

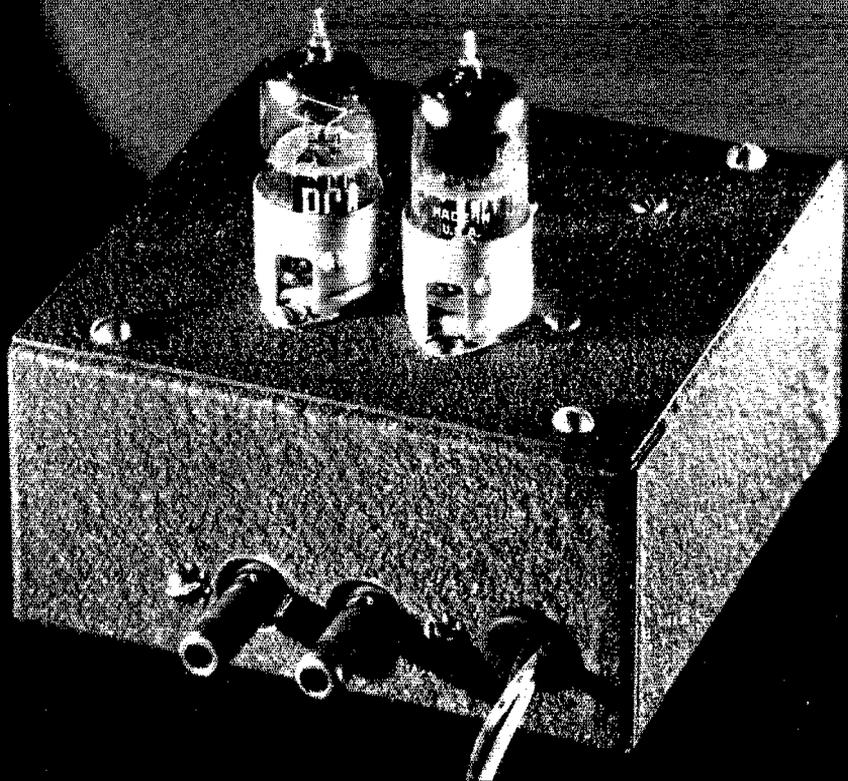
November, 1947

35 Cents

QST

devoted entirely to

amateur radio



PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

Outstanding

...for DX or RAG-CHEWING

The only high level cardioid crystal microphone with Dual Frequency Response. Gives you high fidelity for clear channel, or rising characteristic for extra crisp speech signals that cut through QRM. Brings more and better QSO's. Also overcomes room reverberation, permits working at greater distance.

THE Cardax

CARDIOID CRYSTAL MICROPHONE



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MODEL 910

CRYSTAL MICROPHONE

Here is new smartness, new performance you can enjoy at low cost. This modern E-V crystal microphone has high output (-48 db) ... and voice quality that gets answers to your CQ's. Extra rugged for rigorous service. Satin chrome finish.

Send for Catalog and Selection Guide No. 101

ELECTRO-VOICE, INC.
Buchanan, Michigan

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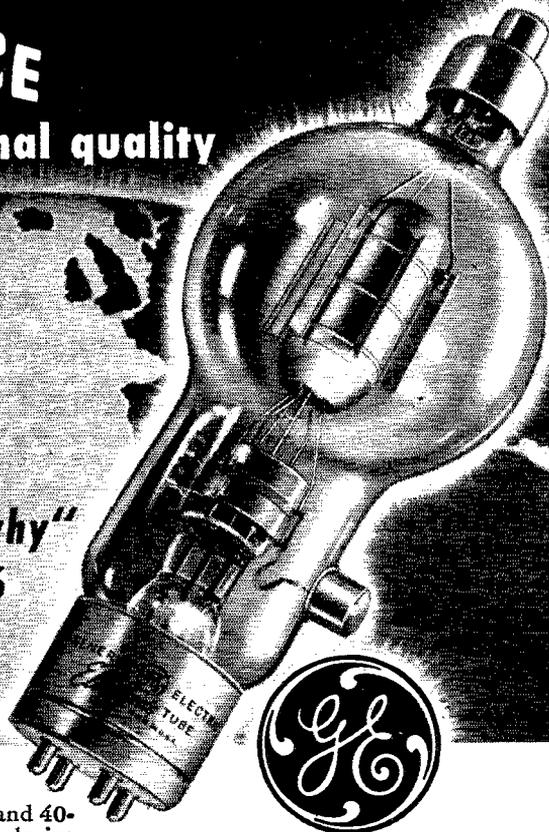
NO FINER CHOICE THAN

Electro-Voice

DISTANCE

with topnotch signal quality

that's the "why"
of Type GL-806
for your final!



YOU may be pounding brass on the 10, 20, and 40-meter DX bands . . . or going after those elusive 10 and 20-meter phone contacts. Either way, a GL-806 triode will give you that clean, positive signal you've been seeking.

Here is a real big-league performer with "what it takes" to talk to the other fellow half-way 'round the globe! A single GL-806 rates up to 1,000 w max CW input (ICAS), or 600 w phone. The tube's top frequency at full input is 30 mc, assuring 10-meter-band operation with throttle wide open.

Other features: (1) Extremely low plate-filament capacitance (0.4 mmfd) means a more easily designed tank circuit. (2) All the tube's capacitances are low because plate and grid connections are brought out to the top and side of the bulb respectively. (3) The tantalum plate of the GL-806 surrounds the other electrodes, thus conserving power by eliminating loss from bulb bombardment and stray electrons.

Give this 1-kw champion a prominent part in your DX plans for winter and spring! Your G-E tube distributor gladly will supply you with price and further details. *Electronics Department, General Electric Company, Schenectady 5, N. Y.*

Be sure to ask your G-E tube distributor for the latest copy of Ham News. It's free!

ELECTRICAL CHARACTERISTICS

Filament voltage	5 v
current	9.5 amp
Interelectrode capacitances:	
Grid-plate	4.0 mmfd
Grid-filament	5.5 mmfd
Plate-filament	0.4 mmfd
Frequency at max ratings	30 mc

Typical Class C Operation, 1 tube (ICAS)

	CW	PHONE
Plate voltage	3,300 v	3,000 v
current	300 ma	195 ma
Grid current (approx)	40 ma	27 ma
Driving power (approx)	34 w	24 w
Power output (approx)	780 w	460 w

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

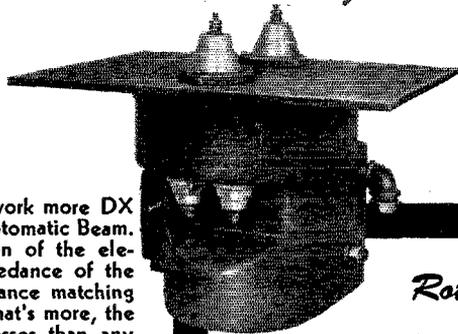
GENERAL ELECTRIC

161-F22-8850

JOHNSON

Rotomatic

BEAM ANTENNA



Heavy-duty drive unit is self-lubricating and fully enclosed.

You'll have more QSOs, work more DX with the new JOHNSON Rotomatic Beam.

Because of the construction of the elements, which match the impedance of the open wire line, exact impedance matching is possible on two bands. What's more, the open wire line has lower losses than any other method of feed.

In spite of the JOHNSON Rotomatic's tremendous increase in directivity and gain, and resultant front to back ratio, it possesses such broad band characteristics that it can be used over a wide range of frequencies. That old bug-a-boo, sagging of the elements, is entirely eliminated by a special alloy tubing.

The drive unit is really heavy-duty—providing rotation through 360° at 1½ RPM. May be purchased without motor for hand drive. The combined direction indicator, with great circle map and beam control, is a marvel of operating efficiency—where speed counts as never before.

New direction indicator and beam control is Selsyn motor operated.



Write For Latest
JOHNSON Catalog

Rotomatic Features

NEW ANTENNA ARRAY

The entire unit is so strong and light that it will withstand heavy icing and extremely high winds. Adjustable elements that are permanently sealed against corrosion with a tough, clear plastic for efficient radiation.

Two band operation with Deluxe model. Two arrays fed with same transmission line, switched by low-loss RF relay.

Receive better, too! Selective receiving reduces interfering signals.

NEW MATCHING SYSTEM TO OPEN WIRE LINE

New matching system permits efficient wide band operation and freedom to move about from the low to the high end of the bands. In addition, the open wire line results in the lowest losses possible.

NEW HEAVY-DUTY DRIVE UNIT

Powerful, smooth rotation through 360° at 1½ RPM.

Mechanism is self-lubricating and fully enclosed in weather-proof housing.

Universal bracket for mounting on pole or platform. May be driven with ½ HP motor or larger — rated at 1750 RPM.

NEW DIRECTION INDICATOR AND BEAM CONTROL

Selsyn motor controlled indicator. Indicating arrow glides through 360°, in either direction, under great circle map of world etched on convex dial face. Stop beam anywhere instantly.



JOHNSON ... a famous name in Radio

E. F. JOHNSON CO. WASECA, MINNESOTA

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

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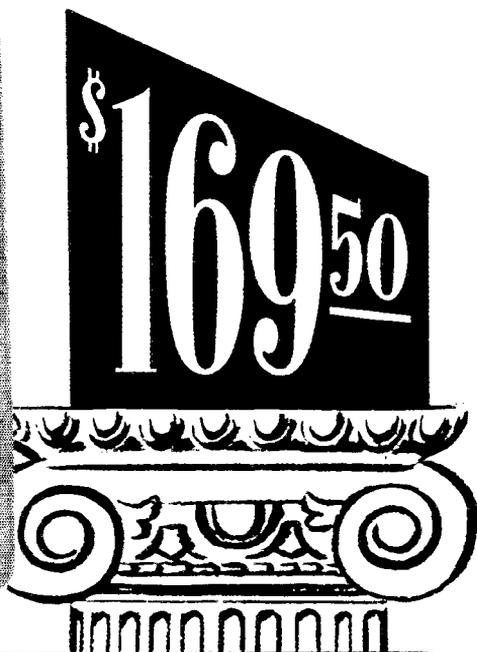
Model
SX-43

"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.

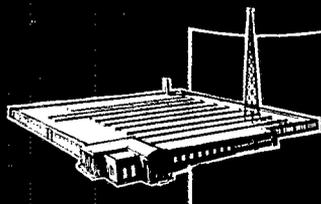
This new member of the Hallicrafters line offers continuous coverage from 540 kilocycles to 55 megacycles and has an additional band from 88 to 108 megacycles. AM reception is provided on all bands, except band 6, CW on the four lower bands and FM on frequencies above 44 megacycles. In the band of 44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



- 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

THE HALLICRAFTERS CO., MANUFACTURERS OF RADIO AND ELECTRONIC EQUIPMENT, CHICAGO 16, U. S. A.

Sole Hallicrafters Representatives in Canada:
Rogers Majestic Limited, Toronto-Montreal

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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Jensen

Model J-61

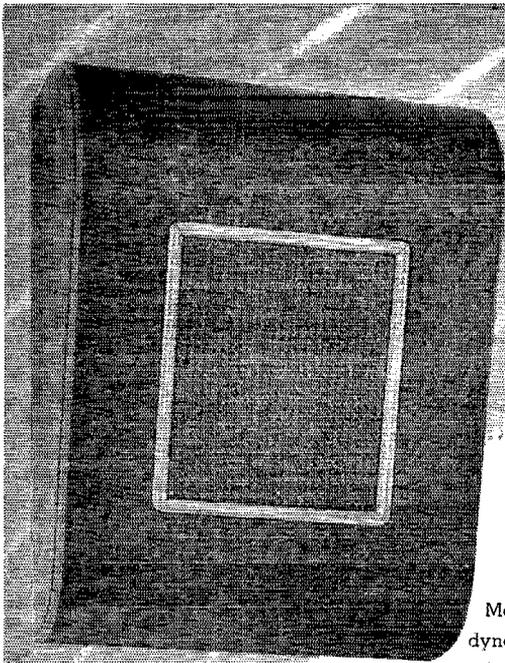
WALL CABINET

Model J-61 Wall Cabinet, employing the Peridynamic principle, is another new JENSEN enclosure, destined for wide use in such public address installations as hotels, factories, schools, airports, railroad stations and offices.

It may also be used to enclose extension speakers in homes. It can be used with any 6-inch speaker.

Model J-61 Wall Cabinet is of durable construction and beauty of design and finish and is formed of attractively textured brown composition wood over solid wood frame. The grille is of matching brown fabric with chrome trim around aperture. Brackets for wall mounting are furnished. On the back is mounted a 5-lug terminal strip. Height, 16-2.3 inches; width, 12 $\frac{3}{4}$ inches; depth, 6 $\frac{1}{4}$ inches.

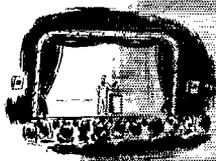
Model J-61 Wall Cabinet (ST-751) . . . \$14.50



OFFICES



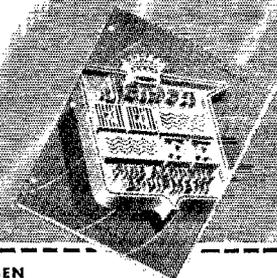
AIRPORTS



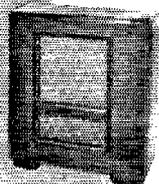
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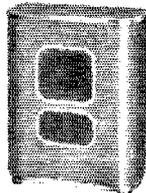
RAILROAD STATIONS



JENSEN BASS REFLEX CABINETS



TYPE D



TYPE B



TYPE H

*Designers and Manufacturers
of Fine Acoustic Equipment*

JENSEN
MANUFACTURING CO.
6611 S. LARAMIE AVENUE

Please send me a copy of the 1947 Jensen catalog.

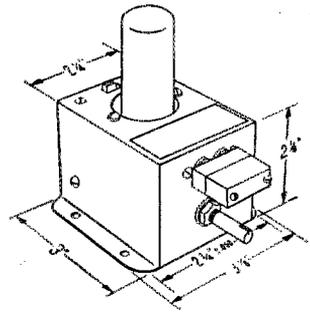
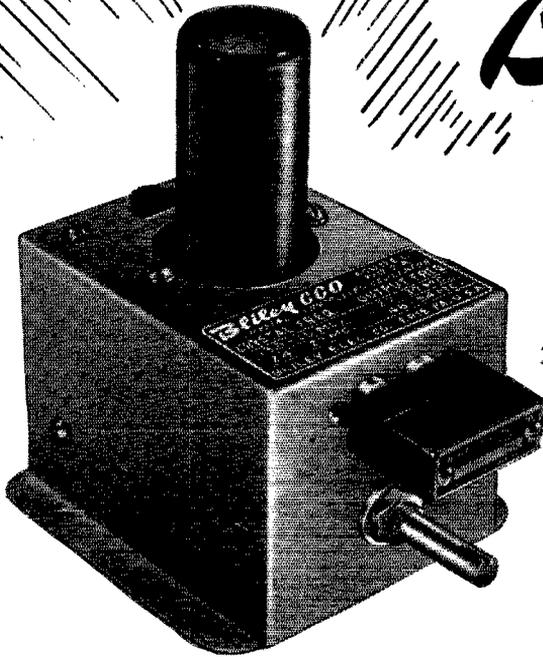
Name.....

Address.....

City..... Zone... State.....

Bliley CCO

MODEL 2A

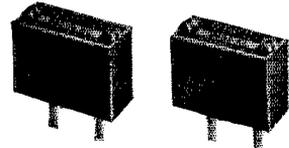


A COMPLETELY PACKAGED OSCILLATOR UNIT FOR THE 2-6-10-11 METER BANDS

As a basic unit in the construction of your amateur rig Bliley offers the new CCO-2A crystal controlled oscillator, factory engineered for peak performance in the 2-6-10-11 meter bands. Amateurs agree that guesswork and extra expense are eliminated when a Bliley packaged oscillator is used as a starting point in construction of new equipment.

The CCO-2A is the ideal nucleus for an efficient 4-band transmitter providing output directly on 6-10-11 meters with only a tripler stage needed for 2-meter operation. Maximum output is obtained with single dial tuning and self-oscillation is entirely eliminated. Ample drive is available for VHF medium power tubes.

The CCO-2A is recommended for use only with Bliley type AX2 plated crystals for 10-11 meters and the new Bliley AX3 plated crystal for multiplication to the 2-6 meter bands.



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

**AVAILABLE NOW THROUGH YOUR
BLILEY DISTRIBUTOR**

CCO-2A less tube (6AG7) and crystal. \$9.95
 AX2 crystal, 11 meter multiplier, 13580-13715 Kc. . . 3.95
 AX2 crystal, 10 meter multiplier, 14000-14850 Kc. . . 3.95
 AX3 crystal, 6 meter multiplier, 25000-25500 Kc. . . 3.95
 AX3 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
 CRYSTAL CONTROLLED OSCILLATORS

GET **SYLVANIA QUALITY** in TRANSMITTING Tubes too!

INVESTIGATE THE TYPE 3D24

BEAM POWER TETRODE WITH ELECTRONIC GRAPHITE ANODE

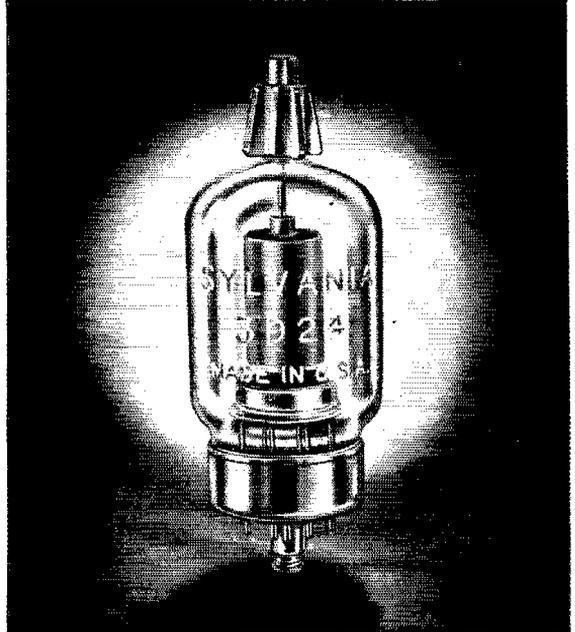
First of Sylvania's new line of transmitting tubes, the 3D24 is a four-electrode amplifier and oscillator with 45 watt anode dissipation. An outstanding development is the electronic graphite anode, which allows high plate dissipation for small area and maintains constant interelectrode relationship and uniform anode characteristics.

