, we have struggled with the effects of a personnel shortage over the last few months. When no summer slump developed, a few desks rendering membership services began to run behind. We apologize to some members for unavoidable delays in handling their WAS and DXCC applications during this period; it may require 30 to 60 days from the time this *QST* appears and new personnel get on the job to put all our matters on a current basis. But appropriate arrangements have now been concluded to cope with the increased level of activities, and the quality of our checking and research to maintain high standards in awards has not been allowed to suffer.

It gives us pleasure now to announce the names of some well-known amateurs who are joining our staff to fill our vacancies and develop our special ARRL programs.

Albert F. Hill, jr., W6JQB, leaves the field assignment of Asst. SCM of the Los Angeles Section to assume the Hq. post of communications assistant, specializing in the duties earlier handled by Joe Moskey, W1JMY. Promotion of traffic and trunk-line work will be a "natural" since JQB has been an ORS, active in net operation and support of organized communicating since about 1935 . . . RM and OBS since 1940. His wartime work was in Naval communications. JQB was first licensed in 1933, and holds a shiny new Code Proficiency Certificate at the top figure. His record of participation in DX and SS Contests, LO Nites, etc., insures his understanding of your problems in these fields.

Albert E. Hayes, jr., W3LVY, will fill our new post of National Emergency Coördinator in early September. Licensed since 1934, Doc also has a wealth of ARRL and operating experience in addition to his work in the patent field, and membership in IRE and the Physical Society. Doc Hayes was operator at W1MX in the '38 hurricane, and has more recently been emergency coördinator for Baltimore, Md. In addition to boasting a Class A ticket, W3LVY has managed the Traffic Outlet, held down a TLC post, and has participated in our recent conferences with the National Offices of the American Red Cross. The continued growth of the ARRL Emergency Corps, development of new aids to local ARRL emergency leaders, and rendering of direct assistance to ECs and SECs on all problems relative to emergency preparedness are Doc's special interests. This big assignment takes a big man to fill it . . . see page 70, March *QST*, and you will see that A.E.H. fills the bill!

With regret we announce that Jim White, W1PHW, will no longer be with us as a W1AW attendant. Jim is going to college this fall under the GI Bill of Rights. We wish him well in all his studies and future work! Rod Newkirk, W9BRD, who has operated all c.w. bands as well as 10-, 11- and 20-meter 'phone, will take up W1AW projects and duties where Jim leaves off. Rod has about 80 countries to his credit, is a BPL-size

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It's not very often that members of a net including such widely-separated areas as W2, W4, W5 and W9 can get together in person. The amateurs in this group realized that opportunity during July at a meeting in Miami. They're all members of the Silverliner Net (7220 kc.). L. to r., standing: W4HOJ, W4ABI, W2HMJ, W4GOG, W4IGE, W9NTG, W4GXW, W5DOZ and W4CZN. Kneeling: W4FPK, W4EJN and W2LBZ.

traffic man from prewar, has won the SS for Illinois, and has spent three years in Signal Corps aircraft-warning work with additional tape-transmitter experience at WAR. W9BRD's results have been obtained with low power, mostly using under 100 watts, so you can be sure he won't pass you up if your signal is weak. Rod not only has our top Code Proficiency ticket but can take the stuff at 50 w.p.m. or better, so if you send decent stuff don't worry about snowing him under if conditions are right. Also, you can depend on W1AW to slow down *to your own choice of speed* if you happen to be rusty. You're invited to get acquainted with Rod over the air, whether you use voice or c.w. It's just a coincidence, but his station picture appeared in *QST* for July, page 65.

— *F.E.H.*

PRIZE-ARTICLE CONTEST

• The article by Mr. Herbert S. Brier,* W9EGQ, wins a prize in the CD Article Contest.

You are invited to submit entries in this contest. The author of each article used is awarded a $10 prize, consisting of $5 in Victory Stamps and $5 in ARRL supplies or publications (except *QST*). Contributions may be on any subject of interest to amateur radio operators. Articles are selected on originality and value to the fraternity.

Give this contest a try. You may wish to write on Emergency Corps planning work and drills; 'phone or c.w. operating procedures; work on radio club committees; organizing or running a club; the most interesting band for you; code proficiency techniques; DX activities; traffic work; *getting the most out of ham radio*; or some subject we haven't mentioned. You are not limited; make your contribution on any topic of interest to radio amateurs. Please mark your contribution "for the CD Contest."

THE GOLDEN RULE

By Herbert S. Brier,* W9EGQ

In every communications emergency Amateur Radio has covered itself with glory; however, the operation of individual stations often leaves much to be desired. This article, based on observation of the 3.9-Mc. 'phone band during the recent disasters in Oklahoma, Southwestern Iowa, and Texas, discusses the operation of some stations far from the primary disaster areas.

Unnecessary interference made the handling of emergency traffic difficult, and a frequent cause of it was long CQs. Almost every station contacted after one, when told he was interfering with emergency traffic, replied with something like, "Gee, OM, I'm sorry, but I just flipped the transmitter on and called CQ while the receiver warmed up, and I didn't know . . .," and so on for several minutes.

A second group did listen long enough to find a reasonably clear channel without paying attention to what the weak signals on it were doing. The last and smallest group knew that emergency traffic was being handled, but claimed as much right as anyone to the frequency.

Groups one and two coöperated either by closing down or shifting frequency as soon as the situation was explained to them. If their number was not so great, they could be dismissed with a shrug, but there was an unending stream of them. Under any circumstances "blind" calling of CQs is inconsiderate. During an emergency it borders on the criminal, being in the same class as a man picking up a shotgun, closing his eyes, firing both barrels, and then opening them to see what he has bagged. Sooner or later someone is bound to get hurt.

Most of the group who claimed they had as much right to the frequency as anyone did consent to move after considerable discussion or having an FCC order quoted; however there were a few whom even this failed to impress because they had not received an "official notice" that an emergency existed. Some of them later received telegrams from the FCC which were "official" enough even for them.

The group who refused to move frequently claimed that the emergency nets were doing nothing but rag-chewing; and it was often true that they did much of it between messages. Nevertheless, they did handle emergency traffic efficiently the moment it appeared. The wisdom of needless conversation on an emergency net is doubtful; yet it does help keep other stations from moving in on an apparently unoccupied channel.

On the basis of these observations, two impressions were obtained: First, the interference would be reduced if all stations would listen before transmitting. It appeared that the more power a station had, the less likely he was to listen first, because he knew he could plow through anything. Second, that a further reduction would obtain if all stations, on being informed that they were causing interference, would acknowledge with a brief, "OK, sorry OM," and reserve discussion until the emergency was past.

Only the FCC can take care of those who have never heard of the Golden Rule.

*385 Johnson St., Gary, Indiana.

BRIEF

Members of the Black Hills Amateur Radio Club (South Dakota) furnished 11-meter communications successfully in connection with the local Soap Box Derby held July 27th. Calls used were those of members WØIWE and WØQHX.

DX CENTURY CLUB

Postwar DX accomplishment seems to be surpassing that of prewar days by a wide margin if the number of DX Century Club applications being received is any criterion. Headquarters is being swamped these days with batches of cards both from those DX hounds who are working strictly for the postwar award and those who are adding postwar confirmations to their prewar totals to qualify for the award under the special rules published on page 76 of June 1946 *QST*. Many of the applicants for the postwar award have accumulated the necessary pasteboards in a period of about one year! As we recall, there were few if any DXperts who made the grade in such a short time before the war.

Since the last listing of postwar DXCC awards there have been 27 new certificates issued, 3 for 'phone work. Top place in each category is still retained by W1FH. A glance at the tabulation below, however, will show that the gang are hot on Charlie's tail, though he still maintains a comfortable lead. In the 'phone group W1JCX received certificate No. 2 and W1HKK No. 3.

Our heartiest congratulations to the latest crop of DXCC members. In spite of the fact that there seem to be more countries than ever on the air, it still takes plenty of digging and smart operating (And we don't mean *dirty* operating — *Ed.*) to reach that century mark!

DX CENTURY CLUB AWARDS

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

W1FH	168	HB9CE	103
W8HGW	151	W6GAL	103
W2BXA	144	PA0UN	102
W1CH	130	W8LYQ	102
W6VFR	130	W7BD	102
W4BPD	124	HB9CX	101
W1TW	123	W4AIT	101
ZL1HY	122	W1IAS	100
W2CYS	120	W1AXA	100
W2AGW	119	G6ZO	100
W3BES	116	W2HHF	100
ZS2X	115	W6MJB	100
W8RDZ	111	W6GHU	100
W5ASG	110	W8LEC	100
W2IOP	107	W2QKS	100
W1ADM	104	W8JIN	100
		W8HYQ	100

Radiotelephone

W1FH	120	W8LO/2	100
W1HKK	105	W1JCX	100

BRIEF

Oops, sorry! Our attention is invited to the fact that the Puerto Rican station mentioned in connection with the radio chess matches described on page 64 of August *QST* was KP4AM, not KP4CM.

MEET THE SCMs

In January, 1924, the Western Massachusetts SCM, Prentiss M. "Prent" Bailey, received the call W1AZW, which he has held ever since.

Bailey's main interest has been in operating, with emphasis on traffic. He has been RM and presently holds ORS appointment. A zealous contest man, Prent tries to participate in all operating competitions and was winner for Western Massachusetts in one of the early Sweepstakes. A dyed-in-the-wool c.w. man, W1AZW nevertheless has an NFM rig on 28 Mc. which is used occasionally. He holds a Code Proficiency Certificate for 30 w.p.m., along with WAS and Old Timers Certificates. He has participated in all emergencies that have involved New England, notably the 1927 flood and the 1938 hurricane-flood-tidal wave disaster, for which work he was issued a Public Service Certificate. Most of his work in the 1927 flood was accomplished while he was a key relay station between Vermont and the rest of the country; during that emergency he handled 360 messages in two days, in addition to plenty of press. He is an active Pittsfield Radio Club member and has held all the offices in that organization.

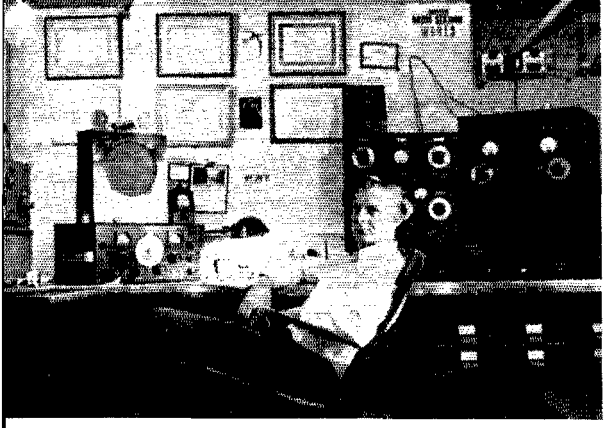
During the war Bailey was communications representative for the Massachusetts Committee on Public Safety and handled all WERS liaison work in Region 1. He also was an active member of the WERS as WKHW-12.

W1AZW is situated in the basement and consists of a 6V6-crystal-or-ECO-6L6-6L6-807 transmitter running 50 watts input on 3.5, 7, 14 and 28 Mc.; a 144-Mc. portable transmitter; a home-built s.s. superhet receiver. Antennas are a 138-ft. flat-top with 66-ft. feeders and a 14-Mc. doublet. For emergency purposes W1AZW has a 3.5- and 7-Mc. portable rig and receiver built in one case and arranged for storage-battery power supply.

Prent has a wide variety of interests, including swimming, football, basketball, enjoys a good game of pinochle, and, last but by no means least, his family of three children. Although no longer actively engaged in amateur radio, Bailey's wife, ex-W1AJJ, is an enthusiastic follower of his DX and SCM work and of radio in general.

BRIEF

KH6AW advises that Hawaii has advanced its clock one-half hour. Hawaiian Time now is two hours behind PST.



W6REB, Yreka, Calif.

We present C. R. "Ray" Jensen, Sacramento Valley Section RM and top-notch traffic handler. Ray is net control station and organizer of the Pioneer Net, which covers California and has excellent U. S. connections and tie-ins to several Pacific points. The transmitter ends up in p.p. T-55s, running 500 watts input, and receivers are an SX-18 and Howard 45-A. Note the message filing cabinet conveniently placed below the table at the right. W6REB also holds ORS, OBS and WAS certificates, and is a member of the RCC and A-1 Operator Club.

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TRAFFIC TOPICS

The Communications Department desires to run an up-to-date listing of all active traffic nets in *QST* as soon as possible. The coöperation of all RMs, PAMs, ECs and net organizers will be appreciated. Please send a postal or radiogram stating the name of your net, times and days of operation, and frequency. This is to be a completely new listing. Even if your net was listed in last year's directory, please submit the requested information so that we will know your group is active this season.

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The Traffic Outlet will begin its regular season on October 6, 1947. The net will meet at 10 P.M. EST on 3705 kc. The call is CQTO. New members are cordially invited to participate.

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From W6REB, net control station of the Pioneer Net, we hear the net is meeting on 3725 kc., Monday through Friday, at 7 P.M. and 10 P.M. PST.

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W8JM, SCM for West Virginia, advises that the West Virginia Net meets nightly, Monday through Friday, 7:30 P.M. EST, on 3770 kc.

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Word was received from W6CMN, RM for Los Angeles Section, that the Southern California Net will meet at 8 P.M. PST Monday, Wednesday and Friday, on 3695 kc. The net will meet more frequently as traffic needs increase.

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The Hit & Bounce Net has been maintaining full operation all summer, according to W4PL, net manager. Operation has been on 7 Mc. and complete coverage of the U.S.A. and Pacific areas has been maintained.

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Message-Handling Note: W1EMG suggests that we point out that the word "same" normally should *not* be sent as a preamble for messages sent in series from the same originator. It may be well enough to follow such a practice on commercial circuits where printed blanks are used between fixed points. However, on amateur traffic nets the receiving operator must go over all his traffic and type in the proper heading before filing. If he handles a considerable volume there is the possibility of error and confusion in forwarding or delivering the messages. In any event, the practice saves time for no one but the sending operator. It is detrimental to efficiency as well as lacking in courtesy. So the preamble should spell out the city of origin clearly with appropriate abbreviation for the state.

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The Southern Texas Emergency Net at the Curero, Texas meeting elected W5FNY net control officer, W5CIX alternate, and W5FNH secretary-treasurer, with controls for Zone 1, W5GMT, Zone 2, W5BGG (alternate W5IC), and Zone 3, W5IVU (alternate W5IU). Tokens of appreciation were awarded to W5EYV, retiring net control officer, and to W5JBZ, editor of the net publication, *Stenscope*.

JULY CD QSO PARTY

Despite summer QRN and otherwise poor conditions, Communications Department appointees and ARRL officials produced an excellent batch of scores in the July CD QSO Party. W8JM summed it up quite well: "Conditions got worse as the time went on, but who ever heard of poor conditions breaking up a CD Party!" W6YYW sent the gang an orchid after taking part for the first time, saying "Noticed that the operating procedure was exceptionally good. Wish the DX gang would operate the same way." Participants made good use of 7 and 14 Mc., newcomers especially expressed enthusiasm about their progress toward WAS in working the rarer states on those bands.

After being a strong contender for top honors in most of the parties held since the war, W4KFC finally tasted the fruits of victory with a first-place score. Apparently inspired by the performance of W3DGM (operating W6RBQ) in putting W6 at the head of the list in the April Party, W6EYH and W6WNI succeeded in snagging second and third places. Several of the top-scoring "regulars" were notable by their absence from the score list. It's suspected that they're resting up for a grand assault on the fall party!

The ARRL Activities Calendar calls for another CD QSO Party October 25th–26th. Any amateur who holds an official appointment or office in the League organization is eligible to take part. The pleasure to be derived from these quarterly get-

togethers can be fully appreciated only by participation. There is an ARRL appointment for you if you're interested in good 'phone operating, traffic handling, frequency measurement or v.h.f. experimentation; you may be eligible for a leadership appointment as emergency coördinator to assist in organizing local amateurs for emergency work. Write your SCM (address on page 6 in each *QST*) for information on how to get into organized amateur activities in your section. The present operating season promises to be one of the busiest and most interesting ever. Get in on the fun now!

Claimed Scores (C.W.)

Station	*Score*	*Contacts*	*Different Stations*	*Sections*
W4KFC	328,770	275	183	51
W6EYH	297,146	181	126	48
W6WNI	241,839	169	114	45
W4KXE	214,730	212	156	41
W1LLX	205,545	207	148	45
W8JM	202,800	202	148	47
W8GBF	201,400	206	142	48
WØBQJ	188,055	189	151	48
W1OJM	157,815	183	122	45
WØCMH	148,630	161	130	48
W8DAE	140,270	163	122	44
W3GJY	130,500	144	126	48
W8PQQ	127,875	155	127	38
W7BED	119,596	109	80	36
W6VEE	117,502	147	115	39
W1AFB	114,005	151	110	41
W1BIH	110,230	145	107	39
W5LFM	110,200	145	110	42
W7CZY	110,200	100	79	37
W8ROX	106,535	143	107	36
W6BIP/6	106,449	101	72	39
W1BFT	98,700	134	103	38
W9EGQ	98,700	135	99	41
W4AYV	96,525	129	102	41
W4KFT	94,500	134	97	38
W1LHE	93,840	136	104	34
VE7ABU	92,214	94	77	32
W3EIS	91,770	127	102	36
W1NJM	88,400	130	95	35
W3ADE	87,120	126	92	40
W5JPC	78,600	114	91	40
W7GNJ	75,180	74	74	31
W1NXX	75,030	116	91	32

Others with scores over 50,000: W6JQB 74,538, W4BZE 73,450, W6VAQ 71,440, W6CMN 70,480, W2GVZ 62,400, W5VT 62,370, W1AQE 61,585, WØRJF 59,590, W8YDR 59,000, W7JQU 58,844, W4FWZ 50,050.

TRAINING AIDS

Looking ahead, the activities manager of a club can tell on just what meeting dates he has need of a program. Attention to program arrangements for meetings months in advance gives him plenty of time to make complete and proper arrangements, and to change them if necessary. When he lets it go until the last minute, he has that much harder a task finding a satisfactory stopgap.

The ARRL Training Aids Program is not intended to supply stopgap entertainment and program material — although it can sometimes do so. It is intended to supply continuing training facilities for both code and technical training of amateurs: would-be, new and old. If the material is scheduled far enough in advance, you can book pretty much what you want; and what is just as important, you can generally book it in the order in which you want it. Except for motion-picture films, we don't care how far ahead you book Training Aids. Three months ahead is the limit for motion pictures, but even here you can figure out a chronological scheme and make it work if you have one showing per month and book each film three months in advance. Clubs who want to conduct a chronological training program should get themselves a list of ARRL Training Aids and copies of all reviews, and "look ahead."

A new series of mimeographs which will be ready for circulation by the time this appears in print includes a complete list of revised rules for all Training Aids, a complete list of ARRL Training Aids available, and application forms for your convenience in requesting material. These are, of course, in addition to reviews which will continue to be mimeographed on all films reviewed by the ARRL staff. Any of this printed material is available to any affiliated club upon request.

BRIEFS

The annual trans-Pacific sail race to Honolulu commenced on July 4th from Los Angeles. Only meager reports on the progress of the various entries were received until July 10th, when W6AM made contact with W6FZC/MM aboard the *Morning Star*. Position reports on fourteen of the boats were received at W6AM and given to various press bureaus, Western newspapers, broadcast chains and local broadcast stations.

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The Delaware Valley Radio Association (Trenton, N. J.) is working toward the goal of having all its members qualify for ARRL Code Proficiency Certificates — ahead of any other ARRL-affiliated club, they hope. We divulge their intentions in order to plant the idea in other club groups and perhaps thereby stir up a bit of competition. A little application on the Monday-through-Friday W1AW practice transmissions, and attention to the dates of the monthly qualifying runs, will help. Which ARRL-affiliated club will reach the goal first?

BRASS POUNDERS LEAGUE

(July Traffic)

Call	*Orig.*	*Del.*	*Rel.*	*Extra Del. Credit*	*Total*
W4PL	12	134	529	131	806
W2TYU	10	18	650	7	685

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

W6AM 150

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

A.R.R.L. ACTIVITIES CALENDAR

Oct. 17th: CP Qualifying Run
Oct. 11th-12th: Emergency Corps Test
Oct. 25th-26th: CD QSO Party
Nov. 12th: CP Qualifying Run
Nov. 15th-17th and 22nd-24th: Sweepstakes Contest
Dec. 16th: CP Qualifying Run
Jan. 19th: CP Qualifying Run
Jan. 24th-25th: ARRL-Member Party

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Jan. 16th-Dec. 15th: 1947 V.H.F. Marathon
Jan. 1st-Dec. 31st: Most-States V.H.F. Contest
First Saturday night each month: ARRL Officials Nite (Get-together for SCMs, RMs, SECs, ECs, PAMs, Hq. Staff, Directors, Alt. and Asst. Dirs.)

AMATEUR RADIO HELPS TO SAVE A LIFE

On July 8th, while listening for DX, W3JCR, Cumberland, Md., heard KP6AA on Palmyra Island calling CQ, the call occasioned by result of a plane crash. On making contact W3JCR was advised that medical supplies were at hand but that advice was needed in the treatment of a crew member who had lost a hand and a leg in the crack-up. There were no doctors on Palmyra.

Detailed instructions were obtained by W3JCR from a doctor at Cumberland Hospital and radioed to KP6AA. Following receipt of these initial instructions, KP6AA requested dietary information to aid the injured man; the required details were obtained by W3JCR and transmitted in short order. W2EQ also worked KP6AA and sent instructions obtained from his local hospital. W3JRF/KG6 and W9YJH contacted during the proceedings and relayed information from KP6AA which was turned over to the military commandant of the Marianas and became the basis for getting assistance by plane from Honolulu.

VERMONT FLOOD EMERGENCY

A flood of water loosed by the breaking of a dam at East Pittsfield, Vermont, swept through the western section of Rutland on June 4th and caused general disruption of power and telephone service. While commercial power was still available, W1AAJ in that city went on the air, under the auspices of the Green Mountain Amateur Radio Club, to organize an emergency network of stations in New England, New York, New Jersey and Pennsylvania. When regular a.c. power failed, a portable gasoline-engine-driven alternator was installed to keep the station on the air. Contact with the local police was maintained; messages were handled for the National Guard; news bulletins were transmitted to outside broadcast stations. Many messages relating to the safety of Rutland residents were handled after the forwarding of priority traffic. About 50 stations were standing by between 3970 and 3980 kc. to coöperate when necessary. Operators assisting at W1AAJ were W1OCD, W1FSV and W1PTB. Several amateurs from outside the city reported in person to help keep the station on the air. As soon as commercial power was restored, W1PTB went on 3.9-Mc. 'phone as auxiliary to W1AAJ; W1AVP also put his transmitter on the air to help handle incoming messages.

One of the most urgent problems during the emergency period arose when it was learned that the city was badly in need of drinking water. W1AAJ put out an emergency call. W2GM, Schenectady, N. Y., responded quickly, took appropriate action, and within a matter of minutes reported that ten Army trucks from the Schenectady Army Depot were on the way to Rutland with tanks of water.

In addition to those amateurs already mentioned, the following are known to have assisted in handling emergency traffic: W1MLJ, W1AD, W1AZV, W1MKM/1 and W2GWY. Numerous other amateurs at more remote points coöperated in various ways.

The emergency was declared over at 6:00 P.M., June 5th, when W1AAJ went off the air as the central control station in the affected area.

BRIEFS

Here's a story with a one-in-a-million twist, told by W6VCN: "One night last June I contacted W7IEY, who was operating 28-Mc. mobile from Twin Peaks in San Francisco. He was on vacation and had just arrived from his home town, Ruppert, Idaho. After the usual formalities, I mentioned that I worked for KPO. He came back and said he had installed the first KPO transmitter. That was coincidence Number 1. Then he asked for my QTH and I replied that it was 915 Fulton St. In a voice filled with excitement he came back and remarked that he had lived at the same address during 1920. I invited him to visit. We spent an enjoyable hour together inspecting 915 Fulton St. W7IEY pointed out the former locations of his rig and antennas. I had placed mine in the same spots twenty-seven years later!"

—•••—

Corrections: The contest committee of the Canadian Amateur Radio Operators' Association advises that through an inadvertent error in the original compilation the score of WØDIB, 722 points and high for the Iowa Section, was omitted from the results of the W/VE Contest published on page 65 of August *QST*. Also, the leader for Northern New Jersey was W2KHT with 16,912 points and the runner-up W2EQS. A typographical error was responsible for listing W5VPC as the Southern Texas winner; actual winner was W5JPC.

HAVE YOU QUALIFIED FOR A CODE-PROFICIENCY CERTIFICATE?

The next opportunity to qualify for a certificate or endorsement sticker in the ARRL Code Proficiency Program is on October 17th. At 10:00 P.M. EST that date W1AW transmits the monthly qualifying run at speeds of 15, 20, 25, 30 and 35 w.p.m. Frequencies: 3555, 7145, 14,150, 28,060 and 52,000 kc., simultaneously.

The text received successfully by ear at the highest speed you can copy should be sent to ARRL for checking. To avoid errors in transcribing send your original copy. *Attach a statement certifying over your signature that the text submitted is direct copy, made from reception of W1AW by ear, without any kind of assistance, personal* or *mechanical.* If you qualify, you will receive a certificate or appropriate endorsement sticker for certificate you already hold. Those who qualified in the past should submit copy only if speed is higher than previously certified.

Each night, Monday through Friday, at 10:00 P.M. EST, on the frequencies mentioned above, W1AW transmits practice material. Tuesday and Thursday transmissions are made at speeds of 15 through 35 w.p.m. in 5-w.p.m. steps. On Monday, Wednesday and Friday practice is at 9, 12, 18, 25 and 35 w.p.m. References to text to be used on several of the practice runs appear below. This makes it possible to check your own copy. It also provides a means of obtaining sending practice since it permits direct comparison of one's fist and tape sending. To get sending help hook up your own key and buzzer and attempt to send right in step with the tape transmissions. Adjust your spacing in the manner indicated as necessary for self-improvement.

Date	Subject of Practice Text from August *QST*
Oct. 1st:	*A 120-Watt Modulator and Speech Amplifier*, p. 13
Oct. 7th:	*Curing Interference to Television Reception*, p. 19
Oct. 9th:	*The "Last-Ditcher,"* p. 24
Oct. 13th:	*Atlantic City Report*, p. 28
Oct. 15th:	*An Electronic Multicircuit Breaker*, p. 34
Oct. 17th:	Qualifying Run, 10:00 P.M. EST
Oct. 21st:	*Cathode-Coupled Converters for Surplus Receivers*, p. 37
Oct. 23rd:	*Technical Topics*, p. 43
Oct. 27th:	*An Inexpensive Rig for Local Duplex Operation*, p. 52
Oct. 31st:	*The World Above 50 Mc.*, p. 54

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 Sections. 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:

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*
Maritime *	Oct. 15, 1947	Arthur M. Crowell	.....
West Indies	Oct. 15, 1947	Mario de la Torre	Deceased
Kentucky	Oct. 15, 1947	Joseph P. Colvin	Resigned
Quebec *	Oct. 15, 1947	Gordon F. J. Phelan	Resigned
Alabama	Oct. 15, 1947	Lawrence J. Smyth	Resigned
Philippines	Oct. 15, 1947	George L. Rickard	Oct. 15, 1938

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian General Manager Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

Iowa	William G. Davis, WØPP	June 16, 1947
Nebraska	William T. Gemmer, WØRQX	June 16, 1947
Western Florida	Luther M. Holt, W4DAO	July 2, 1947
East Bay	Horace R. Greer, W6TI	Aug. 16, 1947

In the New York City and Long Island Section of the Hudson Division, Mr. Charles Ham, jr., W2KDC, and Mr. August A. Nickel, W2HMJ, were nominated. Mr. Ham received 422 votes and Mr. Nickel received 277 votes. Mr. Ham's term of office began July 31, 1947.

In the North Dakota Section of the Dakota Division, Mr. Paul M. Bossoletti, WØGZD, and Mr. H. E. Parmeter, WØCGM, were nominated. Mr. Bossoletti received 46 votes and Mr. Parmeter received 18 votes. Mr. Bossoletti's term of office began July 31, 1947.

In the Eastern Florida Section of the Southeastern Division, Mr. John W. Hollister, W4FWZ, Mr. W. E. MacArthur, W4BYF, Mr. R. E. Lowrey, W4DQW, and Mr. R. H. Bennett, W4ANY, were nominated. Mr. Hollister received 76 votes, Mr. MacArthur received 54 votes, Mr. Lowrey received 45 votes, and Mr. Bennett received 43 votes. Mr. Hollister's term of office began July 31, 1947.

In the Southern New Jersey Section of the Atlantic Division, Mr. George W. Tunnell, W2OXX, and Mr. W. Raymond Tomlinson, W2GCU, were nominated. Mr. Tunnell received 125 votes and Mr. Tomlinson received 103 votes. Mr. Tunnell's term of office began July 31, 1947.

In the Washington Section of the Northwestern Division, Mr. Laurence M. Sebring, W7CZY, and Mr. Lloyd Norberg, W7EHQ, were nominated. Mr. Sebring received 238 votes and Mr. Norberg received 114 votes. Mr. Sebring's term of office began July 31, 1947.

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

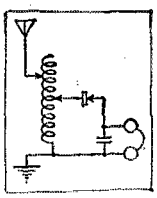
EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — The SVARC of Sunbury supplied communication for the 175th birthday parade of the City of Sunbury. All operation was on 144 Mc., one mobile rig leading the parade and four fixed stations at strategic points. This network kept the traffic moving smoothly along the parade route. Those participating were: WBL, KPH, LYU, MXE, MXT, KSM, NJJ, and MGL. The SVARC held a picnic and hamfest Aug. 31st at Rolling Green Park, Sunbury. BFH is proud papa of a jr. operator. UWQ has a 144-Mc. mobile in his new Frazier. The York Amateur Emergency Corps assisted with communications during the big fire in the York business district. EU has a new location which is much quieter than the old one along a 66-kv. line. CAU is doing a conscientious job as an OO. This from QP: The electric company has replaced the 5-kva. pole transformer with a new 10-kva. The new kilowatt rig must have strained the little one. OA4U tells Jack he needs Vermont for WAS. QEW is faithfully maintaining his schedules but traffic is slow these days. BXE took a little time out from DX to handle some fine traffic. Jack now has 84 countries confirmed. EAN is DXing on 14 Mc. 100 per cent, reporting many rare contacts, mostly with the USSR. EOP is back in Easton so you Eastern Pennsylvania ORS will have to look to your laurels. ELI is having trouble keying his new net frequency crystal. GMK says the Eastern Pennsylvania Net operators are champing at the bit waiting for the fall traffic season. The Frankford Radio Club operated five 144-Mc. units for the Red Cross and the Pennsylvania Disaster Committee during the Soap Box Derby held in Fairmount Park, and assisted in handling casualties and locating missing persons. Arrangements are being made to take part in all occasions where large crowds must be handled. Amateurs with portable or mobile gear are urged to register same for possible emergency use with their local EC. Traffic: W3QP 17, BXE 14, QEW 14, EAN 7, EER 5, ELI 5, AQN 3, CAU 3.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Eppa W. Darne, W3BWT — Asst. SCM, Frances Darne, 3AKB. RM: ECP. The Washington Radio Club held an election of officers for the coming year at its first July meeting. Following were elected: MHW, pres.; MO, vice-pres.; MSK, treas.; AKB, rec. secy.; 4IPS, corr. secy. At the second July meeting DK gave a talk on "Mobile Telephone Apparatus." All Washington area hams received personal invitations to visit the Airways and Air Communication Service, ATC, during the Bolling Field "Open House" on August 1st. Capt. Biggs extended a permanent welcome to all hams to visit AACS headquarters whenever they were in the neighborhood. The Section Net has suspended operation until Oct. 1st when it will resume on 3650 kc. at 7:30 EST with ISF as NCS. The Potomac Valley Emergency Net continued operations during the summer and the gang is to be congratulated on a fine job, well done. EIS is doing a swell job with the Washington Area Emergency Corps. Don has done considerable organization work, tabulating apparatus available and operating personnel. LVY has left the section to take up duties at League Headquarters. "Doc" did an admirable job while in the section, and among his many appointments were RM and EC for the Baltimore area. All of us will miss him. NHT is a new station in Washington, and already has many DX contacts to his credit using 14-Mc. c.w. and 25 watts input. ISF is convalescing after a major operation and has been getting out well with a one-watt transmitter at his bedside. CJT is building a 50-watt portable transmitter for emergency work, using both c.w. and 'phone. AKR is experimenting with various types of antennas. KHJ is running morning schedule with "Hit and Bounce Net." CDQ has been getting out much better since she changed operating frequency. LUE is raising his four-element beam and rotating with motor. EQK is on 28-Mc. 'phone with 250 watts to a two-element beam, using Hytron 5514s in final. KKH is using a three-element beam on 28 Mc. and gets out well. IKX is using 5514s as modulators. FNG, GKP, EYX, MNA, KUX, and JDQ attended York, Pa., Hamfest on July 13th. EYX worked KCA/4 at Skyline Drive, Va., while parked on Sears Roebuck roof using his car portable rig. He also worked Admiralty Islands on 14-Mc. 'phone from his home station. MKS gets out well on 28-Mc. 'phone with 20 watts. ECP is rebuilding and primping up a brand new VFO. MNA is leaving the section for the South. The gang will miss his cheery signal on 144 Mc. Traffic: W3KHJ 28, AKB 15, ECP 13, AKR 6, ISF 3, BWT 2.

SOUTHERN NEW JERSEY — SCM, Ray Tomlinson, W2GCU — Well, fellows, this report will wind up my activities as SCM for this section, and I am grateful to those who helped with news for this column during my term of office. Your new SCM is George W. Tunnell, OXX, 22 Wyoming Avenue, Audubon, and I hope you will give him all possible coöperation. WI one of our most valuable and active Class I OOs, is confined to Municipal Hospital. QOK, SMP, and GCU have all been on vacation and are now back in "de groove." QGZ, who passed away on June 27th following a lengthy illness, will be greatly missed by his many friends. DX at RPH this month includes KH6EV, VK3AIG, VK2TR, VE7CH, D4AWX, VK3AX, VK3VJ, GI5UR, VK3BZ, and VK3LN. Bill's operations were mostly on 14,140 kc. SXK maintains daily schedules for traffic handling. BAY spends lots of time listening on 144 and 50 Mc. ZI made 44 QSOs in 3½ hours for a score of 13,500 points in the CD Party. RDK is endeavoring to arrange schedules for Tokyo traffic which he handles each month, and also is gathering up QSLs for DXCC. RXL has completed his new 100-watt rig for 3.5, 7, and 14 Mc. with p.p. 807 in final. SAI is building new rhombic antenna. GCU is working on new 3.5- and 7-Mc. centerfed antenna. New QTH of Frank G. Tompkins is 20 Jefferson Ave., Crescent Park, Gloucester. Again I want to thank all those who helped maintain this column in *QST*. Thanks for your coöperation, my 73 to all, and best of luck. Traffic: W2SXK 21, BEI 8, DK 5, HX 2.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — The Pittsburgh South Hills Brass Pounders & Modulators did it again with their annual hamfest held in Pittsburgh Aug. 3rd. CKO kept the crowd entertained as "Ballyhoo Man" at the mike. The "Old Polecat Net" of Pittsburgh meets at 12:30 P.M. DST each Sunday on 3665 kc. with NUG, SWX, IWH, KKA, KSR, KSP, and WNN participating. Anyone interested in a good rag-chew is invited to break in. The McKeesport gang, with KPO, as NCS, KPL, and RUM are starting a net on 28-Mc., 'phone. Get in touch with any of these stations, if interested. Reports from Erie on the v.h.f. finds NCJ doing a little reporting on the 144-Mc. boys. GV now has 350 watts with p.p. HK54s, sixteen-element beam and 522 receiver. AU worked Toronto on 144 Mc. LTN puts up square corner reflector antenna. NOJ boasts of 60-ft. poles for 144-Mc. antenna. QKI made final arrangements for early morning DX on 144 Mc. with East Coast and Western stations represented. RAP's 28-Mc. three-element beam is a honey. LWT will be active on 28 Mc. LGM has rebuilt to p.p. 8005. The rotary beams seem to have made a hit with KSI, LGL, and LGM, who are busy building. GJY made 144 contacts in 48 sections in 10 hours in CD Party. RAT, our PAM from Pittsburgh, is on a business trip to the West Coast. MHE finds time for a nice traffic total. LWN became an OES. He reports he hasn't seen an amateur antenna in 1200 miles of traveling down South. MJK is working traffic in spite of the heat. NCJ says Field Day netted him 9 contacts on 144 Mc. He also is ready for ORS with p.p. 813s. KEW, from Mead-

(Continued on page 76)



RADIOTELEPHONE communication used to be so simple when all we had to contend with was amplitude modulation or A.M., plus unintentional F.M. when the oscillator happened to be unstable. But now, just keeping abreast of some of the new modulation techniques is a major project. It is anybody's guess as to what modulation system the amateur of 1975 will be using.

The amateur might well wonder how some of these newer communication techniques, such as Narrow Band Frequency Modulation, Narrow Band Phase Modulation, Frequency Shift Telegraphy, Pulse Time Modulation, Pulse Count or Pulse Code Modulation, Pulse Amplitude Modulation, Pulse Frequency Modulation, and Pulse Width Modulation will change the D.X. or V.H.F. picture. Will they complicate or simplify the apparatus involved? This is the stage of the game where predictions of things to come are many, and differ widely. Basically, there are some fundamental facts which can be applied to give a clearer understanding of the situation.

Concerning A.M., F.M. and P.M., as the *unmodulated* carrier at the receiver becomes weaker it finally gets lost in the noise at a level governed by selectivity, and all three systems are equal in this respect. When the carrier is *modulated* it becomes readily apparent that the effectiveness of any one of these three systems for weak signal reception is determined by its ability to combat noise.

A little investigation into the characteristics of noise shows that with tube hiss and thermal noise, the noise reaches an average value, but noise peaks or very short pulses are as much as 13 decibels (approximately) above the average level. Ignition noise and man-made static are of this character but often have a much larger ratio of peak-to-average value. As the R.F. signal level decreases toward the average noise level these noise peaks obliterate the R.F. signal for very short intervals of time and no type of modulation can be effective. Improvement in reception under these circumstances can then be obtained by techniques which will permit the receiver to recover more rapidly after each paralyzing pulse of noise. If one system of modulation permits receiver designs which allow the receiver to recover more rapidly than another, that system will ultimately be superior in providing readability from a weak signal.

Many practical factors enter the situation, such as complication or simplification of receiver or transmitter, cost of parts, bandwidth to be used, and last, but not least, reduction of broadcast interference, for a few examples.

The F.C.C. in its recent order allowing narrow-band F.M. and P.M. within amateur phone bands for a one year period clearly indicates its desire to gather data on practical operating experience. NATIONAL, developing components and producing equipments, will continue its efforts to help the amateur improve the art of radio communication, and will have an announcement of interest to N.B.F.M. experimenters.

The years have shown the amateur to be truly progressive and we expect to see N.B.F.M. given a real tryout between now and August 1, 1948.

W. A. READY

ville, says ham radio is plumb dead until golf scores get bad. Reports from Oil City show LST has BC-458A as a VFO. KQE has decided that fishing in Canada is more fun than radio. KQX finds YLs sure keep him QRL. DIL and LXR are taking it easy. MLG worked KS4AC on 7 Mc. VTK has finished ROTC course. NDE reports no activity except for early morning QSO on 7 Mc. TOJ says ORS activity for the fall looks better than ever. Traffic: (June) W3MJK 37. (July) W3MHE 69, MJK 45, RAT 15, MLN 2, NCJ 2, VNE 2.

CENTRAL DIVISION

ILLINOIS — SCM, Wesley E. Marriner, W9AND — The ILN continues to operate through the summer on 3765 kc. Most other state nets have closed down for the vacation months. YBY writes to tell us of a loud and aggravating raw a.c. noise on the 28-Mc. band in Streator which he is trying to trace down. KMN is studying for commercial tickets. KA says, "Nothing of interest to report," but we heard him working J9SIR in the Marshall Islands. BON has moved to new QTH in Chicago. WFS is back on 7-Mc. c.w. after a spell of 14-Mc. 'phone. Lightning put LNI's rig out of commission but 8TBP came down from Michigan and helped John get back on the air. DBO wonders where JTX is these days. How about it, Louise? YTV announces the arrival of a jr. operator. The July CD QSO Party was well under way when the plate transformer at YTV burned out. SYZ says he has a schedule with 8BYR in Michigan and that EVJ visited SYZ's shack on July 26th. A new amateur call in Chicago is ZQS. EVJ expects a large net in the fall on ILN. BRX took the family to Michigan. He has acquired new surplus RC350 IFF equipment which will provide 5-inch scope, rotary beam antenna control, 144-Mc. receiver/transmitter, etc. ASN is ARRL Emergency Corps member. In the Rock Island, Moline, Illinois-Davenport, Iowa, area, ØFP is Acting Emergency Coördinator. His address is T. J. Innis, R1,. Bettendorf, Iowa. UPW is sporting a new de luxe Vibroplex key and says he will be using it in traffic soon. HAB has been active with 28-Mc. mobile and has 50-Mc. beam under construction. UPW found a crow in the woods and has trained it for a mascot. QBH revised his OBS schedule. IFY has given up 28-Mc. 'phone for the summer and is active on 14- and 7-Mc. c.w. now. JYF is home for the summer and working DX from his father's 40-acre (antenna) farm. FCN has given up 28 for 144 Mc. IHN is on 14-Mc. c.w. working DX. ACU is working 50- and 14-Mc. 'phone mostly. Francis has 16 states and VE1, 2, 3, on 50 Mc. now. ZHB is doing some mighty nice work on both 144 and 50 Mc. from his high-frequency-beam farm at Zearing. AWA was in the hospital for an operation. GNU made the incision. He also operated on the SCM's XYL. GNU went to Minnesota on vacation and has new 14-Mc. beam and also 144-Mc. beam under construction. VJN has been experimenting with his new 14-Mc. beam and is working some nice DX. ASN moved the rig to the dining room. Bet he's always on time for meals now. AND purchased new RME-LF90, a 522 for 144 Mc. and a portable 3.85-Mc. 'phone transmitter-receiver. FKI schedules LIR daily. The only activity at NIU is Starved Rock Radio Net Tues. and Fri. at 9 P.M. on 3765 kc. HGQ worked across the lake to Michigan as well as down to Rock Island on 144 Mc. on his 522. GBT has new surplus Meissner 200-watt rig now. Don't forget, send in your DX total each month for the Illinois DX listing. How about it KA, NRB, and the rest? Let's build this feature up. This is what we have this month. DX scores: GNU 86, AND 85, AWA 83, KMN 68, IHN 67, ACU 64. Traffic: W9EVJ 33, YTV 21, FKI 16, SYZ 9, KMN 8, AND 7, DBO 4, LNI 3, WFS 3.