The 3D24 may be used at full input up to 125 Mc—maximum permissible frequency will be announced later upon completion of tests.

OTHER FEATURES INCLUDE:

1. **Top cap** providing for short path, greater cooling by radiation and convection, resulting in a cooler seal.
2. **Thoriated tungsten filament**, giving high power output per watt of filament power.
3. **Vertical bar grids.** #1 grid supplied with two leads for better high frequency performance. #2 grid provided with heat-reflecting shield for greater dissipation, low grid-plate capacity.
4. **Low interelectrode capacity.** No neutralizing needed with proper circuit arrangement.
5. **Hard glass envelope.** Permits high power for small size.
6. **Lock-In base.** Short leads, no welded or soldered joints.

The 3D24, a product of the Electronics Division of Sylvania Electric, has interesting potentialities in amateur, police, mobile and marine radio.



MECHANICAL SPECIFICATIONS

Type of cooling	Air—radiation and convection
Mounting position	Vertical, base down or up
Length overall	4.3 inches max.
Seated height	3.769 inches
Diameter	1½ inches
Net weight	1.3 ounces

ELECTRICAL CHARACTERISTICS

Filament Voltage	6.3 volts
Filament Current	3.0 amperes
Amplification Factor	50
Direct Interelectrode Capacitances	
Grid-Plate	0.2 μmf max.
Input	6.5 μmf
Output	2.4 μmf
Maximum Class "C" Power Input	180 watts C. C. S.

Direct inquiries to Radio Tube Division, Emporium, Pa.

SYLVANIA ELECTRIC

MAKERS OF RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES; FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES; ELECTRIC LIGHT BULBS

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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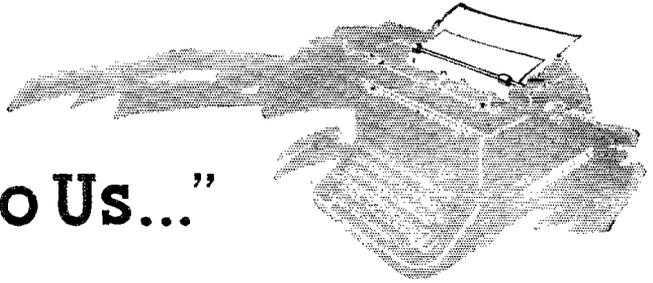
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"It Seems to Us..."



TVI

Amateur radio today faces a threat to its well-being, perhaps potentially greater than any obstacle we have heretofore met.

The television broadcast service is rapidly utilizing its frequency assignments in the range 44 to 88 Mc. More and more new stations are being constructed, more and more receivers are being purchased — and each speeds the other. Soon every sizeable city and town will have television service and many, many receivers.

A television receiver is the direct engineering opposite of the highly-selective equipment we communications services — amateur, fixed, mobile — use for our own receiving needs. It has a wide-open "front end," a Welcome mat for any signal on adjacent channels. It is also susceptible to interference from almost any kind of *near-by* transmitted signal, no matter what the frequency, no matter whether the transmitter is operating in full accord with existing regulations. And our amateur transmissions constitute a great many of such near-by strong fields. Being people, our numbers predominate in the major population centers — precisely where TV is getting first established and will have its largest growth.

It can be — yes, has been — demonstrated that a 28-Mc. amateur transmitter, carefully engineered, meticulously checked for harmonic output, and otherwise operating in strict accord with regulations to the extent the present technical state of the art permits, can still cause general interference (on Channel No. 2, 54-60 Mc.) to television receivers located within a half-mile or so. In major population centers, the radius of a half-mile or so surrounding an amateur transmitter includes a whale of a lot of people and, eventually, a good many television receivers.

But the public won't know it isn't the amateur's fault, that we are operating our transmitters in accord with regulations. It is a technical matter John Q. cannot be expected to understand. All he knows is that he paid \$375 — or \$1175 — for his TV set and feels he is entitled to interference-free reception. Generally speaking, his receiver will be "of good engineering design" to the extent that economics and the nature of television permit.

All this points to the certainty that in areas where television becomes established, stations in the amateur service using the 28-Mc. band, and even some of the lower ones, are going to cause general interference to television reception — interference that, in the present state of the art, cannot be eliminated. When it's one ham against hundreds of lookers-in, who do *you* think will win? Although such bands will remain assigned to us in regulations, the practical effect may well be that numerous amateurs will be denied the use of them in many areas during certain hours. And, mind you, those areas will probably soon include half the people — and therefore half the amateurs — in the country.

The present allocation of channels to television and adjacent services is a result of the 1944 FCC hearings, where the basis of radio's postwar allocations plan was produced. The League has long maintained that frequency allocations to amateurs should be, at least insofar as possible on the lower frequencies, harmonically related. The Hoover conference of 1924 was the first to assign amateur bands in harmonic relation. The wisdom of that policy has been proved again and again. In testimony before FCC at the 1944 hearings we said in part, "below 60 megacycles it is of very great technical desirability that the amateur allocations be in harmonic relationship, at least as concerns a portion of each band." But the pressure for television channels was so great that agreement among all the parties concerned could be reached only on the basis of a shift of our 56-Mc. band to 50-54 Mc., a move that permitted squeezing in an extra TV channel by the method explained in detail in earlier *QSTs*. At those same hearings it was the consensus of the engineering minds of the country that the unused (alternate) television channels in any one region could be utilized by fixed or mobile services without interference. How erroneous this thinking proved to be has been vividly demonstrated during the past year — it just doesn't work.

The situation became so difficult that in June of this year FCC called a special, but informal, engineering conference to try ironing out some of the problems which included, although to a

lesser extent, that of amateur harmonics. Data presented at this meeting indicated conclusively that it was impractical to continue shared use of television channels. The League was represented at that hearing, as has been reported in *QST*. Our position was plainly stated: It is bad allocation engineering to assign any kind of broadcast service to channels which are harmonics of amateur bands. There are so many amateurs that in metropolitan areas interference to such services as television is bound to result, and no amount of technical engineering can eliminate it completely.

After studying the viewpoints and technical data presented at the June meeting, FCC issued a notice of proposed rule making, announcing its intention of abolishing Television Channel No. 1, 44-50 Mc., and putting in that band the fixed and mobile users which had found unworkable the sharing arrangements in higher television channels. The Commission intends to call a formal hearing soon to discuss this and allied problems. The only other item in the proposal which is part of our story is FCC's comment: "Possibilities of interference to television from such sources as harmonic radiations, television receiver response to stations on intermediate or image frequencies and television 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."

Now while fully realizing the many engineering difficulties, arising both from spectrum limitations and from the very nature of TV, confronting those who make the radio regulations, we believe it unwise to dismiss so lightly a subject which easily can become the greatest interference problem in the history of broadcasting. The situation is — or certainly will be — so serious that *any* change offering improvement will benefit not only the general TV-viewing public and the services on near-by channels, but also *FCC's own administration of the interference problems.*

What can be done? Well, if the Commission holds to its intention to eliminate Channel No. 1, there is one change in the 44-88 Mc. range which can help appreciably in the areas where Channel No. 2 is assigned. The League has made plans to propose it at the Commission's formal hearing. It calls for a switch in the location of Television Channel No. 2 and our 6-meter band, making Channel No. 2 thenceforth 50-56 Mc. and moving our band back to its prewar figure of 56-60. Now that FCC proposes to abolish Channel No. 1, thereby discarding the basis on which our 56-Mc. band was moved in the first place, our suggested change will not affect the system of assigning alternate television channels in one

area. The change would not affect the number of kilocycles available to any service. It has the most important feature of permitting the second harmonic of 28 Mc. to fall within one of our own bands. It does not guarantee that those harmonics no longer will interfere — but it at least gives us a fighting chance to solve the problem on our own. Despite the new Atlantic City allocations, it seems to us that the change could be made by the concerted action of the countries of the American Region, and that it ought to be done.

The above proposal is contingent on and additional to FCC's plan to abolish Channel No. 1. But the Commission's announcement of intention to eliminate a TV channel opens the way for an alternative idea which appears to us an ideal solution for all concerned. It is simply to *abolish Channel No. 2, 54-60 Mc.*, (rather than No. 1) and put there the fixed and mobile users who can no longer share TV bands. No other change would be necessary. Television would still lose a channel, as already proposed by FCC, but the number of kilocycles available to other services would not be affected. Amateur 28-Mc. harmonics would no longer be the curse of TV reception, as they would fall in a fixed-and-mobile band where receiving equipment of normal selectivity would be in use — and in unusual cases the amateur could shift his operating frequency so that its harmonic would not interfere with local fixed services, a solution not possible when 54-60 is used for TV. Second harmonics of 27-Mc. diathermy, presently the major source of TV interference, would no longer fall in a television band and plague reception. In addition, the change has further desirable features as compared to switching our 50-Mc. band and Channel No. 2: It would not require a "conspiracy" by countries of the American Region to derogate the treaty; it would not require the realignment of thousands of television receivers now in use; it would permit us to remain at 50-54 Mc. The only hardship worked would be in requiring the two (presently known) stations operating on Channel No. 2 to shift to Channel No. 1. We believe that everyone — including the station owners themselves — will agree that is a small price to pay for interference-free television reception.

We shall be present at the Commission's formal hearing to present both of these plans, throwing our strongest support behind the second one as the solution offering least inconvenience to all concerned. If FCC decides against either change, it will soon have to ask Congress for a doubling of the appropriation for its field-engineering offices; they are going to need twice as many people simply to handle TV-interference complaints of 28-Mc. harmonics. — *J. H.*

Four-Twenty Is Fun!

Simple Gear for Use Below One Meter

BY E. P. TILTON,* W1HDQ

BUILDING a new array for 20 or 10 this fall? If so, you'd probably like some answers; answers that come only with considerable labor and expense when the experiments are made at normal communication frequencies.

How much will height-above-ground affect the beam's performance? Want some horizontal and vertical patterns? How about this close-wide spacing controversy? Will your favorite matching device really give you a flat line? Is a fourth element worth the trouble? The answer is the same for all these questions, and many others: take no man's word for it. Find out for yourself — with

in working with test models on 14 or 28 Mc

Models working on 420 Mc. are fine for the v.h.f. man, too. Maybe you've been wondering whether a plane reflector might not be better than parasitic elements on that new 2-meter array, but you've held back on the project because it requires quite a framework. A window screen in back of a 420-Mc. model will give you the answer. Are directors of any value when added to a large phased array? Though 2-meter antennas aren't too large, it's still infinitely easier to get the answer on 420 Mc.

Want to measure the gain of your favorite multielement array? Models on 420 Mc. are used by W. F. Hoisington, W2BAV, for this purpose, as follows: Set up a dipole radiator at a distance from a field-strength indicator. This may be any distance and it will depend on the power of the transmitter and the sensitivity of the indicating device. Be sure that the coupling and matching systems are adjusted for optimum output. Now hook up your pet beam, and measure the distance from the beam to the field-strength meter at which the same reading is obtained as with the dipole. The square of the ratio of the two distances is the gain of your array.

An example is given of an 8-element array tested in the ARRL laboratory. The reference distance with the dipole was 17 inches. To get the same reading with the array it was necessary to back off to 74 inches, 4.35 times as far, or a gain of approximately 19 times. Converted to db., this indicates a gain of between 12 and 13 db. for the array under test.

And there's still another use for the u.h.f. gear — you can use it for communication! The equipment required is simplicity itself; it should appeal to many who feel that amateur radio is fast becoming more professional than amateur. Here is a field where radio principles may be seen in basic form, uncluttered by the elaborate mechanical and electrical accessories that have made opera-

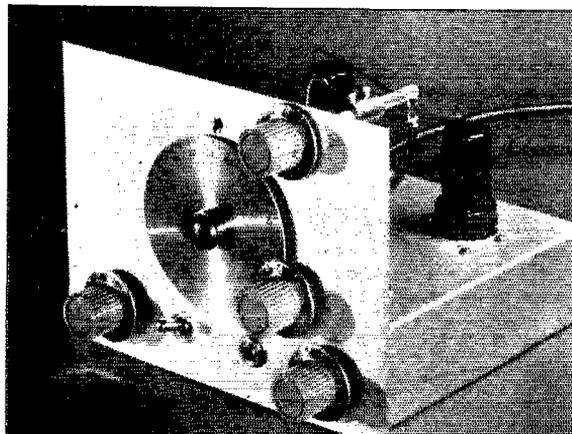


Spotlighted on our cover this month, this simple transmitter for 420 Mc. uses two 6J6 tubes in push-pull-parallel. Antenna coupling terminals project through the front of the chassis.

420-Mc. models. Up here where a half-wave antenna is less than 13 inches long, you can learn more about directional arrays in an interesting afternoon in the back yard than a week of element trimming and tower climbing could tell you

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

◆
A superregenerative receiver for 420 Mc. The two lower controls are for variation of detector voltage (left) and audio gain. The vernier dial controls the position of the tuning vane, while the knob at the top adjusts the antenna coupling.
◆



November 1947

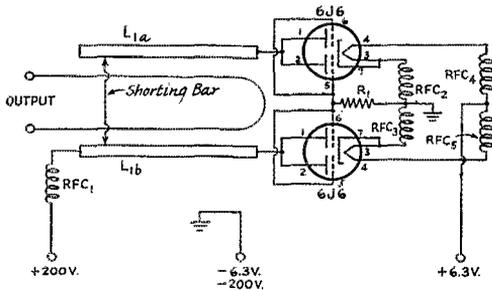


Fig. 1 — Circuit diagram of the 420-Mc. transmitter. R_1 — 2700 ohms, $\frac{1}{2}$ watt. L_{1a} , L_{1b} — Plate line; see Fig. 2. RFC_1 , RFC_2 , RFC_3 , RFC_4 , RFC_5 — 6 turns No. 20, $\frac{3}{16}$ -inch inside diameter, $\frac{5}{8}$ inch long.

tion on lower frequencies a terrifying prospect to the beginner or nontechnical old-timer.

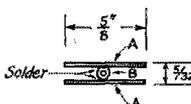
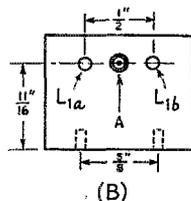
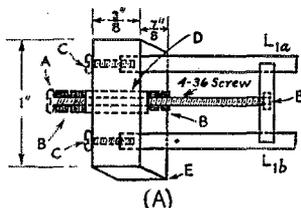
The 420-Mc. band is logical territory, too, for the 2-meter enthusiast who likes operation with the simplest sort of gear, but who is now almost forced out of business by the current stabilization of that band. There is no denying that 144 Mc. is fast becoming crystal-control-and-superhet territory; the overpowering advantages of stabilization and selective receivers (in a relatively narrow band), and the availability of many war-surplus rigs which are easily converted to amateur service, have turned the trick. Use of such equipment on 144 Mc. has reached the point where the modulated-oscillator-and-superregen fellows are just out of luck.

Not so, 420. Here we have thirty megacycles to play around in; plenty of room for all. There is not much likelihood that there will be any great

use of crystal-control or selective receivers in this band for the present. And it's not beyond the reach of the receiving-tube technique, either. Look over the transmitter and receiver built by W1JEQ of the ARRL Lab. staff, and described herewith; then get out the copper tubing and hack saw, and let's have some 420-Mc. fun!

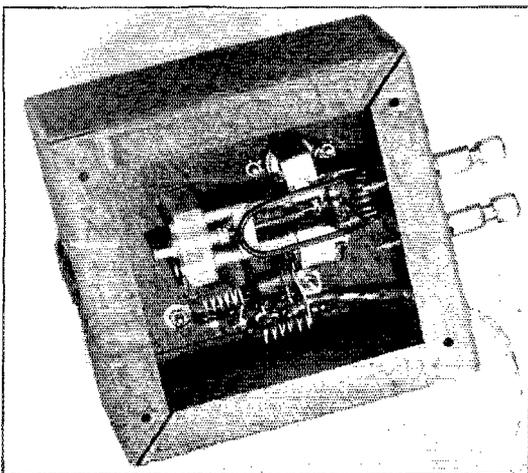
The Transmitter

Yes, there are receiving tubes that are capable of generating usable amounts of r.f. at 420 Mc. Of the ones that are available, the 6J6 is a logical choice. The little transmitter pictured is hardly



(C)

Fig. 2 — Detail drawing of the plate-line assembly used in the 420-Mc. transmitter. A shows the lines and method of mounting in the polystyrene block, which is shown in detail at B. The shorting bar, for frequency adjustment, is shown at C. In view A parts B are 4-36 nuts which are tightened on shaft A, a $\frac{1}{2}$ -inch 4-36 screw. Part D is a bushing which is embedded in the polystyrene block. It serves as a bearing.



Bottom view of the 420-Mc. transmitter, showing the plate-line assembly. Note wide strips used to make connection to the tube plates.

original in concept; in fact, it was lifted bodily from a piece of aircraft gear known as the AN/APS-13. Using a pair of 6J6s in push-pull-parallel, it is capable of an input of 15 watts without damage to the tubes, and the output of a couple of watts or so is enough for the purposes at hand. Since a gain of 15 db. is available in a compact array (a 16-element array is about 2 by 3 feet in size), the 2 watts is hopped up easily to the equivalent of 60 watts in a dipole.

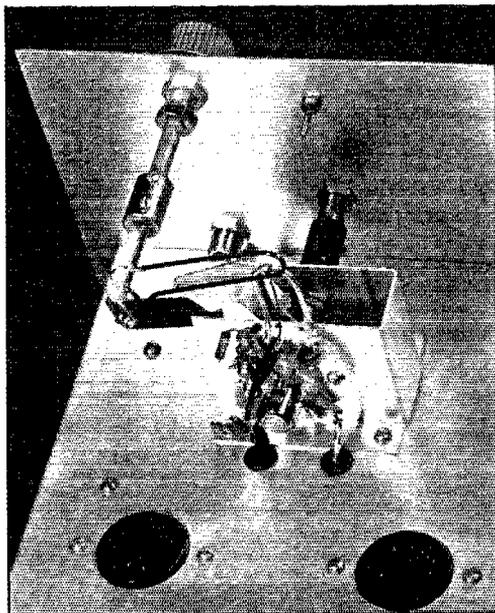
The tank circuit used is best explained by the under-chassis view and a few detail drawings. The line was made of $\frac{3}{16}$ -inch copper tubing,

which can be tapped with a 6-32 thread by running the tap into the end of the tubing. This makes a simple method of mounting the tank circuit on a small block of polystyrene. The shorting bar is made of spring bronze, two pieces being soldered to opposite faces of a 4-36 nut which has been filed down slightly, so as to be somewhat smaller than the tubing diameter. A long 4-36 screw, mounted on the polystyrene block as shown in the detail drawing, provides for frequency adjustment. Movement of the shorting bar the full length of the tank circuit just about covers the 420-450 Mc. range. Output drops off slightly at the high end, as might be expected with most of the tank circuit shorted out. Note that the two plates of each 6J6 are connected to the tank circuit by means of strips of copper strap $\frac{3}{8}$ inch wide. You just don't use *leads* at this frequency!

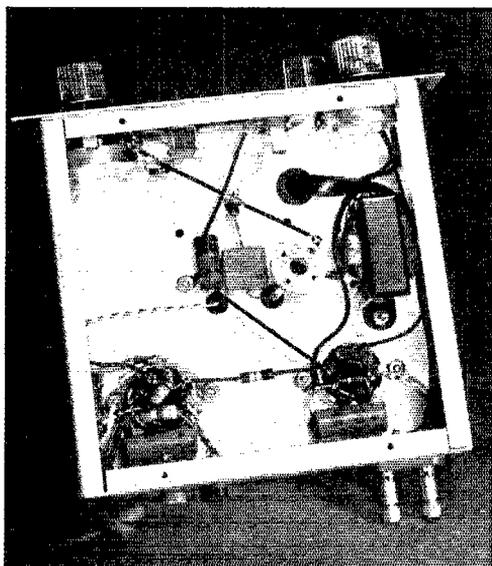
The unit is mounted on the top plate of a small-sized utility box, with the antenna coupling loop attached to antenna terminals on the side of the case. Frequency adjustment is accomplished by inserting an insulated screwdriver through a small hole in the opposite side of the box. Power-supply requirements are 6.3 volts at 1 amp. and 200 to 250 volts at 60 ma. The modulation can be supplied by a single 6V6.

The Receiver

Satisfactory tuned circuits for 420-Mc. receiver use were more of a problem. The shorting-bar technique used for the transmitter would be



Close-up view of the detector assembly used in the 420-Mc. receiver. The frequency coverage is attained by moving a copper vane across the "U"-shaped detector tank circuit, maximum frequency being reached when the loop is covered by the vane. Antenna coupling is varied by means of the hairpin loop at the left. The two audio tubes were removed from their sockets to permit a clear view of the tuning system.



Bottom view of the 420-Mc. receiver. Loudspeaker terminals are at the lower left. At the right are the antenna terminals, from which a length of 300-ohm line runs up through the chassis to the antenna coupling loop.

noisy, if used for tuning a receiver circuit, and conventional coils and condensers were out of the question. A simple solution is the tuning-vane arrangement shown in detail in the rear-view photograph.

A "U"-shaped loop of wire is connected between plate and grid of a 955 triode (with a blocking condenser on the grid side, of course) and the inductance of this loop is varied by moving a vane of sheet copper in a plane parallel to the loop. The vane is attached to a $\frac{1}{4}$ -inch rod of insulating material, which serves as the tuning shaft. The shaft could be made of metal, but this would necessitate using care to see that the vane did not touch the loop at any point in its travel, as the plate supply would then be short-circuited to ground.

Variable antenna coupling is provided by a hairpin loop, also attached to a polystyrene rod which is controllable from the front panel. As regeneration control is very critical at this frequency, some method of adjusting the antenna coupling from the front panel is absolutely necessary, if anything like uniform sensitivity is to be obtained as the operator tunes across this relatively-wide band.

Except for the details mentioned above, the receiver is similar to the superregenerative jobs

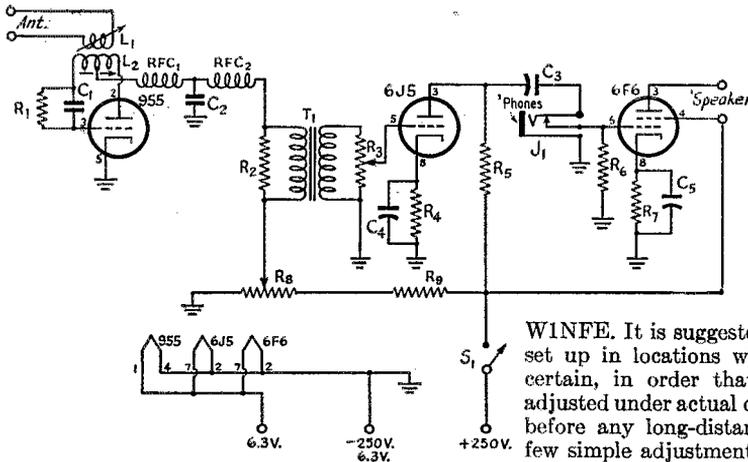


Fig. 3.—Schematic diagram of the 420-Mc. receiver.

- C₁ — 50- μ fd. trimmer (National XLA-C).
- C₂ — 0.0033- μ fd. mica.
- C₃ — 0.01- μ fd. 400-volt paper.
- C₄, C₅ — 10- μ fd. 25-volt electrolytic.
- R₁ — 1.2 megohms, $\frac{1}{2}$ watt.
- R₂ — 47,000 ohms, $\frac{1}{2}$ watt.
- R₃ — 0.5-megohm potentiometer.
- R₄ — 2200 ohms, $\frac{1}{2}$ watt.
- R₅, R₆ — 0.1 megohm, $\frac{1}{2}$ watt.
- R₇ — 470 ohms, 1 watt.
- R₈ — 50,000-ohm potentiometer.
- R₉ — 22,000 ohms, $\frac{1}{2}$ watt.
- L₁ — Hairpin loop; No. 12 wire with an inside diameter of $\frac{3}{8}$ inch and a length of 2 $\frac{1}{2}$ inches. Vane-tuned — see text and photograph.
- L₂ — Hairpin loop; No. 12 wire with an inside diameter of $\frac{1}{2}$ inch and a length of 2 inches.
- J₁ — Closed-circuit jack.
- RFC₁ — 4- μ h. r.f. choke (Millen 34300).
- RFC₂ — 10-mh. r.f. choke (Millen 34210).
- S₁ — S.p.s.t. toggle switch
- T₁ — Interstage transformer.

used for years on lower v.h.f. bands, and it should present no new problems to v.h.f. workers who have been accustomed to superregenerative-receiver peculiarities. The serious worker will undoubtedly wish to improve his reception technique, once he has had a taste of 420-Mc. activity, and the superhet will be a logical step. The broad i.f. strips used in radar receivers and other wartime applications should be ideal for use on this band, and the construction of a suitable converter for 420 Mc. should not be difficult. The vane-tuning system here described would be useful in the r.f. section of such a set-up.

Results

This little transmitter and receiver were set up in the attic of a house on Martha's Vineyard Island during the writer's vacation. No thrilling DX was worked, but strong signals were exchanged with WINFE at Woods Hole, Mass., about seven miles across Vineyard Sound. The 16-element array shown on the October QST

cover was used, also inside the attic. The path was only slightly below line-of-sight, but there were houses and trees intervening for a mile or more at the Island end. Signals were strong both ways, eventually, though several tries were necessary before it was possible to hear anything of

WINFE. It is suggested that the equipment be set up in locations where a signal exchange is certain, in order that the equipment can be adjusted under actual communication conditions, before any long-distance work is attempted. A few simple adjustments made in this way may be the difference between success and failure over longer distances.

As in the case of our more-used v.h.f. bands, any distance over which line-of-sight obtains is not difficult to negotiate on 420 Mc., and paths somewhat beyond line-of-sight are workable under ordinary conditions, even with the simplest sort of gear. What happens when peculiar atmospheric conditions prevail, or what will develop as amateur technique on these frequencies improves, is anybody's guess. It is logical to assume that the phenomenal distances now being worked on 144 Mc. can also be covered on 235 and 420 Mc., and it is highly probable that atmospheric duct effects may be present to extend the operating range on 420 Mc. when no propagation peculiarities are in evidence on lower frequencies.

What is in store for us on this and higher frequencies will be known only when more of us get in there and work one another regularly. Who can deny that we have another intriguing chapter in the history of expanding amateur horizons awaiting our occupancy of the 420-Mc. band in greater numbers? Let's go!

Strays

Speaking of the romance of ham radio . . .

Recently W1NUF was married to W1NHN by W1IDR, whose XYL is also a licensed amateur. The wedding ceremony took place in Dedham, Mass., on Needham Street. One of the ushers was W1JLI, while JLI's XYL acted as bridesmaid. Another bridesmaid was the XYL of W1JNX.

National Bureau of Standards has discovered that a small diamond crystal placed between electrodes of approximately 1000 volts potential difference will indicate the presence and intensity of gamma rays by the number and frequency of pulses flowing in the circuit. These pulses result from action on the diamond by the gamma rays.

Audio Filters for the Speech Amplifier

Designing Around Available Components

BY JULIUS L. GALIN,* WILOP

• If you have any thoughts toward speech clipping, you've got to have a good low-pass filter to back up the clipper. Here's how to design an audio filter that will meet the rather tough requirements. No previous knowledge of filters is required.

RECENT issues of *QST* have carried a number of articles on speech clipping and filtering.¹ Whether or not clipping is used, the reason for filtering is to restrict the sidebands of a 'phone transmitter. The higher the audio frequency impressed on the carrier the wider the sidebands. High-frequency sidebands that are not essential to intelligibility cause unnecessary interference to neighboring channels and, since most communications-receiver i.f. amplifiers do not pass much sideband energy above about 3000 cycles, there is no reason why these useless frequencies should be transmitted. For communicating purposes audio frequencies above 2500 or 3000 cycles are not necessary for intelligible speech.²

Most amateurs look upon filters as being very complicated and difficult things to design and construct. The writer, knowing very little about audio-filter fundamentals, shared in this feeling — but nevertheless decided to make the attempt. Equipment was available to make measurements on experimental filters, so it was readily possible to check performance. As a result, the writer is convinced that any amateur without previous experience with filters, but having a knowledge of elementary algebra, can design and build thoroughly-satisfactory audio filters. Precision components are not necessary.

Designing the Filter

There are many types of filters that could be used to do the particular job. The most common types can be classified as either a pi network or "T" network. Electrically these two types should work the same. However, in this article

* 5 Clay St., Hartford, Conn.

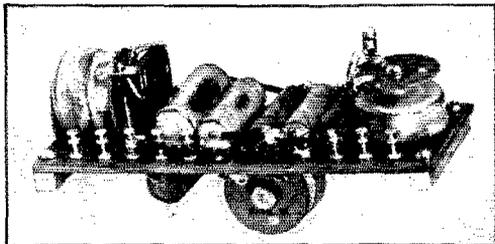
¹ W. W. Smith, "Premodulation Speech Clipping and Filtering," *QST*, February, 1946; "More on Speech Clipping," *QST*, March, 1947. Also J. W. Smith and N. H. Hale, "Let's Not Overmodulate — It Isn't Necessary!", *QST*, November, 1946.

² Grammer, "House Cleaning the Low-Frequency 'Phone Bands," *QST*, May, 1947.

³ F. E. Terman, *Radio Engineers' Handbook*, McGraw-Hill Book Company, New York.

we will concern ourselves with the pi type because of the convenience in handling the design.

Many readers are not aware that the familiar receiver power supply employs a simple pi network as a low-pass filter. A low-pass filter attenuates all frequencies above a certain frequency called the "cut-off frequency" and passes all frequencies lower than the cut-off frequency. Since we are dealing with audio frequencies that fall in the lower end of the audible spectrum, a low-pass filter would be the type suitable for attenuation of the unnecessary high frequencies, and yet pass the wanted low frequencies. After examining the various low-pass filters in Terman's *Radio Engineers' Handbook*³ a shunt *M*-derived filter was selected for simplicity and adaptability to a speech amplifier. The name itself implies fundamentals that are more advanced than will be covered, but Terman's *Handbook* can be consulted for the theory. It is sufficient to say here that the shunt *M*-derived filter, shown in Fig. 1A, not only has the cut-off frequency that is characteristic of the simple pi section but also will provide an attenuation peak at a selected frequency outside the passband.



Using high-inductance r.f. chokes and tubular paper condensers, a three-section filter is quite compact and relatively inexpensive. This one is mounted on a 2 X 6-inch terminal board.

When the filter is to be connected to the plate of an amplifier tube, it is important to keep the load or terminating resistance as high as possible. The reason for this is to obtain the largest possible signal voltage from the filter stage. With available components, the value of terminating resistance that can be used will be small compared to the optimum load for the tube, and in such a case the output voltage will be approximately proportional to the load resistance (*R* in Fig. 1A). The value of *R* depends directly on the

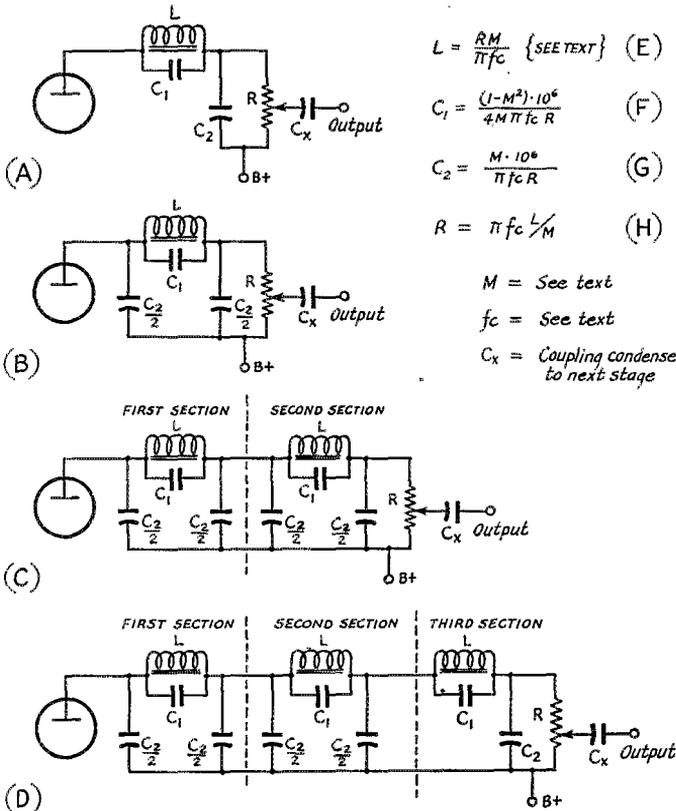


Fig. 1—Shunt M -derived filter circuits and design formulas. In the equations, inductances should be expressed in henrys, resistances in ohms, frequencies in cycles per second, and capacitances in microfarads.

inductance, L , in the filter. Iron-core r.f. chokes were chosen for use in the filter because of their compactness, availability and high Q as compared to larger iron-core coils. A 250-millihenry choke was the largest unit of its kind available for the experiments. The value of R can be found from the equation in Fig. 1H.

Before any of the equations can be solved, M must be found from the equation

$$M = \sqrt{1 - \left(\frac{f_c}{f_h}\right)^2}$$

where f_c = cut-off frequency,
 f_h = frequency of peak attenuation.

This brings up the problem of choosing f_c and f_h . The choice of f_c and f_h is very important inasmuch as the shape of the response curve is greatly affected by M (which depends on f_c and f_h only). Although it is theoretically possible, with pure reactances, to obtain a cut-off frequency equal to the frequency of very high attenuation, practical considerations require f_c and f_h be not too close to each other. One reason is the impractica-

ble size and quality in the condensers and chokes; the other reason is that the attenuation will not be very large at frequencies above the cut-off frequency if the peak attenuation frequency is close to or the same as the cut-off frequency. It has been found by experiment³ that if the value of M is equal to approximately 0.6, the filter will have comparatively-flat response characteristics in the passband (voice range) and will still attenuate effectively the unnecessary high frequencies. Very elaborate filters can be designed to give better response characteristics than the shunt M -derived, but they are not necessary for practical purposes.

It is sometimes quite necessary to connect sections of filters together as shown in Figs. 1C and 1D for greater attenuation of high frequencies, without affecting the passband. As long as sections of the shunt M -derived filter are designed for the same load resistance, they can be connected in cascade as shown in Fig. 1D. Only one terminating resistance is necessary for the complete filter. If f_c is kept constant, a different

value of f_h may be assigned to the various sections without affecting the terminating resistance. This practice will give more uniform suppression at all frequencies above cut-off than is possible with a series of sections each having the same f_h . However, if f_c needs to be changed for different sections to hold M near 0.6, L must also be changed to keep R at the same value for all sections.

Losses in the filter itself are mostly attributable to the a.c. resistance of the coils. With the r.f. coils mentioned they are small and need not be considered in design.

The number of sections to be used in the filter will depend on the amount of attenuation needed. The total attenuation of the filter is the sum of the attenuations in all sections. A one-section shunt M -derived filter is shown in Figs. 1A and 1B. Either circuit may be used since the two are electrically equivalent. In general, at least two sections, as shown in Fig. 1C, should be used, and a third section may be added, as shown in Fig. 1D, to give very high attenuation at all frequencies outside the passband. Each section is designed separately, and they are then joined to-

TABLE I
Table of Values Used in Experimental Filters

Section	C_1 ($\mu\text{fd.}$)		C_2 ($\mu\text{fd.}$)		R (Ohms)		L (Henrys)	M Computed	f_c Cycles	f_h Cycles
	Ideal*	Actual	Ideal	Actual	Ideal	Actual				
First	0.0063	0.006	0.0199	0.02	3550	4000	0.25 hy. (given)	0.665	3000	4000
Second	0.0063	0.006	0.0199	0.02	3550	4000	0.25 hy. (given)	0.665	3000	4000
Third	0.0033	0.003	0.0125	0.015	3550	4000	**Computed 0.157 hy. but used 0.20 hy. (Millen 34400-200)	0.696	5000**	7000

* For $M = 0.6$.