INDIANA — SCM, Ted K. Clifton, W9SWH — MVZ is chairman of the new Indiana Radio Club Council. Chuck also is trustee of the CQ Club of Gary. AAI has the big rig back on 3.85 Mc. BTR has moved from Shelbyville to Rushville. YB worked over thirty countries in a few days with a new antenna consisting of a stacked Lazy-H on 200-foot towers, but now is QRT because no one on the Purdue staff holds a license to act as trustee. 3IWX ex-CVX, visited the Fort Wayne boys. TBE, of Muncie, has 60 watts on 7 Mc. The Tri-State Amateur Society of Evansville is conducting a club contest which started Aug. 1st. PTW left his rig at Lafayette and is teaching sailing in a boy's camp at Cass Lake, Minn. RZR graduated from Purdue and is working for Collins. The New Albany Amateur Radio Club is the newest Indiana club. YDA has been ill. ZJO has a new sixteen-element beam for 144 Mc. AB worked 1HDQ on 50 Mc. UIA has a new 42-foot aluminum self-supporting tower erected with the help of UMS, DGA, QLW, and GFO. GJN runs a restaurant. SWN, who is a new ham, just got married. Louie has a T55 on 28-Mc. 'phone and changed from a folded dipole to an 8JK. DGA has rebuilt rig into a 6-foot rack. GFS joined Mac on Field Day and used a 12-watt rig with 6V6-6V6 vibrapack-powered rig. OHT has moved to Owensboro. BZX is engineer at WEOA. MHE, of the Atomic Club, is on 3.85 Mc. with n.f.m. PMT vacationed in California. NKB is operating mobile 28-Mc. in his new Chevvy and also has a new 14-Mc. beam. VBJ, NKB, UYJ, and LJI of the Michigan City Radio Club all have SCR-522s converted to 144 Mc. All members of the QIN should watch the *Bison*, which will announce starting of QIN in September. Anyone interested in net operation, please contact your SCM. RXZ has finished at V.T.I. and has moved back to Michigan City. RDU is a new OO and is located at Indianapolis. HEI, of Munster, is on 3.5 Mc. The Fort Wayne Club is starting meetings in September. Traffic: W9QLW 2.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — LFK operated portable with 3 watts input to VFO at Okauchee Lake during vacation. YCV increased power to 140 watts 'phone and 190 watts c.w. ESJ schedules QIX daily on 3.9-Mc. 'phone. DND, MNG, and DNB are active at Barron. SIZ is active on 3775-kc. Wisconsin c.w. net and now is ORS. BCC is new call in Stevens Point. HDJ took exam and got his old call back. Organization of a club at Stevens Point is being planned. CJO sends an FB report from the Madison area. AWO, Madison Club publicity chairman, who worked 36 countries with less than 20 watts, has taken a government job on Baffin Island. Four Lakes Radio Club elected the following officers: HHR, pres.; NAK, vice-pres.: PYE, secy.; YPP, treas.; RBI, RNX, and LIJ, directors. NGM, WON, QKT, WFZ, RBI, CJO, HHR, MFR, IHB, and HZS have new 28-Mc. beams ready for fall DX. Madison portable-mobile is growing with WFZ, MFR,, RBI WON, BAP, and HHR active. RSR will have Madison as his new QTH. UFX, RBI, QKN, KML, NGM, and WFZ participated in Stoughton's Centennial Celebration, using Madison club's call, SWQ. GPI, our PAM, reports lots of 144-Mc. activity in Milwaukee with SCR-522s in quantity! We regret to report PRK as a Silent Key. CIH is doing an FB job as OO. RQM broke the ice on 50 Mc., and worked W2, 3, 4, 5 and Øwith 25 watts to an 807 doubler. The Wausau Club held it annual picnic July 27th. BDJ is new call in Wausau. AFT applied for OPS appointment. FZC, Wausau EC, is rebuilding for higher power. QJW, FZC, VHA, and GAA have 28-Mc. mobile at Wausau. OFG worked Tunis on 7 Mc. with 40 watts to a 6L6 crystal oscillator. MUM will be back on the c.w. net when the weather cools off. RLB is on 7 Mc. Traffic: W9LFK 51, YCV 29, ESJ 13, DND 12, SIZ 7, CJO 6, RQM 5, RBI 3.

DAKOTA DIVISION

SOUTH DAKOTA — SCM, P. H. Schultz, WØQVY — 3KOV, of Pennsylvania, has been driving a chartered bus through South Dakota this summer. DIY is working into Watertown on 50 Mc. BJV says he'd like to have more stations in the State on 50 Mc. GCP says traffic has been nil on the net because of hot WX. BLK is going to town with 813 and hauling down a lot of DX. Been getting ready for traffic this winter. This column gets rather short when no news is sent in, doesn't it? Traffic: WØGCP 2.

MINNESOTA — SCM, Walter G. Hasskamp, WØCWB — RJF says he is not a DX man, but on 14 Mc. this month he worked 17 VKs, 2 G8s, 4 KH6s, 2 KH4s and an XE. What would he do if he went after DX? Robie also made 95 contacts in the CD Party. 6HJP/Ø now is a member of the Rag Chewers Club, and at the present time is at the Air ROTC summer camp at Chanute Field, Ill. MIM and MCY are Class A now. Copies of a tentative constitution for the Dakota Division Council of Radio Clubs have been mailed to all of the Radio Clubs in the Division for which addresses are available. Answers are starting to come in and it looks as though the Council will be operating in full swing in a few months. SOG has a BC-654 running 7 and 11 watts from a 6-volt supply working FB on 3.85-Mc. 'phone. SOG is the one and only JDO! ZOB rises early to report into the 6:45 A.M. Screwball Net that convenes on 3995 kc. to pass out the raspberries. ROE also is one of the boys who take turns at "nut" control! CYA has been keeping schedules with AJU, of St. Louis, who recently paid CYA a visit. ZIA, of Kansas City, has been visiting NQK, who now is on the air for the first time postwar. RPT now checks into the Iowa

(Continued on page 78)

...GO PR

and KNOW WHERE *you are!*

"Looks like you're out of the band, old man. Of course, my receiver may be off but according to my readings you're . . . etc." — "There's a CW sig on you . . . better check your frequency" — "I can't find you since you moved up, Bill. You said you'd move up 25 kaycees but can't hear you there" — "Sorry, Charlie, I am monitoring the spot set for our sked but no soap. Guess you must be on the wrong frequency." — *How much of this kind of talk do you hear these days?* Plenty. Unless you are CRYSTAL CONTROLLED you can never be sure *where* you are. Get set to enjoy yourself this winter. Pick PR Precision CRYSTALS at your jobber's for your favorite spots. Go PR... and KNOW WHERE YOU ARE! — Petersen Radio Company, Inc., 2800 W. Broadway, Council Bluffs, Iowa. (Telephone 2760)

SINCE 1934

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10 METERS PR Type Z-5.	Harmonic oscillator. Ideal for "straight through" mobile operation. High activity. Heavy drive without damage in our special circuit $5.00
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Net. VJH is acting as alternate NCS on the MSN C.W. Net. The St. Paul Radio Club completed several transmitters and receivers for handling of the open golf tournament at Keller Field. SKJ spent his vacation in Northern Minn. BHY is QRL with a big paint job. VE4LC visited RPT and BHY. For a beautiful 28-Mc. mobile job take a look at the one ZWW has. Not only did ex-FUZ, now EA, get back to Bemidji, but you can find him on 3795-kc. c.w. EPJ is back on from new QTH with antenna by ITQ and YPN. New ORS of the month is FAH. Our Director, SW, visited the Arrowhead Radio Amateurs and on the way home dropped in at CWB's shack. KQA has 50-ft. mast of pipe under construction. YKD is home after finishing radio school. How about some volunteers for OBS on the low-frequency bands? We need them badly! Traffic: WØCWB 19, RJF 15, RPT 12, QIO 9, FAH 3, VJH 3.

DELTA DIVISION

ARKANSAS — SCM, Marshall Riggs, W5JIC — MRD is a new-comer to Arkansas from Oklahoma. Glad to have you, Paul. ICS has new 1st-class commercial license. JXO will be on shortly with kilowatt on all bands. The boys on the 3.85-Mc. 'phone net, 3885 kc., are having good luck getting emergency gear working. They have good attendance. Anyone interested in 3.5-Mc. c.w. net, please get in touch with me. AQF is planning on some 3.5.-Mc. c.w. So he can read 5LVR? EGY says, "Let George do it." The Little Rock Club is organizing a local emergency net to work with the Red Cross. GJL is moving to Arizona. Sorry to see you go, Dave. There is good interest in AEC work. MRX is on 14-Mc. c.w. with p.p. 812. MAR has moved to Fort Smith from Little Rock. Welcome here, Don. How about some news, boys? Let's have your comments. JAP is digging a well, looking for water. BJH is net weather man. What's your blood pressure?

LOUISIANA — SCM, W. J. Wilkinson, jr., W5VT — Hot weather (98 to 106 degrees) must have sent the gang to cover this month, as only a few reports were received. JET completely closed down during July. LSZ, LUU, and KHH are all on 7 Mc. KUZ, formerly of Jonesboro, has moved to Monroe where he now is active on 3.85-Mc. 'phone. DX has lured GMR to 14 Mc. KQV, KRY, HPW, MFU, and MUN are on 28-Mc. 'phone from Winnsboro. KIM is active on 7 Mc. KTE has been vacationing but managed to get some traffic from Rebels. The Barksdale Field Club is being organized so plenty of activity is planned for the fall. IUW will be on the Pelican Net. KUG wants to hear from all who want spots on the Net. LDH is back from vacation and is resuming all OBS schedules. The SCM hopes to see most of the gang soon. Let's have more dope next month. Traffic: W5KTE 16, VT 8.

TENNESSEE — SCM, James W. Watkins, W4FLS — FCF, active on 7 and 14 Mc. reports contact with 6MHF on 14 Mc., who said he was using 1-watt input and putting an S8 signal into Memphis. Mac also reports reception of 2TYU, f.m., at 5:30 A.M. July 25th. FLW is about ready with his pair of 812s and is working 7- and 14-Mc. c.w. QT is busy working DX on 14-Mc. 'phone and in two nights operation worked 13 VKs, 2 ZLs, 1 ZS, 3 J2s, 1 J9, 1 JM, and 3 Gs. MED opened on 28 Mc. with an HT-9 and an HQ-129X. QT is new OBS in Chattanooga. GHL is new ORS at Kingsport. AAW is on with a new c.c.o. and an 813 buffer. AFR is rebuilding using p.p. 813s and Class B 811s. AWB is active on 14-Mc. c.w. EBQ is on 3.85 and 7 Mc., and on 112 Mc. for local contacts. GXM put a new rig on 14 Mc., making use of a five-year-old Class A license for the first time. GYE is putting up a new skywire for 3.85 and 14 Mc. GXX is active on 28 and 3.85 Mc. HUB has a new home-brewed 11-tube Super that works swell. JSM is putting a new small rig on 28 Mc. FUN soon will be on 7 Mc. from Dale Hollow Dam. MEQ is new call in Nashville on 7 Mc. FWH is active on 50 Mc. nightly. MB is on 28 Mc. with a kw. HOJ is active on 7 Mc. GHL's first postwar activity on 7 Mc. netted 8 states with 3 watts to a 6V6. MCZ and MEA are new calls in Kingsport. LNF is new AEC member. GHL is new EC for Kingsport. FCF is new EC and ORS for Memphis. Traffic: W4PL 806, HOJ 10, GHL 4.

GREAT LAKES DIVISION

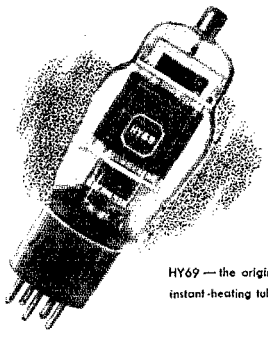
KENTUCKY — SCM, Joseph P. Colvin, W5IEZ '4 — BAZ sent in the following report. LNU lost a daughter — by marriage. QPB relays traffic, but slow. KKG is rebuilding shack and transmitter, commercial style. JPP, en route to California with 28-Mc. mobile rig, scheduled BPE. Donnie McIntosh now is MIS. KFH has new 300-watt rig on 7 and 28 Mc. JEB worked Evansville, Ind., on 28 Mc. KFB works 7 Mc. religiously but is building 28-Mc. rig. MQ is building badly-needed modulator. 144 Mc. is kept hot by IEZ/4, LVL, MFH, NJY, and YXF. LQX is running an 807 on 3.5- and 7-Mc. c.w. ERH has an 807 on 28 Mc. CDA and IUH are keeping 7021 kc. busy. KIV now has 5 states on 50 Mc. WMI/4 is working 50 Mc. from Georgetown. TWU is rebuilding with TZ40 p.p. for 14 and 28 Mc. YNQ worked plenty of real DX before discovering that his antenna was not connected to the transmitter. MDB, with 30 watts on 14 Mc., worked several Gs. KFE is building seven-element beam for 28 Mc. KWT has Sweden on 14 Mc. to his credit. IPR won a cup in ARTS Field Day Contest. ITB is getting code practice locally. NDY is building 28-Mc. mobile rig. UWR built e.c.o. CMP is working KYP on 6 watts. TKC wants more towns on KYP. If interested, try 3955 kc. any hour. CIC is back on KYN and KYP. KWO is installing long wire antenna. YPR is pounding 3810 kc. regularly. KYN needs more towns. Anyone interested in c.w. who can work 3810 kc. is asked to send BAZ a card.

MICHIGAN — SCM, Joseph R. Beljan, W8SCW — SEC: SAY. New appointments: ORS — YJU and VPE. OPS — OAT. A Section Net Certificate was issued to YJU. Fall is once again with us and it's time to dust the cobwebs off the old rig and get set for another successful season. The coming year promises to be the best yet and we are looking forward to a bigger and better QMN and Emergency Corps. If you are not a member of each write to the QMN secretary, FX, for information and QMN bulletins, and contact SAY, our SEC, for information and applications for the EC. Let's keep Michigan active and give the other states something to shoot at. The Genesee County Radio Club, using its 144-Mc. emergency equipment, once again made a swell showing for themselves by providing communication at the motorcycle races south of Grand Blanc, and between the track and Flint. When a motorcycle hurtled into the crowd injuring six persons, the gang alerted the hospital at Flint and obtained ambulances. Again, when two cycles collided injuring the two drivers the hospital and ambulance were alerted. Nice going, fellows, and congrats on the fine showing. The Muskegon gang put on its annual picnic Aug. 3rd at Pioneer Park and the afternoon's festivities included just about everything one could expect at a picnic. The gang enjoyed the big turnout and everyone had a swell time. ZSU is a new ham at Reed City and has a BC-654 on 3.5 Mc. AMT is a new call at Flushing and is active in GCRC EC work. OAT is rebuilding home rig and using portable-mobile in the meantime. WOV is planning on 200 watts to a pair of 809s and will be active in traffic work. SFA reports eight active members at MSC station, SH. KPL is rebuilding and will soon have 300 watts to an 813 and beam. DED is active on 28-Mc. 'phone when not QRL printing those FB QSL cards. ARJ, ex-9SDK, is again active after six years of silence and sends in traffic report. YCT received his RCC and 25-w.p.m. CP certificates. Central Michigan Radio Club officers are: UJS, pres.; WZY, vice-pres.; DOI, secy.-treas.; LR, EC. Congrats to the XYL at QBO, who now signs her own call, ATB. AHT is new-comer to QMN and doing a nice job. WUT, XYL at WUU, is active on 28-Mc. 'phone and just worked her 48th state. Traffic: W8NOH 75, UKV 55, YJU 32, DAQ 30, YAO 29, KPL 12, ARJ 10, WOV 10, YBR 6, IV 5, WXK 4, TYE 3, MGQ 2.

OHIO — SCM, William D. Montgomery, W8PNQ — The midsummer slump in traffic and reports is really with us now. But by the time you read this it will be time to start those reports rolling again. Also, look at your appointment certificates — there are an awful lot that should be endorsed. Send them to me at once before your appointments are lost. To start this month's report we announce the arrival of a YL operator to the FFK family on June 30th. PUN reports that some new equipment has been obtained by some of the boys. PRW has a new NC-173, UGH a new SX-4L, and HZJ a new NC-240D. WAB recently was appointed EC for the Columbus area. DAE added Eritrea, wherever that is, to his list of countries worked. EQN reports the organization of the Springfield Amateur Radio Club. Officers are: JRG, pres.; OG, vice-pres.; SXQ, secy.-treas. TJM recently worked J9KC on 28-Mc. 'phone. EDX has a new NC-173 receiver. Our former Director, AVH, returned from a Michigan vacation to find that his new Signal Shifter had arrived. WRN reports the exodus to Chicago of SFR, who was one of Columbus' most active 144-Mc. boys. WRN goes on to report the arrival of a new jr. operator at the home of ZCQ, who says that it's not dipoles that he's folding

(*Continued on page 80*)

Over 90% OF NEW MOBILE TRANSMITTER DESIGNS USE HYTRON



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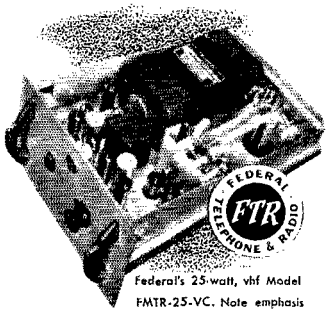
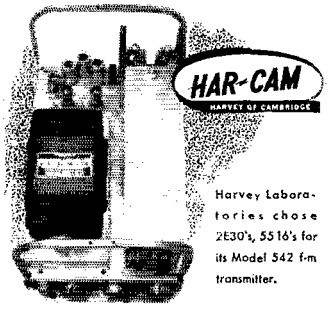
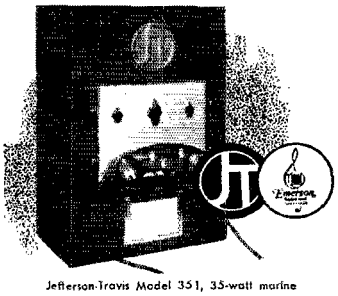
Bendix MRT-3A, 152-162 mc f-m taxicab transmitter uses 2E30's generously.



Federal's 25-watt, vhf Model FMTR-25-VC. Note emphasis on 2E30 and 5516.

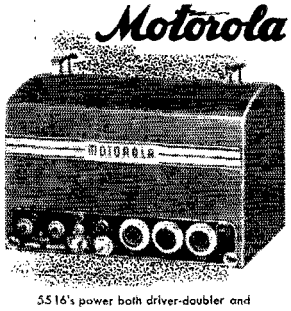


Harvey Laboratories chose 2E30's, 5516's for its Model 542 f-m transmitter.



Jefferson-Travis Model 351, 35-watt marine radio-telephone employs HY69's.

Kaar FM-50X features 2E25, HY69 throughout. Hytron instant-heating tubes since 1939.



5516's power both driver-doubler and final of Motorola's Model FMTRU-30D.

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now. CNP made the discovery that even a good receiver won't work when it's in series with the hall light. PNQ won the last QCEN Hidden Transmitter Hunt, with Dieselberg second and the Luhn boys third. In concluding, we wish to recommend that you be sure and read this column next month. It will be written by our SEC, UPB, while I am in New York for three weeks. Traffic: W8FFK 116, UPB 74, PUN 38, WAB 6, DAE 5.

HUDSON DIVISION

NEW YORK CITY & LONG ISLAND — SCM, Charles Ham, jr., W2KDC — The July meeting of the AEC Brooklyn Net treated changes in procedure; all traffic will henceforth be handled in strictly ARRL form to facilitate net operation. A 28-Mc. net has been organized and will be functioning when this report appears. OHE is eager to hear from all Brooklyn stations interested in AEC operation. While the 144-Mc. Net has fallen away a bit, those who are continuing through the summer are especially active. EPF is added to the crystal-controlled net on 144 Mc. KU and HG are going strong on 220 Mc. and looking for contacts every Tuesday evening. HQT is back on 144 Mc. after rebuilding. HQZ sports a new beam on 144 Mc. NXT dubs 144-Mc. the "522" band. From Queens BSP reports continued activity on 144 Mc. with an average of ten stations at weekly drills and increased activity on 3.5 Mc. AEC Net: OIE, CIQ, OZA, and BSP have joined the "BC-522" Club, which goes a long way toward crystal-control operation on 144 Mc. Asst. EC SYW is rebuilding. CDS is very active on 144 Mc. OIE, CIQ, CDS, BYH, TJA, PQD, LGK, and BSP are going strong on 144 Mc. and confining every third Monday night of the month to message-handling. BSP is kept QRL on 3.5 Mc. with U.N. Bulletins. FI, EC for Nassau, gives us some interesting dope this month. Most of the boys on 144 Mc. are crystal-controlled operating on 144.3, 145.8, 146.52, and 147.3 Mc. with the Net Control on 146.1 Mc. The most recent crystal stations are VKS, QBS, LPJ, ADT, BTA, and CB. Suffolk, the largest county in area in this section, still has coverage difficulty. The active 144-Mc. stations are doing everything possible to hook the east with the west end of the net. KNA, UGH, and the Huntington gang are beginning to get through, with HBQ and VPY very active. The 3.5-Mc. net in the Hamptons is very active. UDP has acquired an SCR-522 which will give him another crystal rig on 144 Mc. JWO does well on 50 Mc. with a new three-element rotary for his 250-watt rig. ADW also got an SCR-522 to use as a receiver on 144 Mc. OQI is using a "522" with the 12-Mc. i.f. working into an NC-100A. IXT is getting ready with higher power for 144 Mc. DOG is up to his neck in the job of computing Field Day scores for the Suffolk County radio clubs. A gap from Patchogue to the Nassau County line must be filled for 144-Mc. AEC operation. EC OQI wants to hear from any 144-Mc. station desirous of helping to make the county a solid net. NYC & LI 3.5-Mc. AEC Net: After Oct. 1st all three nets will operate weekly drills. Watch 3600 kc. on Mondays at 8 P.M. for Group One, Wednesdays at 7:30 P.M. for Group Three, and Tuesdays at 8 P.M. for Group Two. Net Control Stations get together at 3 P.M. Sundays with the SEC, all 3.5 Mc. AEC stations are invited to report in at any of the above-mentioned times. OXM and BSP are handling U.N. Bulletins; EQD never misses his regular drill. HXT replaced 12-year-old RK47 with an 814. URX is using 30 watts and an HRO. VHS is trying for WAS. The Trylon RC has FB code practice schedule. Contact PKD for details. All are invited to visit the Tu-Boro RC at 87-13 87th St., Woodhaven, any 2nd or 4th Friday at 8:45 P.M. Officers are JSV, IAG, HVD, and KYV. TYU is going great guns and made BPL. RQJ is low on traffic but high on DX. RTZ deserted 14 for 7 Mc. and is using a center-fed vertical. MEG is district chairman of YLRL. OWG is back using 150 watts on 3.5 Mc. VAF is temporary chairman of Mid-Island RC, with OXM alternate. Traffic: W2TYU 685, BU 31, LGK 9, RQJ 7, KYV 4, SQD 4, VHS 2.

NORTHERN NEW JERSEY — SCM, John J. Vitale, W2IIN — The Union County Amateur Radio Assn. held its two-day Field-Picnic at IHR's farm at West Portal Mountain with 28- and 144-Mc. rigs operating portable. The 144-Mc. boys worked 27 W3 stations besides many W2s, with R9 reports at 150 miles. Besides Earl, PIX, PIY, LKN, IZC, UQY, JLC, TH, CQD, UMB, DFV, LIQ, 8XY, and URH were present. The boys would like anyone who heard 2PIX/2 on Aug. 2nd and 3rd to drop a line to W2PIX/2, P.O. Box 488, Elizabeth, N. J. NKD is keeping nightly schedules on 3.5 Mc. with MUP vacationing in Maine. LKN worked three W4s in Richmond, Va., on 144 Mc. in one evening. NKD and LFR have been Acting NCS on the N.N.J. Net. With the passing of GIZ the UCARA has lost its vice-president and a charter member, and the amateur fraternity has lost a proud supporter of ham radio since the spark days. AWR, new president of Ocean County ARA, is doing a swell job with the dinner meetings of the club. The RSGB has asked the club to gather spare parts or equipment and send them to the society for distribution to needy hams in G-Land. This request goes for everyone in the section. There are many needy hams throughout the world who cannot afford equipment to get back on the air. If you have any gear that you can spare, please turn it in at your local club office. Clubs can contact the Ocean County ARA for the mailing address and procedure. BYM is champion of 50 Mc. DDV, former UCARA charter member, now is an active Ocean City member. The Ocean gang would like to know why SOX cuts and waters the lawn at certain times. (Ersatz quiet hours, Joe?) MNG, secretary, a volunteer Smokey Stover of Bayville, chases fires besides DX. HZY worked up to 116 postwar countries, even while still on the 4-12 shift. TZY is a big help with his N.N.J. deliveries around Bloomfield. BRC has a new 807 bandswitcher. NRA's brother got UYL. Anyone who wants to play checkers over the air can call QLF on 3775 kc. EGM replaced his 28-Mc. beam with a television job. KMK has a new Modumeter. GVZ certainly likes CD Parties. The N.N.J. Net opened up for the winter on Sept. 8th. If you have traffic, drop in on 3630 kc. at 7 P.M. Mon. through Sat. Our old friend, ex-1UE, now is 4IA in Arlington, Va. BWI is converting an SCR-522. The UCARA started meetings Sept. 8th and will meet the 2nd and 4th Mondays of each month at 8:30 P.M. at the Elizabeth YMCA. PIY, IZC, and PIX are doing nicely with their 522s. RCL is very proud of his "flexible" station — he can hit as many as two different frequencies on the same band, but fortunately at different times! CGG has a new Millen VFO. EUI is working portable on week ends from his summer QTH in Pennsylvania. IIN will help to represent N.N.J. at the American Legion Conventions in New York and Trenton, and the Hudson Division Convention at Asbury Park. COZ is on 144 Mc. Traffic: W2CGG 179, TZY 169, DRV 125, CWK 97, OEC 54, CQB 50, CJX 40, NKD 40, QEM 35, EGM 23, VGW 16, IIN 14, QLF 10, LFR 9, HZY 7, OXL 6, BRC 2, KMK 2.

MIDWEST DIVISION

IOWA — SCM, Wm. G. Davis, WØPP — WHG has rigs on all bands. HKN is on 3.85-Mc. 'phone. NXF visited HKN. NUD and PJC are on 28 Mc. LKK is working for KCBC. WHG, on 144 Mc., worked AEH crossband on 28 Mc. CVU and YOG visited GFQ and Director Colvin. GFQ has new 28- and 14-Mc. beams. WQQ has worked 19 states on 50 Mc.; BPG 18 states on same band. RQN is on 28-Mc. mobile with hot broadband converter of his own design. NQM has new tower for 28-Mc. beam. CVU has new Motorola receiver and transmitter in Chrysler. A four-hour over-the-air reunion of Collins employees from 60GZ with FYF, VTD, HMS, CVU, and EIT was held recently. YFC is active on 3.85 Mc. with Naval Reserve station. QXL is going good on 14-Mc. 'phone. TGW goes for the catfish when 28 Mc. goes dead. DTV and BCC are recovering from Tall Corn Hamfest. UFL has new jr. operator. SCJ kept schedule with AYC to keep the latter informed of the condition of his daughter while in the hospital. PP spent vacation visiting members of Iowa 75 Net in Northwest Iowa. The Tall Corn Net was reactivated Sept. 1st. QVA has 221 frequency meter waiting for September Frequency Measuring Test. The Nish-a-Boyer Radio Club held its annual hamfest at Manilla on July 27th. Features were a basket lunch and addresses by Leo Sherman, a local business man; VBR; VDE; and PP. Your SCM wants a good overall picture of ham activity in Iowa. Your reports will do it. Traffic: WØHMM 52, PP 16, QVA 11, AYC 3.

KANSAS — SCM, Alvin B Unruh, WØAWP — Although news is at a low ebb as this is written, with the temperature at 105 degrees, fall activities should be getting off to a good start by the time this is read. The QKS State Traffic Net will need members in all towns of any size. It is suggested that members work in pairs so that the town may always be represented. BQJ has been scheduling VK9 for traffic and working other DX. He made a large score in the CD Party. VBQ has been keeping 14-Mc. 'phone schedules with Japan, to enable a YF to talk to her husband. Oscar

(*Continued on page 82*)

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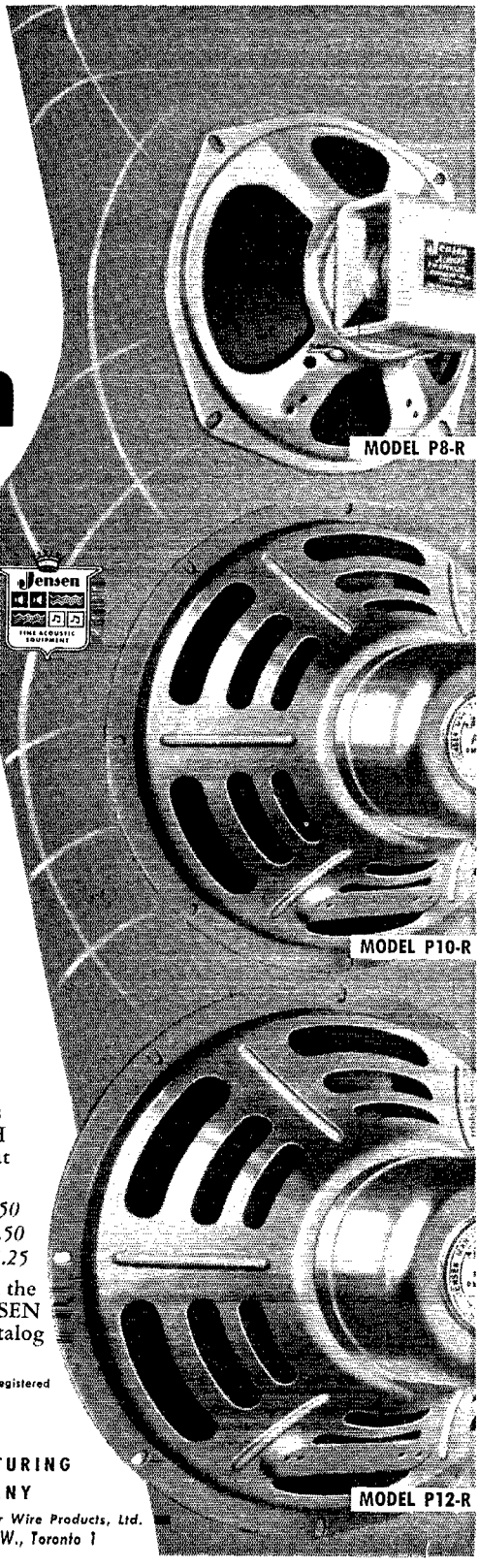

says orchard, berries, and bees limit his ham activities. EPX is operating mobile in Kansas City, but activities are limited by approaching marriage. ESL has SX-42 and 6AK5 preselector for f.m. ZJB, of 50-Mc. fame, has gone into business with YUQ, also of 50-Mc. fame, at Manhattan. OTV is putting a kw. on c.w. PAH, the SEC, is celebrating his 20th anniversary as a ham. He will be pleased to receive correspondence relative to the emergency program. IUV took 28-Mc. mobile on vacation with good results. SUF has new 28-Mc. rig, mobile. ZOJ has 807 c.w. rig on 3.5 and 7 Mc. SRI has 28-Mc. 'phone, but is QRL school. BXZ is chasing bugs in p.p. 811 final. OZN has new VFO. NJS and OZK were Wichita visitors. VSW explained and demonstrated operation of Airways communications, weather station, and control tower at WARC meeting. Traffic: WØVBQ 5.

MISSOURI — Mrs. Letha A. Dangerfield, WØOUD — It's here — that summer slump, as you can plainly see. ARH has been doing some rag-chewing and traffic on 7 Mc. — no DX. BMQ is a new ham at Clayton interested in traffic. CMH says his call was listed as BMH in the CD Bulletin. DEA still is QRL with that array of masts and beams. GCL reports no activity except on CAA Net. KIK is rag-chewing on 7 Mc. QXO still has a lot of good traffic outlets and wants more — and more traffic. SKA cannot understand why he gets out no better with 385 volts on the 807. He has undertaken the EC job for the Tarkio area and says a local old-timer made a recording of his, SKA's, sending. It was quite a shock. EYM is trying to stir up some interest in OPS appointment. GEP is building up push pull 807s. UHR is fighting BCI trouble. ZZW is running cross-town schedule with QXO to clear student traffic and says CMARC is accepting donations of parts to build a transmitter for the club. Ex-BMS was reassigned his original call of DE so he got ambitious and overhauled the rig and now OUD can operate on 7 Mc. The trouble was a resonant by-pass, then the receiver went out and had to be fixed. And that covers all the cards and letters on file here. Send in those certificates for endorsement. Traffic: WØQXO 131, ARH 40, CMH 11, ZZW 10, SKA 6, DEA 4.

NEBRASKA — SCM, William T. Gemmer, WØRQK — I hope I can uphold the fine job done by the past SCMs. "Pop," all the gang wish you a speedy recovery and may we be working you on the air soon. MRH is on with a Stancor 110 and an antenna that is up in the air. ESX moved back to Omaha. BQP is a 14-Mc. DX hound. EWO needs an air conditioned shack for summer activity. QHO is returning to the air at new Ralston QTH. JHI moved to Morril. CBH is new ham at North Platte and is on 28-Mc. 'phone. Congratulations to GPX on the new harmonic. BBS is on with 500 watts on 14-Mc. c.w. VHP is building 200-watt rig in BC-275 tuning unit boxes. ERM is building 100-watt push-pull 807 rig. UBN has new NC-173 receiver. EXP received a recording made in Tokyo of his transmissions to Tokyo. ATB won a Hammarlund frequency standard at the North Platte Amateur Radio Club hamfest. LKE was judged most proficient with his left foot. OHK was auctioneer at the hamfest. DNW is new president of the NPARC with RQK, vice-pres., ZOQ, secy., and CVC, treas. ZOQ increased power from 6 to 60 watts. WBU is building a stacked 8JK rotary for 14 Mc. RCH is rebuilding to 500-watt all-band transmitter and remodeling shack at new QTH. OED plans to be on all bands soon. ANM, AZC, and AYO are new calls in Fremont on 7-Mc. c.w. VMP is going great guns on 3.85-Mc. 'phone. NVE also is operator at KORN. PSX is on 7 Mc. Drop us a line, gang.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Edmund R. Fraser, W1KQY — Club News: NARL — Newly-elected officials are Donald Spencer, pres.; NJM, vice-pres.; DXT, secy.; OKY, treas.; EWH, comm. mgr.; Leonard Borquin, act. mgr. FWH has been appointed EC for Newington. Plans are underway for a local emergency net. During a recent club picnic the emergency rig was operated on 3.5-Mc. 'phone and c.w. using call DXT/1. The club has applied for a station license. BARA — GVK, OPG, and FC purchased SCR-522s for 144-Mc. band. 6TMT has been transferred to another G.E. Co. plant. FC now is W.B.E. Confirmed. GRU built a new operating table for the club. SARC — IAY has new jr. operator. HYF has new Kaiser car. BRP and his XYL celebrated their 20th wedding anniversary. Bill Walker has new SCR-522. The annual picnic was held at Kaza Farm, Huntington. Ten members of the club participated in a recent Red Cross disaster drill. These drills are held every Sunday morning. NHARA — FMV and Polo returned from visits in California and Illinois respectively. Joe Chirnitch received the call QII. Steve Tabor and Bill Murdoch took Class A and B exams, respectively. Code and theory classes are discontinued for the summer. CTC has new YL operator. News in general: HYF operated portable at Lake George on 7 Mc. IKE now has WAC and WAS. JJR worked his 48th state. BGT is working at H. & Y. store in New Haven. CTI is spending two months at Burlington, Vt., per doctor's orders. NMZ, Hartford, is handling traffic. VB, inactive during the summer, now is planning a record season for Nutmeg and New England Nets. New members are welcome. KQY, vacationing at East Hampton, renewed acquaintance with CKQ, EAP, JOS, and TK along with operating portable. Traffic: W1AW 133, ORP 86, NJM 30, DAV 26, NMZ 9, IC 6, HYF 4, BHM 4, KQY 3, AFB 2, BGJ 1.

MAINE — SCM, F. Norman Davis, W1GKJ — SEC: LNI. PAM: FBJ. ECs: IZI, NBK, and TO. FBJ reports that a fine time was had by all at the "Seagull Hameat" held in Boothbay with about 75 attending. Portable-mobile operation at the gathering was represented by AFT, AMR, AUC, and OKU on 144 Mc., and FBJ, LBH, and MBR on 28 Mc. OKU has worked several Cape Cod stations on 144 Mc.; he also operates on 3770-kc. c.w. ECM is working on 144 Mc. with four-element beam. EFR reports 144 Mc. still hot and says OUN now is on the band. EIY is back on the air operating on 3.5-Mc. c.w. NXX now has bandswitching final. OHY says progress is being made in the Portland Emergency Corps. LNI has a rig on 144 Mc. again and reports ground wave and short skip condifions on 28 Mc. have been excellent. QAR is doing well on 3.5-Mc. c.w. with a 15-watt rig. GJY now has a pair of 812s in his final on 28-Mc. 'phone. BGZ wrote from Baltimore to extend his regards to the Maine gang and says he expects to be back within a few months. A lot of out-of-state hams are vacationing in Maine. AQL reports visits from ALZ and LEH. GKJ was visited by 2SQC, ex-CPR, in Old Orchard; 3III, ex-ICM, in Saco; LGV, from Massachusetts, also formerly in Saco; and 2PRW and 2GKJ from New Jersey. Traffic: W1FBJ 10, LNI 2, OHY 2.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr. W1ALP — The following have renewed appointments: IPZ, AWA, JUL, LMS, DDC, MQ, and LJT, as EC. NXY, LLX, and EMG as ORS. LNX, LJT, and ILS as OES. MRQ made 38,325 points in July CD Party. IY, QFE, AYI, and BDF are on 144 Mc. QGJ is new ham in Woburn. NAX is on 3.9-Mc. 'phone. EAU has been working AKY's station and talking to AKY while the latter is in Sweden. HUV has a new NC-173. John Doremus, who was head of Massachusetts WERS during the war, is now working for Belmont Radio in Chicago. QHC is ex-NVJ. KNZ is down South and on with the call 4MIW. IID has mobile rig on 50, 144, and 224 Mc. using crystal. LDD is active on 144 Mc. About 25 are members of spot net on 147.96 Mc. Monday nights at 2100. OBN has a Super Pro. HIL, our EC for Wakefield, has three BC-654A emergency rigs set up. NXY is busy with house and rig. The T-9 Radio Club held its Annual Boat Ride. PFY signed up in the AEC. NKW is living in Nahant and will be on 144 Mc. HA wants Vermont and Delaware on 14 Mc. AYG is on 14 Mc. for the summer. NBS, our Dedham EC, has the following in his group: JNX, LYL, OEJ, OUM, OUZ, PMM, PNH, and SH. OJM spent Field Day with El Ray Radio Club and worked 3.5 Mc. PZG has new Workshop 28- and 50-Mc. three-element beam and rotator. HJ has an SCR-522 and a five-element beam for 144 Mc. PYM, in Auburndale, is handling traffic. AAL has a Stancor 100 MB with 440 modulator, all in rack and relay controlled. ALA and BIO have SCR-522s. OGA is back on the air. BDS was at OMI's on Field Day. PCJ is on 3.5 Mc. and mobile 144 Mc. AWA has new four-element beam for 28 and 50 Mc., and has CWZ and JZQ in emergency set-up. LMS, our EC for Stoneham, will be on mobile 144 Mc. BL, our SEC, reports that the last emergency test was very quiet because of very hot WX. New Bedford, Wellesley, Dedham, Arlington, Newton, and Dorchester reported in. He attended the Brockville, Ontario, hamfest on July 6th and was on 144-Mc. mobile on his trip, making 67 contacts. ILS says there are 25 SCR-522s among the members of the El Ray Amateur Club, OMI. He has been working on his rig for 2300 and 3300 Mc. and is going to try to work BBM on the Cape on 2300 Mc. QEO and QGW are new calls of members of MX Radio Club. OOP says he has worked

(*Continued on page 84*)

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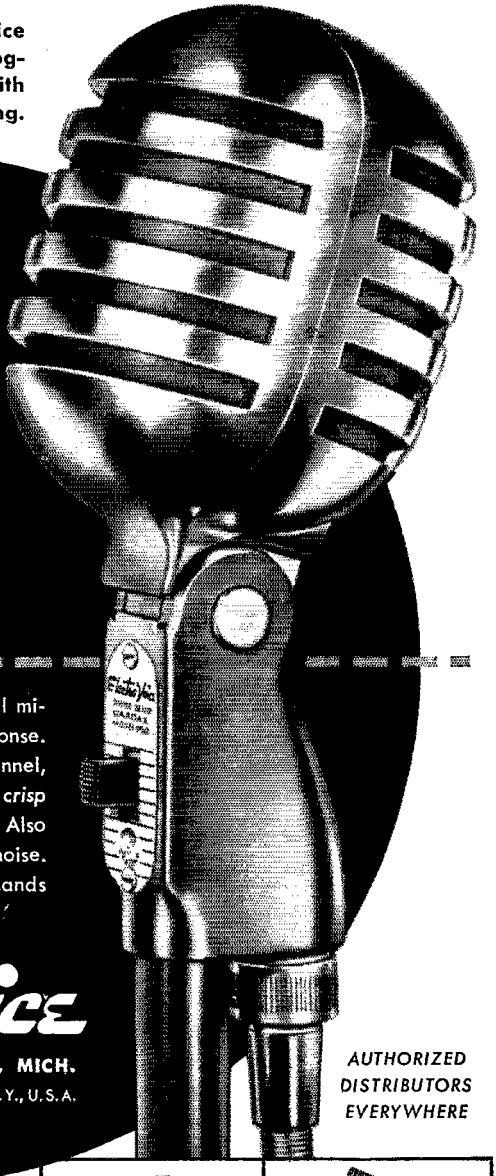

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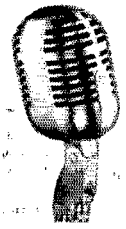

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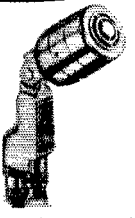

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337 stations, 6 states, on 144 Mc. MX has worked over a dozen states on 50 Mc. NFE is temporary secretary of the Falmouth Radio Club. LMU has an SCR-522. PLQ, EC for Watertown, wants to hear from any ham who is willing to help out in Emergency Corps work. Don't forget the 10th Annual Boston Hamfest and New England Division ARRL Convention on Oct. 18th, at the Mechanics Building. The Mystic Valley Radio Club, KAO, 665 Salem St., Malden, Mass., has resumed regular meetings Thursday evenings at 8:30 P.M., beginning Sept. 4th. Visitors are welcome. Traffic: (June) W1AAL 46, OJM 9, OJT 1. (July) W1BDU 47, HA 35, AAL 32, OJM 17, BB 8, BL 7, NBS 7, LM 6, QHC 5, MDU 4, LMU 3, PYM 3, TY 3, AYG 2, EMG 1 HJ 1, PZG 1.