** Cut-off frequency changed from 3000 to 5000 cycles.

gether to form the complete filter as shown in Fig. 1D.

Practical Filters

A one-section filter, as shown in Fig. 1B, was tried first. Since L was previously decided upon as a 250-millihenry choke (Millen 34400-250), R was determined from the equation shown in Fig. 1H. Bearing in mind the considerations discussed earlier, f_c and f_h were chosen as 3000 and 4000 cycles, respectively. After solving for M , using these values for f_c and f_h , the rest of the components were determined easily by direct substitution in the formulas shown in Fig. 1.

The closest stock values were used in making measurements for the response curve shown in Fig. 2. Table I shows the ideal values of components compared with values actually used.

The curves resulting from use of high- and low-impedance signal sources are shown in Fig. 2. The 50-db. line represents the hum level of the better-than-average high-gain speech amplifier. It will be noted that with a one-section filter insufficient attenuation was achieved. Enough signal at high frequencies was passed with the gain open full to override the hum level of the amplifier.

It was then decided to add another section to the filter as shown in Fig. 1C. The same choice of f_c and f_h was used so that the components were the same as the first section. The output condenser of the first section and the input condenser of the second section can be lumped together to form one condenser. Values computed and values actually used are listed in Table I. The curve shown in Fig. 3 is the result of experi-

ments with a two-section filter. Note the large attenuation at approximately the frequency of peak attenuation. Some high-frequency signal above 4500 cycles was passed, but for most practical purposes this amount of attenuation would do a satisfactory job of cutting sidebands.

A third section was added to the filter as shown in Fig. 1D to see if the high end could really be attenuated. Since the two-section curve began to level off at 7000 cycles, this frequency was chosen as f_h for the third section. In order to keep M at approximately 0.6 and R constant for all sections, 5000 cycles was chosen as f_c . The values used and the ideal values are listed in Table I. The curve shown in Fig. 4 represents the results with a three-section filter. It will be noted in Fig. 1D that a section similar to Fig. 1A was

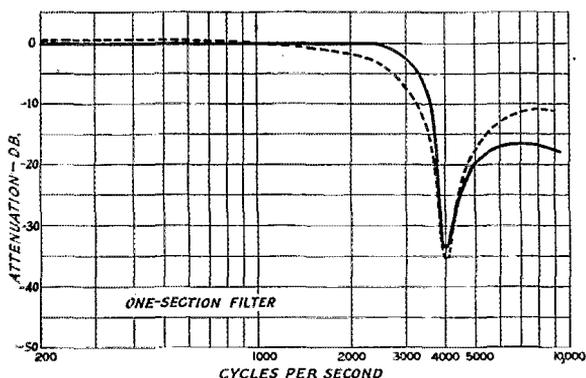


Fig. 2 — Measured attenuation characteristic of a single-section filter (Fig. 1B) using the constants given in Table I. Reference level (0 db.) is the output level at 1000 cycles. The solid curve is the response with the source of signal having an internal impedance of 7500 ohms, simulating the plate resistance of a medium- μ triode. Dashed curve is the response measured with a 500-ohm signal source.

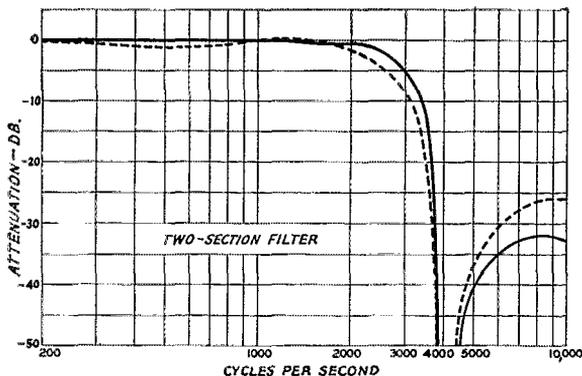


Fig. 3 — Attenuation characteristic of a two-section filter (Fig. 1C) using constants given in Table I. Measurement conditions same as in Fig. 2.

used instead of the type shown in Fig. 1B. There should be no difference in results since both are electrically the same. The results were excellent. Attenuation was high enough to suppress all frequencies above 4025 cycles to a level far below the hum of the amplifier.

Some Suggestions

Increasing the capacitance of the output condenser of the last filter section will increase the attenuation at the higher frequencies outside the passband without greatly affecting the shape of the curve inside the passband. Two or three times the theoretically-correct capacitance can be used. In the case of a two-section filter having the curve shown in Fig. 3, for example, the output capacitance is 0.01 $\mu\text{fd.}$ ($C_2/2$). Increasing the capacitance to 0.02 or 0.03 $\mu\text{fd.}$ will increase the attenuation above 4500 cycles. It also will have the effect of making the cut-off less sharp; this is not at all a disadvantage, because a very sharp cut-off tends to cause transients that introduce a sort of "ringing" on voice peaks.

The entire filter unit can be constructed on a standard 2-inch-wide mounting board, its length depending on the number of sections used. Care should be taken to mount the iron-core chokes at right angles to each other, to minimize coupling that might affect the characteristics of the filter. The photograph shows a three-section unit constructed in this fashion. (This particular filter is not the one whose performance is shown by the curves of Fig. 4, but is similar in circuit. It was designed to use the 125-millihenry r.f. chokes commonly available, and for this reason a lower value of terminating resistance — 2000 ohms — is required. Also, the cut-off frequency in this unit was set at 2500 cycles rather than 3000, giving even

smaller effective channel width without affecting intelligibility. Its out-of-band attenuation is of the same order as with the unit shown in Fig. 4.)

When the high-frequency cut-off is in the vicinity of 3000 cycles, the naturalness of speech may be somewhat improved by attenuating at the low-frequency end below 200 cycles. This can easily be done by reducing the capacitance of interstage coupling condensers in the amplifier to about 0.005 $\mu\text{fd.}$

Insert the filter in the plate circuit of a speech-amplifier stage where the level is fairly high — at least several volts. This will decrease the possibility of hum pick-up and will attenuate any harmonics, above the cut-off frequency, that may be generated in the preceding low-level stages. An extra stage of audio will be

needed to compensate for the low gain in the filter stage. One half of a twin triode such as a 6SN7GT can be used to build up the gain while the other half incorporates the filter.

The d.c. plate voltage for the tube should be applied through the filter, as indicated in Fig. 1. This allows the use of a coupling condenser of normal capacitance between the filter and the grid resistor of the next stage. A wire-wound potentiometer can be used for the load resistance, R . The output of the filter stage can then be conveniently adjusted by either a knob or a screwdriver.

If the expected results are to be obtained from the transmitter after installation of the filter, it is very important that the audio stages following the filter be free from distortion. The modulated r.f. amplifier also must be functioning properly, since the filter cannot cure a broad signal caused by nonlinear operation or overmodulation. Only through conscientious attention to these critical factors will amateurs realize maximum utility from the crowded 'phone assignments.

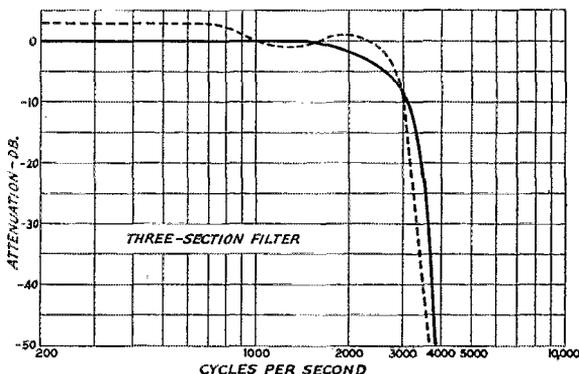


Fig. 4 — Attenuation characteristic of a three-section filter (Fig. 1D) using constants given in Table I. Measurement conditions same as in Fig. 2.



United States Naval Reserve



THIS issue marks the return of the Naval Reserve page in *QST*. As indicated in last month's issue, communications in the new Naval Reserve come under the Electronic Warfare Program. Reserve communications, comprised largely of radio amateurs, is certainly one of the most active and enthusiastic of the Naval Reserve programs.

In response to many inquiries as to just how an amateur goes about enrollment in the Naval Reserve, the following is a brief explanation: If you know of a Naval Reserve armory or an Electronic Warfare company or platoon in your vicinity, contact any member of these units and he will advise and assist you. Otherwise write directly to the commandant of your Naval district (see October *QST*) and his reply will inform you of a Naval Reserve unit in your locality or tell you just how you may enroll in the Reserve and set up a unit of your own. Regulations provide for special consideration to holders of amateur or commercial radio licenses in attaining petty-officer ratings.



On this new rating badge for Electronic Technician's Mates, electrons in orbit are appropriately symbolic.

The Marine Corps Reserve Electronic Warfare Program is now getting under way and follows the policy set by the Naval Reserve in using the amateur bands for the usual amateur-type operations only, drills and Reserve traffic being restricted to service frequencies. Did you know that through the Marine Corps Institute members of the Organized Marine Corps Reserve may

obtain credits toward high-school diplomas and college degrees by completion of correspondence courses? In addition these Organized Reservists are offered opportunity for operational and technical training on the many types of electronics gear provided for Organized Marine Corps Reserve units. For further information on the Marine Corps Reserve contact any Marine Corps recruiter or the Division of Reserve, Headquarters Marine Corps, Washington 25, D. C. Major C. F. Welch, Marine Corps Reserve, ex-W6BBX, has been appointed planning officer for the Electronic Warfare Program.

The Bureau of Naval Personnel plans to issue letter certificates to those Naval Reserve radio stations who work all Naval districts — WAND. Contacts must be with other Naval Reserve radio stations and on amateur bands. All Naval Districts means *all* continental U.S.A. districts plus Hawaii and Alaska. K4NR at Jacksonville, Florida, reports it has already worked all continental Naval districts as well as a dozen or more countries, using a standard Navy 50-watter.

There are now about 300 Naval Reserve radio stations on the air and the total is growing rapidly. Soon amateurs will begin to see the QSL cards which each Naval Reserve radio station has been ordered to procure for use in amateur radio operations.

Commander Everett Battey, USNR, who was ARRL's assistant communications manager for seventeen years, is now a Civil Service employee of the Bureau of Naval Personnel, administering the Navy's electronics schools for officers. Ev surrendered the call W1UE and now is operating W4IA on 80, 40, and 20. George Jette, W1LEW, radio chief at NAE, North Truro, Massachusetts, until his recent retirement after thirty years' service, has requested the FCC to assign him W1UE which he held back in 1914.

NDF (master control station), Naval Reserve Eighth District, New Orleans, transmits a 30-minute broadcast each Tuesday and Thursday from 7:30 P.M. to 8:00 P.M. CST on 2884/5965 kc. at 16 w.p.m. This broadcast should be of interest to all amateurs as well as Naval Reservists, and is good code practice.

NAVY DAY — OCTOBER 27TH

Beam Stuff

Ideas for Rotary-Beam Construction

• Most of the rotary-beam problems these days are mechanical ones. The following collection of ideas is presented in the hope that you will find among them the answer or answers you have been seeking. Even if you have no immediate plans for a new revolving sky-wire, it is a good idea to keep up with the techniques, just in case.

A 4-Element 14-Mc. Beam

BY PAUL L. VAN BRUNT,¹ W6MJB

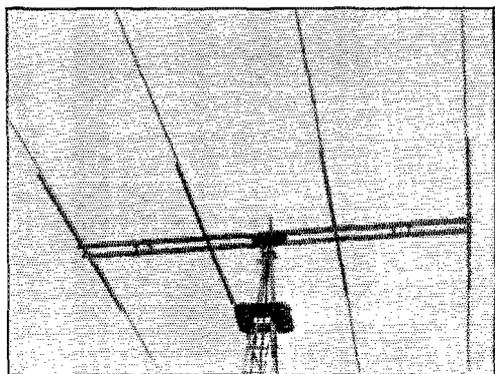
AFTER seeing numerous pictures and reading a great many articles about foxy, all-metal super-duper rotary-beam antennas, I just stopped to wonder how many average hams really have the facilities — and time — to build such gorgeous affairs. By time, I mean that required to chase around scaring up the oftentimes hard-to-get materials, the welding, drilling, etc. Of course, the job is somewhat simplified in a large city with many surplus stores and what not, but even then it takes plenty of time.

However, the average ham, with limited time, and usually located in a small town or outlying district, must make use of easily-procurable materials. A four-element 20-meter beam is a major project compared with a 10-meter array, and re-

¹ 8415 Hillside Ave., Hollywood 46, Calif.

quires a much more substantial type of construction. Ideas on how to build a beam are as common as complaints about QRM, and many excellent designs have been described in past years. The four-element 20-meter beam shown in the accompanying photographs is the acme of simplicity, can be built of materials obtainable anywhere, and can be assembled in two hours' time.

If Douglas fir is used for the boom, the weight of the beam, less elements, will be from 50 to 60 pounds.



A clean-looking 14-Mc. beam, like this one at W6MJB, is obtained only by careful construction and design. "Umbrella" guys add much to the stability of the unit.

The elements are surplus Duralumin tubing, $1\frac{3}{8}$ - and $1\frac{1}{2}$ -inch diameter, supported by $1\frac{1}{2}$ -inch stand-off insulators. Surplus hose clamps were used to fasten the elements to the insulators.

The tower is a Sears-Roebuck wind-mill tower — they *could* be purchased very reasonably in all heights from 22 to 60 feet. The array is turned by a surplus prop-feathering motor. This motor develops around 50-hp. torque, so there is no point or need to use ball bearings. The bearing used is a short sleeve of 2-inch galvanized pipe through which the $1\frac{1}{2}$ -inch drive shaft passes. A pipe flange is welded to the drive shaft and bolted to the center block. A cone bearing was made by turning both the flange and the 2-inch sleeve to match. Fig. 2 shows the details.

A 230-foot 600-ohm open-wire line is run to about the halfway point on the tower, then up the side of the tower to the slip rings. The slip rings are mounted on the top of the tower,

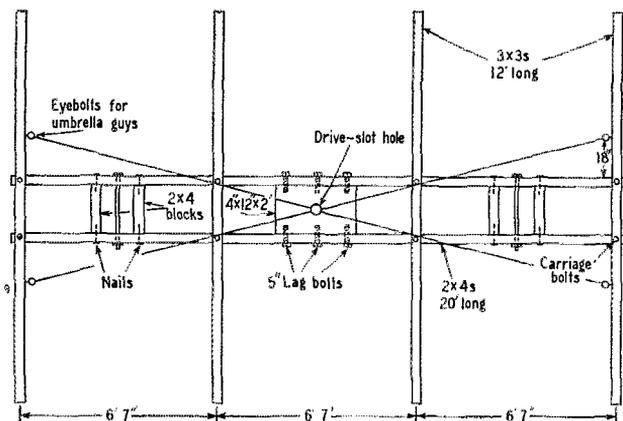


Fig. 1 — The boom for the 4-element 14-Mc. beam at W6MJB is built entirely of wood, held together by bolts and nails and reinforced by guy wires.

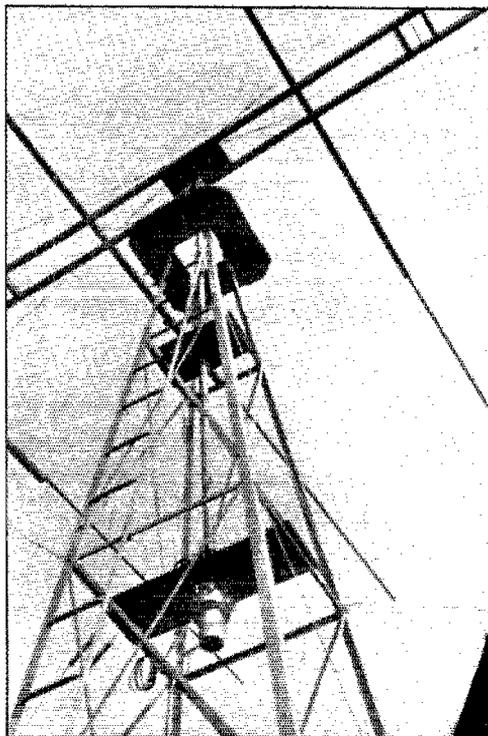
directly under the center block. A quarter-wave-length matching section of transmitting-type 75-ohm Amphenol Twin-Lead hangs in a loop between the driven element and the slip-ring contacts.

As can be seen in Fig. 1, the center block is $4 \times 12 \times 24$ inches, with a hole in the center the proper size for the drive shaft. The boom members are two 20-foot 2×4 s fastened to the center block with six lag screws. The two center screws serve as the axis for tilting, and the other four lock the boom in position after final assembly and adjustment are completed. The blocks midway from each end are 2×4 s spaced about six inches apart, with a long bolt between them. When this bolt is drawn tight, a very sturdy box brace is formed. The crossarms are 3×3 s twelve feet long, bolted to the boom with ordinary carriage bolts.

The umbrella guys should have turnbuckles in them, and the guys are fastened to the center support after the beam has been permanently locked in its horizontal position. With the turnbuckles properly adjusted, there will be no sag in the boom, the elements will be perfectly level and neat, and weaving in the wind will be eliminated.

The complete array may be assembled on the tower in seven easy steps:

- 1) Bore all holes on the ground.
- 2) Mount center block on drive shaft.
- 3) Fasten a twenty-foot 2×4 to each side of the center block, using the center (axis) bolts only.



The drive motor for the W6MJB beam is mounted down on the tower, and the torque is transmitted through a $1\frac{1}{2}$ -inch drive shaft.

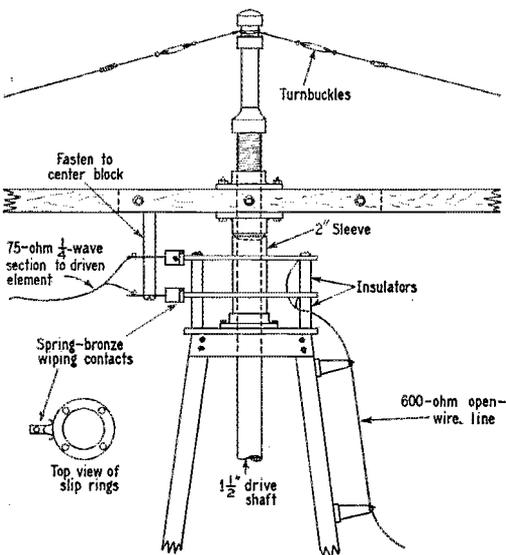


Fig. 2 — Slip rings permit continuous rotation of the W6MJB 4-element beam. The quarter-wave matching section rotates with the antenna. The diameter of the slip rings should not be greater than the width of the center block, so that the boom can be tilted without interference.