WESTERN MASSACHUSETTS — Prentiss M. Bailey, W1AZW — RM: BVR. SEC: UD. Well, it seems that vacations are well over and the summer is pretty well along, bringing forth more activity on the bands. News is scarce again this month but let's see what we can do with what we have. BVR is anxiously awaiting more members on the Western Massachusetts Net. NKN has received his old call back and will be known as JE from now on. COI is spending the lull season putting in a 6AK8 in the r.f. stage of his RME. JAH is one of the faithfuls on the Western Massachusetts Net. JGY is on 7 Mc. working out well. The Fitchburg Radio Club reports a great time at Lake Monomonac, N. H., in the Field Day Contest. MVF is working for IBM in Springfield. The Pittsfield Radio Club enjoyed its summer picnic at Prospect Park, No. Egremont. They have purchased a 2-kw. gas-engine-driven generator for emergency use. OMJ and IZN have made VFO exciters from tuning units. JLT schedules XAMT on 'phone to keep XAMT in contact with his folks in Pittsfield. He also handled traffic with KX6USN and KG6AG. LKO is rebuilding to 1 kw. Traffic: (June) W1MIN 4. (July) W1BVR 14, JAH 12, JE 2, JGY 1.

NEW HAMPSHIRE — SCM, John H. Stoughton, W1AXL — Well, gang, you noticed that there was no report in September *QST*. The reason? Not a single activities report was received the first of July for the month of June to appear in the September issue. There seems to be quite a bit of interest shown in the BC-654A surplus rigs. Hope enough of the gang get them to form a BC-654A emergency net. We have given one of them a good workout here and they are FB for both 'phone and c.w. We are glad to welcome JYJ to the New Hampshire section. He is located at Enfield. Another old-timer has joined us here in New Hampshire. He is CDX and is located at Portsmouth. He will be remembered as one of the CD gang, having been SCM for eight years in Maine. NQ is sporting a new rhombic antenna. KPL has moved into his new home. AXI is spending the summer up in Maine.

RHODE ISLAND — SCM, Clayton C. Gordon, W1HRC — The NAARO has been reactivated with headquarters in the Varnum Armory in East Greenwich. Meetings are held at 8:30 P.M. the 2nd and 4th Fridays of every month. Visitors are welcome. BFB has worked 95 countries on 28- and 14-Mc. 'phone. CJH is on 28 and 14 Mc. 'phone and c.w. OLW has QSOed six states on 144 Mc. NCX has 75 countries on 28 Mc. and a certificate for ten Canal Zone stations. MJL has an 813 final on all bands. QBZ is active on 144 Mc. and reports JFF and LPO are working nice DX on 144 Mc. 4KCV/1 is active on 28 Mc. at Newport since July 6th and has rotating ½-wave antenna. AJQ, our OO, reports the out-of-band operation is decreasing. UY worked 3EKK/1 on 145.9 Mc. from Mt. Cadillac, Maine, two nights running. DWO has been holding up the Rhode Island end of the net operating as well as listening as OO and observed 1MLT QSO with a PK2 on 3.5-Mc. c.w. at about 5 o'clock one morning. DWC has shifted from 14 to 3.5 Mc. GJZ, PTF, BBA, and BGA are known to have ARC-5s running on 144 Mc. Nobody knows how many SCR-522s are around, but modulated oscillators on 144 Mc. are really getting to be the exception. Traffic: W1HRC 2.

VERMONT — SCM, Gerald Benedict, W1NDL — Brattleboro has 28-Mc. net with 1CG, PRE, HOW, MKM, and AZV, and meets at 9 P.M. MCQ is building emergency rig 6V6, 807, and PE-103 power unit. MEP has new 50-Mc. beam and is building portable 144-Mc. rig. GQJ has new 3.85-Mc. final with 304TH. PWB is new ham in St. Johnsbury with Globe Trotter on 28 Mc. JMO has BC-348 and is rebuilding shack. PWX is an ex-W6 ham, now located in St. Johnsbury. EJF will be active again when the weather cools down. All interested in emergency work should get in

(Continued on page 86)

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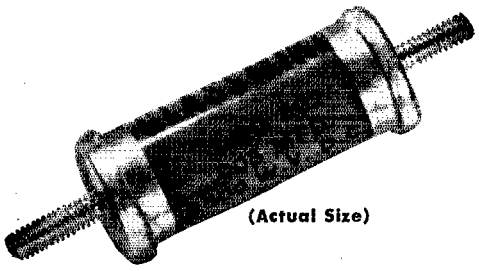

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touch with your SEC, NLO, or your SCM. Contact your SCM for information on any appointments in which you are really interested. Traffic: W1MCQ 2.

NORTHWESTERN DIVISION

ALASKA — SCM, August G. Hiebert, K7CBF — OES W2SLW/KL7 and 7RT reached the end of daily 144-Mc. schedules with no contact as all v.h.f. bands were dead. 2SLW is having trouble with self-oscillation in crystal-controlled 144-Mc. rig. KL7BP returned Stateside to resume W1 call, leaving him without a partner. KL7BD is having crystal-cracking trouble. KL7AG returned from Stateside furlough but a backlog of work keeps him off the air most of the time. KL7BK received Class A license but will stick to 7-Mc. c.w. for some time. Operating activity seems low because of summertime outdoor activities, but many KL7s are rebuilding. How about some more reports, gang? Traffic: KL7BD 21.

IDAHO — SCM, Alan K. Ross, W7IWU — Kuna: EMT is our new RM for the Gem Net. He recently purchased 24 surplus crystals between 3516 and 3580 kc. and says "so am nearly a crystal VFO at lower end of 3.5 Mc. Swell for CD Parties." Aberdeen: First report from FBD since about 1939. He is on again on 14 Mc. with 100 watts going after the DX. I wish more of you fellows would get on 3.5 and 4 Mc. so we all could get to know each other. Since 3745 kc. is the Gem Net for Idaho frequency, how about all of Idaho meeting within a few kc. of that frequency on October 17th after 7 P.M. local time for an All-Idaho Party. Any 'phone boys will have to drop me a line so we can work out something similar on 'phone. We have no organized 'phone net in Idaho. Boise: JMH reports that JSA has been transferred to Boise from Medford, Ore. Let's have lots of reports next time — pile me up! Traffic: W7EMT 6, IWU 1.

OREGON — SCM, Raleigh A. Munkres, W7HAZ — Portland: JGC had a fine business vacation to Crater Lake, Mt. Shasta, and Oregon Caves with 15-watt mobile rig in car. The Portland Mobile Net on 28 Mc. is operating on every other Thursday during the summer. OZC, formerly 6OZC, has moved to Portland from Sausalito, Calif. He is OBS. LaGrande: HBO's folks visited him from Iowa and kept him off the air for about an hour! ARZ is moving back to Salem on account of the housing shortage. KVG is adding to his collection of antennas up at Starkey. He also has a new 28-Mc. rig complete with "bugs." Baker: AOL has had his vacation and is ready for some serious antenna-building before winter sets in. JLU is very conscientiously sending official bulletins on 3.85 and 7 Mc. every evening. GVX has added a room to his house but advises it isn't a new shack, merely a bedroom for the jr. operator. Ontario: FTQ got tired of fighting parasitics so has rebuilt without any provisions for them in the new rig. He also has a new antenna ready to go. IAM has a mast up and is concentrating on the building of a 28-Mc. beam for the coming winter's operations. No news was received from cities not mentioned. The clubs especially are asked to elect or appoint a reporter to give me an item or two before the first of each month. Traffic: W7HBO 2.

WASHINGTON — SCM, Larry Sebring, W7CZY — IVJ is president of the Puyallup Radio Club, which holds meetings the 2nd and 4th Wednesdays. LEC schedules KFM, Yakima. JBH is making hay instead of QSOs. FXD says no more Field Days on top of mountains. LFA, LAN and KGV are on 7 Mc. from Anacortes. JKB works 3.85- and 14-Mc. 'phone when not busy with flying lessons. APS painted his house, also insulators and feeders. JPX has trouble, soft 810s in 3.85 and bugs in p.p. 813 14-Mc. rig. ACF is NCS and DGN is Alternate NCS on Washington Section Net. Net meets 7:15 P.M. PST Mon. through Fri. 3695 kc. Members are: ACF, CZY, DGN, DRT, ER, FRU, ITR, JKB, LEC, LIL, and LIA. The net needs operators interested in traffic handling in many parts of the section. See any of the members for details. HRC is back on the air and looking for old friends. WY is able to operate only on week ends. DET spends his time on 14 Mc. working European DX. JCT has new rig with p.p. 812s. DYL decided one crystal is not enough and is building a VFO. DF, BQX, RT, DYD, and EUI are getting good results on 144 Mc. DMN spends his time on 50 Mc. JFC is the proud father of a boy. CE keeps schedules with KL7s. FRU spends a lot of time handling traffic with the Pioneer Net. DGN has schedule arranged with BYG for daily ski reports from Stevens Pass. LIL is making lots of contacts on 3.5-Mc. c.w.

(*Continued on page 88*)

A MESSAGE from the President

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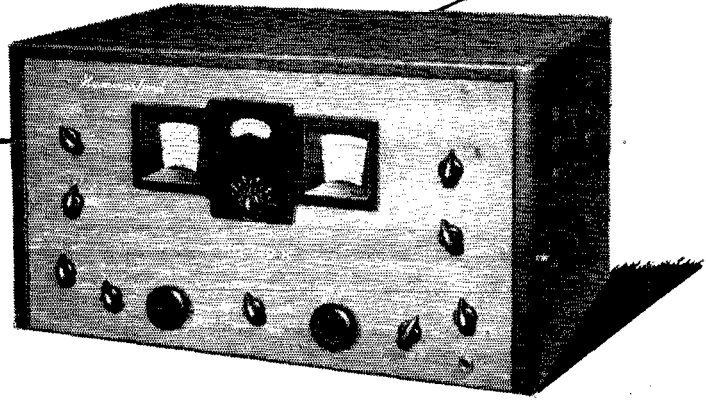

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EOR is using a 304TH on 7 Mc. On July 23rd GVH worked VE8NS, located 220 miles northwest of Hudson Bay and 20 miles south of the Arctic Circle at Baker Lake. The operator expects to be there two years. Traffic: (April) W7CZY 243, FRU 66. (May) W7CZY 288, FRU 51. (June) W7FRU 85, CZY 76. (July) W7CZY 70, FRU 62, DGN 45, LEC 26, JPX 15, APS 12, LIL 9.

PACIFIC DIVISION

NEVADA — SCM, N. Arthur Sowle, W7CX — Asst. SCM, Carroll Short, jr., BVZ. SEC: JU. ECs: OPP, TJY, KEV, QYK, and JLV. RM: PST. PAM: KHU. OBS: JUO. OES: TJI. JUO is equipped with 28-Mc. mobile. JLN has a crystal on 3660 kc., thus another station on Nevada State Net. CDM is building a high-power final. PGD is on 3.5-Mc. c.w. and is erecting a 60-ft. vertical. KLZ is on 3.5-Mc. c.w. 1OOR is operating in Boulder City with 40 watts c.w. on 7 and 14 Mc. WVZ has a Millen exciter. The AEC in Boulder City was alerted recently to supply communications for the Forest Service when a bad fire broke out in the Mt. Charleston area. BTJ now has another rig for 7- and 3.5-Mc. c.w. QYK and MSG are working 235 Mc. as well as 3660 kc. 6TYQ now is 7LJZ. KWA is knocking out the DX on 14-Mc. c.w. KLK is back on 3.85 Mc. KHU has another new 14-Mc. antenna. Traffic: W7JU 22, CX 20, BVZ 12, BTJ 7, OPP 4, QYK 2.

SANTA CLARA VALLEY — SCM, Roy E. Pinkham, W6BPT — Asst. SCM, Geoffrey Almy, 6TBK. RM: CIS. PAM: QLP. KMM has moved to new QTH at Rt. 2, Box 10, Los Gatos, and has room for some rhombics. KG and BHH are using multi-wire-driven elements in their rotary 28-Mc. beams and both report good results with wide-band tuning. LCF is putting up H arrays after talking to GD. SYW has 3.5 Mc. half-wave antenna up and is building n.f.m. unit. HC has new SX-28 receiver. Harry will be on with a full jug and will work on 14 Mc. RFF is trying 7 Mc. for traffic. He has added two new countries to his list. WNI reports a total of 45 sections and 169 contacts in last CD Party for a score of 246,402. KH6DD was a visitor at WNI's shack. PBV is back on 7 and 14 Mc. with 400 watts. ZZ has a total of 80 countries with 69 confirmed to date. Miles wants dope on how to raise VR6AA. TBK has resumed his schedule with KH6AR. BPT is working 50 Mc. and has worked 23 states and British Columbia since June. YQN has moved to new QTH in San Jose. Ex-KH6IC has located in San Jose. Welcome, Hugh. UGF is QRL business and has turned the arrangement of SCCARA meetings over to LCF, who has some FB plans for activity in the coming months. EI enjoyed vacation traveling in the Northwest. Joe is keeping schedules with HC. Traffic: W6DZE 24, HC 19, RFF 12, ZZ 9, WNI 7, KMM 3, PBV 3.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM: 6RJA. SEC: OBJ. RM: ZM. EC: QDE. Asst. EC u.h.f.: OJU. California — God's Wonderland, with the cool breeze of the Pacific Ocean peacefully rolling onto glistening white sands; the land of a million wonders — snow-clad peaks, gleaming white glaciers, rugged precipices, beautiful lakes set in the heart of pine forests. Dashing waters of our beautiful streams and the delicate beauties of our national parks, makes this a never-to-be-forgotten hams' paradise. It is summertime; I can tell by the large lack of reports this month. Remember, to hold ARRL appointments it is necessary to send in reports each month without fail. PB has his 14-Mc. beam up once again. IKQ is getting his new 28-Mc. beam ready for that DX. UPV is installing ART-13 in his car. WP is rebuilding new converter. DUB is QRL remodeling house. GPY is playing with f.m. IDY lost front element on his beam. RM likes his new Johnson Q beam and claims it compares in some respects with his rhombic. UZX is thinking of buying an HQ-129X receiver. OSY is back on the air after a long layoff trying out 14-Mc. 'phone. EJA reports that the Richmond Radio Club is hunting for a new meeting place. CDA is QRL. YDI was away on vacation. CRF has converted Motorola with 20 watts mobile using a Gon-Set converter and noise silencer. TT has 132 postwar countries, TI 113, PB 106, BUY 106, RM and UZX 100. WB gave an FB talk on antennas to the Oakland Radio Club at a recent meeting. EE is waiting for his new transmitter. EY has some new antennas up. SARRO enjoyed the telephone company talk at the last meeting. Members of the Northern California DX Club, Inc., can always be found at one time or another chasing that rare DX. That hard-to-get Zone 23 was worked by TT, TI, PB, and MHB on c.w. and TT, BUY, and IKQ on 'phone. The Mission Trail Net

(Continued on page 90)

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2. **RAYTHEON SUBMINIATURE TUBES PLUG INTO STANDARD SOCKETS** — several commercially available makes to choose from.
3. **READILY AVAILABLE** — OVER 30 TYPES — standard throughout the world.
4. **THOROUGHLY RELIABLE IN OPERATION** as a result of eight years' continuous production of long-life subminiature tubes.

The new Motorola "FM Handie-Talkie" in use on surveying and construction projects. Hand carried model utilizes french-style hand set, pack model uses lapel mike and ear plug.

Write for data sheets on Raytheon Subminiature Tubes, including those used in the Motorola "Handie-Talkie."

RAYTHEON MANUFACTURING COMPANY
SPECIAL TUBE SECTION
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ran through the summer months in full swing, according to ZM, vice-pres. Don't forget, when you say you will QSL please do so, as the other station has a right to expect a card as promised. Traffic: W6CRF 14, TI 8, YDI 8, EJA 6.

SAN FRANCISCO — SCM, Samuel C. Van Liew, W6NL — Phone JU 7-6457. Asst. SCM, Joseph Horvath, 6GPB. RM: RBQ. SEC: PTS. CEC: SRT, KNZ. MHF is building 814 7-Mc. rig. EBY has worked 105 postwar countries. WUJ is busy flying for P.A.A. GMF vacationed in Oregon. ZEI is busy getting "bugs" out of his rig. HJP writes from Minneapolis that he is operating fixed portable from that location on 28 Mc. He is installing a new three-element "Workshop beam" and is eagerly anticipating working a lot of DX during the winter months. Art just returned to Minneapolis from the Air R.O.T.C. summer camp at Chanute Field, Ill. EYY is suffering with bad power leak. He has been rebuilding and cleaning up shack. CWR, member and chief radio man of the Eureka Naval Reserve, writes that Naval Reserve is going strong there. He operates on 7154 and 3570 kc. The Humboldt Amateur Radio Club of Eureka holds meetings the first and third Fridays of each month at 7:30 P.M. with code class at 7 P.M. NAO has been on vacation. IYN is doing lots of brass pounding. SR is well pleased with his new location and has been working some nice DX lately. He is using 813 final with input of 300 watts and spends most of his operating time on 14-Mc. c.w. Art is constructing a 14-Mc. rotary beam and tower. RBQ is putting up new antennas and gunning for DX. His report shows 80 per cent operating time on DX — good hunting. Bill also is on Pioneer Net nightly at 7 P.M., 3725 kc. LV is working those hard-to-get DX stations with ease on that 14-Mc. vertical antenna. BIP has been released from the hospital and is getting around nicely. JWF is handling Mission Trail Net traffic on 3854 kc. Traffic: W6JWF 62, RBQ 23, MHF 7, EYY 6.

SACRAMENTO VALLEY — SCM, John R. Kinney, W6MIGC — Asst. SCM, R. G. Martin, 6ZF. SEC: KME. RM: REB. OES: PIV. OO: OJW and ZF. The Golden Empire Radio Club of Chico and surrounding territory elected new officers with GUV, pres.; WYX, vice-pres.; and RHC, secy.-treas. Plans are under way for a bigger and better hamfest in 1948. GHG is off the air temporarily. TKE has two new 50-foot masts and kw. RHC has abandoned 28-Mc. 'phone for 3.5-Mc. c.w. GUV has rig on 3.5 and 7 Mc. plus new wire. WVR has developed into a red hot c.w. operator on 7 and 3.5 Mc. TID is building f.m. receiver for BCL work. WYX is overhauling exciter and installing new 3-kw. b.c. f.m. station. Members of the GERC plan a 144-Mc. emergency net with a control in Paradise, Calif., and also to connect with Sacramento 144-Mc. net. Thanks to WYX and RHC for this report. VDR has changed his rig to parallel 807s with 125 watts c.w. crystal or 90 watts c.w. e.c.o. or 50 watts 'phone crystal or 40 watts 'phone e.c.o. with operation on all bands with only changes of the tank coil necessary. VDR now has 42 states toward WAS and reports first DX worked on 7 Mc. with 90-watt e.c.o. was ZL2MM. WTL needs 12 more states on 28 and 9 states on 27 Mc. for WAS. OJW has replaced 35Ts with 75Ts and reports 15 zones and 21 countries worked on 14-Mc. c.w. AF reports official bulletins being copied directly from Headquarters and rebroadcast directly. Traffic: W6REB 158, VDR 4.

PHILIPPINES — Acting SCM, Craig B. Kennedy, KA1CB — RP is the most active station at present. 1AR has returned to the States. 1ABM has new 1-kw. rig. 1FH has returned to the air after a slight illness. 1AL is relatively inactive — too many stations, eh, doc. 1NR, 1VVT, 7GC, 1RP (c.w.), 1RTI (c.w.), and 1ABU (c.w.) are to be heard on 14 Mc. 1CB is QRT for improvements. Get your reports in, fellows.

ROANOKE DIVISION

NORTH CAROLINA — SCM, W. J. Wortman, W4CYB — The Key and Mike Club in Winston played host to the W. S. Amateur Radio Club with a good meeting, well attended by both gangs. The idea of refreshments and a door prize will add to attendance at meetings. BYA has been tutoring a new crop of hams between activity on 50 Mc. BCS plans to get on 50 Mc. and ease up on the 28- and 14-Mc. activity. HUL possesses a new final with 8005s. KJS joins the kw. ranks. NI has probably gotten all the bugs out of a new 144-, 50-, and 28-Mc. converter. IZR runs 300 watts on 14-Mc. c.w. IDO, a confirmed 7-Mc. man is slipping — he plans 28-Mc. 'phone. DGV, however, sticks to 14-Mc.

(*Continued on page 92*)

QUALITY PARTS

TRADITIONAL WORKMANSHIP...

National NC EST. 1914

National parts have long been famous among hams for the quality of their workmanship and their ruggedness of construction.

These proven parts have been particularly tailored to the needs of hams throughout the world — and embody the traditional quality of National products.

Whether you're building a new rig or reworking your old one, check your nearest National dealer for the finest in radio parts.

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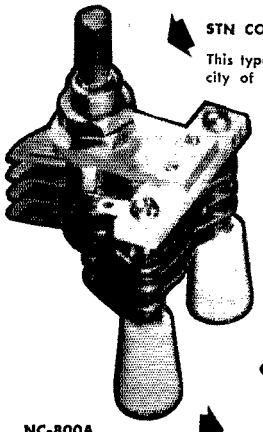
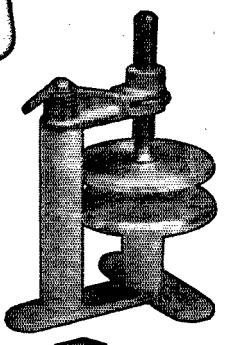


STN CONDENSER

This type has a maximum capacity of 18 mmf (300 v.). It is supplied with two stand-off insulators.



NC-800A

The NC-800A disk-type neutralizing condenser is used with the RCA-800, 35T, HK-54 and similar tubes. It is equipped with a clamp to lock its setting. The chart below gives capacity and air gap for different settings.

NC-600

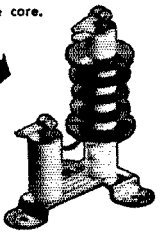
For neutralizing low power beam tubes requiring from .5 to 4 mmf and 1500 maximum total volts, such as the 6L6. The NC-600U is supplied with a GS-10 standoff insulator screwed on one end, which may be removed for pigtail mounting.

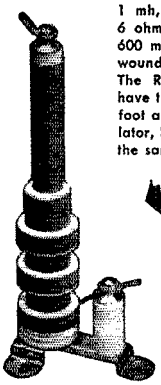
R-152 CHOKE

For the 80 and 160 meter bands. Inductance 4 mh, DC resistance 10 ohms, maximum DC 600 ma. Coils universal wound on steatite core.

R-154 CHOKE

For the 20, 40, and 80 meter bands. Inductance 1 mh, DC resistance 6 ohms, maximum DC 600 ma. Coils universal wound on steatite core. The R-154U does not have the third mounting foot and the small insulator, but is otherwise the same as the R-154.





R-175 CHOKE

Unlike conventional chokes, the reactance of the R-175 is high throughout the 10 and 20 meter bands as well as the 40, 80 and 160 meter bands. Inductance 225 microhenries, distributed capacity 0.6 mmf, DC resistance 6 ohms, maximum DC 800 ma., voltage breakdown to base 12,500 volts.

NC-75

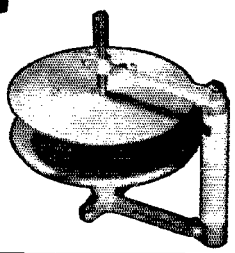
For 75T, 808, 811, 812 and similar tubes.

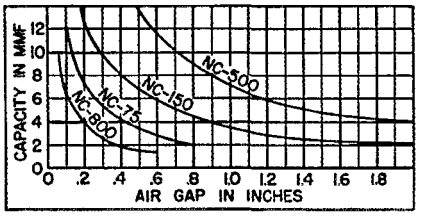
NC-500

For WE-251, 450TH, 450TL, 750TL and similar tubes.

NC-150

These larger disk-type neutralizing condensers are for the higher powered tubes. Such as HK354, RK36, 300T, 852, etc. Disks are aluminum, insulation steatite.





MAKERS OF LIFETIME RADIO EQUIPMENT

'phone, QRM and all. LAH is upping his power from 70 to a couple of hundred watts. At odd times DCW can be found on 28 Mc. now that his house is painted. Wm. L. Starke, 744 8th St., N.W., Washington, D. C., wants to contact some ham in North Wilkesboro. We welcome to North Carolina, 4MFK, ex-2PYM, over Durham way, who is engineer at WTIK. We want to repeat that the gang up in Asheville really put on a hamfest. Don't forget that the Charlotte gang is planning a super-duper for the first Sunday in October. Please send in something to include in this column. One guy stated that we should get on c.w. if we want to obtain some news. Better informed members of the gang know that we have been operating c.w. exclusively for almost two years. Any other suggestions?

SOUTH CAROLINA — SCM, Ted Ferguson, W4BQE/-ANG — DPN reports that he is active on 3.85-Mc. 'phone. FMZ is changing his QTH to Orangeburg. ILP spends his time on 7-Mc. DX. AZT reports activity in the South Carolina and Cracker Nets and also reports that he has talked to his brother in Japan several times. We welcome back to this section 8EDQ, formerly 4EDQ, and 4DQY. There is always room for fellows of their quality in this section. BPD reports that he has acquired a 150-acre farm and has a new array of sky wires from rhombics to ten-element Sterba Curtain. LJJ keeps them busy on 14- and 7-Mc. c.w. The new boys, MAO, MAP, MAQ, MAR, and MAS, better known as the Quads, are busy building transmitters that look FB to us. A nice bunch of fellows, these "young squirts." Traffic: W4AZT 16, BPD 7.

VIRGINIA — SCM, Walter R. Bullington, W4JHK — EOP has headed "Nawth" to Easton, Pa., as 3EOP once more, as chief engineer of b.c. station there. Best of luck, Charles, from the gang. KFT is new OO in Arlington and says he had a lot of fun in the CD Party. BZE is rebuilding, planning, and dreaming. He made 75,000 points in the last CD Party with 30 watts in 8 hours operating. Nice going, Tom. "Ev," 1UE, now is 4IA in Arlington and looks forward to traffic-handling and nets this fall. KFT is new ORS. Congrats, OM. NLN is a new ticket in Alexandria. He has a Super-Pro receiver and a BC-61OE transmittter. Glad to have you with us, OM. FJ, CYW, IWW, KVP, and even JHK are on 144 Mc. mostly with SCR-522s. How about some dope to put in the column, fellows? Traffic: W4NLN 4, BZE 1.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — GBF, RM and NCS for the West Virginia Net, with CSF, ANCS, report everything ready for a banner season. The net operates Monday through Friday at 7:30 P.M. on 3770 kc. MOL and VPO are shaping up a 75-meter 'phone net and would like to hear from you 75-meter 'phone boys. LCN kept schedule for over a month with J2AAO handling State traffic. BTV has cut up, inch by inch, 400 feet of Twin-Lead getting his aerials ready for 3.5-Mc. DX. DFC is assisting on Naval Training Program in Princeton. ZEW, active on 7 Mc., needs 3 states for WAS. MZD, now 2UDM, visited Clarksburg hams recently. YIP and YLG are trying to work YGL on 144 Mc. YGL, with TDJ, worked Pittsburgh from Morgantown on 144 Mc. 4UR, senior FCC inspector, Atlanta, visited Fairmont hams. VZD and 3NCD visited GBF and 3MKM visited ESQ. 2GM, ex-8CVX, gave an interesting talk to MARA members on h.f. transmitters. Murrill, of 8OK, now is 6OQ in California. GBF and JM topped 200,000 in last CD Party and now will have competition from EZR and KWI, new ORS. Visitors to PQQ's shack were amazed to find his 100 countries for post-war DXCC were made without a beam. Traffic: W8GBF 12, DFC 3, FMU 1.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Glen Bond, WØQYT — There was no Colorado report for June as your SCM was out of the State on vacation. Had a fine time visiting up in W7-Land and worked lots of stations with the mobile 28-Mc. rig. The Western Slope Radio Club has a war surplus SCR-284 rig for field tests and emergency use. PXZ also has one of the rigs and says it is FB. Here is what goes on the Western Slope: FQT has finished his new house and will be on the air soon; GKW and VZF are repairing radios; PXZ is an engineer at KFXJ and hopes to be on the air soon with a new type rig; GMB is busy with his peach crop; EBW is on 14 Mc. with a T-40 and MGX has a new SCR-284. Major CXW and Major ZKB promoted an amateur radio hamfest at Lowery Field Aug. 1st and 2nd. Emergency communications in cooperation with the armed forces was the main

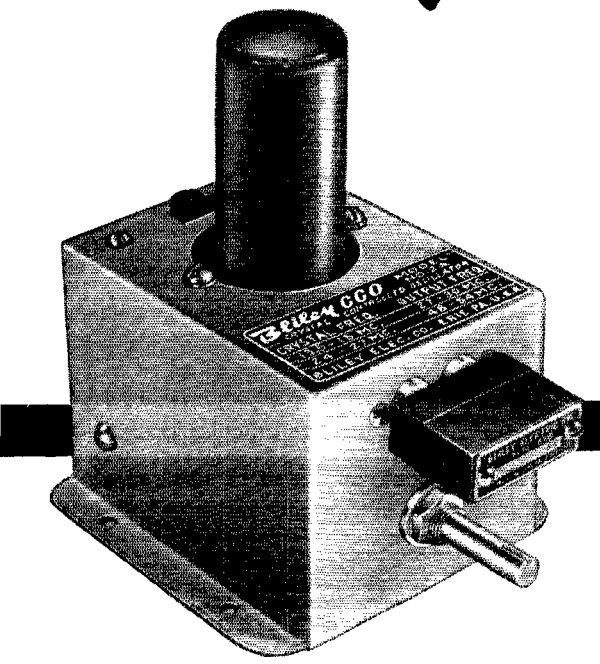
(*Continued on page 94*)

Bliley announces . . .

a new crystal controlled oscillator for the 2-6-10-11 meter bands

CCO

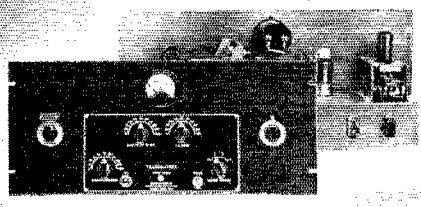
MODEL 2A



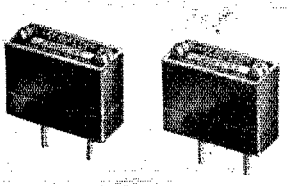
ow available for your amateur rig, a completely pack-ed oscillator unit designed and engineered to utilize the any advantages of crystal control on 2-6-10-11 meters. ith the CCO-2A output is obtained directly on 6-10-11 eters; operation on 2 meters requires only a tripler stage.

he CCO-2A is the ideal oscillator for an efficient 4-band ansmitter such as the Millen 90810*; or as a basic unit new construction. Features include: adequate drive for h.f. medium power tubes, single dial tuning for maximum tput, no self-oscillation under any operating conditions.

eak performance of the CCO-2A is obtainable only when ed with Bliley type AX2 plated crystals for 10-11 me-rs and the new Bliley AX3 plated crystals which mul-ply to the 2-6 meter bands. See table for relation be-ween crystal frequency and output.**



The Bliley CCO-2A is employed as a built-in component of the Millen 90810 high frequency transmitter



TYPE	CRYSTAL	CCO-2A OUTPUT
AX3	25-27 Mc	50-54 Mc
AX3	24-24.6 Mc	48-49.3 Mc
AX2	13.6-13.8 Mc	27.1-27.6 Mc
AX2	14-14.85 Mc	28-29.7 Mc

VAILABLE NOW THROUGH YOUR BLILEY DISTRIBUTOR

CO-2A *less tube* **(6AG7)** *and crystal* **$9.95**
X2 *crystal, 11 meter multiplier,* **13580-13715 Kc** **3.95**
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X3 *crystal, 6 meter multiplier,* **25000-25500 Kc** **3.95**
X3 *crystal, 2 meter multiplier,* **24000-24333 Kc** **3.95**

Type AX2 *units supplied ± 30 Kc of specified frequency*
Type AX3 *units supplied ± 5 Kc of specified frequency*

Bliley CRYSTALS

topic. Some of the out-of-town guests were FDD, of Longmont; 6ZLV, of Fallbrook, Calif.; ØOKF, of Lincoln, Nebr.; 7HDS and 7EUZ, of Cheyenne, Wyo.; MGX and GMB of Grand Junction; JLT and PBR of St. Louis, Mo. The hamfest was sponsored by the Denver Radio Club, Lowery Field Post Signal Dept., AAF, Airways & Air Communications Service. Everyone who attended had a good time. MGX says the Grand Junction Division of the D&RG Railroad is the only division that can supply an all-ham train crew. ØWAP, now pounding brass at sea, expects to get on 28 Mc. with a mobile marine this fall. CQR is a new ham in Denver.

UTAH-WYOMING — SCM, Alvin M. Phillips, W7NPU — JHL and OWZ worked over 40 miles on 144 Mc. with mobile rigs, which is quite a record in "them thar hills." JQU participated in the last CD Party. DLR has new QTH, which promises better hamming for him. New Logan calls are LBY and LCB. HLA is working some real DX with 50 watts. The Cheyenne gang worked 30 states and some good DX during the Field Day Contest. They operated under the call JHL. BLE is knocking off DX with his new three-element 14-Mc. rotating beam while your SCM is struggling to be heard on 14-Mc. 'phone and c.w. with his apartment attic antenna. TRM is moving to Provo. BED is lining up his net for fall and winter activity. You guys note the enviable traffic totals that Lizzette Wolf, HDS, is running up. Fellows, let's watch the expiration dates on appointment certificates and if necessary send certificates to me for endorsement. Traffic: W7HDS 114, JHL 17, HLA 6, EVH 4, OWZ 1.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Lawrence J. Smyth, W4GBV — From Birmingham: The club is building a new rig with 45TLs. DID is on the air now with a 400-watt rig using p.p. T-55s on 7 Mc. and also a new NC-173. DXB has a rig on 7 Mc. using 500 watts input to an 810 in the final and twelve crystals, with front panel controls. GOP, of Greensboro, is building a new final using a pair of 813s. LZX is running 150 watts to a TZ40. QSO total is about 550 including 100 DX from May 16–July 31. Selma's JLU is portable 5 at Port Arthur, Tex., running six watts. Traffic: W4DXB 3.

EASTERN FLORIDA — Acting SCM, W. E. MacArthur, W4BYF — SEC: JQ. RM: BNR and BYF. PAM: JQ. DOO sent a photo of a good looking new final. That Palmer is now running on kerosene and furnishes all power requirements. IQV holds regular schedules on 7165 kc. with PL and IKI and is making a lot of the boys and their families happy by originating traffic from the local VA hospital. Also, with NN and AGB, he is starting code classes for the local aspirants. You are doing a fine job, Al, and we are all proud of you. BT, FPK, and LVV are doing some remarkable DXing on 14-Mc. c.w. BT also pounds away nightly on that 14,140-kc. spot with the midnight broadcast while IKI is bearing the brunt of the 7-Mc. OBS service on 7170 kc. at 8:30 P.M. BXL took a shot at the last CD Contest but found the going pretty rough. We know how it is, Dick! AAR, who puts in 99 per cent of his time on traffic during the winter, now puts in the same percentage on DX. DQW says that GIC has a new SCR-522. Bob is polishing the rig for that winter traffic load. JAV schedules CO5FL and CO2RA on 7075 kc. at 5–6 P.M. Mario also puts out bulletins of international interest in Spanish on 28 Mc. CO2FM visited him and then went to Tampa to say hello to IVD. FWZ says that the weather is too hot to do anything but he managed to run up 50,050 points in 8 hours in the last CD Party. I want to thank all of the Eastern Florida gang who helped me over the rough spots for the past four months. I am grateful to you for the reports you sent in because they made my temporary job so much easier. Let's all get behind our new SCM, and give him every last bit of coöperation. We are all with you, Johnny, and wish you the very best. Traffic: W4IQV 83, BT 61, IKI 56, BYF 25, FWZ 8, AAR 6, JAV 3.

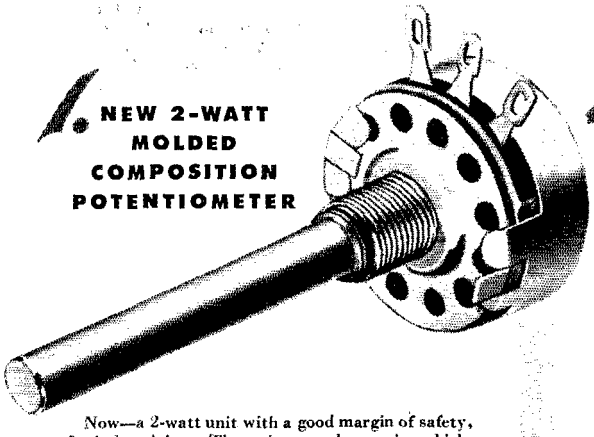
WESTERN FLORIDA — SCM, Luther M. Holt, W4DAO — JV is a proud papa. MS erected a 40-ft. tower. EQR and CNK work 50 Mc. LT has kw. on 3.85-Mc. 'phone. LCY moved to Warrington. BJF QSYed to 28-Mc. 'phone. DZX is building 600-watt 'phone. EGN works 14-Mc. DX. KAS moved to Tampa. KIK is building high-power 28-Mc. 'phone. AXP bought a new receiver and works Europeans. BFD built f.m. exciter. FHQ uses flea power on 7 Mc. JPA is building a kw. rig. KFP and QK have new rotary beams. LRX is on 7 Mc. at Chipley. IRO works 28-

(Continued on page 96)

FIVE NEW OHMITE Products

for the Radio Amateur

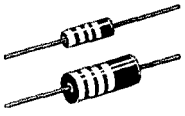
1. NEW 2-WATT MOLDED COMPOSITION POTENTIOMETER



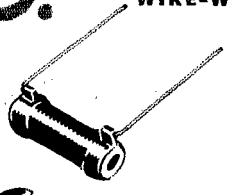
Now—a 2-watt unit with a good margin of safety, for industrial use. The resistance element is a thick, solid-molded ring, heat treated under pressure—not a film. It is unaffected by heat, cold, moisture, or length of service. *Sold only through Ohmite jobbers.*

2. NEW ± 5% TOLERANCE LITTLE DEVIL COMPOSITION RESISTORS

These popular resistors are now available in ½ and 1-watt sizes in tolerances of ±5%, in addition to the standard ±10%. The resistance and wattage are clearly marked on every unit. *Sold only through Ohmite jobbers.*

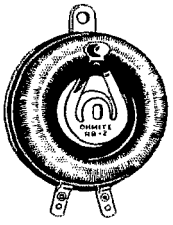


3. NEW 5-WATT BROWN DEVIL WIRE-WOUND RESISTORS



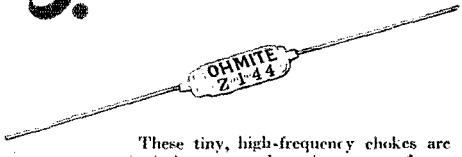
A rugged, new Ohmite wire-wound, vitreous-enameled resistor of unusual compactness. Easily mounted by its 1½-inch tinned copper-wire leads. Tolerance ±10%.