- 4) Install bracer blocks and bolts.
- 5) Now, by tilting the boom, mount the cross-arms with elements attached, alternating the sides to keep the boom close to balance.
- 6) Set boom in a horizontal position, screw in the four locking bolts, fasten the umbrella guys to the center support, and adjust turnbuckles.
- 7) Go into the shack and call "CQ DX," then stand back!

In my own case, I split each element and installed friction-contact "hairpins," so that with the aid of a pole with a hook on the end, I can adjust the elements without tilting the boom, merely by pushing the "hairpins" in or out. There is no need to describe the tuning procedure, since many ideas for that have been given in past issues of *QST*, but it might be well to repeat that careful tuning of the beam always pays off in results.*

This beam has withstood winds of 60-70 m.p.h. with no ill effects whatsoever, and I feel that many hams will appreciate its low cost and simplicity.

*This is no idle speculation. W6MJB received postwar DXCC Certificate No. 21, the third to a W6. — Ed.

Lightweight Boom Construction for 28-Mc. Beams

BY CLIFFORD ANDERSON,²W9TWM

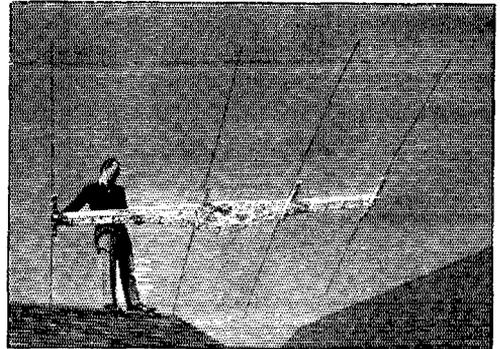
THE 28-Mc. beam at W9TWM is supported on a wooden-lattice boom, and its light weight is indicated by the ease with which the structure can be held at one end, as can be seen in the accompanying photograph. The boom is 13½ feet long, 6¼ inches wide, 12 inches high at the center and tapers out to about 1½ inches at the ends. The curve was included more for eye appeal than for structural reasons.

The boom is made from ¾-inch-square spruce, braced by gussets of ¾₂-inch phenolic-bonded plywood. The gusset material is good — without any paint it can be soaked in water for a week and yet it will not delaminate when dried out. The spruce strips and gusset plates are fastened together with a phenolic resin called "Penacolate," and small brads can be used to hold the pieces in position while the glue is setting. The crossarms are made of spruce, 30 × 2 × ¾ inches, which in turn are clamped to 20 × 2 × 5⁄8-inch crossarms fastened to the boom. The boom and crossarms were sealed with a coat of spar varnish before giving them two coats of white paint.

The elements are made of ½- and 3⁄8-inch telescoping ST aluminum tubing. They are held in place on the National 2-inch cone insulators by straps made by flattening ¼-inch copper tubing and then wrapping it around a ½-inch rod. The driven element is fed from a 470-ohm open-wire line through a "T"-match section made of ¼-inch copper tubing.

The boom is mounted on top of a hollow square mast which drops down free for about 20 feet and is then supported inside a lattice mast. The an-

tenna itself is 55 feet above ground. The antenna is turned by a large synchro which drives a worm gear through a flexible shaft. The worm gear drives a large gear at the bottom of the hollow-



The 4-element 28-Mc. beam at W9TWM uses a boom of aircraft-type construction, with spruce members and plywood gussets bonded with phenolic-resin glue. The boom slips over a square hollow mast that is rotated inside a lattice-type supporting mast. W9WCD is holding the assembly.

mast section. A similar worm is connected to the driving synchro in the shack, and a similar gear acts as the direction indicator. The driving synchro (or Selsyn) is turned by a small hand crank connected to the worm.

Although the structure is not heavy and may look flimsy, it has stayed up in windstorms that took down other amateur antennas and one broadcast-station tower.

Bamboo Poles for Beam Elements

BY PHILLIP SHANNON,³W8MQV

IT is easier to reach the decision to own a 20-meter beam than it is to figure out how to build the gismo. I happened to own a 20-foot triangular steel mast (prewar), so one afternoon I started to plan something that could be mounted on the tower. It had to be lightweight and capable of being conveniently rotated from the base of the tower.

A trip to the lumber yard suggested something for the boom. Four 10-foot lengths of pine, 2 × 1½ inches, were all that were needed, plus a 12-inch-square piece of 2-inch-thick hard pine which was found in the attic scrap pile.

The boom was constructed by nailing two of the 10-foot strips to the sides of the 12-inch-

square block. The other two strips were cut in half to form cross braces to make the boom rigid. The centers were half-cut to interlock and fastened to the boom strips with 2-inch bolts. The ends are held rigid by fastening a 13-inch crosspiece on the bottom of the boom ends and a 3-foot crossarm across the top. Long finishing nails hold the crosspiece, crossarm and boom strips together, and a long bolt through the center of the crossarm and crosspiece adds strength to the assembly.

The elements consist of four 18-foot bamboo fishing poles which were purchased at the local hardware store at 25 cents per pole. The thick ends of each pair are crossed and overlapped about 3 feet and bound together with pieces of wire. The assemblies are then bound with wire to

² 833 North 11th St., DeKalb, Ill.

³ Woodsfield, Ohio.

the crossarms. The separation of 10 feet comes out close to 1/15-wavelength spacing between antenna and reflector, making it ideal for maximum forward gain.

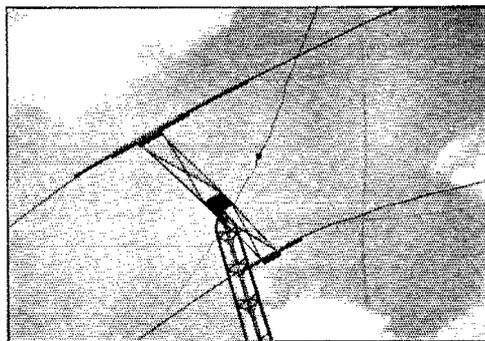
The metallic portion of the elements was made from No. 9 aluminum wire (No. 10 or 12 copper can be used). The only reason for using the aluminum wire is the fact that it weighs practically nothing at all. The wire is taped on along the bamboo poles. Rubber tape is ideal, but I used regular friction tape. Forget the idea that the wire must be suspended on insulators! If rain is encountered, losses are bound to occur, but not much more noticeably than in any other antenna. The biggest change in final-amplifier tuning will be caused by a wet transmission line rather than the wet antenna elements. However, wet or dry, little or no change is noted in signal reports at this station.

Now for the rotating device. A half-inch flange was fastened with 1/4-inch bolts at the center on the bottom of the 12-inch-square boom center piece. About 18 feet of galvanized steel pipe was fed through the center of the tower (enough to reach from the flange at the top of the boom almost to the base of the tower). The top end of the pipe was threaded to fit the flange. This antenna can be erected without a tower by using 1-inch pipe and placing it against the eave or gable of the house, garage, or what have you. Place it against the building with enough room for a pulley arrangement. Small pulleys should be used for as many bends as the drive rope will need to get to the operating position. I used four pulleys, making one 90-degree bend to the side of the building, then through to the shack, then one more 90-degree bend to a large pulley placed on the side of the wall. The pulley in the shack is calibrated directly for antenna direction. Two bicycle-seat springs were found ideal to use as take-up springs in the drive rope. In wet weather rope will contract slightly, and by having a spring in each leg the direction calibration will remain reasonably accurate.

Several methods of feed can be used. I chose to use 300-ohm Twin-Lead through a quarter-wave transformer of 70-ohm Twin-Lead. The feed system would be an exact match into 17 ohms, which is probably not too far from the actual antenna impedance. The Twin-Lead 70-ohm match was selected because it is available and cheap, but either the "T"- or delta match could have been used with good results. Standing waves on the transmission line will be low with the feed system mentioned.

Tuning the antenna is simple. Put up a half-wave doublet antenna (about shoulder height) about a wavelength away from the antenna. At the center of the doublet connect a 0-1 milliammeter in series with a crystal (series the meter and crystal in the center of the antenna). For the center of the 20-meter 'phone band, cut the an-

tenna wire 34 feet long and the reflector 35 feet. Find the centers and tape the wires to the poles. Place the beam at about shoulder height, pointed at the field-strength antenna, with the reflector behind the driven element, and excite the beam with very low power. Excite it enough to get a midscale reading on the field-strength meter. If copper wire is used for the elements, start tuning by bending back the wire on itself, an inch at a time, from each end of the antenna and note the meter reading. Continue until the highest field reading is obtained. Do the same with the reflector. The bent ends can be cut off after the tuning process is completed. If aluminum wire is used for the elements, the tuning may be done by clipping the ends 1/2 inch at a time, since aluminum wire is brittle and will break if bent back and straightened out again. Now rotate the beam 180 degrees away from the field-strength antenna. Excite the antenna just enough to show on the field meter; now rotate until the front is again on the field antenna. A ratio of about 10-to-1 should be noted. Although the standing-wave ratio on the line is very small, I found it quite helpful to make the untuned 300-ohm line a quarter wavelength longer than is necessary to reach to the final link coupler. Then, with the antenna loaded, I checked along the line toward the antenna with a small neon bulb, to find the first current loop (voltage minimum). The line was cut at this point and connected to the final-amplifier link. Practically all r.f. disappeared from the chassis, and the final loaded like a short-circuit. This doesn't mean that the



The 2-element 14-Mc. beam at W8MQV uses elements of aluminum wire supported by bamboo fishing poles, supported by a lightweight wood boom.

line is flat under these conditions, because it isn't. It only means that the over-all system is tuned with this particular length of feeder.

The beam here at W8MQV has been in operation since the middle of July, 1946. No maintenance has been required so far. Local State-side contacts give consistently excellent reports, and DX contacts are presently up about 200 per cent.

Building Your Own Beam Rotator

BY JOHN KLAR, & WILFI

AFTER trying several different ways to rotate my 28-Mc. beam, and looking at every other beam rotator I could find, I came up with an arrangement that is inexpensive and seems to work well. The unit is designed to work at the base of the tower, or at least somewhere down the tower, and the torque is transmitted through a 1½-inch pipe to the beam proper. Coaxial line running up inside the pipe is used to feed the beam, and the line is brought out through a hole in the pipe located a few feet above the rotating unit.

An old G.E. washing-machine motor is used for a power source. It was made reversible by bringing out the starting windings to a reversing switch. By changing the starting-winding polarity with respect to the field winding, the motor can be made to run in either direction. The motor normally runs at 1725 r.p.m.

An idea of the construction of the reduction-gear unit can be obtained from the photograph. The motor is mounted on three steel brackets which are tack-welded to the motor frame. Electrical tack-welding is best, since too much heat may warp the motor housing. The motor shaft is connected to a small drive shaft through a

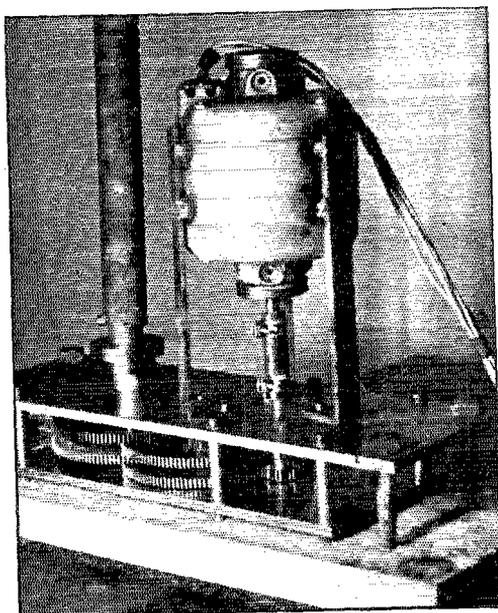
short length of garden hose, clamped to the shafts with hose clamps. Only two types of gears are used, small 1-inch diameter 20-tooth gears and large 6-inch diameter 120-tooth gears. The motor drives a small gear through the flexible coupling, and this small gear drives a large gear. The large gear is connected to a small gear through a compound steel bushing (Boston Gear Works GAB20), and there are three sets of these double gears. The antenna drive shaft is connected to a large gear. The resultant reduction is 1296 to 1, which brings the 1725 r.p.m. of the motor down to 1.33 r.p.m. The large gears are Boston Gear Works GA120 and the small ones GA20.

The two mounting plates which support the idler shafts and motor are two ¼-inch steel plates. Spacers and dowel pins can be obtained in any good hardware store, and no special hardware is required. The two central compound gears float on a common shaft, and the third compound gear runs free on the antenna drive shaft. Thus the only gears tied to shafts are the small one driven by the motor and the large one on the antenna drive shaft. In building this rotator, I welded these two gears to their shafts, but the gears can be bought with hubs if the use of setscrews is preferred.

No trouble has been encountered with overrun, since the large reduction makes the slight amount of "coasting" a negligible thing. The whole unit is set in an oil pan filled with standard No. 20 motor oil. For a pan, I used an inverted 7 × 17 × 3-inch chassis, with the corners soldered to stop the oil leaks. With the powerful motor, it isn't necessary to use a lighter oil in the winter, and the oil helps to reduce the "coasting." Actually, of course, no amateur beam has a directivity pattern sharp enough to show up a few degrees error in bearing.

While brass or fiber gears could be used, none was available at the time of construction, but the steel ones have given no trouble.

The beam-rotating pipe is supported on a brass hub, turned out on a bench lathe, and the underside of the hub is supported by a ball-bearing unit from the front wheel of a car. One probably doesn't have to be as fancy as this, particularly if the weight of the antenna isn't supported by the gear box. A slot in the pipe fits over an Allen setscrew in the shaft, and in severe wind storms the setscrew is removed, to allow the beam to turn freely in the wind. This is a controversial point, but I have found from experience that there is less beating of the elements when the array can swing free in a storm.



A simple beam rotator used at WILFI. It is made from stock gears and an old washing-machine motor.

A Projection-Type Beam Direction Indicator

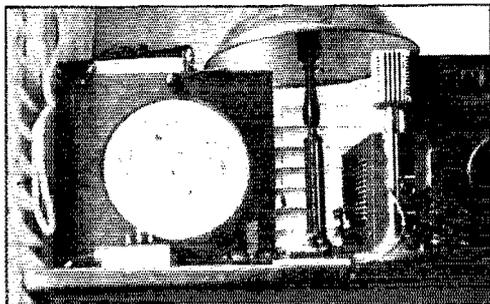
BY JOHN BRAWLEY,⁵ WØGYZ

THE first step in building a beam direction indicator of this type is to get a map of projected great-circle routes centered on or near your particular location. Maps are available centered on San Francisco, Washington, New York, Schenectady, and Wichita. We couldn't find one centered on St. Louis, so one we found in an atlas was enlarged and modified. The map was done in black drawing ink on drawing paper, and the countries were colored in water colors. Some of the inhabitants of Luxembourg or Afghanistan might be alarmed at the liberties we took with the established boundary lines of their countries, but the resultant approximation is easily good enough for our antenna. The map was made 10 inches in diameter, and the circumference was marked off in degrees. The map was mounted between two 12 × 14-inch sheets of double-strength window glass. The glass holds the map perfectly flat and secure.

A box, 14 inches square, was made of Presdwood (or Masonite), to house the map and indicator apparatus. The front panel is a sheet of Presdwood with a 10½-inch diameter hole in the exact center. The map, between the two sheets of

glass, was then fitted flush with the front of the box and the panel fitted over it and screwed down.

A pair of Bendix No. 5 synchro motors are used for direction indication. One is of course connected to the antenna drive shaft, and the other is mounted inside the box, as shown in Fig. 3. The



The beam direction indicator at WØGYZ projects a beam of light representing the beam pattern on a projected world map.

"pointer," made from a large tomato can, is connected to the shaft as shown in the lower sketch. The open end of the can was bent carefully in the shape of a "V," spreading out to about 1¼ inches at the outer edge. A hole in the bottom of the can was cut to clear the lamp socket which holds a 20-watt bulb. The can was mounted on a base of Presdwood and fastened directly to the shaft of the synchro motor. A counterbalance was added and adjusted until the assembly was exactly balanced on the shaft with the synchro held in a horizontal position. Care must be taken that the point of the "V" comes directly above the center of the shaft so that when the assembly is rotated, the point of the "V" will remain centered on the map. The synchro was mounted on a 14 × 8 × 1-inch pine board. A 3-inch hole was cut in the center of the board and the end of the synchro fitted into the hole and clamped down. The board was then screwed to the sides of the box so that the top of the beam indicator was as close to the glass as possible without dragging.

No satisfactory means was found for connecting the light bulb so that the assembly would be continuously rotatable. However, a lightweight wire was used and sufficient slack left so that two or three complete revolutions could be made. The wire is not heavy enough to upset the balance of the assembly and thus put a load on the motor. Since most beams are fed without the use of brushes or slip rings in the feeders, this is no disadvantage because the beam is limited to two or three revolutions before reversing.

On the side of the box near the bottom, a 7-

⁵ 724 North Florissant Road, Ferguson 21, Mo.

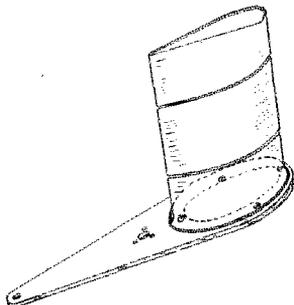
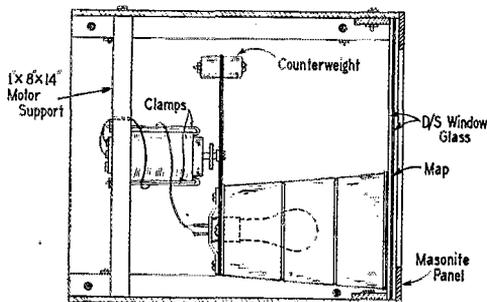


Fig. 3 — A sketch of the beam direction indicator at WØGYZ, and the details of the shade. A projected world map centered on the station location is mounted between two sheets of double-strength window glass, and light projected from the rear illuminates the beam path. The lamp housing is formed by bending a tin can to the proper shape (bottom detail).

terminal connector strip was mounted and labeled to correspond to the necessary connections. A switch was mounted on the front panel so that power might be turned off when the indicator was not in use. (Incidentally, it is necessary to connect the a.c. for both synchros through this switch, since the motors will operate, but with considerable heating, with a.c. connected to only one motor.)