4. NEW RB-2 DIRECTION INDICATOR POTENTIOMETER



A compact, low-cost unit used in a simple potentiometer circuit as a transmitting element to indicate, remotely, the position of a rotary beam antenna, wind vane, or other rotating device. Used with a six-volt battery and a simple 0-1 *milliammeter.*

5. NEW R. F. PLATE CHOKES



These tiny, high-frequency chokes are single-layer wound on low power factor bakelite cores, covered with a moisture-proof coating. Six stock sizes for all frequencies from 7 mc to 520 mc. Two lowest frequency chokes rated 600 ma; all others 1000 ma.

Here are five new Ohmite products—all made to the same high standards that characterize other Ohmite products—built to stand up under severe service conditions. When you need rheostats, resistors, tap switches or chokes, play safe and specify Ohmite.

WRITE FOR INFORMATION

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Be Right with **OHMITE**

RHEOSTATS • RESISTORS • TAP SWITCHES • CHOKES • ATTENUATORS

Mc. DX. EQZ and UW are busy running WBSR. BCC and HIZ have mobile rigs. GXN bought an HT-9. ØSAA/4 operates a radio store in Pensacola. MEN has trouble loading antenna. The Pensacola Amateur Radio Club meets the 2nd Friday of each month. BKQ built an FB plumber's delight rotary. JNP keeps busy with new job as club secretary. Traffic: W4AXP 6.

GEORGIA — SCM, Thomas M. Moss, W4HYW — GQR sends along a newspaper clipping outlining emergency plan for Bartow County. We now have public recognition for emergency service in several counties. We still can use ECs for many counties. BCR reports new three-element beam and a visit from CT2AB. YC is moving to Vocational School. BQU and EYK are new OOs, Class I. IWP has returned to Jonesboro and wants to know where those u.h.f. boys are hiding. He has some nice rigs on, but u.h.f. activity has been practically nil except for OK in Hapeville. DCZ, FNA, JII, LVU, LGK, KV, and HYW are a few of the latest additions to the Eastern Air Lines gang in Atlanta. GDD is with Eastern in Columbus. The boys have a net known as the "Silverliner" Net on 7220 kc. The SCM finally got down on 7 Mc. and should also be on 3.5 Mc. by the time you read this. Let's hear from all those with ambitions for traffic nets during the coming winter season. We still are short of nets. The Rebel, CAA, and EAL Nets are our only traffic outlets. However, the Cracker Emergency Net stations are available for traffic on their Sunday periods. Traffic: W4BCR 23, HYW 5, JDR 5, BQU 1.

WEST INDIES — Acting SCM, Everett Mayer, KP4KD — AM has consolidated equipment into convenient compact unit. He worked SU, LU, VP6, and KH6 on 28-Mc. 'phone during the month. BE is active and working Ws. DV schedules W3EIV and handles traffic. He worked I1, PY7, OZ2, PA0, SM4, D4, F8, and a flock of Gs. Look for him on 14106 kc. when you have QTC for KP4. BJ's bleeder and plate meter went up in smoke. NY4CM radios in his report and reports nice DX score. KD still calls "CQ DX NO W." The San Juan gang had an FB get-together at CN's shack at which CN, BJ, CV, CU, AC, DC, CC, EG, BY and KD were present. CU worked ES in Ponce on 28-Mc. 'phone on reflected skip. JA and KD received CAROA member pins presented by Mr. and Mrs. VE3AZI. EX, EZ, FC, and FD are new calls. With 28 Mc. down and out with and the summer slump, activity seems to have hit rock bottom in the section. Traffic: KP4DV 33, NY4CM 17.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Ben W. Onstenk, W6QWZ — Asst. SCM, Vincent J. Haggerty, IOX, Santa Barbara. The Asst. SCM is managing the activities in his area so address your inquiries to him if you are in that area. I hear from RIU that some of the MK Club members are installing transmitters in one of those yellow life rafts to use when they go out spearing fish. Last time QWZ was in one of those things he fell out, clothes and all. The Los Angeles section need more mobile gear for the various Emergency Corps groups and with all those PE-103 generators lying around you shouldn't have too much trouble. When you get set up, let your local Emergency Coördinator know of your availability. New Emergency Coördinator for Inglewood is HMW, whose address is 1327 Centinella. EC for Santa Barbara is QZA, whose QTH is 1417 Mountain Ave. There is still a need for more Emergency Coördinators in a number of districts. How about the clubs in those districts that don't have an EC picking one out and letting me know about it? RWV is now on all bands with a pair of 807s. UGX, IK, RPH, EOZ, GM, SEY, UZL, WEX, ZBC, ZUK, ZJM, UAH, YDQ, and HDY were some of the stations that operated the San Bernardino Club equipment on Field Day. Their score was 7965. VDE and VIX were on the south end of the new DX record on 430 Mc. and worked ZRN 195 miles away. VGV is back on 14-Mc. c.w., as is SQO. IOX is going strong on 3.5 Mc. with the traffic nets. CMN has a net on 3615 kc. and would like to have some more outlets in and around Los Angeles. How about some of you fellows on 3.5 Mc. giving him a call? AM handled traffic for the Los Angeles to Honolulu Yacht Race. YVJ schedules KL7. VAQ made 71,440 points in the CD Party. MEP is going on 430 Mc. DUC received QSL from China with 804 dollars worth of stamps on it. Traffic: W6IOX 318, AM 256, JQB 134, CMN 57, WUM 5, MEP 4, MU 4.

ARIZONA — SCM, Gladden C. Elliott, W7MLL — The Southwestern Division Convention, to be held Oct. 18–19 in Phoenix, promises to be the largest affair of its kind ever

(*Continued on page 100*)

D-104 FITS PERFECTLY into the PATTERN of NARROW BAND FREQUENCY MODULATION

EXPERIMENTS now being conducted with narrow band frequency modulation, by many Amateurs, indicate the need for a microphone with characteristics possessed by Astatic's Model D-104 for maximum intelligibility. High output, as obtained with the D-104 Crystal Microphone, long a favorite with Hams, aids materially in simplifying amplifier construction.

CATALOG AVAILABLE

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Astatic Crystal Devices Manufactured under Brush Development Co. patents.

See your Radio Parts Jobber

Why this team can bring

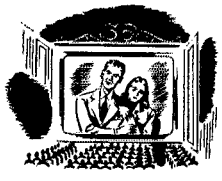
ACTIVE DEVELOPMENT of loudspeakers moved forward after World War I, when Western Electric produced the 196W, employing a non-magnetic diaphragm driven by an armature. First used in the Victory Loan campaign of 1919, the 196W took part in the national political conventions of 1920, the presidential inauguration of 1921, and the burial of the Unknown Soldier later the same year. Success of these pioneer public address systems rested not only on loudspeakers but also on high quality microphones and amplifiers—all Western Electric developments.

Continual progress in the intervening years has kept pace with the development in Bell Telephone Laboratories of telephone transmitters and receivers for the Bell System. Fundamental to both loudspeakers and telephones have been the Laboratories' pioneering studies in sound, speech, hearing and the theory of vibrating systems.

Sound distribution systems, sound motion pictures and radio broadcasting—all have benefited from the teamwork which has done so much to make possible today's efficient, powerful, wide-range loudspeakers.

1919. New York's Victory Loan celebration pioneered the art of reaching tremendous audiences. 113 Western Electric speakers made possible this mass demonstration of the new art of sound distribution.

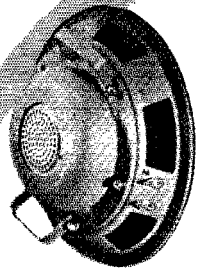
1924. Non-directional, small in size, yet extremely wide-range for its day, the 540 cone speaker designed for broadcasting was so popular for home receivers that it became a symbol of early radio.



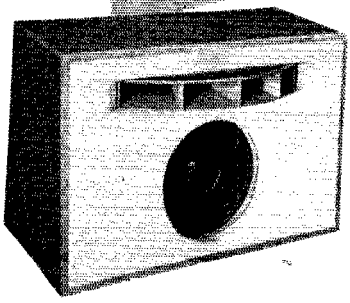
1926. The 555 Receiver, with its large wooden horn, contributed to the success of sound motion pictures. From this single-unit loudspeaker grew the high quality wide-range theatre speaker systems of today.

1937. The introduction of the 750 series of loudspeakers provided the first really wide-range direct radiator. With the proper mounting, this speaker covers a frequency band from 80 to 10,000 cycles. Still a popular speaker.

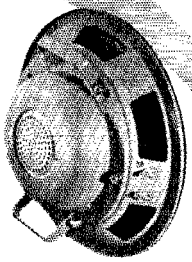
you loudspeakers like these



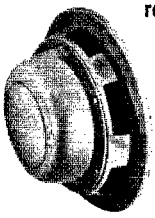
728B 12" direct radiator, 30 watts continuous capacity. Frequency response 60 to 10,000 cps.



757A two unit system, using 728B plus separate high frequency speaker. Frequency response 60 to 15,000 cps.



756A 10" direct radiator, power handling capacity 20 watts. Frequency response 65 to 10,000 cps.



755A 8" direct radiator, 8 watts capacity. Response 70 to 13,000 cps.

TODAY Western Electric offers a complete line of wide-range direct radiators, high frequency speakers, horns and multi-unit systems all designed by Bell Telephone Laboratories. There's one to meet your requirements for highest quality sound whether you want an eight inch, eight watt speaker, or a giant theatre-type system with 120 watts capacity.

No matter which you select, you get the benefit of a broad experience which long antedates the public address art.

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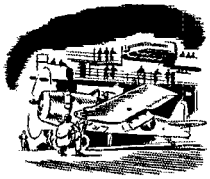
OFFICES IN 95 PRINCIPAL CITIES



1943. Battle announce speaker designed for the United States Navy hit a new high in intelligibility and power. Used on all types of Navy ships, they passed commands to fighting men over the noise of battle.

BELL TELEPHONE LABORATORIES
World's largest organization devoted exclusively to research and development in all phases of electrical communications.

Western Electric
Manufacturing unit of the Bell System and the nation's largest producer of communications equipment.

(Continued from page 96)

held in Arizona. GV has 150 watts on 28 Mc. KXB is working n.f.m. on 28 Mc. KXE has a three-element plumber's delight. UPR is on 7-Mc. c.w. in Douglas. LBN has a 70L7 rig on at Greer. 6KMM, 7JYZ, and 4KFC held a coast-to-coast Arizona reunion on 7 Mc. The Tucson Club issues a Worked All Tucson Certificate for 50 Tuscon stations. QAP has a twelve-element beam on 50 Mc. and reports 30 states. KAE has 35 states on 50 Mc. 1AWA is now 7AWA and is on 14- and 28-Mc. 'phone. GGS, LSK, KTJ, and TJG are on 420 Mc. in Phoenix. KTJ and LKK are using 10,000 Mc. radar in Phoenix. KGN has a wide-spaced four-element beam on 28 Mc. RMB and LFE have new Supreme AF-100 rigs. New calls: LKH and LIZ. The two Tucson clubs and the Phoenix club held a joint hamfest in Tucson with about 25 in attendance from Phoenix. DFE and LHS are on 3.85 Mc. in Ajo. TCQ is on 3.85 Mc. at Willcox. Get in the Arizona nets: 3515 and 3551 kc. daily; 3865 kc. Sunday A.M.; 29,000 every night in Tucson and Phoenix.

SAN DIEGO — SCM, Irvin L. Emig, W6GC — Asst. SCM and SEC, Gordon Brown, APG. San Diego section appointments are as follows: ORS — BAM, BGF, LUJ, NDF. OPS — APG, BKZ, CHV, FMJ, VJQ. OO — FMJ, GC, KW, WNN, YYW. OBS — CHV, LRU, VJQ. OES — DEY, JUM, MKW, WNN. LDJ and LHN are erecting an East-West rhombic. YYW is using a new two-element 14-Mc. rotary and taking traffic from the Orient. DEY and MKW sent in detailed reports on v.h.f. conditions. 3FAM/6 is operating from San Nicholas Island, 100 miles off the California Coast, using an SCR-522 on 144 Mc. LRU, who boasts 73 countries, schedules G5UX five days a week and OX3GE once a week. MI crashes through with 73 countries and 32 zones. BGF makes Pioneer Net each day. OBD boasts 83 countries and keeps biweekly schedule with KX6USN on Bikini. LMV has a new 10 over 20 beam. VYD is new YL in San Diego. KD, JRM, WXK, YQK, APG, and WNN are heard regularly on 50 Mc. YYM is working hard on the YLRL chapter. FMJ is operating portable with BC-474 at Sequoia. JUM can operate 28 Mc. from his car. 9HHM is touring Pacific Coast operating on 28 Mc. MKW says new 420-Mc. record was made in late July by ZRN/6 on Frazier Mt. who worked VIX/6 on Mt. Helix, a distance of 195 miles. BWO is finishing all-band exciter starting with BC-211. NGN furnished 144-Mc. communication for Soap Box Derby. ZDO, BDW, GRD, BOS, CDQ, MXK, YBI, ZOP, and TMC are on 144 Mc. ZWY, WHN, UYA, VKN, and WWX are active on 28 Mc. During Honolulu Yacht Race IZ kept 7- and 14-Mc. schedules with FZC/MM and DAQ/MM. URU is Orange County EC. PHJ is mobile on 144 Mc. DKN is using m.c.w. on 144 Mc. DHP, HWJ, and URU are on 3.85-Mc. 'phone. The Section expresses deepest regret at the passing of NDD. Traffic: W6OBD 39, BGF 18, YYW 12, LDJ 8, OOT 4, WNN 4, GC 3, YYM 3, LRU 2, MI 2, YXE 2.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, N. C. Settle, W5DAS/-MNL — QA is guest reporter this month. Well, fellows, the good old Northern Texas section sure is getting emergency minded. We now have more EC members than any other section. Activity is running pretty high although summer WX seems to have brought on a lot of moving around and hunting for DX. I had a visit with KEF at Cross Plains. He is active on 7- and 3.5-Mc. c.w. HZX, at Ballanger, has new HQ-129X and is rebuilding transmitter. LRJ has moved from Gages, Okla., to Perryton. DN is now on 3.5-Mc c.w. with 696A and soon will be on 7 Mc. BJ has bought a home. JDZ has finally gotten his Class A ticket and is working everybody. Other hams in Coleman are CZR, 28- and 3.85-Mc. 'phone; LMY, 7- and 3.5-Mc. c.w.; LCH, 7- and 14-Mc. c.w.; AT, 7-Mc. c.w.; LPO, 7 and 28 Mc. HPG, HSE, and AKU are active in Brownwood. HOF is active in Gatesville and is trying hard to get contacts on 144 Mc. with ECE and the Dallas-Ft. Worth bunch, where activity on 144 Mc. seems to be high. Lubbock has a large bunch of active hams. I don't have a complete list but here are some of them: KTX, JQD, EWB, and CLB. EGJ and FVN are active in Perryton. ECE, KOW, HPG, FNQ, and QA have BC-654A rigs. WV is on in Plainview. NW, GNH, and AMU are active in Odessa. FPH is an EC member. If you are not a member of Northern Texas EC why not contact DAS, DXR, ECE, QA, or any member of the net. DN is active on 28-, 27-, and 3.5-Mc. 'phone, and GFN is on 28- and 27-Mc. 'phone.

(Continued on page 102)

KEN-RAD Radiogram

Lighthouse Larry Comments:

WHAT metal tube for your intermediate-frequency system? . . . To answer that question properly a distinction must be made between narrow and medium-band-width systems.

The former, as you know, is the type used in AM communication or home receivers, and the latter in FM receivers. (FM may not interest you now, but the time is coming when it will play an important part in ham activities.)

Selecting the right tube for either type of IF system, narrow or medium-band-width, is based on simple circuit logic. In narrow-band IF work we want as much gain as possible, but using high-g_m tubes for that purpose is apt to cause oscillation difficulties. Low-g_m tubes will "stay put"—also, will provide a greater measure of stability, which is important. (Observe that there is, after all, a definite use for low-g_m tubes!)

We nominate Type 6SK7, with two runners-up as alternate candidates—the 6SS7, which is the same tube with a low-current heater; and the 6SF7, which is a 6SK7 with a diode section added for use as the second detector. In practice, as many as three 6SK7 metal tubes may be applied in cascade with no oscillation troubles.

For medium-band-width work, lower load impedances are necessary to achieve band widths of some 150 kilocycles. This means less gain is produced; so, as an offsetting factor, high-gain (high-g_m) tubes are called for. In medium-band-width service high-g_m tubes will not cause oscillations, since grid and plate loading act as deterrents.

Two metal tubes are logical selections—6SG7 and 6AC7. The latter, however, has much the higher g_m, and takes precedence over the 6SG7 where the greatest possible gain is desired.

Generally when comparing tube types for IF work, it is helpful to apply a figure of merit. The narrow-band-width f. of m. is a tube's g_m divided by its grid-plate capacitance. The medium-band-width f. of m. is the g_m divided by the sum of input capacitance and output capacitance.

The higher the quotient, the better that tube is for the job. A brief table of characteristics for different tube types is given herewith . . . In conclusion: if there are any further facts you would like to have on metal receiving tubes for IF work, by all means write me.

Lighthouse Larry

Tube Type	G_m	Input Cap.	Output Cap.	Grid-Plate Cap.
6SS7	1930	5.5	7	.004
6SF7	1975	5.5	6	.004
6SK7	2350	6	7	.003
6SG7	4700	8.5	7	.003
6AC7	9000	11	5	.015

178-F10-8850

OKLAHOMA — SCM, Bert Weidner, W5HXI — Asst. SCM, George Bird, 5HGC. SEC: AHT. Oklahoma c.w. Net, OLZ, has operated all summer six nights a week. AHT is co-author of the monthly *OLZ Bulletin*, that is quite a sheet. The Stillwater Club held a Bar-B-Q Sept. 21st at the Fairgrounds. IGO has plans for a new home with 3.5-Mc. rhombic. GFT/Ø, former Oklahoma SCM, reported into OLZ from Minneapolis. 8CRI now is on the air at Pawhuska with 5NHD. AHT reports ECs have been appointed for six counties of the seventy-seven in the section. Fourteen members of the Bartlesville club and their families attended a birthday party for GOL. Please contact AHT for County Emergency Coördinator appointments. There should be at least one in each county. Traffic: (June) W5IGO 36, GVS 27, AHT 20, HGC 11, IOW 8, FMF 6, ADC 5. (July) W5AHT 36, GVS 31, IGO 18, FMF 17, IOW 9.

SOUTHERN TEXAS — Ted Chastain, W5HIF — SEC: HQR. PAM: EYV. There is a rumor making the rounds that STEN is a closed net. This is not true — the net is open to anyone who will participate on a regular basis. STEN also would like to have other nets in this section join with it in furthering the cause of emergency service. Information may be obtained from Net Control Officer, Charles Burford, FNY, San Antonio. HZJ is new ORS and OBS and reports the San Antonio Radio Club has a WAS and DX Contest for members in process. IVU has new rig, RK-4D32 final-807 modulator. LCR received Class A license. EYV has 10-kw. a.c. generator, also new all-band antenna supported by telephone poles. LUN is EC at Freeport and has new 40-watt emergency portable. DDJ, Galveston, is on 144 Mc. Houston's 144-Mc. emergency net is working hard to prove the value of this band for emergency service. ACL is new ORS. MSI is new EC for Orange. JPC is EC at Kilgore. EWZ worked UAØKAA. LWV reports from El Paso that NBC and NGW are new calls on 30 Mc. The El Paso Radio Club elected the following new officers: EVJ, pres.; MWX, vice-pres.; COE, secy.-treas. Address for the club is P.O. Box 3113. The Corpus Christi 27-Mc. emergency net drills on alternate Thursdays at 8 P.M. Recently when a tropical storm was threatening the Gulf Coast, STEN stood by for 24 hours on the alert with mobile transmitters located at strategic points. HQR has new HT-9. HIF has NC-173 and VHF-152. DAQ is new OBS. CCD and AQK are having a private DX feud. This section could use a few more Official Observers. How about some of the VHF gang making application for appointment as Official Experimental Station. STEN advises that a new Zone Four is in the process of formation. All CD appointees should check their certificates and send them in for endorsement if appointments have expired. EUO has moved back to Corpus Christi. EWZ works 7 Mc. only. Traffic: W5MN 134, EYV 12, ACL 10, JPC 9, CCD 6, MKL 6.

NEW MEXICO — SCM, J. G. Hancock, W5HJF — ZM/ZU is our new SEC. AOH is completing a two-story shack just for hamming, including guest rooms and bath. DVJ, Farmington, has received his W5 call after holding 7DVJ in Nevada and 6DVJ in Arizona. Paul has a swell signal on 3.85-Mc. 'phone and says he is in New Mexico to stay. MYU is new ham in Las Vegas on 7- and 14-Mc. c.w. KXX is giving the Oklahoma Net QRM. Inquiries have been made as to the whereabouts of HWG. Carl, if you see this, please give us your QTH. EUT has moved to Oklahoma City. FHC is stationed at Tyndall Field, Fla. HPT has been transferred to Richmond, Va. HZE is in Warsaw, Poland. JQR has moved to Tulsa, Okla. MJS has been transferred to Swan Island, West Indies. OL has moved to Dallas, Tex. Response to a recent form letter has been very encouraging. Less than two weeks after 240 letters were mailed, 54 replies were received and 26 letters returned unclaimed. Eighteen of those replying expressed a desire to join the c.w. net starting on Sept. 15th at 7 P.M. on 3705 kc.; twelve expressed an interest in a 'phone net. Thanks for your wonderful cooperation, fellows. Also thanks to ZU and Mrs. Sayre for their help in addressing envelopes.

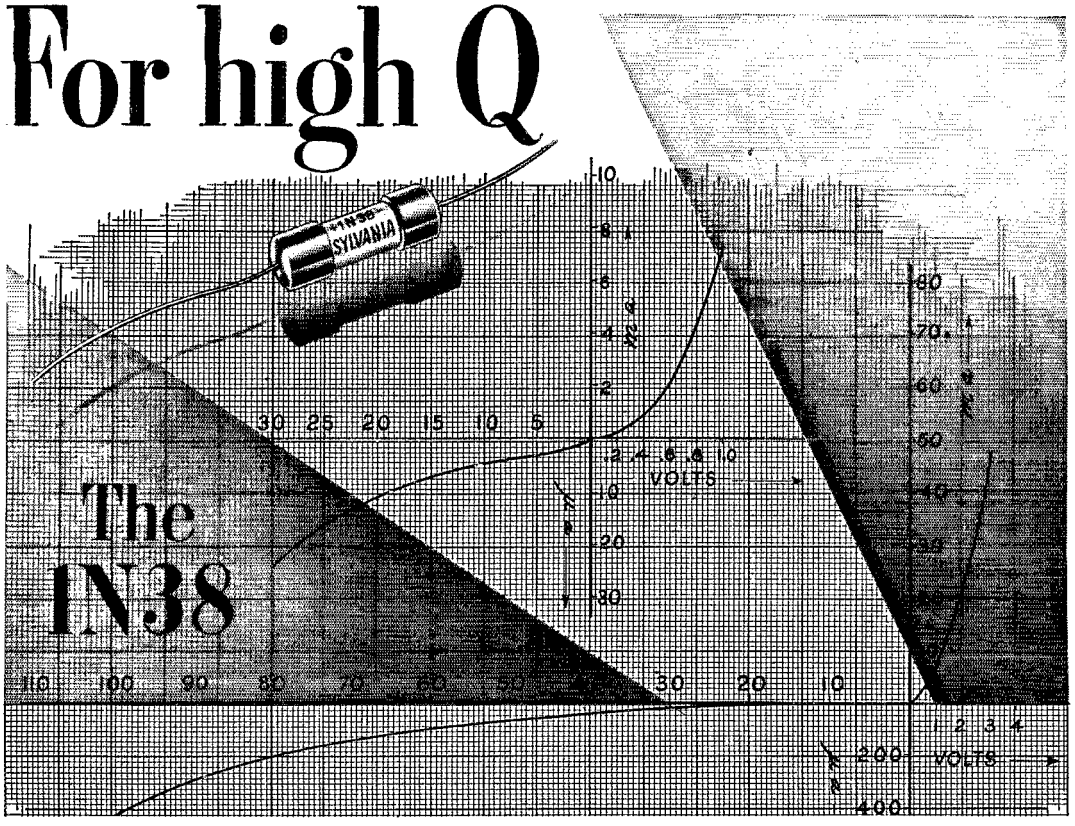
CANADA

MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — HJ contacts VO6U daily at 7:30 P.M. ADT for traffic from VO6SC. AX, one of our high-power 14-Mc. 'phone men, has a new Triplex beam. DB has jacked up the power a bit and has a schedule with 3AUN when conditions permit. New clubs recently have been formed at Yarmouth and the

(Continued on page 104)

For high Q



The 1N38

- A megohm at −3 volts.
- .8 megohm at −2 volts.
- .5 megohm at −1 volt.
- .35 megohm at −½ volt.
- 2 megohms at −5 volts.
- 2 megohms at −18 volts.
- A megohm at −33 volts.
- .25 megohm at −100 volts.

The 6,000,000th crystal Sylvania made was a 1N38!
Let Sylvania engineers help you with your crystal problems.

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South Shore. DW is secretary of the Yarmouth Board of Trade. Some 144-Mc. activity on Cape Breton Island includes work by AL, CR, and EC. Reg has a new rig going at his summer location, giving him duplicate set-ups at both QTHs. While visiting PX, DJ had a nice QSO with the XYL at home. FQ is handling a bit of traffic on 14-Mc. 'phone with PAØIDW and incidentally giving the new three-element beam a good workout. MZ is completely rebuilding the rig. RR is knocking off the DX with a new beam on 14-Mc. 'phone. EK has receiver trouble and threatens to increase power. DQ has the dual "bird cage" on the garage "turned east." GR, KJ, and LR did a spot of emergency work on 3.8-Mc. 'phone. ET has the new 28-Mc. three-element beam perking FB. QZ, QY, SF, PQ, QG, and FL are active on 50 Mc. QY had over 53 and QZ over 63 QSOs. Wanted — more news and reports of YOUR activities. Traffic: VO6U 42, VE1HJ 27, DB 7.

ONTARIO DIVISION

ONTARIO — SCM, David S. Hutchinson, VE3DU — TC is on 28 and 14 Mc. AMB has new wide-spaced beam on 28 Mc. AQO is pounding out on 28 Mc. ATM has fine wide-spaced beam. MT has n.f.m. on 29.5 Mc. AZI works the Porto Ricans regularly. IT pulls them in with 30 watts. AIW has four-element beam and cathode modulation. AXW works plenty of ZLs. ACJ is trying new beam. YY, with Triplex and 813s, works around. AHA and ABP are doing FB on 14 Mc. GM works all bands and has five b.c. f.m. sets. LL works the world on 14 Mc. BBJ will soon have new beam with p.p. 813s. The midnite rag-chewers, BEU and NO, still burn up the juice. ANY and ADO, the v.h.f. experts of Toronto, are on 50 and 144 Mc. AAA now is on 50 Mc. AIB is active on 28 and 50 Mc. BQF increased power to 250 watts c.w. CP will be on 28-, 14-, and 3.5-Mc. c.w. and 'phone with new Pardo VFO and more power. ALU is having plenty of QSOs with his 807s. PA is working 14-Mc. 'phone. PH has moved into the bush with a Command Set on 7 and 3.5 Mc. BBQ is active on 144 Mc. BHU replaced 6L6 with 807. BJE is building 14-Mc. rotary. TZ is working 7 Mc. exclusively. WI has new vertical and ¼ kw. on all bands, c.w. and 'phone. AKH and ANH are using pair of 807s. AZN is tearing BC-191 apart to convert for 813s. BAT, the KLARL station, is on every second Thursday evening. HY is revamping. 7ADT/3 is very active on 7 and 14 Mc. AOI is new operator on 3.5 and 7 Mc. in Haileybury. BQL, putting 450 watts on 14, 7, and 3.5 Mc., is our newest ORS. AWJ is rebuilding. TM has BC-348R and is revamping the transmitter. GB and BBI are experimenting on 144 Mc. ADC has Bendix TA12G rig working on all bands through to 28 Mc. AJE, AOO and AJP are working DX in the wee sma' hours. DU is converting Bendix TA12G. BBQ is our first OES. Traffic: VE3ATR 20, AWJ 10, BQL 10, HP 9, BMG 4, CP 2.

QUEBEC DIVISION

QUEBEC — Acting SCM, Gordon A. Lynn, VE2GL — BE reports 97 VK contacts; BE and BG schedule VK3HF daily; and CA, SA, AX, BE, BG, and UJ are among the early morning gang on 14-Mc. 'phone. HH is rebuilding. ZZ, on 3.8-Mc. 'phone from summer location, reports poor results with his flea power. UC and TY now have unrestricted 'phone and are trying 3.85 and 14 Mc. CC is doing FB on 3.5-Mc. c.w. with 25 watts and is giving 7 Mc. a try. GK has been hearing quite a few Ws on 50 Mc. but no luck working them yet. OG and UW are doing OBS work on 28 Mc. GT is on 50 Mc. and has worked between 40 and 50 Ws. KN has worked 16 states, W2, 4, 8, 9, and Ø on 50 Mc. and has heard W5, 6, and 7 also. New Canadian regulations appear to have chased some of the boys who were using modulated oscillator. NR and BB are gratified to see results of their code practice transmissions. George Pendlebury has passed exams and is awaiting call. NR has new NC-173. HF motored to Vancouver and visited VE7MQ. AX, on 14-Mc. 'phone with 90 watts on 829, has worked VK3NC, who uses 4 watts 58 times out of 64 daily schedules. XA and TH are chasing bugs in new finals. PU has new 28-Mc. beam. DJ is on 14-Mc. 'phone with 250 watts to pair of 812s with 811 modulators. JJ reports poor success on 14 Mc., particularly to the east. MG, ZB, ZL, ZF, IQ, and AAD are new calls heard. Ex-VE2LE now is G3BLT and is heard on 14 Mc. JJ, YV, and RD worked W2SJY just below the border on 28 Mc. Please send reports.

(*Continued on page 106*)

SPRAGUE TRADING POST

FOR SALE — HQ-129-X receiver complete with speaker used only 3 months $160; also crystal-liner signal generator $45. O. C. Kuberski, W905V, Rt. 2, Boyceville, Wisc.

FOR SALE — Hytron HY-Q-75 all assembled, never used, won at hamfest, less tube, VHF transmitter, $8. Robert T. Hudson, 42 Varnon St., Arlington, Mass.

WILL TRADE — Parts, tubes and meters worth over $90. Want good communication receiver. L. R. Ware, 536 Maple Ave., Doylestown, Pa.

FOR SALE — National NC-100A receiver less speaker. Excellent condition $65. W2OFB, 52 East 8th St., Clifton, N.J.

FOR SALE — BC-654 Army transmitter and receiver with dynamotor and vibrator power supply; also set of Continental code records and instructions. Write William Berhardt, Hotel Penn Hunt, Huntingdon, Pa.

FOR SALE — Blue Racer $12.50; QST, 1923–1939, $55; Electronics, 1946, $10; RCA Review, 1946, $5; T & T Age 1946, $3. Cash only, Ralph V. Osborn W1AHT, 94 Colonial Road, Stamford, Conn.

WILL TRADE — Complete college course in accounting, auditing and business administration, 24 leatherette volumes of over 300 pages ea. Worth over $200. Want AN/ART 13 or good receiver, V. E. Kruger, 3015 G. S.E., Washington, D. C.

WANTED — Hallicrafters SX25 or similar receiver. Will answer all letters. L. C. Waddell, 601 Vine St., Irwin, Pa.

FOR SALE — Filament and bias transformers (Raytheon); primary 110 v. 60 cycles, secondaries 10 v. 26a., 772 v. 70 ma., 2.5 v. 5 a., and 2.5 v. 5 a; high voltage insulation. Also two jumbo 4-pin tube sockets, $5. O. L. Updike, W4LAM, Thornton Hall, University of Va., Charlottesville, Va.

FOR SALE — 10 meter NFM mobile transmitter R.C.A., complete with dynamotor, tubes, control panel, cables and instruction book, 30 watts, $75. Joseph Alvarez, W3KRO, 2602 Germantown Ave., Philadelphia 33, Pa.

FOR SALE — Condensers, mica, paper, tuning, electrolytic; resistors, chokes, transformers, sockets, plugs, tubes, switches, wire BC-1206-C (5 tubes) carbon mike, etc. $18 and postage. J. Dalzell, 250 Palmo Way, Palm Beach, Fla.

SELL OR TRADE — Mark II transceiver, never used. All replies answered, R. A. Rosenquist, 238 E. Woodside, South Bend 14, Ind.

FOR SALE — Hallicrafters S-36, am-fm transmitter BC-223-AX, Albert Pastorello, 2872 West 23rd St., Chicago 23, Ill.

FOR SALE — QST's 1920 to 1939 most years complete and good condition, 204 issues for cash; also very FB power supply 600/700 400 mf. Write for details and list of other parts, vibropacks, genemotors, etc. Percy Slade, W2YH, 4613 Broadway, Union City, N. J.

SELL OR TRADE — 5-1 mfd 10,000 v., WKG d-c inerteen condensers; 3-1 mfd, 6000 v. WKG d-c Pyranol condensers; 5000 v., CT, KVA, 110 v. pri. transformer, W1IJL, 594 Springfield St., Chicopee, Mass.

FOR SALE — New and used books on electronics and communications, including Radio Engineering Handbooks by Terman and Henny; Applied Electronics by MIT. Send for list, W2OTF, 97 Sobel Court, Staten Island 4, N. Y.

FOR SALE — Hallicrafters S-40 communications receiver with S-meter in new condition. $70. Albert Penney, 378 Oaklawn Ave., Stamford, Conn.

SELL OR TRADE — Eastman 16mm Fl. 9 Cine Kodak movie camera, new 562 Supreme Audalyzer, 450TL's; ham or 3105 kc crystals. George Pasquale, 9421 Thornhill Road, Silver Spring, Md.

FOR SALE — BC-342-N 1.5 to 18 mc AC receiver complete, other ham items. Swap some for Rider's manuals. Free list. All inquiries answered promptly. Malcolm E. Hughes, 4819 Euphrosine St., New Orleans, 15, La.

WANTED — Hallicrafters S-20-R in good or serviceable condition. Will pay up to $45. R. Johnson, Rolling Bay, Box 173, Washington.

FOR SALE — Collins ART-13 transmitter converted for 110 v. a-c, $280; SX-25 perfect condition less speaker $90; Hickok 110B VTVM up to 10,000 v. d-c, new $50; Waterman pocketscope used little, $45. For complete information on above write, W. Z. Ferguson, P. O. Box 102, Kosciusko, Miss.

FOR SALE — Vomax, RCA 500 watt modulation transformer, S-41G receiver and Wilcox Electric receiver. E. L. Felder, W5FSS, Box 184, Tylertown, Miss.

FOR SALE — Meissner 150B transmitter with signal shifter, coils and tubes; also key and microphone. Robert F. Perry, W31TX, 5013 Wakefield St., Philadelphia 44, Pa.

WANTED — All Star Jr., any condition or similar receiver. State price, Charles McGeorge, 1077 W. 25th St., San Pedro, Calif.

WANTED — Radio hams to write discussing radio, radio circuits, etc. George Tomisek, 3033 S. Homan Ave., Chicago, Ill.

SELL OR TRADE — New 12" p.m. speaker and walnut wall baffle, new black crackle large metal cabinet suitable for transmitter; miscellaneous receiving tubes and parts. Need bug, meters, transmitting parts or what have you. Otto Woolley, W0SGG, 825 E. Pikes Peak Ave., Colorado Springs, Colo.

YOUR OWN AD RUN FREE

The Sprague Trading Post is a free advertising service for the benefit of our radio friends. Providing only that it fits in with the spirit of this service, we'll gladly run your own ad in the first available issue of one of the six radio magazines in which this feature appears. Write CAREFULLY or print. Hold it to 40 words or less. Confine it to radio subjects. Make sure your meaning is clear. No commercial advertising or the offering of merchandise to the highest bidder is acceptable. Sprague, of course, assumes no responsibility in connection with merchandise bought or sold through these columns.

Dept. Q-107, SPRAGUE PRODUCTS COMPANY, North Adams, Mass.

(Jobbing distributing organization for products of the Sprague Electric Company)

VANALTA DIVISION

ALBERTA — SCM, W. W. Butchart, VE6LQ — The Alberta Hamfest staged by NARC was a complete success. 8AI, of Teslin; 7MQ, of Vancouver; 2WW, of Montreal; and ex-5CP, of Prince George; were "out-of-province" visitors. DN, of Glenwood, took in both Waterton and Edmonton 'Fests, as did LC, of Strathmore. EO set up Alberta QSL Bureau at Edmonton 'Fest and did a brisk business. MP and HZ, of Chancellor, and KU and TA, of Hussar, motored in for the doings. Calgary was represented by a gang of 26. IX, of Hackett, walked off with the men's top attendance prize. To LG, president of NARC, goes the honors for carrying out the successful arrangements for the Edmonton 'Fest. WS, of Edmonton, visited Spokane and Waterton 'Fest. EA wandered down to Portland for a holiday. VX, of Medicine Hat, is working in Edmonton temporarily. EL and LL, of Camrose, met lots of old pals in Edmonton. HM was visitor in Kelowna and Penticton. EX-4AC, of Winnipeg, now is 6KN, stationed in Edmonton as technician for RCMP network. BW attended Magicians' Convention in Seattle. AL has NC-173. DT, formerly of Glendon, is set up in Stony Plain and on 3.8 Mc. with FB signal. IZ has returned from New Zealand. Traffic: VE6MJ 8, LQ 5.

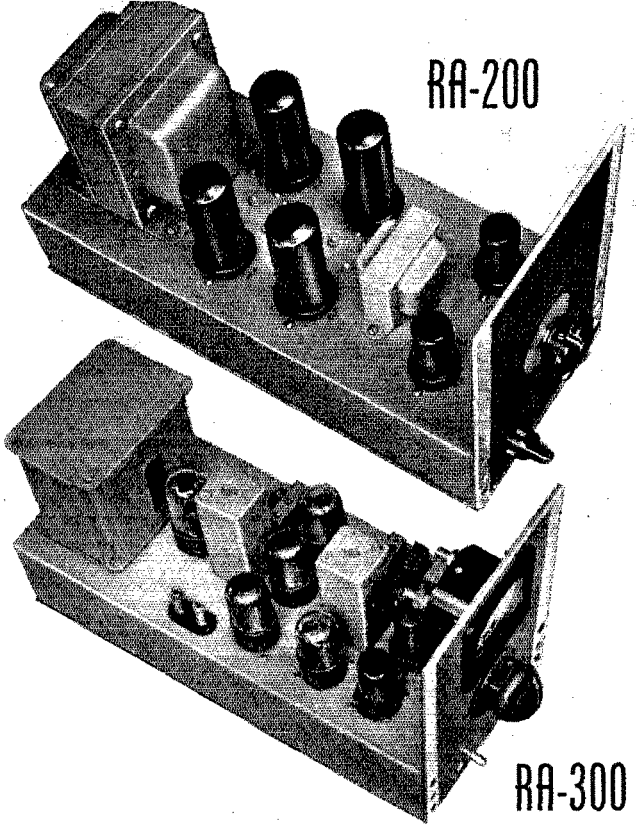
BRITISH COLUMBIA — SCM, W. W. Storey, VE7WS — AEY and his XYL are back after spending a month in California. ALQ and family have arrived back in town from Mount Rainier, Wash. Vancouver was "saved from a hostile power" recently when a pair of sleuthing radio amateurs took just 49 minutes to locate a "hidden transmitter." The test was sponsored by the Vancouver Amateur Radio Club. The portable transmitter was hidden in a clump of trees on Quilchena golf course. Intermittent sending was started at 10 A.M. At 10:49, Clyde Matheson burst into the thicket from the golf course while his partner, Jim Laughton, closed in from the interurban tracks. To make it tough for the searchers who used "directional" receiving equipment on automobiles, King Cavalsky, president of the club, and Ernie Savage, owner of the transmitter and technician for the "underground," chose a spot just below the Arbutus and Twenty-fifth power station, with its high tension lines and noisy transformers. Cavalsky and Savage arrived on "location" at 9:35 and had the transmitter ready by 9:45 A.M. At 10 A.M. Savage went on the air for five minutes with voice. After five minutes of silence the secret transmitter went back on the ether waves with Cavalsky tapping out code on a key. Thereafter the transmitter alternated with five minutes operation and five minutes silence until captured. At 11 A.M. FQ, WS, and RY jumped on the "bootleg" broadcaster. Third patrol, two or three minutes later, included 7AFN and 7AKF.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — During the past month high winds took several communications lines down. All were repaired within 24 hours. Fortunately these high winds did not occur the previous month as the flood conditions would have made it impossible to get such a fast repair job. If the two (flood and windstorm) happen at once, this section will be unable to help because of lack of emergency equipment. Have you any? If so, let me know, and join the Emergency Corps. This section can use anyone interested in ORS, OPS, OES, or any other ARRL appointment. WF is back on his feet after having an operation. ZK is heard on 14-Mc. 'phone. QV got his beam up. DL is on 14-Mc. c.w. NI has been busy with visitors, including a G. AM worked his first DX since '36 and is going to hibernate to 3.5 Mc. for the winter. JM sends official bulletins on 3825 kc. Mon., Wed., and Fri. at 10 P.M. CST. BG is leaving Canada for sunny California. Best of luck from all of us, Alex. We'll be looking for you from W6-Land. TJ has new rig completed. No traffic reports reached me although I heard lots of traffic being handled. Please report it.

SASKATCHEWAN — SCM, Norman Thompson, VE5CO — I would like to have any reports on 50-Mc. activities in the district. AR has heard Ws around the central states coming in FB. He's using his SX-42. HR is active with 40 watts on 7 Mc. DP has a 1155 and it really seems hot. OM has his beam tower lying in the yard. He'll be wanting help very soon. OP is occasionally on 'phone testing. DQ has a 19 set transceiver running about 25 watts which he converted putting in an a.v.c. control and an r.f. gain in the receiver and changing the coupling in the transmitter. CW

(Continued on page 108)



GO ON PHONE *with* TEMCO

RA 200 or 300

THE LAST WORD IN MODULATORS

RA-200 SPEECH AMPLIFIER AND MODULATOR UNIT

The RA-200 speech amplifier-modulator unit has been designed to modulate a tetrode or pentode power amplifier at voice frequencies between 200 and 5000 c.p.s., with inputs up to 150 watts. While output is only 50 watts for sinusoidal waveform, the sharp peaks occuring in ordinary voice waveforms are easily supplied by this modulator so that inputs of 150 watts to a final amplifier (rather than 100 watts as might be expected when sine wave modulation is used), can be successfully modulated.

The push-pull parallel 6L6 modulator circuit has been laboratory tested in order to carefully check its operation to highly critical standards. This unit is completely free of self-oscillation at any condition, from no signal to peak signal operation; thus eliminating AF distortion and spurious side bands on output carrier.

The CW man who wants to convert his present telegraph transmitter for phone operation, will find the RA-200 and its associated power supply, RA-100, the most convenient solution to his problem. The RA-200 is recommended for use with RA-600, 150 watt power amplifier and wide band frequency multipliers

Ask your dealer for a complete TEMCO RA catalog or write to Temco

RA-300 NARROW BAND FM EXCITER

Addition of this unit to an existing or contemplated transmitter, will permit the transmitter to be used for Narrow Band Frequency Modulated emissions for reception along the IF slope of ordinary AM receivers. Naturally, the cost of an Amplitude Modulator may be saved, if the equipment is designed specifically for NBFM, but usually the consideration dictating use of NBFM is existence of complaints from broadcast listeners. The TEMCO RA-300 exciter is practically a sure-cure for trouble of this kind.

Circuit consists of a grid-to-screen Pierce oscillator (6AC7), "electron-coupled" to a plate load so arranged as to supply RF excitation of proper phase-relation to the balanced modulator (6SA7's) grids. Signal grids of the balanced modulators are driven in push-pull by audio from a PM/FM 150 microsecond filter, while the plates are parallel connected to a permeability tuned plate load inductor. AF input from the microphone jack is first amplified by a 6SJ7, ½-6SN7 amplifier, then split by the other half of the 6SN7 and fed into the PM/FM network. Frequency Deviation Monitoring facilities consist of meter mounted on the front panel and another 6SN7, half of which, is used as a cathode follower; the other half as a rectifier.

For incorporation in existing or home-built transmitters, only a Jones "2412" series socket is needed, with choice of high or low impedance output for coupling to multiplier stages.

TEMCO RADIO COMMUNICATION EQUIPMENT

TRANSMITTER EQUIPMENT MFG. CO., INC.
345 HUDSON STREET • NEW YORK 14, N. Y.

is very active on 7 Mc. TX is pushing a pair of 813s on 14-Mc. c.w. and worked PZ1FM the first night. Cliff intends to use a Wilcox CW3 receiver as a converter on 28 Mc. DF is trying to get back on the air. BH is working all bands but hangs out on 14 Mc. mostly. BB is rebuilding and now has a VFO exciter which may be heard at the end of 14 feet of bed spring. RC is running his 8½ watts (2 watts dissipation) and is passing traffic regularly. RA is running 100 watts after a power boost. GD has been working 28-Mc. 'phone at noon (MDT). AX is heard on 7 Mc. at intervals. LA now is in VE4 country. Traffic: VE5HR 8, DQ 3.

BOOK REVIEW

Highways in the Sky, by Louis Shores. Published by Barnes & Noble, Inc., 5th Ave. and 18th Street, New York 3, N. Y., 1947. 269 pages. 6¼ × 9¼ inches. 56 illustrations. Price $3.00. All author's royalties go to the AAF Aid Society.

This book is the story of the Army Airways Communications System, from its earliest beginnings to the peak of its development shortly after V-J Day. The skilled hand of the author takes the reader first to Washington, where an officer in the Office of the Chief of the Air Corps receives a directive saying, in effect, "Let there be Highways in the Sky." From there we follow the development of the AACS from a handful of officers and men struggling for recognition and autonomy to a separate command of the Army Air Forces, culminating in the triumphal landing of a plane at Atsugi airdrome bearing AACS communications equipment and personnel, the first American plane to land in Japan after V-J Day.

AACS was the organization assigned the task of performing the unglamorous duty of establishing and maintaining communications required by our Air Force during the war — a duty that was relatively unimportant during peacetime when planes needed to fly only when weather permitted and then over pre-established well-traveled routes, but which mushroomed alarmingly when the requirements of combat made it necessary for planes to fly in all weather and through skies heretofore unexplored. The book explains in graphic and well-illustrated style how the Highways in the Sky were established in each theater of the war, and how the central headquarters was constantly under the necessity to fight off attempts of other military organizations to control and regulate the AACS. Some readers may find themselves skeptical of the importance of AACS and the apparent faultlessness of its leaders.

The part played by amateurs in the AACS is not touted nor even explicitly commented upon at any length, but implied throughout by occasional use of amateur terminology and passages like "The AACSmen accepted the challenge. Were they not Hams, just like their CO, Ivan the Terrible?" and phrases like " . . . Farman and his Hams." No glowing tribute is paid to amateur radio in so many words. As a matter of fact the author completely neglects an opportunity to include amateur radio in his description of where the AACSmen came from when he says, in the Foreword, that the Highways in the Sky were put there by "A civilian Army recruited right out of classrooms. Out of business, trades and professions." Late in the first chapter, when describing the difficulties of obtaining promotions and higher ratings for the men, he furthers the commonly mistaken impression that radio amateurs are a bunch of kids by saying " . . . increased ratings and pay were obtained for the men on a technical basis, permitting the recruiting of a number of promising radio 'hams' just out of high school and junior college."

If you can forgive these few minor faults, however, you will find the book is written in lucid, entertaining and dramatic style and is well worth reading. — *G. H.*

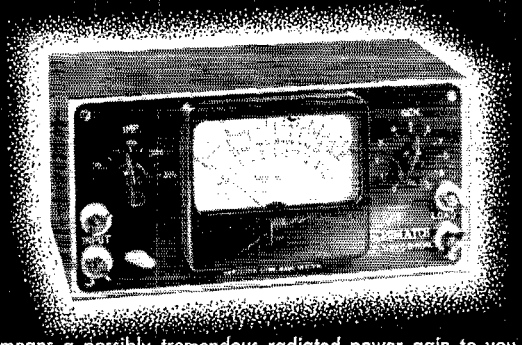
SILVER Presents...

MODEL 701 Transmitter, 80 through 6 meters, crystal controlled, 75 watts CW input, 28 watts 100% modulated AM phone, built-in modulator — yet only $36.95 net ready to go, less four tubes, coils and the power supply you probably have . . .

We think that's quite a value . . . was worth waiting for. We thank you for your patient wait. Today MODEL 701 is here, at your favorite jobber — all ready to get going for you.

Whether you want what we believe is the smallest, most compact — only 5" x 10" x 5¼" standard "ATOM-X" size and construction — transmitter you can buy for portable/mobile operation, or whether you want a miniature "power-house" for your main station, we think you'll fall in love with MODEL 701 when you see it. On 6 meters as on 80, it's a little honey. Run it crystal control, drive it with a v.f.o., use it to drive the biggest final the law allows, MODEL 701 is still an outstanding value.

MODEL 908 "MICROMATCH"



When QST said *"simply astonishing"* to describe the "MICROMATCH" standing-wave-ratio and r.f. power meter in its April, 1946 issue, there could be no doubt that here was something of tremendous value. Already hundreds in use prove it to be probably the greatest transmitter power gainer you can buy. "MICROMATCH" connected in your antenna feeders — in any link coupling lines — lets you measure the standing wave ratio — power your transmitter generates but *isn't putting into your antenna.* With "MICROMATCH" you can tune your antenna to look like a pure resistive load — easily and quickly. This means a possibly tremendous radiated power gain to you — possibly as much as many hundred percent! Yet MODEL 908 "MICROMATCH," licensed and approved by inventor M. C. Jones, is only $29.90 net — at your favorite jobber. In "ATOM-X" size and style, range 50 through 300 ohms impedance, 10 through 1000 watts power, with big, open 4½" meter, it will pay its way for you as will no other transmitter investment.

Mail postcard for NEW 16-page, just-released catalog of transmitters, receivers, *xtal-controlled v.f.o., test equipment, etc.*

OVER 36 YEARS OF RADIO ENGINEERING ACHIEVEMENT

McMurdo Silver Co., Inc.

1249 MAIN ST., HARTFORD 3, CONNECTICUT

"Twin-Lamp"

(*Continued from page 23*)

Using the "Twin-Lamp"

To assure yourself that the indicator works as stated, connect the test section to your transmitter output coupling in place of your regular 300-ohm line. Hang a 300-ohm noninductive resistor across the other end of the test section and apply power. As you increase the power, the lamp toward the transmitter will start to burn, but the other one should remain dark. The coupling can be increased until the one lamp shows full brilliancy without the other one showing any color, if the resistor is nonreactive. Reduce the power from the transmitter and short the resistor, and both lamps will light. This indicates a high order of standing-wave ratio. If the resistor is removed and the test-section end left open, it will probably be difficult to get any indication in the lamps, indicating that the sensitivity of the device depends to some extent upon its position in the line, for high values of standing-wave ratio.

Comparison tests show that with the lamp on the transmitter side burning at almost full brilliancy, the other lamp will start to show color when the s.w.r. exceeds about 1.5. You can check this by substituting other values of resistance for the 300-ohm termination, remembering that the s.w.r. will be the ratio of the terminating resistance to 300 (if the termination is greater than 300 ohms) or the ratio of 300 to the termination (if the termination is less than 300 ohms). For example, either a 450- or a 200-ohm termination will give a 1.5 s.w.r. Since a ratio of 1.5 or less is good in amateur practice, if the lamp toward the transmitter shows full brilliancy when the other shows nothing, you know your feedline is up among the elite!

It should be pointed out that this is only a standing-wave *indicator*, and the relative brilliance of the bulbs does not necessarily indicate the actual *ratio* on the line. In fact, it has not yet been proven that there is not some load condition other than $Z_L = Z_0$ that will cause the load-side bulb to extinguish. Unfortunately, a rigid mathematical proof of the device is not as simple as its mechanical construction, and the validity of the device under all possible conditions is still being checked.

However, the gadget is so simple that it was thought best to describe it at the present time. Its convenience lies in its simple construction and the fact that, with two lamps, one always has a check on the power level in the line as well as a standing-wave indication. To use the indicator while adjusting an antenna match, connect it in the line within sight of the matching device. Make your adjustments until the bulb away from the transmitter is completely extinguished, with the other one burning. If your adjustments reflect a large change in impedance at the transmitter, the coupling may change, but this will be indicated by the brilliancy of the lamp on the transmitter side. For a cross-check, the indicator can

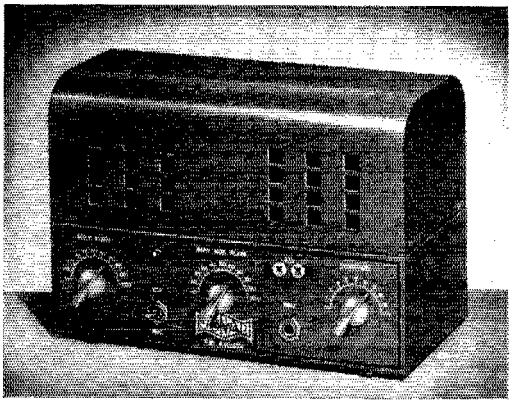
(*Continued on page 112*)

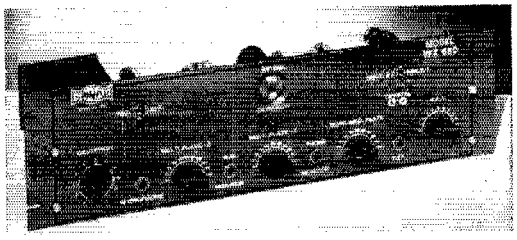
ORIGINATORS OF NBFM EQUIPMENT FOR THE HAM

THREE OUTSTANDING PHASE MODULATED PRODUCTS by SONAR

THE XE-10, first of the SONAR products, was designed to give the Ham a modulation unit for his complete AM rig. The XE-10 will convert any CW rig (regardless of power) to NBFM. Your VFO can be used to regulate the frequency input to the XE-10 or the xtal can be inserted directly into the XE-10.

XE-10 AMATEUR NET **$39.45** Complete Less Xtal



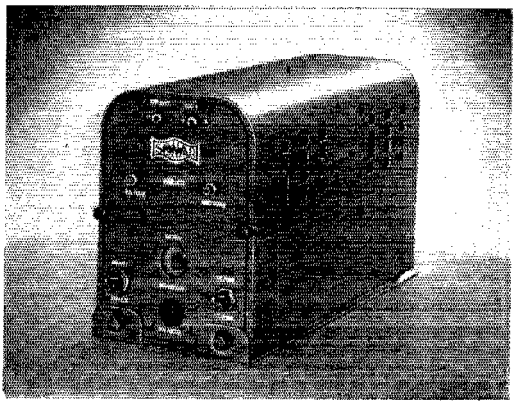


THE VFX 680 was designed to meet the demands for a stable VFO-xtal exciter and also incorporates the exclusive SONAR NBFM circuit* giving a complete 4 to 6 watt all band exciter, with NBFM phone and/or straight CW. The VFX 680 also has VFX (ruberizes any cut xtal) giving xtal stability with a variable signal. An ideal "pre-stage" for that new rig.

VFX-680 AMATEUR NET **$87.45** Complete Less Xtal

THE MB-611 is another SONAR product incorporating NBFM, designed for mobile or fixed operation, on 6 to 11 mtrs—40 watts input with a pi-network to match any antenna. Further details on this xmitter and other new SONAR developments will be found in future advertisements. The engineering staff at SONAR has many new designs including low, medium, and high power xmitters.

MB-611 AMATEUR NET **$72.45** Less Pwr Sup. and Xtal



*Pat pending
†NBFM is at present permitted in USA on frequency bands 3850 to 3900 Kc, 14200 to 14250 Kc, 28.5 to 29.7 Mc, 51.0 to 54.0 Mc; in Canada on 27.395 to 27.455 Mc, 29.5 to 29.7 Mc.

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SONAR Radio

SONAR RADIO CORP. Box 445 BKLYN 1, NEW YORK

NARROW BAND FM

NOW AVAILABLE FREE. *The new finger-tip controlled, calibrated dial (80 Mtrs) for your VFX 680. Send in your xmitr serial number and call letters. State color desired.*

Available at your dealers—the Table cabinet for the VFX 680 at a nominal cost.

be connected in the line near the transmitter, and the relative brightness should be the same as it was in the position near the antenna, provided your line doesn't pick up some impedance "bumps" or unbalance to ground by being run too close to metallic objects. If the indicator bulb burns only on the transmitter side, it shows that you're in business with more r.f. in the antenna than you've had in a long time!

Acknowledgment

I wish to express my gratitude to R. R. Brown, professor of electrical engineering, North Carolina State College, for his help in deriving an explanation for the indicator, and to the technical staff of the ARRL for aid in testing the device.

Bandpass Frequency Multiplier

(Continued from page 81)

cuit for 80 meters, with switch S_{1E} then tapping down upon this coil for 40-meter output. Coil L_2 similarly takes care of 20 and 14 meters while L_3 (in this case really two separate windings, although diagrammed as a tapped coil) takes care of 11-10- and 6-meter output.

Construction

The photographs show the arrangement of parts above and below the aluminum chassis which is 6 inches wide, 3¼ inches high and 10⅞ inches deep. The row of tubes along the front-to-back center line are the 80- to 40-meter doubler, the 40- to 20-meter doubler which also functions as the 40- to 14-meter tripler, the 20- to 10-meter doubler, the 10- to 6-meter doubler and, at rear, the 807 final amplifier, always operated "straight-through." The multitude of air-trimmer capacitors on either side of the 6AG7 frequency-multiplying tubes are for the dual-tuned bandpass filters. These are disposed, two to each filter, in the six pairs along the horizontal axes. The four odd trimmers, three on the left and one located at right center, are progressively switched in to compensate for differences in load capacitance mentioned previously when connected to the input of another 6AG7 or the 807.

The 807 plate coils are wound upon Micanol low-loss plug-in forms for convenience of mounting only. They do not need to be changed in operation. L_1 is to the right of the 807 socket, L_2 to the left of the 807, and L_3 is at the right rear of chassis. Mounting the 807 in a horizontal position enables its plate and grid leads to be kept short enough to provide efficient operation, including bandswitching through 54 Mc.

Power requirements are 6.3 volts — a.c. or d.c. — at 3.4 amperes for the five tube heaters and 300 volts and 30 ma. d.c. for each multiplier, or 120 ma. when all four multipliers are operating. The 807 requires 600 volts at 100 ma. for full output, but may be operated at as low as 300 volts with still quite respectable power output.

(Continued on page 114)

THE RADIO AMATEUR'S LIBRARY

These are the publications which every Amateur needs. They form a complete reference library for the Amateur Radio field; are authoritative, accurate and up to date.

Title	*Price*
QST	$3.00 per year*
Operating an Amateur Radio Station	Free to members; to others 10c
The Radio Amateur's Handbook	$1.25**
The Log	50c each
How to Become a Radio Amateur	25c
The Radio Amateur's License Manual	25c
Hints & Kinks for the Radio Amateur	50c
Lightning Calculators:	
a. Radio (Type A)	$1.00
b. Ohm's Law (Type B)	$1.00
A.R.R.L. Antenna Book	50c
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** Postpaid in Continental U. S. A. — $2.00, postpaid, elsewhere. (*No stamps, please*)

THE AMERICAN RADIO RELAY LEAGUE, INC.

WEST HARTFORD 7, CONNECTICUT

Adjustment Procedure

Tuning up such filters as those used in this multiplier is not at all difficult. It consists of feeding a frequency of 3250 kc. into the primary of T_1, setting switch S_1 to position A, tuning the 807 plate circuit for maximum brilliancy of a lamp load connected to the link at L_1, and then tuning C_1 for maximum output-lamp brilliancy. This process then is repeated with C_2, after resetting the exciter to 3750 kc. and retuning the 807 output circuit. This done, tuning the exciter from 3000 through 4000 kc. will result in only minor variation in brilliancy of the lamp load when the 807 plate circuit is retuned along with the exciter. Actually it is hardly necessary to reset the 807 plate capacitor more than once to obtain good output to cover the whole band of 3500 through 4000 kc.

All succeeding filters, T_2 through T_6, then are similarly tuned, the primary tuned at a frequency 25 per cent in from the low-frequency end of each band, and the secondary at a point 25 per cent in from the high-frequency end of each band. Remember that "each band" as used immediately above does not mean only the 40-, 20-, 14-, 11-, 10- or 6-meter band itself, but also the highest and lowest limit frequencies that will have to be passed by any following stages in terms of harmonics of the stage being tuned, of course.

C_3 is adjusted after T_2 has been tuned as above. C_3 is set as was C_2, except that it is adjusted only when switch S_1 is in position B; C_6 when S_1 is set to C; C_9 when S_1 is set to E; C_{14} when S_1 is set to F.

While it is admitted that the job of building and correctly adjusting an exciter of this type is not one to be recommended to the beginner who is not familiar with the various factors which come into play in adjusting circuits of this type for the desired results, there is no reason why a reasonably-skilled amateur cannot duplicate this unit with good results. While it does not constitute the complete answer for full single-dial control with bandswitching, it is believed that it goes a long way toward achieving that objective.

Sonnet of a Ham

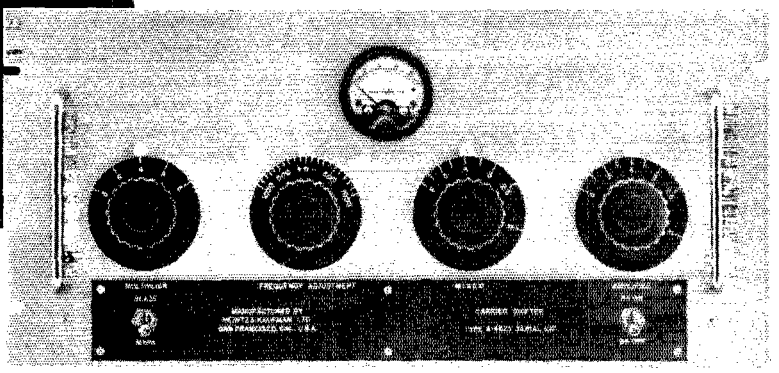
Today I held the wide world in my hand;
Space rolled away and England's sun was low,
As Ken of Cambridge told me of his land.
Next, fast as thought, as he said, "Cheerio,"
I raced the sun, until at zenith time
O'er western plains I said "Hello" to Lee —
Then "73," and morning skies were mine
As John became my host at Waikiki.
The XYL recalled my wandering
To Georgia's pines, for dinnertime was nigh.
When, afterward, with Venus shimmering
Beside a thin new moon and Mars' red light,
I gazed their way, and wondered as night fell —
"Cannot we hold these in our hands as well?"

— Ewell G. Pigg, W4KGD

Announcing

HEINTZ AND KAUFMAN FREQUENCY SHIFT EXCITER

Another unit in the Heintz and Kaufman line of FS equipment which assures improved communications



Frequency shift communication systems require use of a transmitter exciter which will shift the carrier around a center frequency. Shifts normally used vary from 600 to 850 cycles between mark and space frequencies. The frequency shift keyer replaces the usual crystal oscillator stage in the transmitter.

The H&K Type A-4625 is a frequency shift exciter designed for this purpose. The output of a 200 k. c. stabilized oscillator is mixed with the output of a crystal oscillator which operates in the 2 to 6 megacycle band. The highest frequency derived from this mixing operation is selected, amplified.

A reactance tube and keyer tube are provided for obtainance of frequency shift. The reactance tube shunts the 200 k. c. oscillator circuit and is so arranged that keying voltages applied to the grid of the keyer tube cause changes in oscillator frequency in accordance with the telegraphic impulses transmitted.

TUNING CONTROLS

The unit is designed for maximum ease of operator adjustment. A control is provided for small variations in output carrier (center) frequency. Adjustments of 1000 cycles at the shifter output frequency can be made with this control. A calibrated shift spread control is also furnished which establishes the amount of shift required at the fundamental frequency. The relationship between extremes of shift is not changed by adjustment of the carrier center output frequency. Mixer plate and amplifier plate circuits are tuned by calibrated panel dials. A test switch for the purpose of establishing mark and space frequencies is provided to permit placing the unit on assigned frequency and then adjusting the desired amount of frequency shift.

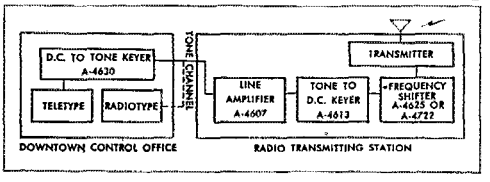
POWER SUPPLY

A separate power supply of heavy duty construction is included with the shifter exciter. It is capable of providing 200 ma. at 300 volts together with required filament voltage of 6.3 volts.

PHYSICAL DESIGN

The shifter and power supply are constructed on separate 2"x8"x17" chassis with 8¾"x19" panels. The units may be installed in a standard 19" relay rack or cabinet. Chassis are chrome plated steel or anodized aluminum. Panels are finished in platinum grey crackle.

Frequency Shift Exciter in Transmitting System



Write for detailed information. We make a complete line of FS equipment. Our Engineering Department will be glad to correspond with you about your requirements.

HEINTZ AND KAUFMAN, LTD.

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Gammatron Tube Division • Lynden Avenue • South San Francisco

EXPORT AGENTS: M. Simons & Sons Co., 25 Warren Street, New York City • Cable Simontrice, Newyork

Happenings

(*Continued from page 52*)

arrangement: "Possibilities of interference to television from such sources as harmonic radiations, television receiver response to stations on intermediate or image frequencies and television receiver oscillator radiations are engineering equipment problems which the Commission expects can more properly be solved by equipment development rather than further revisions of frequency allocations."

SIGNAL CORPS RESERVISTS

Because of the immediate need for additional technically-qualified commissioned personnel, the Signal Corps has been authorized the voluntary recall of 100 reserve officers to active duty, most of which will be in company officer grades. Reserve officers volunteering may apply either for an indefinite period, or a fixed period of two years.

3-Element Beams

(*Continued from page 42*)

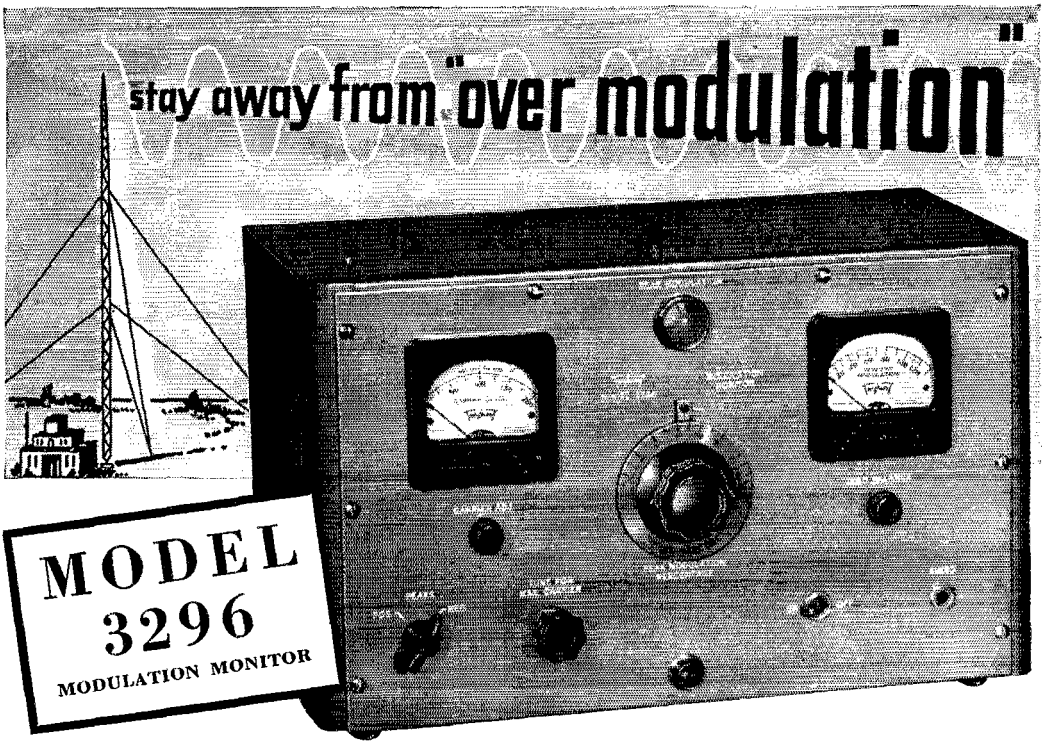
With the parasitic elements replaced, they not only were rather critical of adjustment, but immediately showed a tremendous increase in gain over the driven element alone.[7]

Checking all s.w.r.s with the Micromatch disclosed inherently higher values with one or both elements close-spaced than with the wider spacings. This was no doubt caused by the decreased radiation resistance and the fact that all adjustments of the "T"-match were critical for close spacing. Five close-spaced beams were tested at as many different locations, all using different arrangements of the "T"-match. Contrary to most recent published data, it was impossible to get a low s.w.r. on any of them when fed with 300-ohm Twin-Lead or open-wire line. Changing to 70-ohm Twin-Lead in three cases brought the s.w.r. down to more reasonable values. But only with the wider spacings was it possible to get the s.w.r. down to 2/1 or better.

Many stations worked during changeable band conditions verified the efficiency of the well-matched R-0.2-A-0.15-D array. S8 reports were received on several occasions from South America with the beam 20 feet off the ground and using 15 watts input on 'phone. The West Coast was worked consistently at either end of the 'phone band with the same low power.

(*Continued on page 118*)

[7] No satisfactory explanation is at hand for this apparently critical behavior of the driven element; it is hard to reconcile it with the fairly wide-band acceptance of the wider-spaced systems, inasmuch as the detuning from the resonant frequency in these tests represents a greater percentage change than the differences between most of the published formulas for resonant frequency. Nor is there any obvious theoretical reason why the driven-element length should have to be exact, aside from matching difficulties that prevent efficient power transfer from the transmitter to the antenna. — *Editor*



MAKE THE MOST OF YOUR *Station Power*

Every time your modulation exceeds 100 percent, harmonic distortion is introduced which causes interference with other stations, and violation of FCC Regulations. With this Modulation Monitor you can modulate to the fullest for top power-output, yet you know instantly when you are *over*-modulating. Model 3296 provides four separate circuits for measuring amplitude modulation—(1) percent modulation, average; (2) peak flash percent modulation; (3) carrier shift; and (4) audio output for headphones. These methods may be used separately, all at once, or in any combination. The peak indicator can be pre-set for any percent of modulation from 20 to 120, and will flash when pre-determined modulation is reached. You can figuratively "see" the signal received by your listener!

A handsome, precision-built instrument, Model 3296 blends with any standard amateur equipment, enhances the appearance of your station, and will greatly step up your operating efficiency.

VOLT-OHM-MILLIAMMETER

MODEL 666HH

A new streamlined tester with wider ranges: A.C. and D.C. Volts 0-10-50-250-1000-5000 at 1000 ohms per volt; D.C. Milliamperes 0-10-100-500; ohms 0-2,000-400,000. Molded, insulated, pocket-size case. A top value.

SEE YOUR DISTRIBUTOR FOR DETAILS OR WRITE TODAY. Address Dept. J107

Triplett ELECTRICAL INSTRUMENT CO. BLUFFTON, OHIO

The use of co-ax cable for feeding low center-impedance arrays is also generally indicated, but it has fallen into disfavor because of its unbalanced characteristics. This unbalance can be readily circumvented by using some form of "bazooka" or line balancer, but a simpler method would be the use of two pieces of co-ax side by side in the manner of a two-wire line, with the shields tied together. The resulting series impedance would still be reasonably low, and of course the line would be completely impervious to weather conditions. In any event it is recommended that, regardless of the method of feed, every effort be made to reduce the s.w.r. to a minimum. Line radiation caused by a high s.w.r. can only result in poor transfer efficiency and an unsymmetrical beam pattern.

About the Author

• After a daily stint studio-controlling soap-box operas for CBS, New York, it must be welcome relief for W2LAH to carry on his beam experiments in the peace and quiet of the busy 10-meter band. Besides his b.c. engineering duties, Philip C. Erhorn's radio interests are DXing and v.h.f. experimenting. A member of the Garden City Radio Club, W2LAH is holder of an ARRL Public Service Certificate for notable work during the 1938 Long Island hurricane.

Strays

The following experience, related by W9LZP, is certainly one for the book!

"While tuning the 28–28.5-Mc. end of the 10-meter band, listening for a station on Guam, I ran across a signal that beats anything I have ever heard in 20-odd years of ham radio.

"Hearing a GI's voice, I listened until the stand-by. He signed EL2A. Not being the KG6 I was looking for, I tuned by him a bit, but then, thinking about it a little, I tuned back to his frequency. When he came back, sure enough it was EL2A. Well, that would not have been unusual a few hours earlier, but at 7:15 P.M. CST it was not the ordinary. EL2A, perfectly readable, was in contact with a W8. My curiosity got me. I tuned up to 20, and for the pay-off I heard him there, too, although not as well as on 10. I had been hearing his second harmonic on 10! Going back to 28 Mc., I rotated the 4-element beam. With the array in a westerly direction he came in best — peaking to an S6. That proved it! EL2A's second harmonic was reaching Delphi, Indiana, over the long path around — nearly 20,000 miles!"

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Presenting . . . . .

THE NEW THORDARSON LINE OF SPLATTER SUPPRESSOR CHOKES!

Here at last is the new line of Thordarson Splatter Suppressor Chokes you have been waiting for! Engineered and manufactured by Thordarson for amateur use, these quality units make narrow channel AM transmission with minimum band-widths a reality. Designed to permit a higher percentage of modulation, these components considerably increase the get-through ability of the signal.

These new chokes have 10,000 volt insulation, variable inductive range from .2 to 1.5 henries, low distributed capacity, good "Q" and chatter-proof construction. Harmonic distortion is minimized and broadcast interference sharply reduced. No critical adjustments are required.

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Volume Compressor

(Continued from page 43)

The required fixed negative bias appearing from point B to ground is obtained conveniently by inserting the variable resistor, R_7, between ground and the high-voltage center-tap of the power transformer. It is assumed that the amplifier's total plate-current drain is at least 60 ma. or so. The "B"-supply voltage available to the plate circuits of the amplifier will be reduced by an amount equal to the drop across R_7. This decrease can usually be tolerated in a speech input amplifier.

Adjustment

Only two simple adjustments are required. They are semipermanent and not critical to obtain. Potentiometer R_3 determines the degree of compression which the circuit will provide. A maximum power compression of at least 27 db. should be available with but a few volts of driving voltage. Thus the modulation level will be increased about 22 times.

The second adjustment should be made with no signal input into the amplifier. Simply adjust R_7 until the voltage at A with respect to ground is −3 volts. This voltage will increase to about −55 volts when the 6AC7 is driven to cut-off. Compression in the order of 27 db. will be obtained when the bias to the 6AB7 is −25 volts. If the audio power tubes of your amplifier operate Class AB instead of Class A even more compression should result.

A 50-volt d.c. voltmeter connected from point A to ground will indicate the degree of compression which the amplifier undergoes. This meter could then also serve as a modulation indicator.

The slight complication of delayed a.v.c. was not considered particularly necessary for amateur applications.

Distortion

Practically all compressor circuits introduce some distortion, the distortion increasing with the amount of compression. Logically, for least distortion the compressor stage should be located at the front end of the speech amplifier, where the signal voltage (grid swing) is small and consequently the distortion would be minimum. However, a compromise must be made, since the tendency toward motorboating increases with the gain (number of stages) between the compressor tube and the source of the biasing voltage.

Measuring the distortion of the speech amplifier alone at 400 cycles, it was found to be 3.3 per cent at 8 watts output. With 27-db. compression the distortion was only 3.7 per cent. This small amount of distortion is negligible for all practical work, and the 27 db. of compression is a range wide enough to take care of almost any condition.

It should be pointed out that if an existing stage of the amplifier is to be used as the compressor, and the entire compressing ability of the proposed circuit is to be attained, it will be necessary to have an additional amplification (ahead of the compressor tube) of 27 db.

PLACE YOUR ORDER WITH ALLIED NOW!

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NC-57

Communications Receiver

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Here is the new, completely modern receiver Hams and SWL's have been waiting for—designed for maximum performance at a moderate price. The National NC-57 features extended frequency range, tuning 550 Kc. to 56 Mc., continuous in 5 bands. Has electrical bandspread for pinpoint tuning on SW and Amateur bands. Features include: Accurate calibration on all bands; automatic noise limiter; antenna trimmer; voltage-regulated RF, Oscillator and BFO; Loktal tubes in RF circuits for maximum efficiency at high frequencies; universal antenna input; emergency battery-power socket; built-in 6" dynamic speaker; 3-position tone control; BFO pitch control; 1 RF and 2 IF stages. 7 tubes plus VR tube and rectifier. An outstanding receiver guaranteeing fine performance at an amazingly low price. **AMATEUR NET, Complete . . $89.50**

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Come Aboard

(*Continued from page 48*)

Amateurs, both those who are now Naval reservists and those interested in the Naval Reserve, are cordially invited to visit the headquarters of a nearby Electronic Warfare unit. The services of amateurs are useful in coördinating local civil emergency communications plans. The assistance of amateurs who volunteer as training advisors, instructors and lecturers to Reserve units will be appreciated.

Those amateurs desiring more information on the Naval Reserve Electronic Warfare program are invited to write to the commandant of the Naval district in which they reside (see map). Addresses are: 1ND, 495 Summer St., Boston; 3ND, 90 Church St., N.Y.C.; 4ND, Navy Yard, Phila.; 5ND, Naval Operating Base, Norfolk; 6ND, Naval Base, Charleston; 7ND, Naval Air Station, Jacksonville; 8ND, New Federal Bldg., New Orleans; 9ND, Naval Training Center, Great Lakes, Ill.; 11ND, Naval Operating Base, San Diego; 12ND, Civic Center, San Francisco; 13ND, Naval Station, Seattle.

About the Author

• Commander Delbert S. Wicks, USN, is a native of Providence, R.I., where he held the call W1IZO. He received his A.B. and M.Sc. degrees from Brown University for work in mathematics and electronics. An officer in NCR, he was ordered to duty in 1940, serving first as instructor in math and navigation at the Academy, later at Radiation Labs of M.I.T., and finally as assistant head of radar design in the BuShips, Washington. Soon after V-J Day, Cmdr. Wicks was ordered to the office of the Assistant Chief of Naval Personnel (Naval Reserve) where he developed and placed in operation the Naval Reserve Electronic Warfare Plan. Commander Wicks has been a member of ARRL and the Providence Radio Association since 1933 and is also a member of IRE. He is the proud father of three children, the younger two being leap-year twins born February 29, 1944.

25 Years Ago

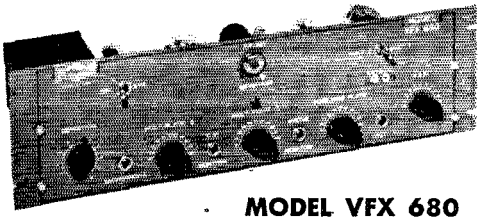
(*Continued from page 49*)

Georgia, 8BO, Detroit, portable 3OI, Parkesburg, Pa., and Naval "SA," San Juan, as it appeared in 1904.

Strays comes up with two good hints for the receiver constructor: (1) Use an all-aluminum panel and do away with the messy handling of tinfoil, and (2) simplify filament control by using a common rheostat for all vacuum-tube filament circuits.

HARVEY for . . . . . FM

Get on the air with Narrow Band FM with this *Sonar* equipment . . . NBFM exciter, mobile rig or VFX exciter.

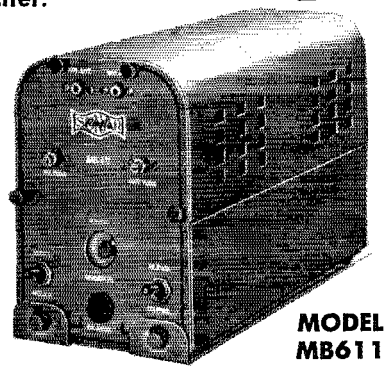


MODEL VFX 680

Wrapped up in one package is an xtal exciter; a VFO; a VFX that permits deviation of xtal frequency as much as 30 kc. on 80, 240 kc. on 10; FM phone on all bands; CW or phone monitor, with dual tuning eye.....**$87.45**

MODEL XE-10

2-3 kc. deviation. Penetrates QRM, can be heard on any AM receiver. More output from final than with AM. Eliminates BCI. Price, less xtal.....**$39.45**



MODEL MB611

A compact rig for portable-mobile work on 6 or 10-11 meters. 22.5 watts into the antenna, and it works into any type of antenna having impedance from 30 to 600 ohms. Uses 40 meter xtal and features Sonar NBFM. 2E26 in final. Complete with tubes and coil for either band, less power supply and xtal. **$72.45**

HARVEY'S HITS OF THE MONTH

Harvey has 20 meter crystals for a buck! Mounted in holder with ½" pin spacing. Also 40 and 80 meter and 6 and 13 mc. bands at the same low price.....**$1.00**
Special 8 mc. xtals for 2 meter xtal control, only.....**$1.50**

Also in stock complete line of Bliley AX-2 xtals
Include 10¢ postage with your crystal order

HARVEY'S HAMFESTIVAL OF VALUES

Heavy Duty 12-inch speaker completely encased in steel with wall mounting brackets. Type T12LS, 600 ohms impedance with volume control. Excellent for monitor, projection booth or factory. Brand New.....**$14.95**

Silver Micromatch, 3-30 mc., 0-1 kw. 4" square meter, extended scale.....**$29.90**

Millen VFO 90700.....**$42.50**

Broad band converters, BB-27 for 10-11, BB-50 for 6, BB-144 for 2 meters. Takes power from receiver **$27.50**
Power supply for above.....**$19.50**

Hammarlund 4-11 Modulator — 11 watts audio output, perfect as speech amplifier and modulator for 4-20 or any other transmitter. Complete with tubes.....**$72.50**

Hammarlund 4-20 Transmitter — complete CW rig for 10, 11, 20, 40 and 80 meters; 20 watts power output; tunes four different circuits to four different frequencies with single control. Complete with tubes, less crystal.....**$120.00**

Millen 90810 HF Xmittr for 10-6-2 meters. NEW. Uses 6AG7 xtal oscillator, 2E26 tripler, 829B final. May be driven by high frequency ECO. Less tubes, power supply and xtal but with complete set 10 meter coils..**$69.75**
Coils for 6 or 2 meters, grid and final tank, 2 required, each **$1.80**

Millen 90881 500-watt P.A. Wired for use with 812 tubes but can be converted for 35T's, T55, HK154 etc. Less tubes **$89.50**

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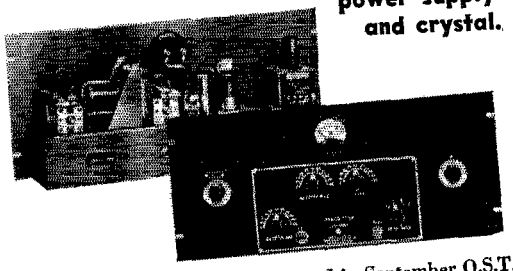

This new 2-6-10-meter xmtr, featured in September Q.S.T., is available RIGHT NOW from the Radio Shack. You know Millen quality so you know this is a "fine business" rig.
Tube kit for 90810 ..... 8.10 Set of 6-meter coils 3.60
Set of 2-meter coils 3.60

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Time payments if desired — write for details. $70.00 Down

$350.00
Price, complete with tubes, less coils and crystal

NEW! BC-348 COMMUNICATIONS RECEIVER $69.50

It's the best surplus communications receiver value in the world, in our opinion, and you may never have another opportunity to get a brand new BC-348 at this extremely low price. Guaranteed absolutely new and unused, they are shipped you in the original, unopened, wood cases in which the AAF received them. Complete with built-in dynamotor, crystal filter, full set of tubes, and detailed technical manual . . . at the low price of only $69.50.
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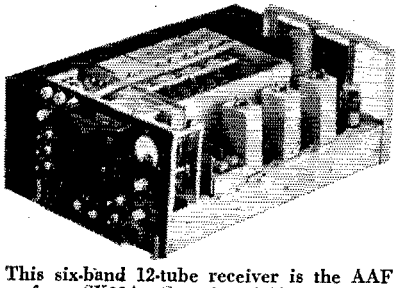
Transformer for 220 volt stepdown to 110 volts, 60 cycles $6.50



RCVR Model R45/ARR-7 only $99.50

This six-band 12-tube receiver is the AAF version of Hallicrafters SX28A. Covering 0.55—1.6—3—5.8—11—21—42 mc, it's complete with 6-volt tubes, but you'll need to make a power unit supplying 6.3 volts a-c and 135 mils at 270 volts d-c. A top-quality receiver at a rock-bottom price.