Unless the synchro attached to the beam is accessible for adjustment, the one on which the indicator is mounted should be orientated with the beam before it is clamped down. An added refinement which we did not consider necessary at the time would be a device brought out to a knob on the front of the panel which would adjust the position of the synchro motor around its axis and thus provide easy orientation or reorientation with the beam.

Put That Beam Up To Stay

BY MILTON J. HEIDT,⁶ W8SDD

A ROTARY BEAM is not necessarily the best antenna which you can build, but you may not have the space for one of those superdeluxe antennas and will have to compromise on the best antenna for us "city dwellers," a rotary beam. It is with this thought in mind that I would like to pass on a few tips on how to make the beam stay up and weather the wind, rain, hail and snow. If your beam is put up carefully, it will stay up for a long time, and you won't have to be repairing this or that every other day.

The Mounting

What you are going to mount the beam on deserves a lot of consideration. Maybe it will be on a tower or pole in the back yard, or on the house (as the author's is), or maybe you have a pet place of your own all figured out. If you have decided to use a pole in your back yard, it will pay you to talk to the foreman of one of the pole-raising crews of the local electric or telephone company. Those boys set thousands of poles, they know how to make them stay up, and they will be glad to give you the information. In some localities, poles can be purchased from the utilities quite reasonably, the cost depending on how far you live from the source of supply of the poles. In any case, before setting your pole, be sure to give it four or five heavy coats of creosote, applied liberally so it can soak in and preserve the wood. Coat the bottom of the pole, or the part that goes into the ground, with hot pitch, poured on while the pole itself is warm. This will keep the bottom of the pole from rotting and prevent termites from getting into the wood. Set the pole four to eight feet in the ground, depending on the

⁶ 3753 Frances Ave., Cheviot 11, Ohio.

It will, of course, occur to many that a simpler way to build this indicator would be to use a fixed light and rotate a disk with a slit in it. We tried this first, but found that the disk has to be very close to the glass to get a sharply-defined beam on the map. If the disk isn't true and flat (ours wasn't!) the light projection will vary with rotation. Also, such a system requires backing with ground glass or something else that will diffuse the light properly.

Since the indicator was originally installed, a device has been installed that locks the rotation before the power is removed from the synchro. This is to insure that the two synchros will be synchronized when the power is reapplied the next time. If it isn't done, and the two motors get out of step, they may start spinning and wind up the light wire in a hurry!

height. It is a good idea to pour concrete around the base of the pole for about a foot deep and then fill up the rest of the way with earth. The concrete will help to hold the pole in strong winds. After filling the rest of the hole with dirt, allow water to run slowly on the dirt for a half day to help it settle. Mount climbing spikes on your pole, starting them about six feet off the ground so that the neighborhood small boys won't be tempted to climb the pole. Use a stepladder against the base when you climb it yourself. Be sure to build a platform near the top of the pole so you can tune the antenna and give the framework another coat of paint every now and then. Have this platform built before you raise the pole, since it is much easier to do it on the ground than when the pole is up in the air.

If you have made up your mind to build a tower for the backyard, it is a good idea to construct the tower with screws and casein waterproof aircraft glue instead of nails. Nails are all right for carpenters to build houses, but if the tower is constructed with them they may pull out before the tower is very old and then your troubles will begin. Use brass screws, since they will not rust and rot the wood. The cost of the brass screws is very little more than the iron variety, and their trouble-free service will more than justify the slight extra cost. When using brass screws, drill a small guide hole for them. If this is not done, screws will be wasted by burring the heads, since brass screws are softer than iron screws. Coat the pieces of wood to be put together with a spreading of casein glue, such as Casco, and then put in the screws. A tower constructed of brass screws and waterproof aircraft glue will give long trouble-free service if treated to a coat of good paint every

year. When painting the tower be sure to use good paint — it pays in the long run. And mix your own paint. It is cheaper, and the paint will last longer than any ready-mixed variety I have tried. For the first coat on new wood use pure white lead, thinned with three parts of pure linseed oil to one part of turpentine. Do not use drier in your paint if it will possibly dry without it. Drier used in paint will cause it to peel from the wood after a year or two. For the second and third coats, use only pure white lead thinned with pure linseed oil. Allow plenty of time between coats for drying. Painting over a coat which has not thoroughly dried will cause the paint to blister and peel. Paint the tower white unless the little woman actually threatens to shoot you for not painting it her pretty robin's-egg blue. White paint will last half again as long as colored paint. I don't know why, but experience here has proved this to be the case on both the house and tower.

When you attach guy wires to the tower (if they are used), do so with a metal band around the tower uprights. Do not put a screw eye into the upright for attaching the wires and expect it to hold. Screw eyes or extra holes in the uprights will only weaken them. Use copper-coated steel wire for guys. No. 12 wire of this type will guy a pole or tower more safely than No. 8 copper wire and it won't stretch. Break up your guy wires about every ten feet with egg-shaped strain insulators. Fasten the guys securely, and be sure when you put them up that they don't kink, since kinks in the wire will weaken it. If the guys are run to the ground, anchor the ground end with a dead-man's anchor. If they are to be anchored at the edge of the roof, suitable anchor plates should be made from $6 \times 1 \times \frac{1}{4}$ -inch iron. A 45-degree bend should be made in the iron 2 inches from one end, and a hole for the guy wire should be drilled in this bent-up portion. The plate can be fastened to the rafter or joist by three 5-inch screws. Cover both the iron and the roof with a generous coat of roofer's cement, to keep the iron from rusting and the roof from leaking. Attach the guy wire to the hole in the iron by means of a ferrule.

Another factor to consider is mounting the beam as close to the shack as possible, to shorten the feedline. If using an open-wire line, try to arrange it with as few bends as possible. All feedlines have a certain amount of loss, so the shorter the line, the more r.f. delivered to the antenna. Coaxial line, while more expensive than open line, will be disturbed less by rain and ice.

Mount your beam as high as you possibly can. The higher the beam is mounted, the less will be the effect of surrounding objects on the pattern.

The Rotator

There are several complete motor-driven rotators on the market, and they are easy to mount, convenient to use, and require little or no maintenance. However, to many the cost of such units

puts them out of reach, and a homemade unit must be considered. These homemade rotators have been described in past issues of *QST* and other magazines. Generally speaking, lightweight units are better because they reduce the load on the mast or tower. Don't pass up the variable-pitch propeller motors now available on the surplus market at a very reasonable price. These units, with very little conversion, make excellent lightweight beam rotators. Drill a small hole in the bottom of the aluminum motor case though, to drain the moisture which results from condensation.

Be sure to paint the unit before mounting it in place. A primer coat of aluminum paint, followed by two coats of enamel, and finished with a coat of clear Glyptol varnish will add years of life to the exposed metal parts of the rotator. Be sure, of course, that the surfaces are clean and free from grease before painting them. Grease can be removed by brushing it with kerosene and then squirting the surface with a solid stream of water from a hose. The work can then be wiped dry with a rag. Covering the commercial units with a coat of clear Glyptol varnish over their paint will do no harm.

The power and control leads to the rotator should be run in electrical conduit or in lead covering, and the metal should be grounded. Often r.f. appearing in power leads can be reduced by suitable filtering, but running wires in conduit is generally easier and more satisfactory. Any r.f. in the wiring can sometimes be responsible for feed-back in a 'phone transmitter. The outside electrical connections you have to make should be soldered, bound with rubber tape followed by regular friction tape, and then given a coat of Glyptol varnish.

If hand rotation of the beam is used, or if the rotating motor drives the beam through a pulley system, bronze cable or chain drive is preferable to rope. However, if you must use rope, be sure to soak it overnight in pure linseed oil and then let it dry for several days before installing it.

Framework

Now let's consider the framework for the elements. Spruce, if available, is one of the best materials. If there is a ladder-manufacturing plant near you, purchase a couple of undrilled spruce ladder rails, as these will make an excellent boom. Do not use an ordinary ladder unless you have to, because the hickory rungs are a lot of unnecessary dead weight. If you use an ordinary ladder, remove the rungs and use four pieces of spruce to bridge the rails. Mount these with screws and glue as in the suggested tower construction. This will be stronger and lighter than a ladder. And don't forget that they need paint also. The crossarms are best built from white

(Continued on page 114)

Triode Mixer vs. Pentode Amplifier

Designing a Weak-Signal Converter for 28 Mc.

BY JEROME TANNENBAUM, * W9RGS

THE paramount requirement of a weak-signal receiver is the ability to distinguish signal over noise.

Gain, while an essential factor, is relatively secondary to signal-to-noise ratio and bandwidth. It is also relatively easier to obtain. Assuming that means are taken to limit the receiver bandwidth to the narrowest usable value, gain may be added at the r.f., i.f. or audio ends of the receiver with equal results. I.f. gain is generally preferred for reasons of simplicity, stability and ease with which selectivity is obtained. R.f. gain or preselection is usually needed to overcome noisy mixer performance and improve image ratio; however, it involves ganging and stability problems.

It is not too widely appreciated that the signal-to-noise ratio of a receiver is largely established in the first stage. This follows since the inherent noise of the first stage is added to the signal and is amplified to the same extent by subsequent stages. It is thus necessary that the input stage of the weak-signal receiver possess the lowest possible tube and circuit noise. And, in order to present the largest possible signal to the input grid, the tuned input circuit must be of high Q and high impedance and be correctly coupled to the antenna. Broad-banding is out. The gain requirements of the input stage are not stringent so long as the signal is built up to a level where it completely masks the inherent noise of the following stage.

Tube Noise

In designing a high-performance 10-meter converter it was first assumed that the most prom-

ising arrangement would consist of a stage or two of preselection using the "hot" 6AK5 followed by mixer and oscillator. Inquiry into the literature indicated that equivalent results could be obtained with far simpler means.

The noise energy developed in a tube is given by a figure called the "equivalent noise resistance," here abbreviated e.n.r. The e.n.r. is considered as that resistance which, if inserted in the grid circuit of the given tube, would produce as much noise energy as the tube does itself. For pentodes used as amplifiers:¹

$$e.n.r. = \frac{I_b}{I_b + I_{c2}} \left(\frac{2.5}{G_m} + \frac{20 \cdot I_{c2}}{G_m^2} \right)$$

Where I_b = plate current in amperes,
 I_{c2} = screen current in amperes,
 G_m = transconductance in mhos.

Solving for the 6AK5 as an amplifier:

$$\begin{aligned} e.n.r. &= \frac{0.0075}{0.0075 + 0.0025} \left(\frac{2.5}{0.005} + \frac{20(0.0025)}{(0.005)^2} \right) \\ &= 0.75 (2500) \\ &= 1875 \text{ ohms, approx.} \end{aligned}$$

This value is influenced by the random division of current that occurs between the screen and plate of a pentode. The e.n.r. of pentodes is usually 3 to 5 times greater than that of a triode giving equal amplification.

Triodes not only make quieter amplifiers but also quieter mixers than pentodes. The 6J6 with its high transconductance offered itself as a possibility.

The equivalent noise resistance of a triode as a plate-detection mixer is given as:^{2, 3}

$$e.n.r. = \frac{13}{G_o}$$

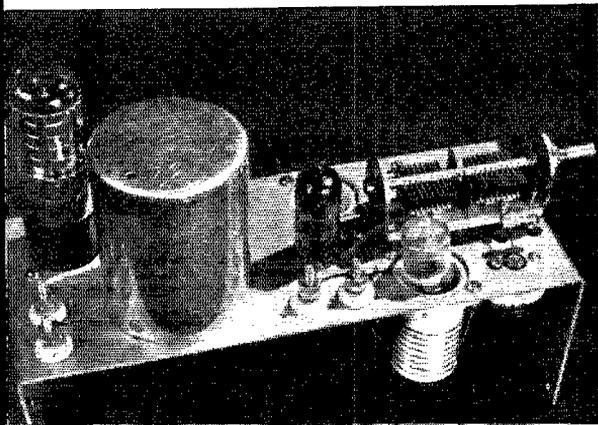
Where G_o = transconductance in mhos at zero bias.

* 1329 1/2 West Touhy, Chicago 26, Ill.

¹ W. A. Harris, *R.C.A. Review*, vol. 5, p. 514, April, 1941.

² F. E. Terman, *Radio Engineers' Handbook*, p. 572.

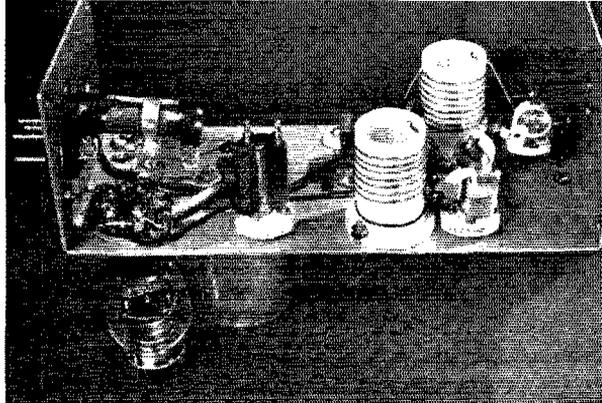
³ Tube data taken from curves supplied in R.C.A.'s *HB3 Handbook*. E_b is 180 v. in both cases. The 6AK5 as a plate-detection mixer has e.n.r. = 8346 ohms.



◆

This top view of the converter chassis shows how the antenna coil can be moved into or out of the mixer grid coil to adjust the coupling to the optimum value. The shield can houses the i.f. output circuit.

The oscillator circuit is in the foreground and the mixer input circuit in the rear. The condenser between the oscillator coil and the VR-tube socket tunes the i.f. output circuit.



Then for a 6J6 triode section as a mixer,

$$e.n.r. = \frac{13}{0.00725} = 1793 \text{ ohms, approx.}$$

Terman also shows that actual measured noise corresponds very closely to the values thus calculated. Clearly then, *the use of pentode preselection would not essentially improve the signal-to-noise performance of such a mixer.*⁴

⁴ The use of a triode preselector stage such as a 6J6 used as a cathode-coupled amplifier would appear to hold promise of further improvement of signal-to-noise ratio. It is proposed to treat this in a later article.

This seemed to be a good point to put these conclusions to test. Accordingly the following circuit was projected and tried.

Circuit

As the schematic (Fig. 1) shows, the converter consists of a single 6J6, one triode section of which is used as a square-law (weak-signal) converter.

The antenna coupling is variable to allow a proper impedance match. The coils are of high L and high Q . The cathode is grounded directly, thus improving stability and reducing interaction between mixer and oscillator. An i.f. of 6.8 Mc. was chosen since the performance of most commercial receivers still holds up in this region. The high-i.f. and high- Q circuits greatly reduce image interference.

The oscillator section is entirely straightforward. The use of series-capacitance bandspread may be questioned but the availability of inexpensive quality components makes this entirely practical.

After years of repriming of tapped coils, etc., it was a decided pleasure to be able to adjust bandspread and tracking at will by the turn of a screw. Injection for weak-signal reception was adequate with just the coupling introduced by socket and stray capacities. No "pulling" effects were observable.

The entire unit was built on an 8 × 4 × 3-inch "U"-shaped chassis which was bent up from a small stiff panel. The builder may incorporate such a dial and shielding as suit his taste.

No difficulty was experienced in putting the converter into operation except the usual one of finding the band. The mixer section operates at a plate current of 8 ma., which implies an average grid voltage of -0.75 volt. The mixer plate current without excitation is about 12 ma., well within the rating of the tube. It is not recommended or desirable that tube plate voltage of higher than 105 volts be used. The oscillator plate current is 3.5 ma. Mechanical and elec-

(Continued on page 116)

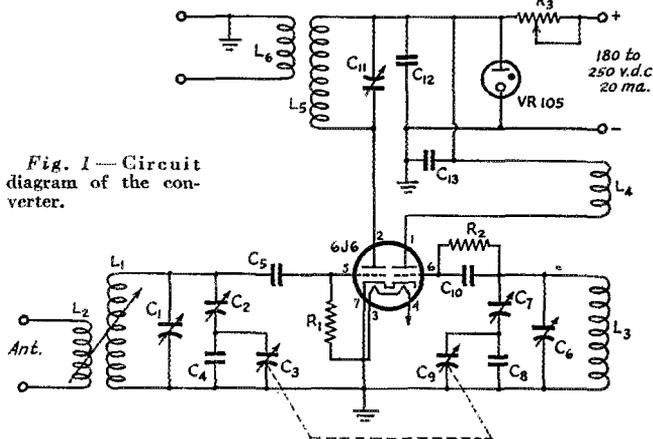
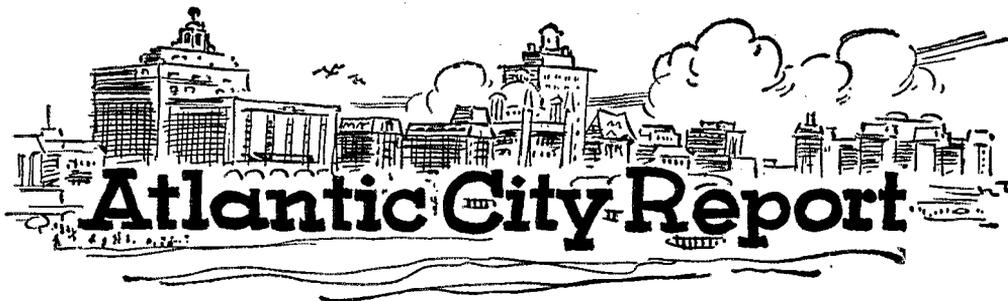


Fig. 1—Circuit diagram of the converter.