*The one and only original RADIO SHACK is located in Boston and has no branches or affiliates elsewhere.

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SX-42	275.00	55.00
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NC-46 with spkr	107.40	21.48
NC-240D with spkr	241.44	48.28
HAMMARLUND		
HQ-129-X complete	173.25	34.65
SP-400-X complete	342.00	68.40
R M E		
RME-45 complete	198.70	39.74
RME-84 complete	98.70	19.74

*Write for details of time payment schedule on the receiver of your choice.

"BUG" KEY
Brand New J-36

$5.95

You'll be pleasantly surprised at this value . . . its counterpart has been sold by a well-known speed key manufacturer at more than double our bargain price. Made for the Signal Corps by Lionel Corp.; supplied complete with cord, wedge plug, and switch. You've always wanted a "bug" . . . now you can have one.

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RECEIVERS $5.95 each
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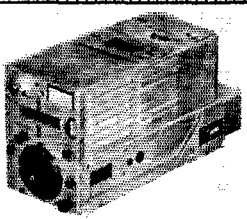
XMTRS $9.95



RCVRS Great for stand-by on 40-80 meters; phone or CW; ample band-spread; complete with 6 tubes

BC-454-B	3- 6 MC	$5.95 each
BC-455-B	6- 9.1 MC	

XMTRS - Furnished with 4 tubes, including 1629 magic eye, 1626, and 2-1625's; also calibrating crystal

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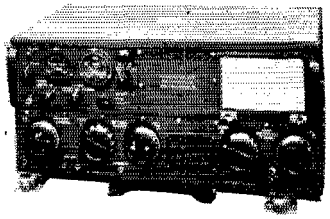
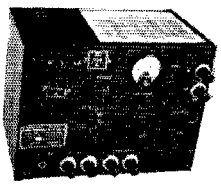


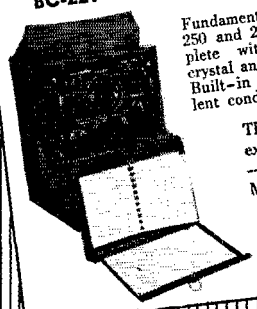
A real bargain — famous Collins quality in a transmitter covering 1500 KC to 18 MC — in A-1 used condition — complete with tubes. Shipping weight, 90 pounds.



BARGAIN for BEGINNERS BC-187-A XMTR $9.95

Rugged MOPA made of finest parts in a style ideal for experimenters. Designed for 2.4-3.7 mc; easily converted to 80-meter band. No new Ham should miss this buy. Shp. wt. 40 lbs.

BC-221 AK FREQUENCY METER



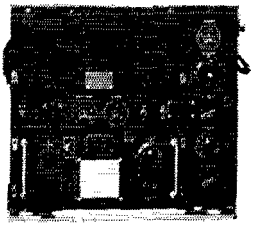
Fundamental ranges are 125-250 and 2000-4000 kc. Complete with tubes, original crystal and calibration charts. Built-in modulation. Excellent condition. Order today!

The BC-221 makes an exceptionally fine VFO — W7NU tells how in March QST.

$79.50

AAF XMTR BC-375-E

A special buy brings you this favorite at a greatly reduced price. Basic xmtr unit and tubes, plus one hand-calibrated tuning unit and detailed data on easy modification to 110-volt a-c operation. Made by G.E.; used but in good condition.



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One hundred-foot RG-8/U cable comprising two 50-foot cables coupled with CPH-4919 **$3.90**

SUPER SPECIAL BRAND NEW 807's

Westinghouse JAN-inspected

80¢ each

THE BUY OF A LIFETIME

GOVERNMENT SURPLUS TUBES

Type	Net	Type	Net	Type	Net
2AP1A	$5.25	809	1.79	957	.75
2C34	1.12	811	1.95	958	.75
2C40	2.62	813	6.75	959	.75
2D21	.60	8.36	1.50	954	.75
VR105	.75	840	2.70	955	.75
VR150	.75	866A	.75	9001	1.05
3B24	3.00	872A	2.25	9002	.90
5CP1	3.37	874	1.95	9003	1.05
5CP7	5.25	914	5.62	9004	.90
3BP1	3.00	860	3.00	9006	.60
5BP4	3.37	923	.45	832	2.25
6AK5	.90	931A	1.87	(VT118)	
6C21	13.50	1619	.75	826	2.25
8005	$3.15	1624	.90	(VT222)	
8000	6.00	1625	.75	2X2A	.90
801	1.72	1626	.60	815	2.25
803	9.00	1651	.75	(VT287)	
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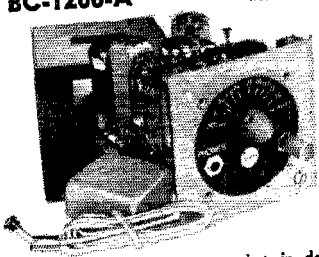
HOT! 3C24 (HK 24G) HOT!
90c each . . . . . 6 for $4.50

SHURE SW-109 HAND MIKE

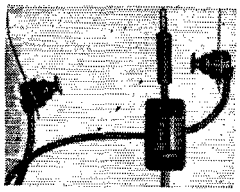
Brand new single-button carbon mike with press-to-talk switch, cord and plug. A rare chance to get a fine hand mike under a dollar.

only 98¢

RADIO RECEIVER BC-1206-A $4.95 with tubes



This compact midget superhet is designed to fit a 3-inch meter hole for back-of-panel mounting. Originally used for receiving marker beacons and weather reports, in 200-400 KC band, you'll find it a handy all 'round receiver. Five tubes provide pre-selector, converter, oscillator, 175 KC IF, 2nd detector, and AF. Draws 900 mils at 28 v. d-c. Container in metal case; shielded battery lead passes through RF filter. Can't be told from new.



HS-30 HEADPHONES

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"Ear-plug" style phones, complete with head-band, cord, plug, and impedance matching transformer (2000-8000 ohms). Used, excellent condition.

The RADIO SHACK Corp.

CABLE ADDRESS · RADIOSHACK
167 WASHINGTON ST., BOSTON, MASS., U.S.A.

50 Mc.

(*Continued from page 57*)

ton, and W4FJ and W4CYW, Richmond, Va., the last two being 360 miles distant. He heard W4KWY, Norfolk, Va., 370 miles.

The excitement attending the breaking of the record by W3EKK/1 and W3KUX, on the night of August 7th, obscured many other contacts made in the East that night which would have been front-page news otherwise. It is believed that many things happened that night which have never been reported in correct detail. At 2:30 A.M. on the 8th, W2LVQ worked a station signing W5TQA. This station was heard by others in New Jersey, Pennsylvania and Maryland, though no such call is listed in the *Call Book*, and no DX claim has been made by any W5. If anyone can furnish more information on this one, we'd be very glad to have it. W3KCA in Baltimore heard a W5, whose call was unintelligible because of fading, working W2LVQ at this time. He reports that the signal was coming from about 25 degrees south of west, and the station gave his location as some place in Texas. The frequency was 145.5 Mc. W2LVQ heard W8ICL, Columbus, Ohio, and a W4 in Raleigh, N. C., shortly after the mysterious W5 QSO.

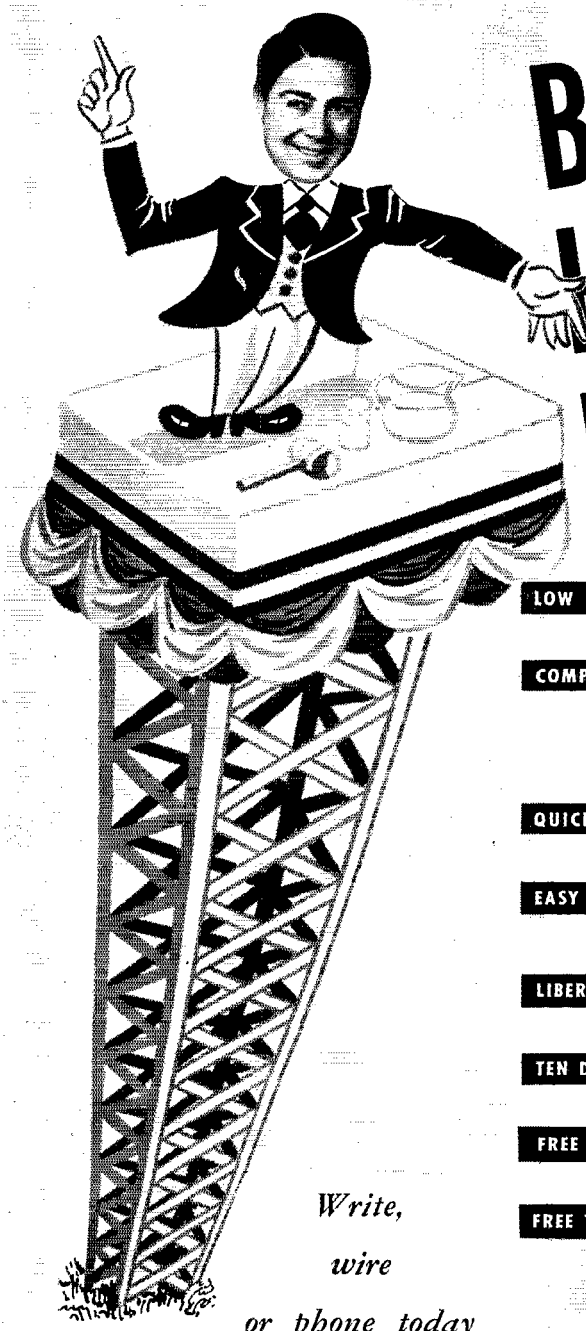
Not all the good work has been done over favorable paths, though the DX reports are most frequently received from coastal or Great Lakes area stations. W3HWN, Mechanicsburg, Penn., has worked W3s RUE, OMY, KWD and KWH, Pittsburgh, about 150 miles, over very mountainous country, and has heard several stations in Ohio, at distances around 300 miles. There is a tremendous new horizontal-vertical array about ready to go up at W3HWN, and then things should really start happening across those Allegheny Mountains!

Stations along the Eastern Seaboard will be glad to know that there is appreciable activity on 144 Mc. in Nova Scotia. VE1QZ at Halifax reports that VE1s BC, QG, SF and QZ have crystal rigs, good receivers and beam antennas. They are on almost nightly, and are concentrating on attempted contacts with Ws at 10, 11 and 12 P.M. EDST, making five-minute transmissions on the hour, listening thereafter for calls from W-land.

W3KUX sends in an observation that will bear investigating. He says that while listening to W2 signals in the midst of a thunderstorm he found that there were sudden large increases in signal strength coincident with cloud-to-cloud lightning discharges. The signal bursts were not in evidence when the lightning flashed to earth, and not always on the "sheet-lightning" flashes. Has anyone else noticed this effect?

August saw the accomplishment on 144 Mc. of an aim that never was achieved on 56 or 50 Mc. — a message relay from the Middle West to the East Coast went all the way on 2 meters, without the aid of unusual propagation, other than the normal summertime conditions. Two messages, originated on August 1st by WØHAQ,

(*Continued on page 128*)



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RECORDS

Two-Way Work

50 Mc.: W7ACS/KH6–VK5KL
5350 Miles — August 25, 1947

144 Mc.: W3KUX–W3EKK/1
575 Miles — August 7, 1947

235 Mc.: W6OVK–W9OAW/6
186 Miles — March 2, 1947

420 Mc.: W6VIX/6–W6ZRN/6
186 Miles — July 27, 1947

1215 Mc.: W1BBM–W1ARC
3 Miles — April 7, 1947

2300 Mc.: W6IFE–W6IFE/6
24.6 Miles — May 24, 1947

3300 Mc.: W6IFE–W6IFE/6
20.2 Miles — June 5, 1947

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

10,000 Mc.: W4HPJ/3–W6IFE/3
7.65 Miles — July 11, 1946

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

Davenport, and WØIFB, Solon, Iowa, were delivered to your conductor by a routing reported to be WØHAQ, W8CVQ, W8GJF, W8ML, W8WXV, W3OMY, W3NIX, W3HWN, W2AES, W1OSQ, W1HDQ. There were undoubtedly some other relay stations between the first two listed. It took two weeks on the way, but the important point is that the circuit *was* completed on 144 Mc. Let's try again, and speed it up — a good activity for the fall and winter period when conditions may not be providing DX thrills.

50-Mc. News

The news from Atlantic City, insofar as it concerns the v.h.f. bands, is mostly good. The inability to secure world-wide acceptance of 50–54 Mc. as an amateur band was a disappointment, but the establishment of it as amateur territory in all the Americas, Australia, New Zealand, Asia and South Africa, should extend our sphere of operations for the current sunspot peak. Particularly good news is the alignment of South Africa in the 50-Mc. column, as there are many enthusiastic v.h.f. men in ZS. Word has been received that, through the coöperation of their Postmaster General, the ZS boys will be able to operate on 50 Mc. this fall by special temporary authority to be issued upon application, despite the fact that the allocation resulting from the conference decision will not be effective for some time to come.

Though there is no provision for European amateurs in the region between 30 and 72 Mc., it is probable that operation in the 50–60 Mc. range will continue, for the present, contingent upon lack of television interference from amateurs using these frequencies. Thus, we may still look forward to a possible two-way v.h.f. QSO across the North Atlantic this fall, with our PAØ friends on 50 Mc., and even the Gs on 58.5, if the m.u.f. goes as high as it appears now that it

(Continued on page 130)

it's NEWARK for BETTER SERVICE — BIGGER VALUES!

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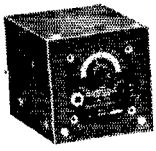

BEACON RECEIVER BC-1206-B

Truly sensational buy for Hams, Experimenters! 5-Tube Set, tunes 195 to 420 Kc. (A-N beam signals). Operates on 28V DC; easily changed to 110V. 4"x4"x6⅝" long. Wt. 3¼ lbs. Complete with tubes, slightly used, A-1 condition, and it's all yours for only..... **$3.95**

Amazing New

PILOTUNER adds F-M to ANY Receiver!

Simple to connect, it brings you all the benefits of FM reception formerly available only in expensive models . . . now at an astonishingly low price that everybody can afford! Features: 5 tubes plus selenium rectifier; 3-gang cond., Builtin FM Antenna; self-contained AC pwr. supply; handsome walnut wood cabinet 8¾"x6¾"x5¾". YOU can own it, for only..... **$29.95**

NEW MicroMatch MM2

Same XMTR Same Antenna MORE POWER!

Measures stdg. wave ratio, RF pwr. on coax transmission lines. 3 to 162 Mc; 10 to 500 watts.

MM2A 52-ohm coup.& indic.	$37.45
MM2B 72-ohm coup.& indic.	37.45
Either coupler only.....	19.95

HANDMIKE T-17

New low price for this perfect 200-ohm carb. handmike; Press-to-talk switch, 5-ft. rubber cord, plug, dust cover, BRAND-NEW **95¢**

HANDSET TS-13

We've SMASHED the price on this fine handset! 200 ohm carbon mike, 2500 ohm earphone, butterfly switch, PL68, PL55 plugs, 6 ft. rubber cord. BRAND NEW, and it's yours for only..... **$2.39**

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Pri: 105 to 250V 60 cy. Sec: 6½V @ 20 amps, 6.3V @ 3 amps, 5V @ 3 amps. No. S-541. NOW YOURS FOR ONLY..... **$3.49**

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NC-240D W/Sp'ker	241.44	48.36	17.06
NC-46 W/Speaker	107.40	21.48	7.59
HAMMARLUND			
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6 or 20 meter coils, each.....	$3.15
6AK5 Tube	90¢

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Model 90800 — 50 Watt Xmitter/Exciter, uses 807 final straight or as doubler. With 10-11 meter coils..... **$42.50**

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Really Terrific! The famous Skyrider, sold everywhere for $99.50, now reduced at Newark to only $49.50. "Seeing Eye of Sending" is a 10 Tube Superhet, electronically-tuned, with self-contained scope—monitors up to 200 kc. visually and analyzes signal characteristics from your own or other transmitters. Hooks into any rig. No Ham should be without one. SP-44—Complete with tubes, for 115 VAC. Shpg. Wgt. 20 lbs. NOW..... **$49.50**

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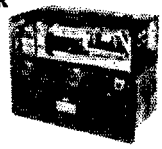

One of our most sensational values! These wonderful surplus 2-meter rigs for practically a song! Receiver and transmitter less power supply and control box. Some have crystals, some may be missing. But the basic unit is there — ready to operate. Can be converted to 110V AC. Schematic included. Shpg. wt. 75 lbs. Limited quantity at this amazing price. The whole works, as is, for only..... **$14.95**

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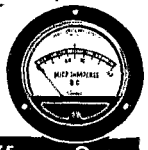

2½" round case. 0-500 microamp movement, 0-600 DCV scale. ONLY A FEW LEFT. No. S-275..... **$2.95**

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may. There has been a great increase in v.h.f. interest over there during the past summer, and it should not be difficult to promote 50-Mc. tests across the Atlantic this fall, with many of the countries of Europe.

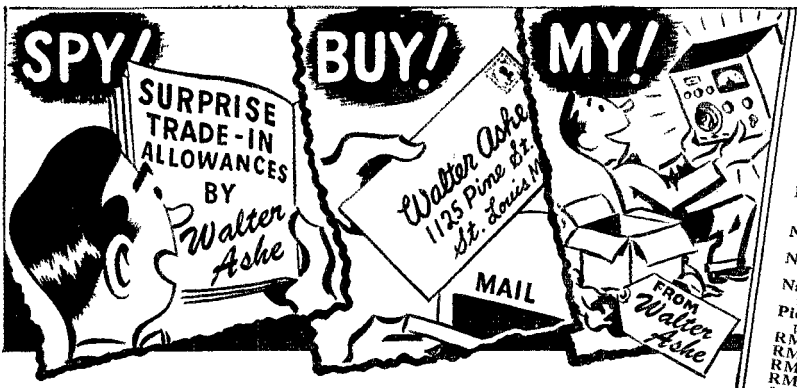
August produced no great excitement in this country. There were fairly frequent openings, and many good skip contacts were made, in what used to be considered a dead month. The weather conditions that produced the phenomenal DX on 144 Mc. also provided plenty of good long-haul "ground-wave" contacts on 6, but generally speaking, the boys were laying low, waiting for the fall m.u.f. peaks. One flurry of excitement developed during a nice opening on August 9th, when the state of Vermont had its first resident activity on 50 Mc. W1MEP, of Glastenbury Mountain fame in prewar days on 5, got going on 6 from his home location in Bennington. Nestled deep in a valley, Chet has yet to hear a "local" signal, but he provided Vermont contacts for W9JMS, W4JBF and W8ZVY. He heard several Florida W4s the following day but was unable to make any contacts. Look for W1MEP on 50.8 Mc.

There was a bit of "double hop" on August 10th. W6OVK worked W4WMI/4, Georgetown, Ky., and heard W4AVT, Raleigh, N. C. Jim makes an interesting observation regarding the appearance of double-hop signals. Similar to his prewar experiences in Arizona on 56 Mc., he notices that the single-hop stations become very loud for a short period, and then fade down after perhaps 20 to 30 minutes, when they take on a wavery quality and the double-hop signals start to come in. From the Bay area, Jim hears Colorado and Utah in this way, followed by W9, W8 and W2. When these fade out, the single-hop signals come back strongly and stay in for an hour or more with good strength. A somewhat similar condition has been noticed in W1, and there is a saying here, "When you hear W9PK fade, look for W6s!" It's worked more than once!

Aurora contacts were common during August, accounting for a few more "new states." The fuzzy stuff was reported on August 11th, 13th, 15th and 16th by W9ALU. W9ZHL says that the signals heard on the 15th were the loudest ever heard by this medium. He worked W4JBF, Covington, Ky., his first aurora contact with a station farther south than Terre Haute. Aurora contacts were made on several dates in the East, but it was noticed that many chances were being missed because some fellows still do not make full use of their opportunities. It's a pretty good idea to turn the beam north and listen carefully with the b.f.o. at frequent intervals!

When you get up to 45 states, the rest come *hard!* Ask W9DWU, who has only two to go for a 50-Mc. WAS, or W4GJO and WØUSI, who lack only three. WØUSI needs Montana, South Carolina and Nebraska. He heard W7KKB and W7CJN (both in Montana) in QSO one night recently, but they were still at it when the band went dead! Bill is having good luck working

(*Continued on page 132*)



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RME DB-22	86.60
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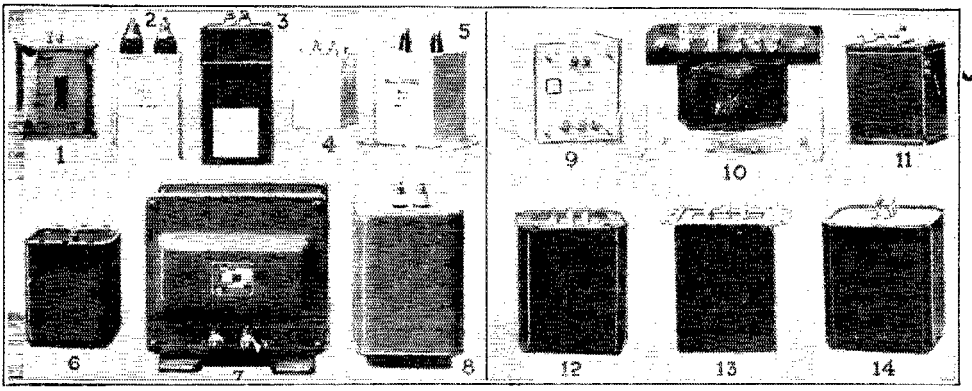

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2500 VCT., 150 MA. Pri. 115 VAC. 60 CY. Steel case with standoff insulators. No. 161919..... **$9.95**

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WØIYD • WØPGI • WØQDF

V.H.F. MARATHON

Call	Contacts Through August 15th 50 Mc.	144 Mc.	235 Mc.	Score	States Worked in 1947 50 Mc.	144 Mc.
W1AF	153			1115	24	
W1BCT		186	5	879		6
W1CGY	112			1238	32	
W1CLS	285			3440	42	
W1HDQ*	237	101		3561	39	8
W1HMS	114			1279	33	
W1KLR		138		784		5
W1LLL	224			2710	40	
W1LMU		72		302		2
W1MPO		35		227		5
W1PEN		118		1024		6
W3CIR/1	245			2832	42	
W2AMJ	253			2263	37	
W2BYM	287			3039	37	
W2CBB		211		918		8
W2COT	74	140		791	11	3
W2DZA		185	12	905		6
W2NLY		395		2816		9
W2QVH	242	83		2296	36	3
W2RLV	102			1512	33	
W2RSO		148		1552		8
W3AWS		34		179		3
W3GKP	39	82		1013	10	7
W3HWN		188		1614		7
W3MNA		95		597		5
W3RUE	97	66		1799	31	4
W1KMZ/3	99		2	1098	29	
W4AVT	89			1159	26	
W4FJ	72	35		1512	26	7
W4HVV	147	2		2037	28	2
W4WMI/4	243	2		3209	29	1
W5ESZ	70			942	28	
W5FSC	121			2111	34	
W5LIV	83			902	24	
W5ZZF	110			1360	29	
W6BPT	57			1200	23	
W6BWG	138			872	11	
W6HZ	128	205	1	1513	13	1
W6OVK	107	149	4	3273	29	1
W6WNN	128	6		2187	24	1
W7QAP	136			2191	25	
W8QQS	64			825	20	
W8RFW	76			936	25	
W8TDJ	59	1		799	22	1
W8UKS		101		2478		6
W8WJC**		67		2640		7
W9AB	65	13		826	22	3
W9AGV		65		457		5
W9ALU	96	11		876	32	2
W9JMS	233	6		2585	36	3
W9MBL	37			424	10	
W9PK	238	68		3902	40	6
W9ZHL	320	4		4957	42	1
WØDNW	150			1708	32	
WØQIN	237			3292	43	
WØVIK	93			957	20	

*Not eligible for award.
**Seventh-period winner: W8WJC with record score of 2640 points.

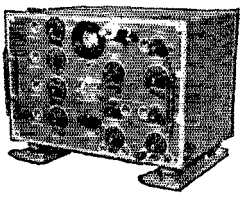
WØYSJ, Fargo, N.D. and W9DWU, Minneapolis, so he feels that WØDYG in Omaha, Nebraska, should provide Number 46 when Todd gets his rig back on the air. South Carolina, needed by all three of the leaders, is still the one "impossible" state — the one left without a single resident representative on 6.

Many of our v.h.f. men in the Pacific Islands are coming home, but for the most part there are others ready to take their places. J9ACS is no more, its operator reverting to civilian status as W4KRT. J9AAI has his Okinawa gear, and

(*Continued on page 136*)

'HOT RADIO VALUES' at Sun Radio..

100 WATT BENDIX TRANSMITTER TA12



CHECK THESE VALUES: Three 807 Tubes, four 12SK7, one 2-inch 5 amp. RF meter, four Separate Master oscillators. (These can be easily changed to cover 20-40-80 meters and by using crystal for the 10 meter band you will have a complete coverage transmitter.)

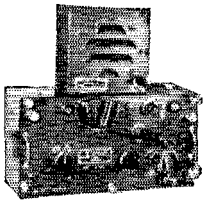
Four separate output tanks.

One 4 position selector channel switch having seven sections which changes the ECO, IPA and output tanks simultaneously. All the controls are mounted on the front panel. The housing is cast aluminum; shields and case are sheet aluminum. Dimensions 11 x 12 x 15 inches, weighing 35¼ lbs. Complete, simple instructions for conversion furnished. Complete with tubes **$49.95**

SUPERHETERODYNE RECEIVER

This crystal fixed frequency receiver comes with full conversion instruction for variable tuning of all ham bands and broadcast. A highly selective superheterodyne receiver, 110 V.A.C. power supply built in. Using the following tubes: 6K7-RF Amplifier; 6K8 Mixer and Oscillator; 6K7 F. Amplifier; 6F7 — Defector and A.V.C.; 6C8 Output and Noise Suppressor; 80 Rectifier. Dimensions—3½ x 19 x 11½ inches. Comes complete, brand new, with one set of coils and two sets of tubes..... **$16.95**

Extra set of coils..... **$2.95**



LOW FREQUENCY RECEIVER BC-344

Just a very few left . . . Brand new, operates on 110v AC complete with 10 tubes . . . tunes 150–1500 kc . . . Your last chance to get one of these "hot" low frequency receivers at this spectacularly low price **$69.95**

Speaker..... **$6.95**

All items F.O.B., Washington, D. C. All orders $30.00 or less cash with order. Above $30.00, 25 percent with order balance C.O.D. Foreign orders cash with all orders plus exchange rate.

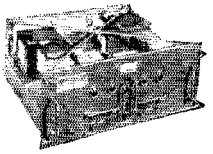
SPERRY AMPLIFIER

Brand new servo amplifier containing two beam power output tubes (1632) similar to 25L6, two twin triodes (1633 and 1634) similar to 6SC7, two mica condensers, dozens of color coded half watt resistors, two dual and four section bathtub condensers, three transformers, two wafer switches, one volume control, four octal sockets. Easily convertible.... **$3.95**

For the greatest values ever offered in transmitting and receiving crystals refer back to your September QST issue. We still have some but the quantity is limited.

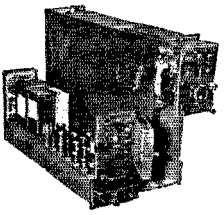
HAM AND POLICE SUPERHET TUNER

Brand New. Complete with 7V7 (1 Stage T.R.F.), 7Q7 (1st IF & Osc.), 7V7 (2nd IF), 7F7 (Audio) and 7V7 (BFO). Frequency 2.4 to 16.3 mc. Filament voltage required 6.3 AC or DC—2.1 amp. Plate voltage required 135 V DC–30MA. Only 4½ x 9½ x 3¾" and weighs only 6½ lbs. Ideal for Ham and Police..... **$14.95**



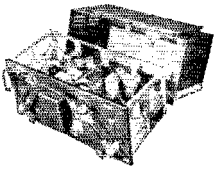
POWER SUPPLY

Ideal for high and low voltage supply for television or scope. Contains 3 hermetically sealed power trans and 3 filter chokes, 7 rectifiers (3–5u4, 3–2X2, 1–6X5) and 9 oil filters (4–7mfd 600 V, 2–.2mfd 5000V, 2–4mfd 600 V, 1–2mfd 1000 V). Input 117 V AC, 60 cy; output 2400 V & 544 V DC, filaments 2–6.3V–12 and 10a, 3-5.V-3a each and 1–2, 5V–1.75a.. **$16.95**



WAVEMETER

We're closing out the last few of these precision wavemeters which tune from 150–210 mc and which contain a high quality resonant cavity wavemeter, oscillator, heterodyne amplifier, electric tuning eye, complete with 19 tubes, 110 v AC power supply. The tubes alone far exceed your close out costs of only..... **$17.95**

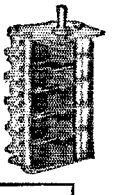


420-460 MC TRANSCEIVER

Brand New. With double slug tuned IF strip ideal for television; Mixer, 5 stages IF, 2 stages video amp.; IF frequency—30mc. Already aligned for proper bandpass for television. Complete with 9–6AG5, 5–6J6, 2–2D21 all shielded and 1–VR105, and vertical blocking Osc. Trans. **$14.95**

5-GANG TUNING CONDENSER

Brand new . . . 5 gang, 365 mmfd. per section . . . a truly precision built condenser with ceramic insulation. A $13.50 value in the greatest offering ever made in tuning condensers for only..... **$2.95**



D.C. MILLIAMMETER

Brand new General Electric 2" round panel meters 0–300. **$2.97**

A.C. VOLTMETER

$3.49

Brand new G.E. 3" square panel meter 0–150v.

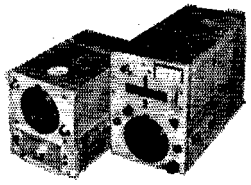
SUN RADIO

OF WASHINGTON, D. C.

938 F STREET, N. W. WASH. 4, D. C.

Here Is Really USABLE, LOW PRICED SURPLUS

I've waited until *now* to give you fellows the kind of Surplus you can *really* use. The prices are low! Get them while they are still available.



Brand New — Low Priced

XMTR and RECEIVER

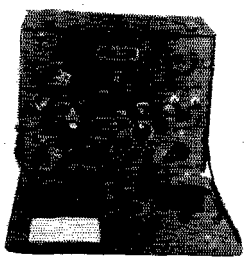
These are brand new. Complete with tubes — three 12SK7's, 12SR7, 12A6, and 12K8. Designed for dynamotor operation, but easily converted to 110 or 32 volt operation. Two I.F. stages and gang condenser.

BC-453	150 to 550 KC	$7.95
BC-454	3 to 6 MC	$5.95
BC-455	6 to 9.1 MC	$5.95

Complete with Tubes.

BC-458-A TRANSMITTER — Up to 55 Watts Output–Makes Dandy V. F. O. Covers 5.3 to 7.5 MC.

Consists of a master oscillator tube (1626 or 12J5) exciting a pair of beam tetrodes in the power amplifier stage (1625's or twelve volt 807's). This unit when used as a VFO can be made to work directly into the crystal socket replacing the crystal itself. Complete with full conversion instructions for VFO operation on FM or AM. Complete with tubes..... **$5.95**

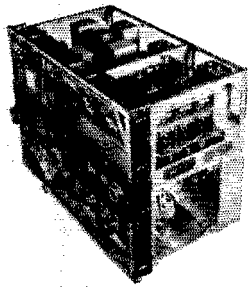


THE SENSATIONAL BC-654 XMTR-RECEIVER

25 watts power. Covers 3800 to 5800 KC. F.B. for 80 meters, and for fixed station or fixed mobile work. Used but in good order. The transmitter is a 6-tube circuit with variable antenna-matching network. The 7-tube superhet receiver has 2 RF stages. Built-in 200 KC crystal calibrator. A regular $351.00 value. Complete with set of tubes, less power supply... **$12.95**

VFO & XMTR

BC-457A—Xmtr. tunes 4.0 to 5.3 MC. Near new. Same as BC-458A — pictured to left. With tubes & crystal — a steal at..... **$3.95**



SCR 522 RECEIVER-TRANSMITTER, *Low Priced*

A War Surplus Natural — The Hottest 2-Meter Layout Available

Covers 100-156 mc. The receiver can be converted so the 2-meter band will cover at least 70% of the bandspread dial. Can be pretuned to four different frequencies in the 2 meter band. Also makes a wonderful FM receiver. The transmitter consists of a 6G6G, crystal oscillator; 12A6, first harmonic amplifier; 832, second harmonic amplifier; 832, power amplifier; two 12A6's, modulator; 6SS7, speech amplifier 6SS7, r-f indicator. Xmtr, Receiver and all tubes in rack and case with complete conversion instructions.... **$19.95**

VFO & XMTR

New Cby-52232 — Navy version of 274-N. 2.0 to 3.0 MC. Tunes 4.0 MC easily. Same as BC-458A. With tubes & crystal only **$5.95**

S METERS

Perfect for use with BC 348 and other types of communication receivers. Basic 0 to 1 mill movement. 2½" round. Luminous numbers and pointer. Provisions for dial light. Easy to hook up. Complete with full installation instructions..... **$1.95**

0 to 200, or 0 to 500 DC Milliammeters. 2½" round standard make.....$2.95

These Are Hot! PE-103 DYNAMOTORS

Brand New, in original packing. Fine for mobile work. Delivers over 200 mills at 500 volts DC. Operates from 6 or 12 volts DC. Shock mounted. Includes breakers, switches, relays, filters..... **$8.95**

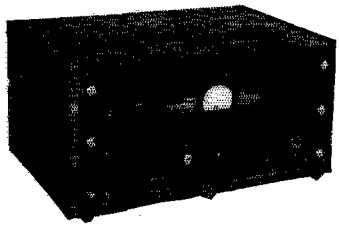
Smashing Reductions on Tubes and Condensers

3C24/24G	$.95
QC3/VR105	.75
QD3/VR150	.75
75TL	2.25
304TL	3.75
RK60	.95
6AK5	.90
VT-127A	.395
Socket for VT-127A	.90
807	1.05
809	1.50
811	1.95
813	6.75
814	4.50
815	2.25
929 or B	3.95
866A	.95
4 mfd. 100 Volts	1.19
4 mfd. 600 Volts (Rd.)	.69
2 mfd. 600 Volts (Rd.)	.59
2 mfd. 1000 Volts	.71
4 mfd. 1500 Volts	1.29
2 mfd. 2000 Volts	2.49

NO RED TAPE—WE FINANCE OUR OWN PAPER . . . USE LEO'S EASY PAY PLAN

Liberal Trade-ins

Item	Cash Price	Down Payment
New Stancor ST-202-A Xmtre Kit	$ 92.50	$18.56
Hallicrafters HT-17	79.50	15.90
Hallicrafters HT-18	110.00	22.00
Hallicrafters S38	47.50	9.50
Hallicrafters S40A	89.50	17.90
Hallicrafters SP44	99.50	19.90
Hallicrafters SX42	275.00	55.00
Hallicrafters HT-9	350.00	70.00
Hallicrafters SX43	169.50	33.90
RME VH-F-152A	86.60	17.32
RME-84	98.70	19.74
RME-45	198.70	39.74
Hammarlund HQ 129X (speaker $11.85 extra)	177.30	35.46
Hammarlund SPC400X (with speaker & cabinet)	398.25	66.81
National NC46	97.50	19.50
National 1-10A	67.50	13.50
National NC173	179.50	35.90
National NC240DT or NC240DR	225.00	45.00
National HRO-STAL or HRO-5RA	245.00	49.00
National HRO-7T	279.00	55.80
Pierson KP-81	367.65	73.53
Gon-Set Converters	39.95	7.99
Handy Converters	29.95	5.99
Collins 70E-8	40.00	8.00
Bud VFO-21	52.50	10.50
Meissner Signal Shifter (complete, 4 sets coils)	95.50	19.10
Abbott TR-4B Special	45.00	9.00
New Micro-Match Unit	29.50	5.90
Millen R-9er	24.75	4.95
BB-27 10 meter converter F.B. for 348	27.50	5.50
Sonar Mobile MB-611 transmitter	72.45	14.49
MB-611 with power supply	81.45	16.29
WRL exiter unit wired	23.95	4.79
Millen 90800 exciter	42.50	8.50
Sonar XE-10 transmitter	87.45	17.49
Workshop 28 megacycle beam 3 element	39.50	7.90
Workshop 6 element 28 megacycle type	100.00	20.00
Workshop 20 meter beam 3 element	120.00	24.00
Gordon Rotary Beam	225.00	45.00
Direct-O-Beam	117.00	23.40



POPULAR GLOBE TROTTER XMITTER KITS

Available for Immediate Delivery

A 40 Watt input kit including all parts, power supplies, chassis, panel and streamlined cabinet. Write for export prices. Cat. No. 70-300 less tubes..... **$69.95**

Cat. No. 70-312 same as above, wired 79.50

1 set coils, meters, tubes, extra 17.15

FOR ANYTHING IN RADIO — YOU'LL GET THE BEST DEAL FROM LEO, WØGFQ

World Radio LABORATORIES — EVERYTHING IN RADIO — INCORPORATED

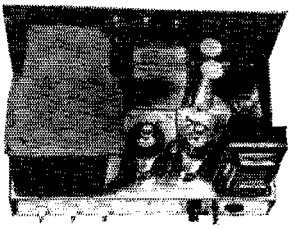
COUNCIL BLUFFS, IOWA

NEW 275 WATT XMITTER

FOR IMMEDIATE DELIVERY

AS LOW AS $70 DOWN

B



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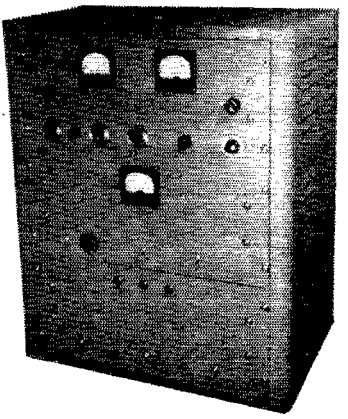

C

A versatile, advanced design transmitter kit that will give you efficient performance on 6, 10, 20, 40, and 80 meter bands on phone & C.W. Available in complete kit form or in individual sections. There's nothing like it on the market for quality, features, and price.

(A) **RF Exciter Section** — Here is one of the most efficient exciter driver units available. Capable of 40 watts input on all bands including 6 meters, 6 meter output from 2E26 tube obtained by using crystal frequencies from 8335 to 9000 KC. 40 meter crystals do a F.B. job for the 10 and 20 meter bands. 7C5 regenerative type crystal oscillator, with provisions for ECO, driving the new 2E26, giving high efficiency on all bands. Voltage regulation is provided for oscillator tubes and screen of 2E26 offering high stability to both stages. Tube line-up: 7C5 oscillator; 2E26 buffer doubler; and two VR150 voltage regulators. Chassis size 7" x 12" x 3". Uses 8¾ x 19" relay rack panel when used with Final RF section. Weight 10 lbs.

(B) **Final RF Section** — Another brand new feature never before used in transmitters is a front panel Coupl-Trol that controls the amount of coupling of the antenna to the final amplifier. The latest in easy to drive triods, the V7OD's are used in the final amplifier. Designed for the shortest RF leads and parts, and placed to eliminate the presence of parasitics and self-oscillation. Tube line-up: two V7OD's. Chassis size: 10" x 12" x 3". Utilizes 8¾ x 19" relay rack panel when used with exciter section. Weight 16 lbs.

(C) **Speech Amplifier and Modulator Section** — The latest in circuit design and the use of zero bias on the four 6L6's gives more power than ever before with very low static plate current. The use of resistance coupling up to 6F6 driver gives excellent reproduction of audio frequencies, and, incorporation of a high quality audio transformer from the 6F6 to the 6L6's gives more efficiency and better matching between stages. Power consumption is cut down and heat dissipation is held to a minimum by this improved circuit design. Plate voltages are relay controlled for ease of operation. This new speech amplifier and modulator is capable of modulating inputs from 300 to 350 watts. Tube line-up: 6SJ7;6C5; 6F6; four 6L6's and 83 rectifiers. Load: 450 volts at 250 amps. Chassis size: 12" x 17" x 3". Utilizes 8¾" x 19" relay rack panel. Net weight 48½ lbs.

(D) **Dual Power Supply Section** — Tube line-up: 5Z3; two 866A's. Load: 600 volts at 200 amps, and 1150 volts at 300 amps. Chassis size: 12" x 17" x 3". Utilizes 8¾" x 19" relay rack panel. Net weight 58 lbs.

D

World Radio Laboratories
Department Q-10
Council Bluffs, Iowa

FREE

- ☐ Send latest Free Flyer
- ☐ Send more data on 275 Watt XMTR
- ☐ Send more data on the Globe Trotter
- ☐ Send data on your Good Surplus

Send more data on these items.....

Name.....

Address.....Call letters.....

City.....Zone....State.....

BUY ON LEO'S EASY PAY PLAN

This new WRL 275 Watt Transmitter kit is available as a complete unit, or individual sections may be purchased separately as priced below.

	KIT FORM *Less tubes, meters, coils and cabinet*	WIRED *By Our Engineers. Less tubes, meters, coils and cabinet*
WRL 250 Watt Kit Complete with R.F., Speech Amplifier and Modulator, and Power Supply sections.	$274.50	$299.50
RF Exciter section.....	43.42	50.56
Final RF section.....	57.97	61.55
Speech Amplifier and Modulator section.....	91.81	98.95
Dual Power Supply section...	81.30	88.44

3 section cabinet for complete kit, with antenna feed insulators installed. Size 28 3/16" high, 22" wide, 14¾" deep. Weight 38 lbs..... **$19.50**

Tubes for Modulator	$8.80	Tubes for RF Final.	$13.90
Meter for Modulator	5.50	Meter for RF Final.	5.50
Tubes for RF Exciter	6.80	Coil set for RF Final, per band.....	4.00
Meter for RF Exciter	5.50	Tubes for Power Supply.....	4.50
Coil set for RF Exciter, per band...	2.95		

Complete with tubes, meters, cabinet, set of coils

KIT FORM $351.45

WIRED BY OUR ENGINEERS $376.45

J9AAO has the automatic keyer used to transmit from J9ACS. J9AAK is on the way back, we understand, and KH6DD is on duty at Quantico, Va., making ready to get going from his home in Alexandria for the fall DX season. KH6DW is back in Macon, Ga., where he gives the 6-meter gang a thrill by signing KH6DW/W4. W7ACS is now back in KH6, and off to a flying start in making 50-Mc. history from Honolulu this fall. Several stations may be expected to be active on Guam, Iwo, Okinawa and in Japan, to give him some opportunities.

Helpful Hints Department

Ever wish for an easy way to check for unbalance in a push-pull amplifier? One can insert separate meters in each side of the grid circuit, by modifying the amplifier to incorporate separate grid returns for each tube, but a better method is suggested by G6DH. Denis removes the plate clips from his 24Gs and inserts a low-range milliammeter from each plate to ground. With the grid drive on (but no plate voltage applied, of course) rectification takes place and sufficient current is obtained for a good reading on a 0–10 ma. meter.

How About 235 and 420?

There is no denying that 144 Mc. is now definitely committed to crystal control and superhet receivers, and no one who has had the experience of operating on the band by both the old and the new methods would ever wish to go back to modulated oscillators and superregenerative receivers. The amazing difference between the spring of 1946 (DX record 200 miles) and the fall of '47 (DX record 575 miles) is almost entirely a matter of the swing to modern techniques. Operation on 2 last year was a continuous pain in the ears, what with hashy transmitters, splatter, and receiver squeals. Today, with more stations on, the QRM is negligible. Operation is similar to lower frequencies, but minus the heterodynes.

All very nice, of course, and nobody wants it otherwise, but what of the fellow who likes it simple? The modulated oscillator and the superregen are OK until heavy activity develops — why not go to 235, or better still, 420, with them?

Interest in both bands is picking up, but more stations are needed before anything like regular activity can be said to exist in either. Most of the work is confined to crossband tests, but it need not be.

Up in Arlington, Mass., W1CTW has a crystal rig and a superhet on 235, but that doesn't need to scare the boys who want to use the simpler jobs. Cal has been heard briefly in W2 on 235, and his signal was readable over the 95-mile path to West Hartford, with only 12 watts output at his end, and a much simpler antenna system and receiver at W1HDQ than are used for 144 Mc.

W1OSQ, Milford, Conn., put a solid signal up to W1DAH, North Scituate, R.I., and W1CTW, on the eventful August 27th. Frank was using a string of doublers and triplers to drive an 832-A,

(Continued on page 138)

Here's How CREI Home Study Training Prepares You NOW for a BETTER Job and a SECURE Career in Radio-Electronics and Television

CREI Courses for Every Radioman Keep You Ahead of Competition — Earn You More!

Never before have so many men like you had the opportunity to step ahead into better-paying jobs and enjoy lasting success. Men with up-to-date technical training are needed in every branch of radio-electronics. That's because radio's *manpower* has not kept pace with radio's *technical* developments.

What are you doing to meet this need for highly trained, expert technicians and engineers? You must improve your technical knowledge not only to qualify for the better job you want, but to *hold* the job you now occupy. CREI offers you a proved program of technical self-improvement that you can study in your spare time, at home. The same type of practical, down-to-earth training for which thousands have enrolled since 1927.

No matter what your radio experience — CREI offers complete training in radio-electronics for *any* man who wants to improve his ability and his chances for advancement. You can "*go all the way* with CREI" from introductory basic principles to advanced training and on to specialized engineering subjects.

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☐ I am entitled to training under the G.I. Bill.

running 60 watts (poor thing!) input as a straight amplifier. It was a temporary lash-up, and only a simple dipole antenna was used, but it shows what can be done when conditions are right. The distance between W1OSQ and W1CTW is about 130 miles. It is felt that, with a little concentrated effort, these paths can be nearly as good on 235 as on 144 Mc.

W9OAW, 235-Mc. record-holder, with W6OVK, is now located in Baltimore. He is interested in trying for a new 235-Mc. record along the Eastern Seaboard. Anyone who would like to work with Joe can reach him at 1435 Key Highway, Baltimore 30, Maryland.

The 420-Mc. band is getting some attention here and there. This looks like the ideal band for the experimentally-inclined worker. It is high enough in frequency so that care must be used in designing equipment, yet it is not impossible to build simple inexpensive gear that will work satisfactorily. Antennas are down to intriguing dimensions, yet conventional designs work — it is not a wave-guide-and-parabola band. W2HNY, Westfield, N.J., has gear for 420, and is interested in lining up others for tests. He and W2LYP and W2MLF will arrange to operate on a regular schedule if other interested parties will get together on a desirable night. The rig at W2HNY has an 8012 oscillator, with a measured output of about 6 watts. Antennas are horizontal, but they will change to vertical if it will help to get things started.

HAMFEST CALENDAR

IOWA — A 10-meter mobile picnic will be held Sunday, October 5th, at Devil's Backbone State Park, near Manchester, Iowa. All amateurs are invited. Bring a picnic lunch and the family. A caravan will leave Cedar Rapids at 10 A.M. Further particulars may be obtained from Charles W. Boegel, jr., WØCVU, 1949 First Avenue, East, Cedar Rapids, Iowa.

NEW YORK — The Federation of Long Island Radio Clubs is sponsoring its Eleventh Annual Hamfest at New Columbia Hall, 86–41 122nd Street, Richmond Hill, New York, on Friday, October 17th, at 8 P.M. An excellent program, including prizes and entertainment, has been arranged. Tickets are $1.50 at the door or $1.25 in advance, and may be purchased from Federation clubs or Louis H. Roth, W2DKH, 163–18 Jamaica Avenue, Jamaica, New York.

NEW YORK — Saturday, October 18th, is the date of the Annual Hamfest of the Schenectady Amateur Radio Association. The affair is being held at the Hotel Van Curler. There will be a demonstration of mobile television equipment, prizes, and technical lectures. Reservations may be made through Dallas T. Hurd, W2PFU, chairman.

NEW YORK — Because of last year's heavy attendance the Radio Association of Western New York has this year secured the main ballroom of Buffalo's Hotel Statler for its hamfest. The date is Saturday, October 18th, with registration starting at 2 P.M. Prizes, speakers, demonstrations and an excellent dinner are programmed. Reservations and further information can be secured from Ed Graf, W2SJV, 81 King Street, Tonawanda, N. Y.

—•••—

ONTARIO — The Kirkland Amateur Radio League is staging a hamfest on Saturday, October 4th, at the Canadian Legion House, Government Rd. W, Northern Ontario. Prizes, games, banquet and dancing, plus a visit to the famed gold mines, are the pleasures of the day. Registration is $5.00 — $1.00 for XYLs. Reservations can be made through Secretary Hal B. Grover, VE3BJE, 149 Pollock Ave., Kirkland Lake, Ontario, on or before September 27th.

HARRISON HAS IT! HARRISON HAS IT!

IF you like friendly helpful service, and want to enjoy that warm feeling of confidence that you are getting a square deal and your full money's worth, every time—

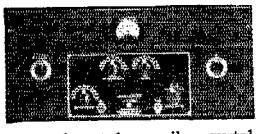
THEN I'M YOUR MAN!!

I offer you —

- **COMPLETE STOCKS**
  All the best makes of Receivers, Transmitters, Test Equipment, Parts, etc.—all latest models.
- **LOWEST PRICES — always!**
- **GUARANTEE** — Free Service for 90 days
- **TOP TRADE-IN ALLOWANCE**
  at least 5% more!
- **FREE TRIAL**
  If not satisfied with your new receiver, you may return it for full refund.
- **QUICKER DELIVERY**
  I know how eagerly you look for its arrival!
- **HARRISON EASY PAY PLAN**
  Easiest terms in the country! Tell me what you want, terms desired, and enclose only $5
- **AND there's plenty more good reasons for doing business with me. Let's get together—I promise you'll be well satisfied. Drop in, or write to me—NOW!**
- **TNX ES 73**
  Bil Harrison W2AVA

NEW ARRIVALS

MILLEN HF XMITTER



75 watts output on 11-10-6- and 2 meter bands! Xtal controlled. See Millen and Bliley ads in this issue — and then rush your order in to Harrison for quickest delivery! Model 90810, less tubes, coils, crystal, and power supply..... **$66.15**

Coils, per band.....$3.60
Set of tubes $20.04. (With HSS 829-B $7.95)
Millen 90281 Power Supply $84.50. Tubes — $2.50

SILVER VOMAX

"Universal" Vacuum Tube Voltmeter. Readings up to 3,000 Volts, —50 DB, 2,000 Megohms, 12 Amps DC. Complete, with RF probe good up to 500 Mc..... **$59.85**

BEAMS

Complete with rotator, indicator, etc., less only feed and control cables:
MIMS Signal Squirter dual 10 and 20...$358.00
GORDON dual 10 and 20.....$479.60
GORDON 4 element 10 meter.....$361.80.

Altec-Lansing's new WIDE RANGE AMPLIFIER

is perfect for FM and the new records. Response is within one DB from 20 to 20,000 cycles. Bass and low pass filter treble controls. Equalized phono input for GE Reluctance and Pickering pick-ups. Phono-Tuner input switch. 15 Watt output with only 2% total harmonics above 60 cps. 2.5-5, 8-12, 16-24 ohm outputs. Model A-323B. **$125**
Complete.....

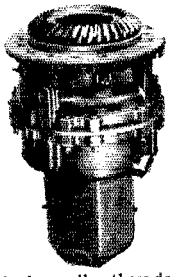
Stancor XMITTER KIT

ST-202-A. Up to 125 watts input on all bands 10 to 80. Band switching of exciter stages. Complete kit including twin power supplies, with chassis and cabinet, less accessories.... **$92.80**

Come in and see the new TEMCO GA Series of "Unitized" Transmitters

Here's a ROTATOR for your BEAM!

- ★ Runs on 24 to 33 volts AC or DC
- ★ Reversible—only three wires required
- ★ Approximately ¾ RPM
- ★ 7056 to 1 Gear Reduction (No free swing!)
- ★ Powerful motor, rugged precision gear train, and sturdy thrust bearing—will support and turn any ham beam.
- ★ Weatherproof housing



Used on aircraft to control pitch of propeller, these dependable motors are easily converted into an FB beam rotator! Used, but in perfect tested working condition, with conversion data **$12.95**
(Partially converted — motor housing freed, brake and brake release solenoid removed, terminals jumped, control leads pulled, and limit stop lugs removed.....$3.80 extra)

Phone and Mail Orders add $1.25 for packing

TRANSFORMER. To run motor, etc. Delivers: 27 V at 4.3 A, 5 V at 3 A, 6.4 V at 3 A, and 2.5 V at 3.5 A. Primary 115 V 60 cycle. New.....$4.45

OVERLOAD RELAYS with Electrical Reset.

Protect your tubes, etc. by using this relay to shut down power supply when plate current exceeds safe value. Sensitive, compact, rugged. Pulls out on 15 MA or more. For high currents use adjustable shunt resistor. (Or easily rewind coil form with a 3¼¢ spool of No. 28 Enam for spring adjustment of 150 to 600 Ma). Reset coil 115 volt, 60 cycle. Navy inspected, brand new. Worth many times my low HSS price!..... **$1.65**

5 KW AC PLANT

Signal Corps PE-197. 120 volt, 60 cycle regulated output. Remote control, self-starting. 13½ H.P., 4 cycle gasoline engine. Constructed for dependable continuous rugged duty. Brand new, export packed. Complete with battery, remote cables, maintenance tools, and detailed instruction manual.. **$545**

HAM HEADQUARTERS Since... 1925!

HARRISON RADIO CORPORATION

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PHONE—BArclay 7-9854 • EXPORT DEPT.—CABLE—"HARRISORAD"

JAMAICA BRANCH—172-31 Hillside Ave.—REpublic 9-4102

How's DX?

(*Continued from page 61*)

PK1TC (ex-PK6TC), S/M Ted Thyssen, 18 Sqdn., N.E.I. Air Force, Batavia, N.E.I.
PK2ML, Max R. Rommel, Corp. Tel. 18,352, c/o O.A.Z., Semarang, Java
PK3CK, 5 Slamet St., Surabaya, Java, N.E.I.
PK6TO, Box 76, Macassar, Celebes
ST2FT, P.O. Box 253, Khartoum, Anglo-Egyptian Sudan
VR2AR, RNZAF, Lauthala Bay, Fiji Islands
VS7DR, 205 Squadron, RAF, Ceylon
VU2BX, James Bullick, Rungamuttee Tea Estate, Mal. P.O., Doears, N. Bengal, India
VU2DH, W. M. Hamilton, Post Box 6, Cochin, South India
ZA1RP, Post Box 49, Tirana, Albania
ZC6SV, Box 39, Haifa, Palestine
ZD1WB, Qilliam Bonage, c/o Post Office, Freetown, Sierra Leone, W.A.
ZD4AL, West Africa Signal Regiment, Accra, Gold Coast, W.A.

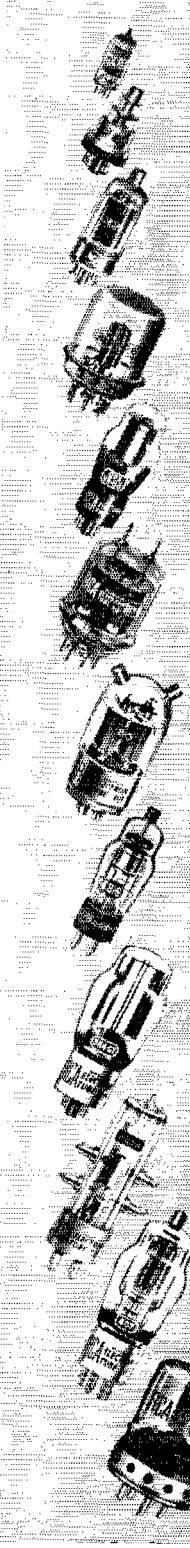
Tidbits:

An up-to-date listing of postwar DXCC standings will be found in the Operating News department of this issue. _ . _ . _ HZ2TG will QSL via WØZRA for all contacts between April 23, 1947, through June 24, 1947. _ . _ . _ If you are looking for Sardinia, a contact with I1AHK or I1AHL will do the trick. _ . _ . _ For confirmations for contacts with XU1YK, send your cards to E. S. Maloney, 6600 Piney Branch Road, N.W., Washington 12, D. C. _ . _ . _ Ex-W6YWV is now with the American Arabian Oil Co., Dhahran, Arabia, so if you suddenly hear a new HZ don't be surprised. _ . _ . _ HS1LN, HS1DI, HS1CF and HS1MR are all the same station, and the gang there request that their cards be held until one is received from them, as they are operating slightly off-side. _ . _ . _ KP4KD, in answer to our query, says one can make the DXCC without having worked Asia. His all-time total minus Asians is 111. _ . _ . _ VS1BX, now back in England, says all stations QSOed from Singapore not having received his card may obtain one by writing to Victor H. Thorne, 79 Blinco Grove, Cambridge, England. _ . _ . _ W1AZW informs us that ET1JF is not where one might think he is; however, he is good DX for a lot of us. _ . _ . _ We have never seen a so-called antenna farm, but here is a quote from W4BPD: "I have a 150-acre farm now and have already put up the following antennas: 10 different rhombics, each 5¼ waves per leg, one long rhombic, 16¼ waves per leg, one 10-element 20-meter Sterba, one NW-by-SE half-wave, one 10-meter vertical extended-Zepp, one 20-meter vertical extended-Zepp, and I intend to put up some more just as soon as I find my weak points on the globe. The place is fairly well covered up now with antennas, but there are a few clear spaces left for some more rhombics, Sterbas,

(*Continued on page 148*)

NEW TUBES ARE NO LUXURY!

INCREASED EFFICIENCY WITH NEW RATINGS! LONGER LIFE!



THERE'S A DIFFERENCE, in YOUR favor when you specify the new, improved RCA Power Tubes! Tubes account for but a small fraction of the cost of your rig, yet their efficiency and stamina determine your operating results! **NEW TUBES ARE YOUR BEST BUY!**

Newly developed materials and manufacturing technique contribute greatly to RCA's success in making fine vacuum tubes.

The Terminal Radio Corporation is proud, as one of RCA's tube distributors, to offer these improved RCA tubes for amateur radio and commercial applications.

Each and every NEW RCA tube is accompanied with the full written warranty of the Radio Corporation of America guaranteeing its faithful high performance.

Check These ADVANTAGES!

You get them ONLY when you buy NEW tubes (now in stock at TERMINAL).

- Latest design improvements
- Newest post-war materials
- Highly uniform characteristics
- Increased power ratings for many types
- Manufacturer's liberal warranty
- Confidence in Quality — No uncertainty about this!

NEW, IMPROVED RCA POWER TUBES — IN STOCK

TRIODES

800	$10.00
805	11.75
809	3.50
810	12.50
811	3.50
812	3.50
826	9.25
830-B	10.00
8000	13.25
8003	11.25
8005	7.00
8012-A	14.00
8025-A	9.25

BEAM POWER TUBES AND PENTODES

2E24	$ 4.60
2E26	3.50
3E22	6.85
4E27/8001	27.50
802	4.25
803	21.00
804	15.00
807	2.30
813	14.50
814	12.50
815	6.25
828	12.50
829-B	14.75
832-A	10.60
837	4.15

VOLTAGE REGULATORS

OA2	$ 2.00
OA3/VR75	1.20
OC3/VR105	1.20
OD3/VR150	1.20

RECTIFIERS Mercury Vapor Types

575-A	$28.00
816	1.25
866-A/866	1.75
872-A/872	7.50
5558	12.00
5561	33.00
8008	7.50

RECTIFIERS Vacuum Types

2X2/879	$ 1.80
2X2-A	1.80
2V3-G	2.75
5R4-GY	1.30
579-B	12.00
878	11.00
1616	7.50
8013-A	9.00
8020	20.00

TETRODES

4-125A/4D21	$25.00
860	30.00
865	10.00

We are also distributors for AMPEREX, EIMAC, GENERAL ELECTRIC, H-K GAMMATRONS, HYTRON, RAULAND VISITRONS, RAYTHEON, SYLVANIA, TAYLOR and UNITED tubes. WRITE TO US FOR COMPLETE PRICE LISTS AND NEW OPERATING DATA, FREE ON REQUEST.

Ask us for Newest Listing of RCA Radiotron Receiving Tubes — *We Have Them!*

WE PAY FOR SHIPPING AND INSURANCE on all tube orders over $5.00 when accompanied with remittance in full.

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RADIO CORPORATION

Distributors of Radio & Electronic Equipment

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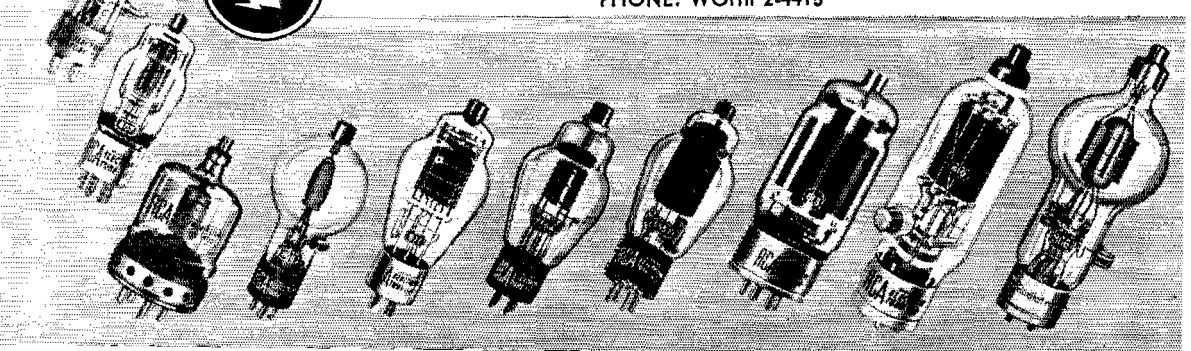
PHONE: WOrth 2-4415



etc." . . . . . The First All-European DX Contest is scheduled from Friday, November 28th, 1801 GCT, until Sunday, November 30th, 2359 GCT. Only c.w.-c.w. QSOs will count on this week-end. The second period will be from Friday, December 12th, 1801 GCT, until Sunday, December 14th, 2359 GCT, only 'phone-'phone QSOs counting. Full details will be given in November *QST*. . . . . 73.

WWV Schedules

STANDARD-FREQUENCY transmissions are made available as a public service by the National Bureau of Standards over its standard-frequency station, WWW, on the following expanded schedules and frequencies:

Mc.	*EST*	*Power Output (kw.)*	*Audio Freq. (cycles)*
2.5	7:00 P.M.–9:00 A.M.	1.0	440
5.0	7:00 P.M.–7:00 A.M.	10.0	440
5.0	7:00 A.M.–7:00 P.M.	10.0	440 and 4000
10.0	continuously	10.0	440 and 4000
15.0	continuously	10.0	440 and 4000
20.0	continuously	0.1	440 and 4000
25.0	continuously	0.1	440 and 4000
30.0	continuously	0.1	440
35.0	continuously	0.1	440

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

The audio frequencies are interrupted precisely on the hour and each five minutes thereafter, resuming after an interval of precisely one minute. This one-minute interval is provided to give Eastern Standard Time in telegraphic code and to afford an interval for the checking of radio-frequency measurements free from the presence of the audio frequencies. Ionospheric-disturbance warnings applicable to the North Atlantic path are given at 20 and 50 minutes past each hour. If a disturbance is in progress or is anticipated within 24 hours, the time announcement is followed by 6 Ws; if conditions are quiet or normal, the time announcement is followed by 8 Ns. The announcement of the station's services and of the station's call (WWV) is given by voice at the hour and half hour.

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

Hints & Kinks

(Continued from page 62)

that an arc-over has taken place. Should there be a permanent short-circuit, the relay will oscillate with a buzzing sound that will be a sure tip-off to the operator to pull switches before the power transformer burns out.

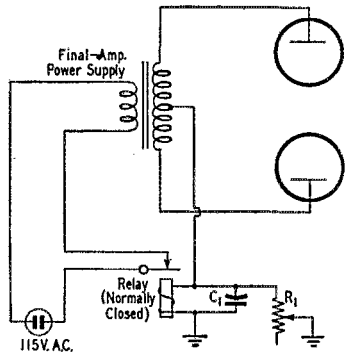


Fig. 3 — A fast-operating circuit that takes the rig off the air and puts it back on again in no time flat when an arc-over starts.
C_1 — 8-μfd. 150-volt electrolytic.
R_1 — 25-ohm wire-wound variable resistor.
R_y — 6-volt d.c. relay, s.p.s.t., normally-closed contacts (Guardian 200 series.)

The condenser shown in the diagram will absorb brief surges that do not result in an arc, and the variable resistor R_1 is used to set the point at which the relay will operate. A setting that causes it to operate at any overload 50 ma. in excess of the normal current drain will be satisfactory in most cases.

— *Eldon L. Kanago, WØUHC*

—···—

GETTING THE MOST OUT OF YOUR MOBILE POWER SUPPLY

FIG. 4 shows a method of getting the most out of a mobile power supply with the least battery drain. A 250-volt vibrator supply is used to power

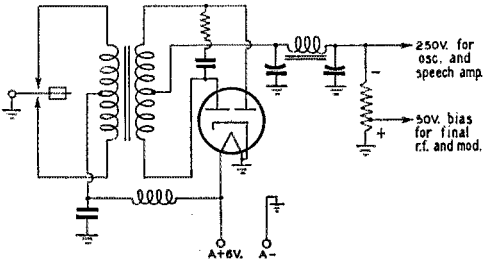


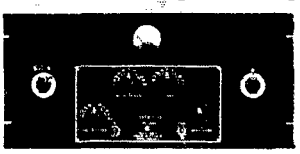
Fig. 4 — Method of wiring the vibrator power supply to obtain both plate and bias voltages with maximum economy of power.

the oscillator and the speech amplifier, and a 500-volt dynamotor (not shown in the drawing) supplies the r.f. amplifier and the modulator. The novelty of the circuit is that the *positive* terminal

(Continued on page 146)

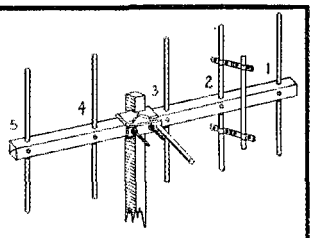
IF IT'S IN RADIO *Resco Has It!*

Millen High Frequency Transmitter



75 watts output, using 829 B tube in final. For 10-11, 6, and 2 meter bands.

No. 90810 **69.75**



Abbott BM-2 5 Element 2-Meter Beam Antenna

Fed with 300 ohm twin lead. Weighs only 3 lbs. All aluminum construction. Special ..... **8.82** NET

A RESCO SCOOP ON ANTENNA SECTIONS

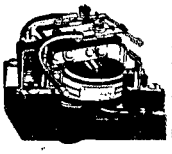
39" long by 3/8" diameter. Constructed of spring tempered light steel tubing, rust-proofed. Each section screws into another with tapered section, to make electrical contact. Assemble as many as you wish. Each Section ..... **15¢**

SYLVANIA X-7018 Modulation Meter 34.75 Net

IN34 CRYSTAL DIODES
Germanium in 34 crystal diodes by Sylvania . . . **$1.60**

COILS FOR HALLICRAFTER HT-9 TRANSMITTER

Complete Set for 10 meters **16.50** Net
Complete Set for 20 meters **15.50** Net
Complete Set for 40 meters **11.75** Net
Complete Set for 80 meters **10.85** Net



POWER RELAY

One of best on surplus market. Made by Leach. D.P.S.T. (makes 2 contacts) 115 V AC coil, 60 cycles. Rated current handling cap. 30 amps: **4.95**

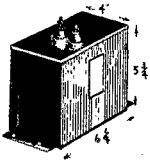
U.S. ARMY HEADSET HS-30-R

Lightweight, complete with extra pair rubber ear inserts, clip to take off ears and adjustment instructions. Standard low impedance (500 ohms)..... **95¢**

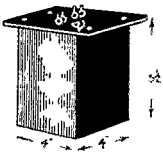
Coupling transformer with cord and plug to convert headset to standard high impedance (400 ohms)..... **25¢**

FILTER CHOKES Made by RCA

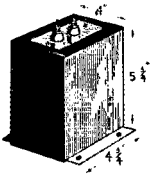
All potted in easy-to-mount cases.



2.5 Henry 700 ma 14 ohms **4.95**

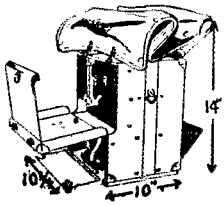


4.5 Henry 500 ma 21 ohms **4.95**



15 Henry 250 ma 60 ohms **3.95**

Write for big Free Bulletin
Include postage with cash orders



CARRY-ALL CASE

Just the thing for the storage of small items is this handy portable U.S. Army case. Dimensions as shown, with three different storage spaces. Weight—13¾ lbs.

95¢ EACH

Radio Electric SERVICE CO. OF PENNA., INC.

7TH AND ARCH STREETS, PHILA. 6, PENNA.
Branches: 5133 Market St. & 3145 N. Broad St., Phila.
Also in Wilmington, Del., Easton, Pa., Allentown, Pa., Camden, N.J.

REVOLUTIONARY NEW INSTRUMENT FOR COMPLETE RECEIVER TESTING!

Signalette

MULTI-FREQUENCY GENERATOR

$9.95 *at dealer or F. O. B. Cincinnati*

Generates R.F., I.F. and AUDIO Frequencies, 2500 cycles to over 20 megacycles, using new electronic multivibrator radar principle. Completely self-contained — fits coat pocket or tool chest. Just plug into A.C. or D.C. LINE AND CHECK RECEIVER SENSITIVITY, AUDIO GAIN, R.F. and I.F. alignment, auto radio aerial peaking or shielding, breaks in wires, stage by stage signal tracing tube testing by direct comparison, etc., etc. Sturdy construction, handsome appearance! *See at your dealers or write for details:*

CLIPPARD INSTRUMENT LABORATORY, INC.
1126 BANK ST., CINCINNATI 14, OHIO

of the vibrator *output* is grounded instead of the negative. In this way, the low-voltage supply may be used as a source of bias voltage as well as a supply for the oscillator and speech amplifier.

The advantages of the system are numerous. The bias voltage does not subtract from the supply voltage, as it would in cases where the bias is obtained from a tapped grounded bleeder. The oscillator plate condenser may be grounded without requiring parallel feed, since the positive is grounded. Fixed bias may be used, without requiring batteries, eliminating the need for cathode bias. This results in a saving in the power usually lost in the cathode resistor, and permits the final amplifier to operate at the full supply voltage.

— *Zoltan T. Bogar, W3CJM*

Delta & West Gulf Divisions in Joint Convention

Over 500 amateurs from the ARRL Delta and West Gulf Divisions met in a two-day convention at the Grim Hotel, Texarkana, U. S. A., on August 17–18th. A well-rounded program was presented, arranged under the joint sponsorship of the East Texas and Texarkana Radio Clubs.

The convention was welcomed by the mayors of both Texarkana, Texas and Texarkana, Arkansas. "Emcee" N. C. "Skippy" Settle, W5DAS, launched the Saturday morning program, which included a get-acquainted session under the guidance of "Mr. X," prize awarding, and a meeting of ARRL appointees. The latter group heard a talk on emergency matters by FCC Regional Manager Joe McKinney.

Highlighting the convention was the Saturday afternoon session. A beam-tuning procedure was demonstrated by Texarkana club members, led by W5KKM, Cmdr. R. V. Robinson, ex-W8IKN, spoke on the Naval Reserve, Major H. E. Eversole, W5DJA, spoke for the Army, and W. C. Stickler, W3KOP, of the FCC Washington office, discussed licensing procedures and arranged for license examinations. Bill Anthony, W5ZS, presented pointers for the v.h.f. men, and Allen Chapman, RCA field engineer, described a simple 144-Mc. transmitter.

Director George S. Acton spoke on "Ham Friendships," while Director Wayland M. Groves discussed late developments at the Atlantic City conferences, reading a telegram from ARRL President George Bailey, W2KH, whose continuous attendance at Atlantic City prevented him from greeting the convention in person. Dick Smith, W1FTX, of Headquarters, demonstrated a new premodulation speech-clipping amplifier.

A movie showing the war record of the 8th Air Force was presented by the Shreveport Radio Club. A brief comedy session, "For Men Only," starring W5GJU, was followed by a code-copying contest under the supervision of RM Joe Buch, W5CDU. First prize was copped by W5NW.

A dance at an under-the-stars nightspot was the Saturday night attraction. The Royal Order of Wouff-Hong held solemn initiation ceremonies for ARRL members during the midnight intermission. Mysteriously, the total darkness required for this secret session continued for the balance of the evening!

Sunday morning's sessions, ably handled by Russ Curry, W5DG, included the awarding of numerous additional prizes. The two Divisions held separate banquets and business meetings Sunday afternoon, Houston and New Orleans being selected as sites for the 1948 conventions.

Equipment displays, QSL card distribution by QSL Manager May, and the full-time operation of stations W5TEX and W5USN/5 (Navy mobile) rounded out this most successful conclave.

Thanks are due members of the convention committee, Chairman W5AQF, W5EGY, W5KKM, W5CEO, W5IYJ, W5GJU, W5DAS, W5ECE, W5GZH, W5HFD, and their families, for a job well done. — *R. M. S.*

Correspondence

(*Continued from page 64*)

CLEANING-UP

1001½ N. 30th, Quincy, Ill.

Editor, *QST:*

For some time I have been seeing comment in *QST* in regard to more bands. It seems to me if we could clean up our present bands it would be a big improvement. FCC has a ruling in regard to key-down operation in all bands 14 Mc. and below; yet any time of the day or night you can hear any number of heavy-fisted dopes tuning up with a foot on the key. I wonder if these guys ever heard of antenna dummies to be used for making adjustments on transmitters?

Also, how come so many commercial stations are operating in the ham bands? Did you ever listen to 20 meters after midnight? It sounds like the commercials are lined up shoulder-to-shoulder.

I recommend we clean up our present bands before we ask for more.

— *H. Laws, W9VTI*

[EDITOR'S NOTE: During the war and its aftermath, a great many "commercial" and government stations made use of the amateur bands, under special wartime powers. Amateurs who still intercept such stations are asked to log the consistent offenders and report calls, times and frequencies to ARRL.]

OPERATING PRACTICES

Lake Charles, La.

Editor, *QST:*

At the present time hams using high-power rigs are inviting restrictive regulations. There is no justification for a power input of over 150 watts on forty c.w. Especially is this true in the daytime when ninety per cent of the contacts are made within a range of 200 miles. I don't know how any ham can justify the use of more power than that mentioned except for emergency operation. I am not in favor of restricting power to less than a kw. by regulation but unless all hams realize soon the extent of our own excesses this will be the inevitable result. If you want to hear some fine examples of the use of excess power just tune your receiver to the 75-meter 'phone band. It will not be necessary to tune any of the half or whole kilowatts on the nose because the nose, in too many cases, spreads all over the face.

— *M. J. Dugan, W6JFR*

1005 Pico Blvd., Santa Monica, Calif.

Editor, *QST:*

In recent months the League has been conducting an extensive campaign to clean up amateur signals. Great headway has been made, but it is evident that some people will never conform. I am speaking of those c.w. men, mostly "old-timers," who insist on having varying degrees of 120-cycle modulation of their carriers. This is especially evident on the 20- and 40-meter bands. The law says we are to have an "adequately-filtered direct-current plate power supply." How, then, can these few have their apparently deliberate T6 notes?

— *Herbert J. Shear, jr., W6WVQ*

3.5-MC. HORIZONTALS

191 Myrtle Ave., Elmhurst, Illinois

Editor, *QST:*

In reference to the excellent article on eighty-meter antennas, in the August issue, it has been my experience that the sky-wave path between any two points provides from 3 to 10 times as much signal strength as does the ground wave, particularly at night. As a result, I find that almost any horizontal antenna will produce better results than any vertical within reach of the average amateur.

As a prewar member of the AARS, I was particularly interested in developing an antenna that would provide consistent signals up to a 500-mile range, using low-power transmitters. Both horizontal wires, and antennas radiating primarily vertically-polarized waves, were tried; as a result, I found the horizontal to be far more effective and consistent. While the vertical produced good signals over short ranges during the daylight hours, effective communication beyond 100 miles was not usually possible after sunset.

(*Continued on page 150*)

The horizontal antenna supplied good signals from 50 miles on as night came on. It is also interesting to note that for general operation the horizontal gave a consistently higher average of "raises" to calls, particularly on low power. This proved to be true even when the vertical antenna had the advantage of height and location. Incidentally, the horizontal also gave better results on reception. As pointed out in Mr. Grammer's article, these effects are attributable to favorable angle of radiation rather than to polarization of the waves.

Thus it would seem that the average amateur interested in getting the most contacts on the 80-meter band would be advised to erect a horizontal antenna. As discussed, the height above ground is relatively inconsequential inasmuch as under normal nighttime conditions any radiation striking the layer at these frequencies will be returned and the sky wave will "illuminate" a large area. This, while true of the 80-meter band, is of course not necessarily true for higher-frequency operation where the higher radiation angles may well be useless for communication.

— *C. F. Rockey, jr., W9SCH*

PUBLIC RELATIONS

Sackville, N. B., Canada

Editor, *QST:*

Have just received August *QST*, and as I always first read the editorial section I thought I would immediately drop you a line on the contents of this one. I believe that if more amateurs would pay a little more attention to the vital matter of better public relations, our cause would be indeed furthered. As you know only too well, the average Mr. Public knows only one thing about that amateur that lives next to him: he is that #%b&—"# that cuts out all his radio programs.

I feel quite sure that if every amateur would seriously read, digest, and then finally *act* in accordance with the principles outlined in your editorial, the amateur fraternity would on the whole be better understood by the aforementioned Mr. Public.

— *Ronald J. Hesler, VE1KS*

RE *QST*

75 Harcourt Ave., Bergenfield, N. J.

Editor, *QST:*

Let me congratulate you on the appearance and mechanical correctness of your publication. It's a nice job and certainly must involve plenty of double-checking. I can appreciate what it takes since I'm managing editor of an industrial trade paper.

Let's have more down-to-earth articles on how to build noncomplex equipment. Not everyone has the time or patience to construct superfancy receivers let alone transmitters. A couple of articles recently are right along this line; for example the small transmitter by one of your staff. . . .

The trend these days is toward more and more specialization, but I wonder just where a person could draw the line between the type of article suitable for *Electronics* and that for your own publication. You certainly want to include all useful information on the subject of amateur radio, and yet a few of the articles sound distinctly "high-brow."

Please understand that these rather disjointed remarks are not intended as carping criticism to pick fault with your paper. I enjoy reading it each month from the sidelines, so to speak, since I haven't the time or ambition to become a ham. You're doing a good job — keep it up!

— *J. W. Moss*

18 Spring St., Williamstown, Mass.

Editor, *QST:*

. . . A lot of fellows want simpler articles in *QST*. Listen — if a fellow has sufficient interest in radio to study it for its own sake then I should think he'd want to learn all he can about it and be proud of the fact that he's intelligent enough to understand such a technical subject as radio. He should further be proud of the fact that his favorite ham mag, *QST*, should continuously demonstrate that mere amateurs, not professional radio engineers, have so great a knowledge of

(*Continued on page 152*)

the science of radio that they often write articles which would do credit to an engineer and give the real technical dope when regular service mags, designed for that purpose, do not do so. Therefore, I plead with you, do not make *QST* a mag for the fellow who professes his lack of intelligence by saying he can't understand such technical articles. Personally, I'd be ashamed to admit I couldn't catch on to deeper knowledge of that which I supposedly knew so well. Besides, don't you have a *Handbook*? It starts out at the beginning. . . .

—*Russell Worthy*

THE NEWCOMER'S SIDE

16 Market St., Tamaqua, Pa.

Editor, *QST:*

Who said the OTs at the game were rough on newcomers? I just received my ticket about a month ago, and have been very much gratified with all my QSOs. My thanks especially to W1NIW, with whom I have maintained a sked, and who has been invaluable in dragging my c.w. out of the 5–10-w.p.m. class; and to all the fellows who were willing to take it easy with a beginner, as I'm sure I shall be when I, too, can "rattle it off."

—*J. C. Gilfert, W3NMB*

16 Garden Street, Potsdam, N. Y.

Editor, *QST:*

I have noted a growing feeling of concern in recent issues of *QST* about the newer hams and the reception they are getting on the c.w. bands. The editorial in the July issue took me back a year to the day when W2NEB came back to my poorly-keyed call to make my first QSO a reality.