- C₁ — 25- μ fd. air padder.
- C₂, C₇ — 4- to 30- μ fd. ceramic trimmer.
- C₃, C₉ — 50- μ fd. per-section variable.
- C₄ — 10- μ fd. fixed ceramic.
- C₅, C₁₀, C₁₂, C₁₃ — 120- μ fd. fixed ceramic or mica.
- C₆ — 50- μ fd. air padder.
- C₈ — 20- μ fd. fixed ceramic.
- C₁₁ — 140- μ fd. air padder.
- R₁ — 10 megohms, 1 watt (metalized).
- R₂ — 47,000 ohms, $\frac{1}{2}$ watt.
- R₃ — 7000 ohms, 10 watts (Slideohm).
- L₁ — 28 to 30 Mc.: 8 turns No. 18 bare copper wire, length 1 inch on $1\frac{1}{8}$ -inch diam. ceramic form.
- L₂ — 6 turns No. 22 e., length $\frac{3}{4}$ inch on $\frac{3}{4}$ -inch polystyrene form. Variable insertion concentric with L₁. Coupling adjusted for best signal-to-noise ratio.
- L₃ — 21.2 to 23.2 Mc.: 7 turns No. 18 bare copper, length 1 inch, on $1\frac{1}{8}$ -inch diam. ceramic form.
- L₄ — 3 turns No. 22 e., close-wound on same form as L₃, spaced $\frac{3}{8}$ inch from cold end of L₃.
- L₅ — 20 turns No. 22 e., length $1\frac{1}{2}$ inches on $1\frac{1}{8}$ -inch diam. bakelite form.
- L₆ — 3 turns No. 22 e., close-wound on same form as L₅, spaced $\frac{1}{2}$ inch from cold end of L₅. (For low-impedance coaxial line.)



Atlantic City Report

THE CONCLUDING WEEKS

Well, it's over! It took nearly a thousand people nearly five months. They say it cost twelve million dollars or around \$200 a working minute. The final documents — the treaty and regulations and annexes and protocols and resolutions — are a printed book as thick as several issues of *QST*. The mimeographed daily working papers fill two drawers of a file cabinet — for a set in just one language — say 10,000 pages of preliminary record. But finally, in early October, after working 7-days-a-week for their final weeks, and with night sessions until midnight and even 2 A.M., the three conferences of 79 nations at Atlantic City concluded their history-making sessions and took their place alongside Washington, Madrid and Cairo in the documentary record of telecommunication government. The memories of the hard work, the 75-meetings-a-week, the arguments, the tea-cupping, the committee battles, and similarly the memories of old friendships renewed and of new ones made, will live for years in the minds of these hundreds of people, for Atlantic City was the longest and the hardest-fought of the international telecommunication conferences.

The new "ACy" allocation table for the amateur bands below 27.5 Mc. will take effect on a date which is still uncertain but which is estimated as Sept. 1, 1949. Above 27.5 Mc. the effective date is Jan. 1, 1949. The reason for the uncertainty on the lower bands is that the radio world is constructing a new frequency-registration list of the frequencies used for commercial and government services (chiefly fixed and broadcasting), to spot the stations in terms of the new ACy table and on an engineering basis that makes the best possible use of the diminishing spectrum. To do this job a large special conference will be in session for about 1½ years, beginning next January, and only when that new list is satisfactorily constructed and approved can the new table go into effect. The present schedule aims at putting both the new list and the new table in effect Sept. 1, 1949. We — and all the rest of the radio world — will just have to wait and see.

The allocation table was approved by the frequency-allocation committee here on Sept. 8th — which approval, incidentally, was the first adop-

tion at committee level of our bands at 3.5, 7 and 21 Mc. Along with other articles of the regulations, the table got its first plenary reading and adoption on Sept. 17th, and at a night session on the 24th it received its second and final approval. It differs from our report in the last issue of *QST* only in its provisions for regions outside the Americas. We shall give you a final summarizing of what it provides for amateurs, but first it is necessary to describe the division of the world into three regions for the divisions of the allocation table. For our purposes:

Region 1 consists of Europe and Africa, plus all the remaining territory of Turkey and of the U.S.S.R. in Asia, the area to the north of U.S.S.R., and the Mongolian People's Republic.

Region 2 consists of the Americas, including the Caribbean area and Greenland, and plus the Hawaiian Islands.

Region 3 is the rest of the world. It consists mainly of Oceania, including Australia and New Zealand, and of Asia except for the Mongolian Republic, Turkey, the territory of the U.S.S.R. and the area to the north thereof. It includes U. S. Possessions east to KH6.

Now let us examine the table, by regions where necessary.

The 1.75-Mc. Band

There is no actual amateur allocation for Region 1 but a special note provides that in the band 1715–2000 kc. Austria, Ireland, the Netherlands, Northern Rhodesia, Southern Rhodesia, Switzerland, the Union of South Africa and the United Kingdom may assign up to 200 kc. for the amateur service provided that the mean power does not exceed 10 watts and that no harmful interference is caused other countries.

For Regions 2 and 3, 1800–2000 is assigned amateur, fixed, mobile and radionavigation, a footnote explaining that in any particular area loran uses 1800–1900 or 1900–2000 and that whichever of these two bands is not required for loran may be employed for the other services on condition of no harmful QRM to loran. Exceptionally, however, in the U. S.-Canadian area both bands are employed for loran and consequently this provision currently offers nothing to amateurs in our two countries.

Success at last! Its work accepted by the radio conference, the Working Group of Committee 5, the Allocation-of-Frequencies Committee, poses for a final picture in Room 708, Ambassador Hotel, the site of its day-and-night labors for many weeks in perfecting the Atlantic City allocation table. In the usual order: Comdr. Charles Loyer (France); Maj. Valentin K. Bragin (U.S.S.R.); Col. A. H. Read (U.K.), chairman of Committee 5 who took over in midstream and carried the work to a successful conclusion; A. H. Mumford (U.K.); Capt. Paul D. Miles (U.S.); P.W.F. Fryer (U.K.), who served as secretary-interpreter for the group in the final phases of its work.



The 3.5-Mc. Band

The allocations for this band properly vary regionally. For Region 1, 3500-3800 is assigned jointly to amateur, fixed and mobile-except-aeronautical. Although regional agreements could be made for the subdivision of this assignment, we understand it is not presently contemplated in that region and that in the usual case (as will be particularly true in U.K.) the amateur service will operate in these 300 kc. in a mixed shared status with the other two services. Any country is free to assign the whole 300 kc. exclusively to amateurs and some may do so. In this region 3800-3900 is assigned to aero mobile, fixed and land mobile; 3900-3950 to aero mobile; and 3950-4000 to broadcasting and fixed.

For our Region 2 the assignment for 3500-4000 reads amateur, fixed and mobile-except-aero, as it constantly has since Washington 1927, and in this region it is well understood to be subject to definitive allocation by a regional conference. The next such American conference is scheduled for Bogotá, Colombia, in October, 1948, and at that time the question of maintaining 3500-4000 as an exclusively amateur band for the entire American Region will again be up for determination.

In Region 3 the amateur, fixed and mobile services are assigned 3500-3900, and the countries in that region are free either to have a regional agreement for the division of the allocation or, in its absence, to assign their amateurs any part or all of these 400 kc. 3900-3950 is shared aero mobile and broadcasting, 3950-4000 shared broadcasting and fixed.

The 7-Mc. Band

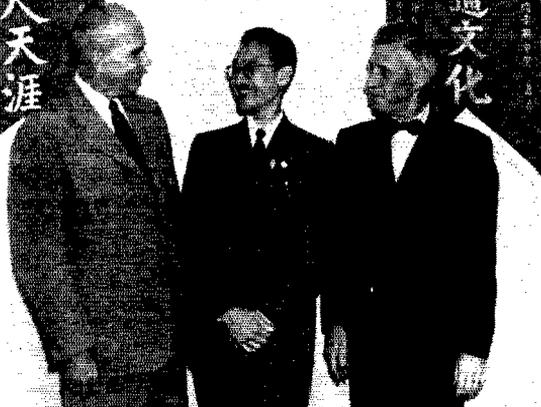
From about 5 Mc. to about 27 Mc. the ACy allocations are on a worldwide basis without regional variations — except in the case of our 7-Mc. band. It is the common feeling of the technical members of most of the delegations at ACy that the allocation adopted for this band is

doubtful engineering but that it was unavoidable in view of the alignment of the various forces that entered the determination. It is the result of a protracted battle between broadcasting and amateurs, in which every word was fought over repeatedly and the allegiance of each country to a particular region or footnote was many times challenged and reexamined. It reflects the penetrations of broadcasting in many areas not so resolute as the Americas in their defense of amateurs and is the inescapable result of a situation where some regions were determined to hold the allocation for amateurs, others were equally determined to take the band for broadcasting, and others were determined to split the difference. The battle raged even through the last meeting of the allocation committee and into the first plenary adoption of the table, the last move being by a group of Asiatic nations led by India who sought to have the band divided 7000-7150 exclusively amateur, 7150-7300 exclusively broadcasting, on a worldwide basis. The allocation is admittedly an unhappy one for a frequency of this DX range but, as desired by American amateurs, it holds the whole band for us on this side. Here it is:

First, the lowest 100 kc. of the band, 7000-7100, are assigned exclusively to amateurs on a worldwide basis.

In Region 1 the next 50 kc. of the band, 7100-7150, are allocated on a shared basis to amateurs and broadcasting, use by the amateur service being authorized provided no harmful interference is caused the broadcasting service. However, in the Union of South Africa and territory under mandate of Southwest Africa, 7100-7150 kc. will be used exclusively for the amateur service. Throughout Region 1 the remainder of the band, 7150-7300, is assigned exclusively to broadcasting.

In Region 2, following the worldwide assignment of 7000-7100 the remainder of the band, 7100-7300, is assigned exclusively to amateurs. That gives us the whole of 7000 to 7300.



The Chinese Amateur Radio League sends silk banners of formal greetings to IARU and ARRL, here shown hanging on the walls of the ARRL office at Atlantic City upon the occasion of their presentation by Mr. K. T. Chu, CIKT, acting president of CARL, center. Shown also are George W. Bailey, W2KH, and K. B. Warner, WIEH, respectively president and secretary of both IARU and ARRL. The small characters on each banner say to whom it was presented, ask that it be kept as a remembrance, state that it is from CARL with compliments, and bear the date of China Amateur Radio Day (May 5th) in the 36th year of the Chinese Republic. The message of the banners is in the large characters down the center. The one to IARU, on the right, says, "To interchange cultural relations," and may be more liberally read, "The aims of the IARU societies are to exchange cultural knowledge of each other and to advance brotherhood." The one to ARRL, left, is on a less formal note and may be read, "Although we are on opposite sides of the world, still we are (through radio) only a foot apart." After the conference IARU's banner will hang in Mr. Bailey's office in New York, ARRL's one in the Hq. office at West Hartford. CARL's greetings, deeply appreciated, are emblematic of the fraternalism of amateur radio around the world. Members will be glad to know that CARL is in the process of being inducted as the Chinese member-society of IARU.

In Region 3 the table generally resembles Region 1, with 7100-7150 shared amateur and broadcasting, 7150-7300 nominally exclusively broadcasting. However, certain deviations from the table are especially provided for by a footnote: In Australia and the Netherlands East Indies the band 7100-7150, and in China and New Zealand the band 7100-7300, may be allocated to the amateur service. These administrations undertake all practicable steps to avoid harmful interference to broadcasting and will limit amateur stations to a peak power of 100 watts on these frequencies, agreeing that if harmful interference to broadcasting is experienced they will consider reducing the use of these additional frequencies by the amateur service.

The 14-Mc. Band

As extensively reported in our last issue, this band will be 14,000 to 14,350 kc. on an exclusive worldwide basis except that in the U.S.S.R. the frequencies 14,250-14,350 are also allocated for the fixed service under an undertaking to confine

the use to interior domestic communications and to take all practicable technical steps to minimize interference to the amateur service.

The 21-Mc. Band

We have an important new band! We are pleased to report that the September actions of the conference, referred to earlier, have resulted in a clean, exclusive, worldwide allocation to establish a new amateur band from 21,000 to 21,450 kc., with no footnotes and no exceptions. Just plain ours, come autumn of 1949.

The 27- and 28-Mc. Bands

In part of the ISM assignment of 27,120 kc. $\pm 0.6\%$, the amateur service will operate within the band 26,960-27,230 kc. throughout our Region 2 and in Australia, New Zealand, South Africa and mandated Southwest Africa. As with our present 11-meter assignment, we must accept any harmful interference that may be experienced from the operation of industrial, scientific and medical equipment. The band limits differ slightly from our present assignment, the new international ISM frequency being slightly different from present U. S. practice. It is probable that this band will be shifted soon, as an exception not awaiting the date of Jan. 1, 1949. No European countries joined in this amateur authorization but it is believed that some of them will find a way to do so later.

The band 28,000-29,700 kc. was assigned the amateur service on an exclusive worldwide basis.

The 50-Mc. Band

Improving upon our last month's report of the outlook, so many countries in Region 3 wanted 50-54 Mc. for amateurs that it became possible to write it into the table as an exclusive allocation for both Regions 2 and 3. It is similarly to be used exclusively for the amateur service in the Union of South Africa, mandated Southwest Africa and both Rhodesias; but we regret to say that, for reasons outlined last month, there is no such band in the rest of Region 1, including Europe. It is hoped that European administrations will be able to place amateurs in an unused television channel in the 50-60 range on a noninterference basis. Exceptionally, in France and the U.S.S.R. 72-72.8 Mc. is allocated to amateurs.

The 144-Mc. Band

The lower half, 144-146 Mc., is assigned the amateur service on an exclusive worldwide basis. Region 1 wouldn't go farther than that but Regions 2 and 3 completed the band by assigning 146-148 additionally exclusively to amateurs.

Bands Above 200 Mc.

From 220 to 225 Mc. is an amateur allocation in Region 2. But, because DME has operating rights in 220-231 in this region under treaty until

1952, our band will temporarily remain at its present location, 235-240 Mc., in U. S. and Canada. Probably because of DME commitments, most of the rest of the world wouldn't go along with this band, but 220-225 is allocated for the amateur service in China, South Africa, both Rhodesias and mandated Southwest Africa. (If VK and ZL amateurs need a 1 $\frac{1}{4}$ -meter band, we believe they could get it by asking for a temporary assignment above 235 Mc. until DME is replaced.)

The band 420-450 Mc. has a worldwide assignment jointly to amateurs and aeronautical radionavigation. The latter has priority and the amateur service is admitted only on condition of no harmful interference to it. In Region 2, however, the navigation allocation is earmarked temporary and is exclusively for altimeters. In Regions 1 and 3, but not in Region 2, this shared allocation is carried up to 460 Mc.

Expanding our old 1215-1295 band, 1215-1300 Mc. is a worldwide amateur band except that in the U.S.S.R. it is allocated for the fixed service, primarily for relaying television.

2300-2450 is also a worldwide exclusive assignment, but we must be prepared to accept ISM QRM within 50 Mc. of 2450 in this region and in Australia, New Zealand, both Rhodesias, South Africa and Southwest Africa, and U.K.

Some time back our 5-kMc. assignment in this country was split into two halves, one being at 3300-3500 Mc. We retain this as an exclusive band in this region. Region 1 omitted it. Region 3 made a wide mixed allocation of 3300-3900 shared between amateur, fixed, mobile and radionavigation — possibly to be split up later.

The other half of the 5-kMc. band, 5650-5850 Mc., is now a worldwide exclusive. The frequency 5850 is designated for ISM, and harmful interference must be accepted within 75 Mc. of that spot in the countries listed in the reference to ISM on 2450. Region 2 gave us the additional 75 Mc. on the high side, 5850-5925, of course subject to the ISM racket, but Regions 1 and 3 didn't go along, assigning them to fixed and mobile.

Finally, 10,000-10,500 Mc. is also a worldwide exclusive hamband, completing the ACy table, which carries the notation "Not Allocated" for the range above 10,500. As previously remarked, we assume that our band at 21-22 kMc. remains on the books in U. S. and Canada.

Who Are Our Neighbors?

We wish we could reproduce the frequencies article but it is 52 printed pages about this size, most of it taken up by the allocation table and its 117 footnotes. The ACy documents will be put on public sale and we believe most amateurs will find them highly informative. Meanwhile we can give you a general outline of the assignments in the h.f. spectrum, through the stretch that has worldwide uniformity, for general information, al-

though with the warning that many details, including exceptions provided by footnotes, are omitted for want of space. Here, that rough, is the DX part of the spectrum:

5,480-5,680	Aero mobile (R)
5,680-5,730	Aero mobile (OR)
5,730-5,950	Fixed
5,950-6,200	Broadcasting
6,200-6,525	Maritime mobile
6,525-6,685	Aero mobile (R)
6,685-6,765	Aero mobile (OR)
6,765-7,000	Fixed
7,000-7,300	By regions; see text above
7,300-8,195	Fixed
8,195-8,815	Maritime mobile
8,815-8,965	Aero mobile (R)
8,965-9,040	Aero mobile (OR)
9,040-9,500	Fixed
9,500-9,775	Broadcasting
9,775-9,995	Fixed
9,995-10,005	Standard frequency
10,005-10,100	Aero mobile (R)
10,100-11,175	Fixed
11,175-11,275	Aero mobile (OR)
11,275-11,400	Aero mobile (R)
11,400-11,700	Fixed
11,700-11,975	Broadcasting
11,975-12,330	Fixed
12,330-13,200	Maritime mobile
13,200-13,260	Aero mobile (OR)
13,260-13,360	Aero mobile (R)
13,360-14,000	Fixed
14,000-14,350	Amateur
14,350-14,990	Fixed
14,990-15,010	Standard frequency
15,010-15,100	Aero mobile (OR)
15,100-15,450	Broadcasting
15,450-16,460	Fixed
16,460-17,360	Maritime mobile
17,360-17,700	Fixed
17,700-17,900	Broadcasting
17,900-17,970	Aero mobile (R)
17,970-18,030	Aero mobile (OR)
18,030-19,990	Fixed
19,990-20,010	Standard frequency
20,010-21,000	Fixed
21,000-21,450	Amateur
21,450-21,750	Broadcasting
21,750-21,850	Fixed
21,850-22,000	Aero fixed; aero mobile (R)
22,000-22,720	Maritime mobile
22,720-23,200	Fixed
23,200-23,350	Aero fixed; aero mobile (OR)
23,350-24,990	Fixed; land mobile
24,990-25,010	Standard frequency
25,010-25,600	Fixed; mobile except aero
25,600-26,100	Broadcasting
26,100-27,500	Fixed; mobile except aero

Some Statistics

An allocation table is a compromise between the conflicting views of many countries. The Atlantic City broadcasting provisions are about 26% greater than the U. S. proposals, and the aeronautical mobile assignments are about 16% greater, although most of the latter increase is above 10 Mc. The fixed service is down 3.1% below U. S. proposals, even counting all shared space as available. For a service as huge as the fixed necessarily is, that is a great many kilocycles. The maritime-mobile allocations are 1.6% below U. S. proposals. The amateur assignments are 2.9% below the proposals made in our behalf by

the United States — although, counting the new 21-Mc. band, they are materially greater than our present assignments, as may be seen in the following tabulation of our so-called "reliable" bands below 25 Mc.