Perhaps I am now an OM to the fellows who are getting their first tickets in the mail, but I doubt if I will *ever* consider myself an old-timer. I do know that my log holds many reminders of fine QSOs with snappy ops who were interested enough in my progress to slow down for me. I also remember a VE2, a VE3, and several other new hams who made me as pleased as punch when I copied their halting "Ur my first W2— so pse QSL."

So please tell them all that before they chuck it all for 'phone they should give 40 and 80 c.w. a fling. That's where they meet the "man-in-the-street" ham — the fellow who has scrimped on his pleasures to put a 6L6 or an 807 on c.w. — and scrimped some more to QSL his contacts.

—*Carl A. Emerson, W2RWH*

P. O. Box 775, Rapid City, So. Dakota

Editor, *QST:*

I'm just a beginner in ham radio and can't afford the fancy receivers or California Kilowatts that seem to plague the bands. Every ham I ran into in the Navy and civilian life was a prince of a fellow, but some I believe are slightly inconsiderate. I've been trying for three-odd months now to just come close to a Code Proficiency Certificate, but every time I get started somebody has to blanket W1AW, and here I am cursing the day he was born and the day I got bitten by the ham bug. Everybody knows the dates of the CP qualifying runs; why can't they work a few kc. away from W1AW for a few minutes once every month? Is that too much to expect? I don't like to complain, but I surely would like to get something on my walls besides cobwebs.

—*Orville C. Stone, W9OSL*

THE "IRRITATING CQ"

144 W. 92 St., New York 25, N. Y.

Editor, *QST:*

In reference to W1LVN's letter complaining about the "wolf-call" CQ from W5KMD, it's the sign of the times. Of course, I realize that a full, red-blooded ham never listens to frequencies below 3.5 Mc. If he did, however, tune his receiver to the never-never land between 550 and 1600 kc., he would be assailed with an obnoxious, offensive device known as the singing commercial.

Now let us be realistic. Sponsors would never shell out

(*Continued on page 164*)

good American cabbage if the returns were poor. Psychologically, the singing commercial pays off because people remember an irritating stimulus a lot longer than a soothing one. So let's give W5KMD credit for using the latest technique of having people remember his call letters, the irritating CQ.

— *A. A. Goldberg, W8HKU*

SIGNAL STRENGTH

P.O. Box 5080, Univ. of Md., College Pk., Md.

Editor, *QST:*

Do you know of anyone who would like a nice new S-meter?

Seriously, I think that the best way to clear up this reporting situation is for you to continue publishing such articles on using the meter readings as an indication of signal strength. Having recently got my ticket, I can say from experience that the new amateur makes the errors that the old-timer does, usually because he follows the practices of the amateurs already on the air. . . .

— *Sol Leise, W8LJV*

CALL CHANGES

66 Lebanon, Hamilton, N. Y.

Editor, *QST:*

We Ws who think that we were unfortunate in call-area changes, causing some of us to lose our calls, must admit that we are still pretty lucky. A Colombian friend just wrote me that he had received his *annual* call-sign change!

— *H. S. Bradley, W2QHH, ex-W8JIW*

QSLs

Julian, N. C.

Editor, *QST:*

Just a few words in support of W3KNK. I had hoped for quite a while to get a WAS. I have given up in disgust. To get a WAS you would have to work all states five or six times. It is so easy to fill out a QSL and it only costs one cent.

I was very much amused a few nights ago when I tuned across ten meters. One amateur was telling another what he thought of a fellow in a foreign country that had owed him a card for three or four months. He was in one of the states that I wanted. I looked in the log and there was his call. I looked in my cards and you can guess the rest. *His* card was not there.

— *Jes. Thacker, W4IOH*

EX-POW

159/6 Seymour Road, Shanghai, China

Editor, *QST:*

XU8RB is still alive and kicking after surviving a Jap political prisoner-of-war camp from November, 1942, to August, 1945, arriving back here in Shanghai in October of that year. I would like to hear from the gang whom I worked on the 20-meter band in 1938–1939. . . .

— *R. J. Broadley, XU8RB*

APPRECIATION

1203 N. Walnut St., Brady, Texas

Editor, *QST:*

While I am not yet a ham, I have hopes, and I want to express my appreciation of some of the ham spirit I have personally enjoyed. Two different hams, whom I wrote relative to surplus receivers, not only took time to answer me, but wrote long letters on the fine points of the equipment to help me out, even though they didn't know me from Adam! And I know how much time it takes to write a letter that long, too, so I know that they did me a real service. . . .

— *Cecil R. Nelin*

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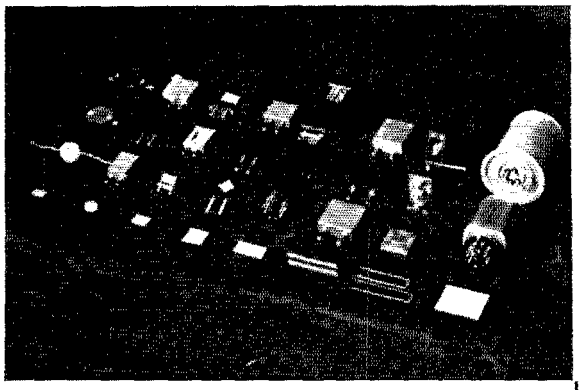

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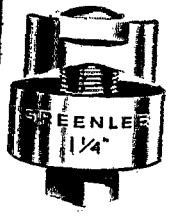

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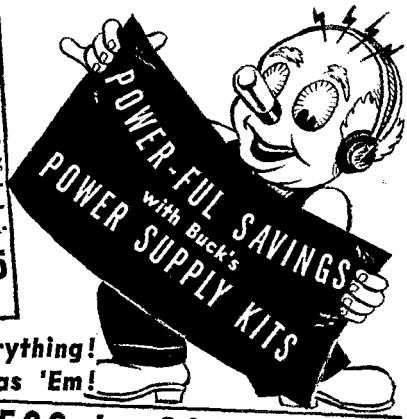

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122-124 DUANE ST. NEW YORK 7, N. Y. Barclay 7-1840

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2), (4) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 75 words in any 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., 719 World Bldg., New York City.

QSLs in colors. Stamp for samples. Glenn Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

DEKA-XTAL. New compact 10-crystal unit for standard 5-prong socket. Looks and operates like a dial-knob. Just plug it in and turn to any of 10 frequencies, your selection. Ask your dealer or write us. Also other low TC ham crystals in FT cases to fit octal sockets. 80 and 40 + 1kc. $2.65; 20 + 4 kc., $3.50. Scientific Radio Products Co., 738½ W. Broadway, Council Bluffs, Iowa.

METER repair. Braden Engineering, 3317 Kenmore, Dayton, O.

COMMERCIAL radio operators examination, question-and-answers. One dollar per element. G. C. Waller, W5ATV, 6540 E. Washington Blvd., Tulsa 15, Okla.

QSLS, samples, Albertson, W4HUD, P.O. Box 322 High Point, N. C.

AMATEURS, experimenters, industrials and export accounts. Write for catalog and monthly bulletins. Buy the "TB" guaranteed way and save. TAB. Dept. Z, 6 Church St., New York 6, N. Y.

AMATEUR radio licenses. Complete code or theory preparations for passing amateur radio examinations. Home study and resident courses. American Radio Institute, 101 West 63rd Street, New York City.

NEW or used: all popular brands in stock. Hallicrafters, National, Hammarlund, Collins, RME, Gonset, Millen, Meissner, others. Send deposit for new gear or write for list of used or surplus. Van Sickle Radio Supply, Indianapolis 6, Ind.

CRYSTALS: Precision low drift units. Type 100A in 80, 40, and 20 meter bands. Two units plug in one octal socket. Plus or minus 5 Kc. One dollar each. Exact frequency, $1.95 ea. Rex Bassett, Inc., Ft. Lauderdale, Fla.

TOWERS for your rotary beam. Full latticework, spruce construction. Priced for the amateur. Write for Bulletin T-101. Sky Lane Products, Ironwood, Mich.

QSLS, large type, quality cards. VYS Print, 1704 Hale Ave., Ft. Wayne, Ind.

TRANSMITTER kits, 40 watts, $69.95. Exciter kit, $17.95. 175-watt xmtr soon. All makes and models new and recondx rcvrs. Trade-ins accepted low payment plan; terms financed by Leo, WØGFQ. Write for specials. World Radio Labs., Council Bluffs, Iowa.

DON'S QSLS. "Leader in the field." Samples, 2138 So. 16th Ave., Maywood, Ill.

QSLS-SWLS. Meade. WØKXL, 1507 Central Ave., Kansas City, Kans.

SALE: Mark II 40-watt transceiver. 2-8 and 235 megs, $65 or best offer. W7LFA, 1019 36th St., Anacortes, Wash.

SELL: WRL 40-watt exciter, meter tubes, coils for 10 and Hallicrafter S-38. Box 776, Lake Placid, N. Y.

WANTED: ARR7 rcvr covering frequency range 28 to 145 Mc AM/FM. Also LC checker. Charles Sackermann, 649 38th St., Union City, N. J.

SELL: New HRO-5TAL; tubes, coils, spkr and power supply, $225. New 1-10; tubes, coils and pwr supply, $60. Many more items! S. ip postpaid. Money order to W1LMS, 149, Hancock, Stoneham, Mass.

HAMS: 500-watt amplifier, 4-850's, uses selenium rectifiers, makes good modulator for Kw, $49.50. Write for dope. SOS, 449 West 42nd St., N. Y.

SELL: Cardwell BC-221 frequency meter; crystal, calibration tables, tubes, complete like new, $55. Bendix BC-221, used, $37.50. Prewar HRO; 80-40-20 and 10 hamband coverage, $160. RCA 10-meter FM mobile rig complete, $60. W9CO, Knochel, Lincoln, Ill.

SWAP S20R, 1 yr. old. Needs speaker cone FB otherwise, for BC-348 even up. Box 297, Hawkins, Wisc.

SELL: BC-342R, AC converted, $60. HQ-129-X with spkr, $150 Both in perfect condition. W3FEG, 12 Dover St., Rehoboth, Del.

W6DLX ex-W1DLX ex-W4HXS, 201 Jefferson St., Vallejo, Calif.

FOR Sale: NC-44 with speaker, $45. Ex-D4ABX, T. W. MacClure, 14546 Marlowe, Detroit 27, Mich.

WANTED: BC-610 transmitter. Roy Anderson, W8WSV, Michigan State Police, Paw Paw, Mich.

SELLING: Best offer. 1922 bound vol. *QST*. 160 copies *QST* late 1932-46. Sky Buddy, like new; extra set of tubes. W9OTL, Woodruff, Wis.

QSLS, maps of all states, all provinces of Canada, all countries. QSL Printers, Box 974, Ft. Wayne, Ind.

SELL: RME-45 Cal-O-Matic tuning, $150, WØCMY, 726 East B St., Hutchinson, Kans.

WILL sell QSTs, starting with Mar. '31, issue solid thru to Dec. 1946, inclusive, except Aug. '44. Price $45, shipped transportation collect. I. H. Small, 5732 Broadway Terrace, Indianapolis, Ind. Cash or m.o.

QSLs in plastic — record cards, Ham Xmas cards. Stamp for samples. Reber Print, R.D. 1, Sewell, N. J.

CAN you identify ham depicted newest Call o' the Wild ham cartoon? True story from 10-band by creator, Call of the Wild cartoons. May be you! 25¢ copy for shack framing size. First 10 properly identifying ham depicted 100 QSLs free! Ham depicted identified by himself gets the zinc plate call thereon rights use personal exclusive QSL. Orders eligible. Watch ham ads winner. Closes Dec. 15. Merchant, Box 1592, Rapid City, So. Dakota.

W5LXP selling out, pr. 304TLs with sockets and fil. xmfr, new, $28. 4E27/8001 and socket, new, $13; 6 v. input, 500 v. 160 Ma. dynamotor, new, $22; 500 watt fone cw rig, $150; alum. tubing for elements and support with heavy duty rotator and selsyns for 10 and 20 meter, 3 element beam, $70. Many other items. Write for list. W5LXP, Luke, 2113 Somerset, Oklahoma City, Okla.

CUSTOM building of ham equipment, your specifications. Medium pwr xmtrs, VFOs, etc. Inquire Chatel, W2RSC, ex-W1DIF, 235 Duffield St., Brooklyn, N. Y.

PAN-Oscillo-Rcvrs. Govt. surplus. Performs work of four units; Panoramic adapter; oscilloscope; synchroscope; rcvr. 3" scope, 21 tubes, variable sweep 35-40,000 cycles, two I.F. stages, push-pull amplifrs for vertical and horizontal plates. 110-volt 60 cycle operation. Price $97.50 f.o.b. Tuckahoe, N. Y. Mail fifty cents for 80-p. technical manual instruction book. Electronicraft, Inc., 5 Waverly Pl., Tuckahoe 7, N. Y. Phone Tuckahoe 3-0044.

W2JJ now W3JJ. John Knight, 2230 Cathedral Ave., NW, Washington 8, DC.

WANTED: Motorola FMT30D or FMT50D, mobile xmtr. Sell: new 450TL, $15, new 803 with socket, $5; Corona portable with telegraphic face type, perfect, $35. W4AKH, 1212 Nira St., Jacksonville, Fla.

TRADE: Pair Galvin Handie-Talkies, perf. condx for VFO, preferably Bud. Also have Wilcox Gay Recordios, Models 6A10 and 6B10 listing for 175 and 225 to swap for SX28A or other amateur gear. M. York, W1OCU, Houlton, Me.

BC-610 Wanted. Will pay cash. All letters ansd. W. Lee Beckley W9SRR, Grundy Center, Iowa.

FOR SALE: transmitter 200-watt cw. Millen exciter driving pair 812s in final. Three power supplies, four meters, and tube keyer. Rack mounted. Parts alone cost $250. Used six months. First money order for $200 and you pay freight. D. W. McKinley, Hubbard, Iowa, WØOPK.

WILL pay seven dollars for a BC375E dynamotor. Write H. T. Mapes, Moose, Wyoming.

FOR SALE: all or none: BC-610E xmtr, like new, $585; Direct-O-Beam rotating device, Premax three-element beam, 50' co-axial cable, antenna tuning and switching panel with ammeters and running time meters, new, never used; Meissner Signal Shifter, Natl. NC-240D rcvr, new. Catalog prices on accessories. Will sell on $400 down payment, balance monthly in state; out of state, cash. Reason for selling: have ¾ Kw rig completing. James A. Lee, 801 Hickory St., Abilene, Texas.

AUTOTRANSFORMERS: limited quantity. Control low-line voltage, increase and decrease power. Brand new gray steel case. 25 amps, 115-volts, 60 cycle, continuous. Output voltage variable in 2 volt steps, is 75 to 135 based on an input voltage of 95 to 115. Easily handle 1 Kw fone. Include shipping instructions. Wt packed heavy wood box, 63 lbs. $8.95. Ed Doherr, W3CIR/1, 96 Highland St., Hyde Park, Boston 36, Mass.

SELL relay rack, Natl. NTX-30, $70. New Millen exciter, never used, complete with tubes, coils for all bands, $42.50. New power supp., $25, f.o.b. Henry Kanjorski, W9VXF, 3839 So. 14th St., Milwaukee 7, Wisc.

TRANSFORMERS: filament 110 volts primary secondary 6.3 volts at 10 amps 6.4 volts at .7 amps, 2500 volts insulation, potted and hermetically sealed, complete with mounting lugs. Dimensions, 2¾ x 4½ x 5¼. Price: $2.95. J. Viola, 1963 Hobart Ave., Bronx 61, NY.

PAIR 420 meg trans-rec in fine operating condx for sale. Converted BC-645s comp. with new pwr supplies, antennae, and spkrs, no mikes. Priced $70. ea., both, $125. Will consider mobile xmtr in part exchange. WØMBW, 20 McDonald Drive, Sioux City, Iowa.

SELL: HQ-129X. Good condx. Less spkr, $145. P. E. Wahl, W6YLD, 307 E. Bethany Rd., Burbank, Calif.

SX-28A and spkr, new Mar. '46, factory reconditioned, $168. Composite bandswitching xmtr, 80-40-20 meter CW, 6L6-807 and power supply with four Triplett meters, in Bud cabinet, $68. Percy C. Noble, W1BVR, 37 Broad St., Westfield, Mass.

SELL: New DuMont 164E 'scope: $75; Hallicrafters SX-25, operated only 6 hrs. Best offer takes it. W9FCL, 585 Turner, Glen Ellyn, Ill.

CRYSTAL kit: includes 4 low drift, highly active xtals, 2 hldrs, abrasive, instructions, treatise. State band preferences from 3500 to 8500 Kc. $1 complete. Mounted xtals, your specified frequency, $1 each. Breon Laboratories, Williamsport, Penna.

SELL: Recently realigned and ham calibrated military model RAS-1 HRO, comp. with standard coils from 900 Kc to 30 Mc, rack mounted, spkr, pwr supply, coil cabinet, R-meter, Navy tech manual, $200. WØPXV.

WANTED: National 1-10 for sale or trade. BC-624, BC-625, Paul West, Box 722, Martinsburg, W. Va.

HAMMARLUND Super-pro, rack-mounted, AACS model, 300 KC-10 Mc, like new, power supply, less spkr, $185 or best offer. W2JQS, Rte #1, Box 194 Briarcliffe Manor, N.Y.

SELL: HRO with pwr supp., 4 BS coils, $110. Abbott TR4B with dual supp., $60; Millen Exciter, $32. Philco tube checker, $20; Thomas Connor, 29 So. Huntington Ave., Stancor 30, Mass.

FOR Sale: Two fone/cw xmtrs complete. Stanco 20P, 616/807 20-watts, $75. Composite 30 watts 6V6g/807, 80–40, 165. W1BB.

SELL 100-watt fone xmtr in 42" Par-Metal gray cabinet. H. Kuck, 620 W. 141st St. New York, NY.

SELL Hallicrafters S-20R rcvr; slightly used, $55. J. R. Burkhart, 20 Pine St., RD #4, Schenectady, NY.

HERE it is! Still time to get your ticket. Bigger, better than ever! 10th Annual Boston Hamfest, Mechanics Building, October 18, 1947.

IN stock: new and used Hallicrafters, National, Hammarlund, Collins, RME, Pierson, Millen, Temco, Meck, Supreme, Sonar, other rcvrs, xmtrs, parts, etc. Lowest prices. World's best terms financed by me. Reconditioned: S41, $19; S38, $35; S-20R, $49; S-40, $59; SX28, $139; SX42, $199; HQ20X, $99; S-39, SX16, SX17, SX24, SX25, SX-32, HRO, NC173, NC240D, HQ129X, SPC400X, SPC400SX, etc. Shipped on ten days' trial. Send $5. Pay rest c.o.d. Write: Henry Radio, Butler, Mo.

SALE: National ACSW3 rcvr. Coils, 80,40,20,10 meters. $25. W4JYX, 2334 Date, Louisville, Ky.

SELL: Amplitone, autm. record changer, plays 14 at a time. Original cost, $100. Two mos. old. Reason: need money for new xmtr. Info supp. on request and best offer takes it. W3NIH, Box 274, Rehoboth Beach, Dela.

SELL: 130-watt cw xmtr, with built-in pwr supply, coils, for 10, 20, 40, 80, Triplett meter, all tubes; 6F6, 42, 2-807s; 80, 2-866As. Almost new, cheap at $95. Paul Cluver, W9RUN, Rt. 1, Watseka, Ill.

BULLETIN of interesting items for hams, experiments. Write Atlantic Industrial Co., Woodhaven 21, N.Y.

QSLS. Quick service. Samples free. Sunland, Box 662, Hialeah, Fla.

CUSTOM-built equipment, factory prices. Write Associated Electronics, 1504 No. 10th St., Independence, Kansas.

FOR SALE or trade: Abbott TR4, 2-meter rig. Will take $45 or swap for Gonset converter. W1PVI, Hampden Highlands, Me.

S-40 rcvr for sale, brand new. $75. Cash. Peter Rosenbaum, c/o Mrs. Harris, 249 So. B'way, Dobbs Ferry, N.Y.

USED but in excellent shape: SX-28A, $135; HQ-20, $92; Meissner 150B, $250. W1MAL.

ALUMINUM tubing for 10-20 meter beams. 15/16" D. lightweight. Bargain. W2PUK, Bloomfield, N.J. Bl. 2-1549R.

REAL buy! New PM dynamotors. Guaranteed output without overheating, 240 v. 100 Ma. with 6.3 v. input. Many already powering ARC5 and SCR522 conversions. Designed 12/24 v. input 500 v. output. Factory sealed, $4.50 f.o.b. 12 lbs. W2SYG, 375 Oak Place, Mineola, L.I., NY.

SELL BC-348 like-new. Converted for AC, $65. Clifford Ratliff, 2938 Fairfield Ave., Baton Rouge, La.

FOR sale: complete amateur station of late W9JPX: HQ-129X, 300-w xmtr, Cardax mike. Mod. meter, etc. Write for info. W9JYP, 934 N. Tuxedo St., Indianapolis 1, Ind.

FOCUS beam antenna. All aluminum. Improved intermediate spacing. Choice of matching systems. 950 Paulding St., Peekskill, N. Y.

QSLS: 15 sample reproductions in booklet, 12¢. Stamps okay. 3 "shack" signs and subpoenas with order in clear plastic box. Westerns see at ham stores. Others write direct. W6GFV, 1406 South Grand, Los Angeles, Calif.

FOR Sale: one 250-watt fone xmtr, final 813, modulators 811s; entire xmtr 26¼ in. panel space. 1 125-watt modulator with pwr supp., TZ40s and 816s. 1 40-watt modulator with pwr supp. and speech amplfr all on 11x17x3 in chassis. Write or call W. L. Brown, 17 Maple St., West Summit, N.J. Summit 6–6553J.

FOR Sale: HT-9, comp. with coils and xtals 10,20,40,80, $225; Millen exciter and hvy duty pwr supp., 700V; 500 Ma coils, 10, 20, 2 mos. old; $80; Meissner deLuxe Signal Shftr, coils 20,40,80, $35; W9ABA, Ross., 9010 Kenton Av., Skokie, Ill.

3" cathode ray 'scope, radar indicator, ID-93/APG-13A, 115 v, 400 cps, comp. with 11 tubes, compact, new, $25. Meissner Traffic Master, 14 tubes, communications rcvr, .55–32 Mc, almost new. $100. EIL, Box 153, Shrewsbury, N.J.

FOR Sale: Best offer for VHF-152 converter with Hammarlund xtal standard. Also new, latest model Super-Pro rcvr. G. L. Hight, Rome, Ga.

WANTED: BC-610E xmtr, for sale or trade; Kw ten and twenty meter partially wired, fone xmtr and 300-watt all band fone xmtr. W0OWK, 4018 So. Lyndale, Minneapolis, Minn.

OAKIE and Little Willie will make you personal phonograph record, $2.50 postpaid, Box 451, Poteau, Okla.

200 bucks will buy my late relay rack model HRO, inc. pwr supp. and 4 sets of coils. All in perfect condx. Will ship express collect in original crate. J. G. Stradling, W4KRD 2222 Peachtree Rd., Atlanta, Ga.

SELL Vibroplex "Lightning Bug" with case, both unconditionally like new, $15. K. E. Bendig, 1000 Midland Bldg., Cleveland, Ohio.

SELL Collins Navy rcvr, type COL-46159, 1500 to 12000 Kc, good condx, $30; RME-84, $70. W5CQF, 1630 Arabella New Orleans, La.

SELL: Navy TBY-8 transceiver, ready to operate portable or mobile. 28–80 Mcs. Write for photos. $45. W7KCH, Dayton, Wash.

SELL transmitter, all-band 300-watt ECO control, complete with pwr supplies. Offer W80PG. 3656 Rawnsdale, Shaker Heights, Ohio.

BACK runs of QST, 1916–1932 inc. Reasonable condx. Send want list. O'Connell, 34 South Portage, Westfield, N.Y.

BC348R for 110V with NC spkr, $100. Arthur Cooper, 103 University St., W. Lafayette, Ind.

COLORTONE QSLS! New, modernistic designs in distinctive colors. DeLuxe! Different! Reasonable! When you send Colortone QSLs, you send the finest! Colortone Press, Tupelo, Miss.

QSLS, SWLS. New designs. Write Dossett, W9BHV, 859 Burlington, Frankfort, Ind.

FOR Sale: HT-9 coils for 4 bands; Nearly new condx. Turner xtal mike, $250. Have Kw going now. Donald Riggs, W3BH, Canton, Penna.

SELL RME-45 rcvr, comp. Kept in excellent condx. Best highest offer over $100. negotiates the transaction. Stanley J. Misorski, WINUE, 18 Clark St., New Britain, Conn.

MEISSNER signal booster, Model No. 9-1008. New tubes. Excellent condx. Best offer accepted. WØCVU, P.O. Box 224, Cedar Rapids, Iowa.

ONE new HT-9 xmtr, comp. with 10-meter coils and xtal, also mike; One SX-28A rcvr, slightly used, in peri. condx with 10" matching spkr. First $500 check takes both. J. H. Stephens, jr. W4JEQ, Box 137 Crawfordville, Ga.

SELL: Ha licrafters S-19R rcvr, Stancor 10-P xmtr, BC474A meter, VFO xmtr and rcvr comp. in exc condx, $60. W1ORN/Ø, 213 Pope, Ft. Leavenworth, Kansas.

RADIO tubes: 50,000 assorted tubes, cheap; for example, 811, $5 Pesos, 6H6, $1.00 peso. Write for details. H. Neuman, Aptdo Aereo, 138 Barranquilla, Colombia.

SELL or swap: FB7A comp. bandspread coils 10 to 80 meters. Best offer. W3FVY, 142 N. Wanamaker St., Phila., Penna.

SELL HRO recently realigned and reserved at National factory, four sets coils, pwr supply, spkr, $155. Want 500 mil filter choke from BC-610. W4KTZ, Eupedon Farm, Clarksville, Tenn.

SX-42 used 3 mos., $250. express collect. No spkr. W8FXN, 1590 Tiffin St., Columbus 5, Ohio

FOR Sale: Pre-war HRO, comp. bandspread coils, no spkr or pwr. supp. Good condx. $130. Harry Kalish, W2LRP, 898 Cauldwell Ave., NYC.

BC-610 Transmitter Wanted. R. F. Farmer 4436 So. Westnedge, Kalamazoo, Mich.

SELL — 50 Watt hi fi R.C.A. Amplifier $70, NC 200-$125, NC 101X-$70.00 W1MS2 2 Shadow Lane, Wellesley 81, Mass.

HIGHEST Bidder Takes All or Individually. Mims 2om Beam Signal Splicer; Shifter Coils; 2A Turrets. W2JIL

SELL: 750 Watt CW XMTR Tri-tet — 807 Dblr — 812 Buffer — PP100THS — 600/10000/2500 power supplies — Steel Rack — Triplett Meters — Antenna Coupler — Overload Relay — 20 Meter Coils — Tube — New Parts — $350. Ray Tomlinson, 623 East Brown St., Trenton 10, N. J.

SELL: Hallicrafter HT-9 transmitter, lo-80 meter coils. $250. W7ADA — 3634-36th West Seattle 99, Wash.

COMMUNICATIONS Receiver — Kaar Model Ke-23A. 500 kc to 42 mc Speaker, S Meter and external crystal filter. First $75 takes it. Hurry. WØZCI Harold Timmerman 2017 Freeman, Kansas City 2, Kan.

SELL: Hallicrafter SX-23, S-Meter, noise silencer, 550 kc to 34 mc, Band spread, with matching speaker. $100. Burwell 4027 Prospect, Kansas City 4, Mo.

QSL Cards, beautiful Lithographed colors, Modern designs, entirely different than the usual run of Cards. Stamp for Samples, Russ Karg, W8DDS 9002 Madison Avenue, Cleveland, O.

FOR Sale: Browning Frequency Standard $25; 00 500 Watt PP 803 Final Amplifier Complete With Coils and Spare Set Tubes $50.00. R. Clough 37-28 86 Street Jackson Heights, N.Y.

4 MFD 600 V.GE Pyranols 80¢. Write for Surplus Bulletin. K. Carlos, W3MJB 2146 Cherry St., Philadelphia 3, Pa.

CHANGING Frequency? Fine commercial cyrstals for Aircraft, Police, Marine, Geophysical and other services. Commercial regrinding: many crystals can be economically reground to new frequencies — inquire. Where quality and not price is the primary consideration — demand Eidson Fine Crystals. Over twelve years of satisfaction and fine service! Try us first. Eidson Electronic Company, Temple, Tex.

SELL: SX-42. New. Less Speaker. First person here with $245. Jack Blackburn, Bedford, Pa.

FOR Sale — New BC-603 FM Receiver, Tubes, Recalibrated Operation 10–11 Meter Bands Plus BC-312 Power Supply — $25.00 — W2Qhl-41 Bayview Terrace, Manhasset, N. Y.

BC-221 AK's (with modulator) Like new. $74.95. BC-454 (3–6 mc) receivers. New, with tuning knob, speaker transformer. $5.95 RA-20 — 110 V. A.C. Receiver Power supply — $6.00. PE 103 — Dynamoters. New. — $7.50. Sprague Condensers — 3mfd. 4000 v. — $4.95. 813 tubes — New — $6.50. Niles Radio Supply, Niles. Mich.

SIX-Band, 12-tube receivers R45/ARR-7 (AAF version of Hallicrafters SX-28A), brand new; cover 0.55 – 1.6 – 3 – 5.8 – 11 – 21–42 mc. Complete with 6-volt tubes but you'll need to make a power unit supplying 6.3 volts A.C. and 135 mils at 270 volts Dc. A top-quality receiver at a rock bottom price — only $99.50 at The Radio Shack, 167 Washington Street, Boston 8, Mass. Mail orders filled promptly.

QSLs? QSLs? SWLs? America's finest! No cheap trash! Samples 10¢. VHF-152A? DB22A? Sakkers Printery, W8DED, Holland, Mich. (Veteran.)

QUARTZ crystal blanks, unmounted crystals, electrodes, and holders for crystal manufacturers and amateurs from a large factory in Brazil, where the best Quartz Crystal is mined. Ask for Bulletin 1–47, address RADIO CRISTAIS DO BRASIL LTDA. P.O. Box 1965. Rio de Janeiro, Brazil

BEAMS; 10-meter, 4 element, high strength, corrosion-resistant, aluminum tubing. Adjustable to your frequency. Complete with T-match and hardware. $31. F.O.B. Write W3NCF, New Kensington, Pa.

KILOWATT Power Supply. Matched Thordarson. 2000/2500 VDC 500 Ma. Completely wired. New. $100. C. R. Thon, W3EOP, 533 Northampton St., Easton, Pa.

PRE-WAR HRO complete $195.00. Excellent condition, W8RM, Port Clinton, Ohio

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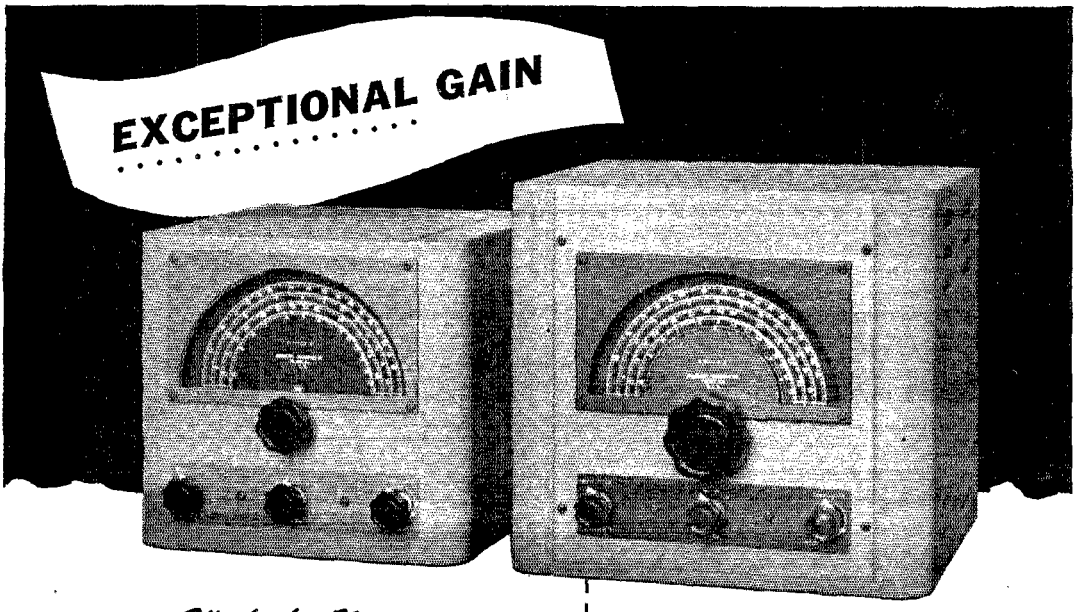


With the New

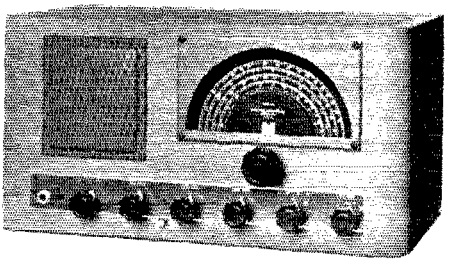
DB22A PRESELECTOR

Because of its advanced preselector design and use of 6BA6 miniature tubes, the new DB22A Preselector has an average overall gain of 30 DB, throughout the tuning range of .54 to 44 MC. Image ratio, too, is phenomenal—better than 50 DB with a communications receiver having a single stage of RF. The DB22A also provides tremendous increase in both gain and selectivity when used with a good communications receiver.

The DB22A is entirely self contained, entirely in a class by itself. Connect it to your receiver just like a good antenna — no extra wiring — no plug-in coils are required.

AVAILABLE IN TWO SIZES

The DB22A is available in two size cabinets: one to match the height of the RME 45, designated as "Standard" and the other to match the RME 84, designated as type "S"



PRECISION BUILT INTO RME 84 RECEIVER

The new RME 84 is a precision instrument — no low priced, "average" components are used anywhere in its construction. Tuning range covers frequencies from .55 to 44 Mc. A planetary drive mechanism, spring loaded to eliminate backlash, makes operating a pleasure. Portability, too, is built into the RME 84. Provision is made for connection to 110 AC, batteries or RME VP-2 vibrapack. Other features include high sensitivity, new series noise limiter and provision for "S" meter.

Write for Illustrated Folders

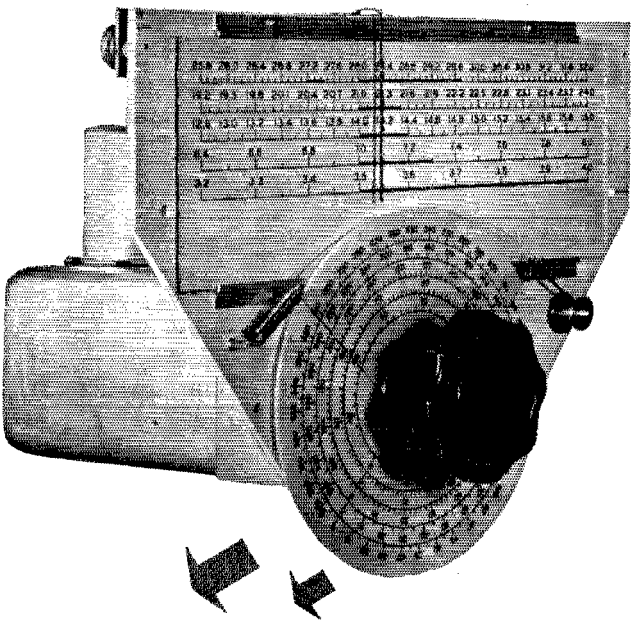
TIME WILL TELL

RME

FINE COMMUNICATIONS EQUIPMENT

RADIO MFG. ENGINEERS, INC.

Peoria 6, Illinois U. S. A.



New!

... a slide-rule dial for the 70E-8

The handsome new Collins-designed dial, which will be standard, now, on the 70E-8 v.f.o., is easier to read, and gives you greater mechanical band spread *and direct reading in kilocycles*.

Each band on the slide-rule has its own vernier scale below. On the 40-meter band, for example, one revolution of the dial changes the frequency 100 kilocycles. Each vernier division is one kilocycle. Direct reading is accomplished instantly by adding the reading of the vernier to that of the slide-rule.

An added feature is the method of zeroing the vernier hair-line, which has a screwdriver controlled adjustment on the panel to provide for exact calibration.

Note: Those who have bought the Collins 70E-8 v.f.o. with the fan-type dial may return it for replacement, free of charge, with this new slide-rule dial. Send it prepaid, well packed, tagged inside and out with your name and address, to "Customers' Returned Goods," Collins Radio Company, Cedar Rapids, Iowa. At the same time, write our Amateur Sales Department at Cedar Rapids, notifying us as to date of shipment.

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

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 West 42nd Street, New York 18, N. Y. **458 South Spring Street, Los Angeles 13, California**

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RUMFORD PRESS
CONCORD, N. H.

Courtesy of Science Illustrated

Captain Bjorn Arnold Rorholt, Los Angeles, Calif.
c/o Norwegian Embassy
Washington, D. C.

Dear OM,

I have the answers to the questions regarding the radio equipment on the Kon-Tiki; I will first put the question as sent to them and then their reply.

1 — Q, Have you tried generator GN58 for receiver?
A, No.
2 — Q, How many batteries did you take?
A, All. 41 six volts and 30 forty-five volts.
3 — Q, Is there any difference in output between generator and battery operation?
A, Not tried yet.
4 — Q, Are you using 6995 KC crystal from the ten meter rig?
A, Yes, but ten meter rig in use too.
5 — Q, Have you removed last audio valve in 173 Receiver?
A, Tried, but receiver then too weak.
6 — Q, What kind of antenna do you normally use?
A, L antenna
7 — Q, Have you tried balloon or kite supported antennas?
A, Both tried.
8 — Q, Have you tried voice modulation since shortly after leaving Peru?
A, Yes, results not good.
9 — Q, Do you use mark two transmitter?
A, Yes, and then very good.
10 — Q, How does the NC-173 stand up under conditions on board?
A, Excellent.
11 — Q, How many hours can you operate the transmitter on one set of batteries?
A, High tension batteries very long life but long articles kill our heater batteries.

In case you did not hear me yesterday their heater batteries are used but Raaby tells me that they make 1½ volt units from their 45 volt batteries and then use four of these for six volts and thus get about four days service from each set. They have about five sets left so are O.K. for sometime yet.

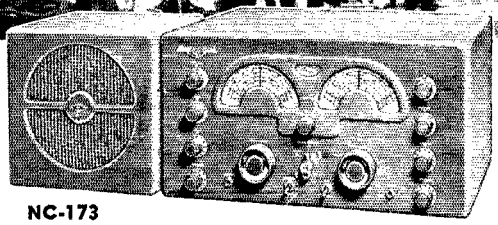
"Pen" sends his vy 73 to you as do I and I hope to work you again soon. I am anxious to meet the boys but I am also going to miss these daily contacts with the raft.

I hope Knut, and Torstein keep up their radio and get on the air when they get back to Norway for I would enjoy very much keeping up our friendship via amateur radio.

Again VY73 to you Pronto and hope to cul.

Very Sincerely,

HAL —W6EVM



NC-173

Frequency coverage from 540 KC to 31 mc plus the 48-56 mc range. Calibrated amateur band spread on 6, 10-11, 20, 40 and 80 meter bands.

Amateur Net....NC-173 (with speaker) $189.50

National
EST. 1914

The press of the entire country has carried stories concerning the day-to-day activities of the 6 young Norwegian scientists, members of the Kon-Tiki Expedition, who set out on a raft to drift more than 5000 miles across the Pacific Ocean.

Very little mention has been made, however, of the battery-powered transmitter and model NC-173 receiver which allowed the Expedition to dispatch over 500 messages and 30,000 words.

These figures furnish one more proof that a National receiver in the hands of a good operator makes an unbeatable combination.

National Company, Inc.
Dept. No. 8
Malden, Mass.
U. S. A.

In tubes for amateur transmitters it's power-gain that counts . . .

. . . and RCA beam tubes have plenty of it

YOUR CHOICE OF RCA BEAM TUBES FOR TRANSMITTER SERVICE					
Type No.	Approx. grid drive (watts)	Max. d-c plate input (watts)	Max. d-c plate volts	Max. freq. at Max. ratings (Mc)	Amateur net price
2E26	0.2	40	600	125	$3.50
807	0.2	75	750	60	2.30
813	4	500	2250	30	14.50
815	0.2	75	500	125	6.25
828	2.2	270	1500	30	12.50
829-B	0.8	150	750	200	14.75
832-A	0.2	36	750	200	10.60

NOTE: Class C telegraphy (ICAS) ratings are shown except for 832-A which are CCS.

The Fountainhead of Modern Tube Development is RCA

WITH POWER GAINS ranging up to 100 to 1 or more it's incredible . . . almost, how little grid excitation you need to drive an RCA beam power tube to full plate input. Receiving tubes do it easily.

What are the transmitter design benefits? Plenty. RCA beam tubes make it practical to use fewer stages . . . fewer components . . . fewer tuning controls . . . smaller, less expensive drivers. They provide true circuit stability for frequency-shifting. They need no neutralizing in well designed circuits. And a beam tube transmitter takes less power.

Pioneered by RCA engineers . . . and continually improved, it is natural that beam tubes are our specialty. For more information, ask your distributor for a copy of "RCA Headliners for Hams" or write RCA, Commercial Engineering, Section M54J, Harrison, New Jersey.

BIG CIRCUIT STORY ON THE 807 BEAM TUBE . . . in the May-June issue of RCA Ham Tips. Get your copy at your local RCA Tube Distributor.

TUBE DEPARTMENT

RADIO CORPORATION of AMERICA

HARRISON, N. J.