Band	Prewar Kc.	Present Kc.	Atl. Cy. Kc.
1.75	300	...	...
3.5	300	500	500
7	300	300	300
14	400	400	350
21	...	...	450
	1500	1200	1600

Since we are writing this from ACy, it still comes under the head of current reporting and we are still too close to the five-month battle to have a thoroughly good perspective on its results. That can wait for a little shaking-down. But we can say that the allocation work here has been a constant tussle in which the whole world engaged, each country for its favored services, viewpoints differing sharply with geographical location, economic status and national ideology. Unless such a conference ends in entire failure, the result inevitably is a compromise, one that offers the greatest good to the greatest number but which is inescapably unsatisfactory in some of its provisions to every country, every service. Of such is the Atlantic City table compounded. Allowing anything at all for the mammoth difficulties under which it was created, it is a monumental accomplishment.

For our part it is time to make an expression in print of our appreciation of the support and assistance of the nations friendly to amateur radio. When we summarized our Cairo experiences, some nine years ago, we said that we had come to the conclusion that the true home of amateur radio in the future was the American Region and the English-speaking British dominions. To that list we now, with a flourish, shall add China. Amateur radio had its numerous supporters in many countries but we shall here make particular mention of the valiant help of China and of New Zealand, which were outstanding. The American Region, from one end to the other, was unswerving in its protection of us with the single exception of Mexico. Canada was as splendid a backer as ever an amateur could pray for. The United States delegation, perhaps naturally, carried the ball most of the time, considering that it had the sole spokesmanship outside of Europe on the Working Group of the allocation committee. Amateurs, particularly W/K amateurs, will be glad to know that we have been backed to the hilt by FCC Chairman Charles R. Denny, jr., who both headed the U. S. delegation and was chairman of all three ACy conferences. We give a special bow to that stalwart, FCC Commissioner E. K. Jett, who particularly earned amateur gratitude at Cairo and who has never-never let us down, including the handling of some particularly

critical maneuvers at ACy. But the star of this radio conference's allocation work was Capt. Paul D. Miles, USNR, chief of FCC's frequency-allocation division, who was the head of the U. S. government-industry frequency team, the U. S. spokesman on all frequency matters, and a member of the famous W. G. He fought our battles both for the United States and for the American Region, both within the W. G. and on the floor of the conference, with many excellent statements on behalf of the amateur service. His generalship and his execution equally left nothing for amateur radio to desire.

International Telecommunication Union

In this concluding article of this series, let us endeavor to get a general perspective on this International Telecommunication Union whose activities shape our amateur allocations. The ITU is an organization formed by some eighty governments for coöperation in international communications — both radio and wire — in a manner generally similar to the Universal Postal Union. It is the oldest international organization of its type in the world, with a long and honorable history. At Atlantic City this Union has been extensively reorganized, its activities greatly expanded. It is well for us to know something of these activities.

Although the ITU has a permanent headquarters and staff, called the secretariat, at Bern, Switzerland (to be removed next year to Geneva), it does its business through world conferences. These conferences are of two types, plenipotentiary and administrative — and one of each has been meeting at Atlantic City. The plenipotentiary conference is the supreme agency in ITU. Its members are the formal representatives of governments, with the power to commit countries. Its agreements constitute a treaty or convention between the governments, setting forth the general purposes and principles of their association. The last such convention was written at Madrid in 1932; it has been entirely redone at ACy. Like the brief but powerfully-binding constitution of a society, it recites all the major principles agreed upon and arranges for their implementation: the structure of the Union, its subsidiary organizations, the rules for admission and for voting, the sharing of expenses, the arrangements for conferences, the plans for monitoring, the official languages, and the agreements for the exchange of international traffic and the clearing of accounts. The plenipotentiary conferences are a bit on the formal and stuffy side, as befits delegates possessing the full powers of their governments.

The detailed implementation of all these principles is carried out in regulations, one set for radio and another for wire telegraphy, which are worked out at what are called administrative

conferences — where the delegates are the practical men representing the communications administrations of their countries rather than the countries themselves. Thus the regulations, in their more extended detail, can be likened to the by-laws of a club. Such an administrative conference has also been held at ACy, revising the radio regulations of Cairo 1938, and it is in these more detailed rules that we find the regulations governing all the international services and assigning them frequencies. There is provision also for special administrative conferences for particular and limited purposes, and for regional conferences that operate within the framework of the general regulations. Almost everything mentioned in the plenipotentiary convention is to be found expanded and worked out in practical detail in the annexed regulations.

Fully illustrating the growth in the complexity of communications administration, ACy has scheduled nineteen additional conferences. Many are on specialized subjects, some purely regional. Aside from the Bogotá conference of the American Region next year, the only one of present concern to us amateurs is the next world conference to revise the ACy regulations, now scheduled for Buenos Aires in 1952.

The Union has now set up, as a new creature, an Administrative Council forming a sort of board of directors, to supervise its work between conferences. It consists of the representatives of 18 member-countries chosen for that duty by vote of the conference, and selected from four regions so as to distribute the representation equitably. The international technical consultative committees — the CCIR, the CCIF and the CCIT, respectively for radio, telephony and telegraphy — have now been put on a uniform basis. Each is to be a permanent, continuing investigative body in its field, with a paid director and small secretariat, study groups, and a laboratory. For the CCIRadio this will be a great change, since it heretofore has had life only during its conferences, four in number to date. Now it will be set up as a continuing body, with its headquarters in Geneva; the other CCIs will move to Geneva also.

And now we have reached the point of mentioning the most interesting and important and valuable of the new creatures of the Union, the International Frequency Registration Board and the Provisional Frequency Board, here to be called IFRB and PFB. For many years the administrations have "notified" to the Bern Bureau of ITU or "registered" their use of frequencies for particular circuits or purposes, in a complicated arrangement intended to give the protection of priority to the early registrant. It hasn't worked out. The radio world generally seems to know as well as we amateurs do that the Bern List represents chiefly a paper congestion, that if there isn't room to register more stations on unused frequencies it is because the



PAUL D. MILES

... chairman of the International Frequency Registration Board and the Provisional Frequency Board created by the Atlantic City conferences. Retiring chief of the Frequency Service-Allocation Division of FCC, Captain Miles was the U.S.A. spokesman on allocation matters at ACy, leader of the U.S. allocation team, and, as a member of the famous Working Group of Committee 5, of great influence in the construction of the new ACy table. He assumes his new duties in Geneva in January.

list is stuffed with notifications of nonexistent stations just in the attempt to secure priority, and that in reality the commercial bands are capable of accommodating many times more stations than are to be found on a sensitive communications receiver. It is therefore news of the first magnitude that they have decided to do something about it. Following a suggestion that originated in our own country and resulted in a formal U. S. proposal, the ACy conferences have adopted detailed statutes setting up a permanent board of international experts to pass upon the registrations of frequencies, to maintain a master list, and to fit in stations upon a strictly engineering basis so as to make the maximum use of the spectrum. Detailed prescriptions are laid down for this purpose, dealing with propagation data, control points, solar cycles, sunspot numbers, hours of operation, traffic load, and so on. There is room to hope that the world is actually tackling the job that every amateur knows could be done if they buckled down to it — using modern technical knowledge to fit in stations in a pattern that effectively employs the spectrum. Well, now, that is to be the job of IFRB, a group of eleven men

(Continued on page 118)

Better N.F.M. Reception with A.M. Receivers

A Simple Narrow-Band F.M. Adapter

BY EDMUND HARRINGTON,* WIJEL, AND WILLIAM BARTELL,** WIPJ

MUCH has been said and written in the last decade about narrow-band f.m., and there is currently much controversy regarding the merits of a.m. and f.m. However, the purpose of this article is not to engage in such controversy, but to describe a practical, inexpensive adapter unit for a.m. receivers. As is well known, the use of n.f.m. usually will allow those otherwise in the doghouse because of BCI to operate during the evening hours. Likewise, it offers an inexpensive means for the c.w. man to try his hand at 'phone operation.

Quite a few hams are now using n.f.m. transmission, but most of the receivers in current use are of the straight a.m. type. It is our experience that f.m. reception on a receiver equipped with an f.m. adapter is quite an improvement, from the standpoint of readability, over the same signal received by detuning the a.m. receiver to detect the f.m. signal on the i.f. slope.

The following description of an n.f.m. adapter does not differ radically from one described some years ago in *QST*,¹ and most of the points brought out in that article are applicable to this unit. While we do not flatter ourselves that this is the ultimate in the design of a good f.m. adapter, the simplicity of the unit lends itself to ease of construction and it is possible to use this as the basic unit to which various circuits can be added in experimenting further with n.f.m. Our desire was to hold the basic unit to two tubes in order

* Electrical Engineer, National Co., Malden, Mass.

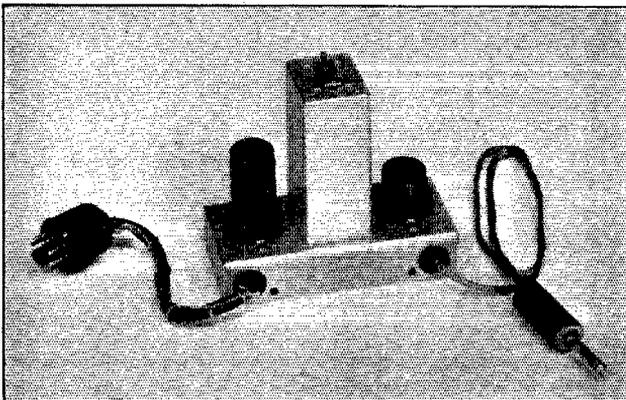
** Sales Engineer, National Co., Malden, Mass.

¹ Grammer, "Some Thoughts on Amateur F.M. Reception," *QST*, March, 1941.

• Reception of narrow-band f.m. or p.m. signals by detuning the receiver is at best a makeshift that does not bring out the full possibilities of the system. Here are two simple adapter circuits that will give true f.m. reception with an ordinary a.m. superhet. The receiver can be changed instantly from f.m. to a.m.

to minimize the drain on the "A" and "B" supply of the receiver with which it is used. If a separate filament supply is used, more stages can be added as desired. Of course, much depends on the receiver to which this adapter is attached, insofar as the results to be achieved are concerned. The receiver should have ample gain to give good limiting action on weak signals.

It has been our observation that when the receiver gain is sufficient, the background noise will rise sharply on each side of the f.m. carrier, and will mask three-spot tuning effects which may otherwise be noticed because of discrimination by i.f. selectivity-curve sides. The adapter has been used with both the HRO and NC-173 receivers with satisfactory results. With the adapter in use the "on-signal" noise level from external noise is reduced because of limiter action, and reports from noisy locations indicate that an improvement in readability is immediately noticed when receiving f.m. signals. Since the adapter allows you to tune to the center of the incoming carrier, any a.v.c. action in the receiver can be used to advantage to hold the "on-signal" noise level down



◆
This two-tube adapter gives n.f.m. reception with a communications receiver having an i.f. in the vicinity of 456 kc. The tubes are a 6SJ7 and a 6H6. The 'phone plug, connected to the audio output terminal in the unit, is plugged into the phono jack on the receiver for f.m. reception, and simply pulled out of the jack for a.m.
◆

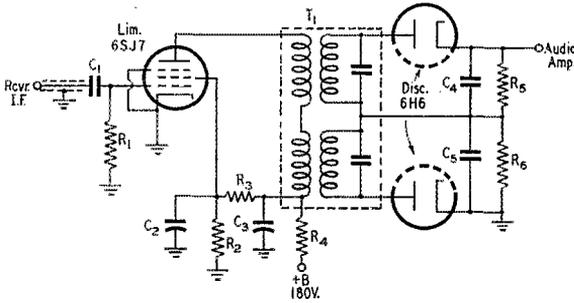


Fig. 1 — The n.f.m.-adapter circuit.

- C₁ — 10- μ fd. ceramic or mica.
- C₂, C₃ — 0.1- μ fd. paper.
- C₄, C₅ — 100- μ fd. ceramic or mica.
- R₁ — 1 megohm, $\frac{1}{2}$ watt.
- R₂, R₃ — 33,000 ohms, 1 watt.
- R₄, R₅, R₆ — 0.1 megohm, $\frac{1}{2}$ watt.
- T₁ — Discriminator transformer (National SA-4842).

by reducing receiver gain, an advantage that cannot be realized with i.f. slope detection. "Off-signal" noise is somewhat greater than with a.m., but this is not too serious since most tuning is done on a.m. and the adapter is switched in when an f.m. signal is present. Later in the article we will describe how a slight addition can be made to reduce the noise level to a value comparable with a.m.

Adapter Circuit

Basically, the adapter unit consists of a limiter stage followed by a discriminator. The limiter uses a 6SJ7 tube with a 10- μ fd. coupling condenser and a 1-megohm grid leak, as shown in Fig. 1. The tube will reach full limiting at about 2.5 microvolts input to the NC-173 receiver, and the limiter output is constant over a wide range. In tests made with a.v.c. off, the receiver i.f. system overloaded before it was possible to overload the limiter, indicating that little would be gained from the standpoint of maintaining constant output by adding another limiter stage. A graph of limiter action is shown in Fig. 3.

The discriminator transformer used is an ex-

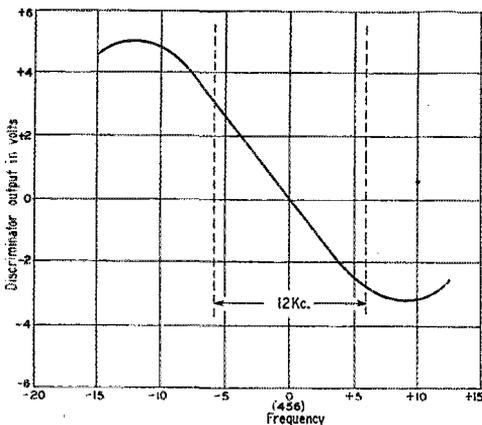


Fig. 2 — Discriminator operating characteristic.

perimental one consisting of two separate low-impedance primary windings, each with a separate secondary winding coupled to it. Each half of the transformer secondary is fixed-tuned with a

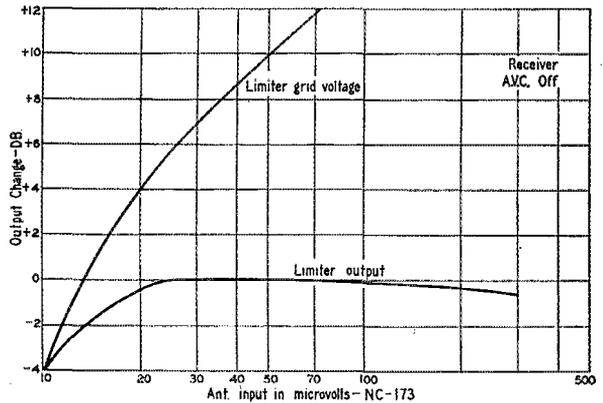
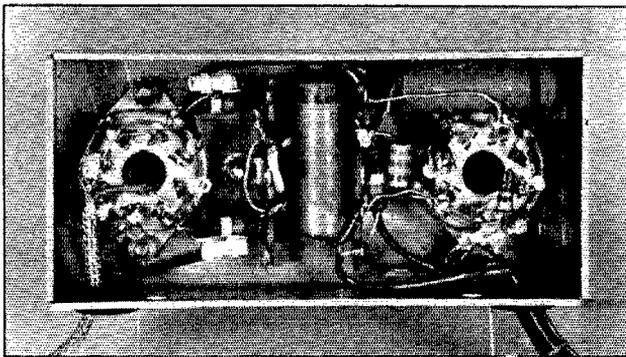


Fig. 3 — Limiter operating characteristic.

510- μ fd. silvered-mica condenser, and variable tuning is accomplished by means of movable iron cores. One of the transformer secondaries is tuned to a frequency approximately 10 kc. higher than the i.f. of the receiver to which it is attached. The other is tuned approximately 10 kc. lower than the i.f. The transformer should be used with a receiver having an i.f. of approximately 456 kc. The bandwidth of the transformer is approximately 20 kc. and the characteristic is quite linear over approximately 12 kc. The output of the discriminator is fed directly to the receiver audio system. Discriminator output is approximately $\frac{1}{2}$ volt per cycle of frequency deviation, as shown in Fig. 2.

Construction of the unit is relatively simple, as will be apparent from reference to the photographs and schematics. It is possible to construct it in an evening; in fact, several have been made at the one-per-man-per-evening rate. The chassis, which measures $2\frac{1}{4} \times 5 \times 1$ inches, is constructed from a piece of 0.062-inch aluminum sheet measuring $4\frac{1}{4} \times 7$ inches. Construction can be simplified by using a piece of metal $4\frac{1}{4}$



The simplicity of the wiring is evident in this underneath view of the adapter. The i.f. lead, a piece of small coaxial cable, is laced with the power and audio leads.

by 5 inches and by putting only two bends in the chassis, making it "U" shaped. Socket holes, as well as the mounting holes for the discriminator transformer, are punched before the chassis is bent to its final shape. Insulated lugs can be mounted on socket screws, as shown, to provide for neat layout of parts.

Most NC-173 receivers are provided with adapter sockets at the rear into which the adapter may be plugged. This adapter socket provides all voltages necessary to operate the adapter, as well as i.f.-output and audio-input connections; thus no other connections need be made to the receiver. In the first experimental model of this adapter, the audio output was run through a shielded lead to the phonograph-input jack on the front of the receiver, and switching from a.m. to f.m. reception was accomplished by inserting the plug in the phono jack. Simpler methods can be devised, especially if the user has no objection to adding a switch to the front panel of his receiver. In this event it is simply necessary to switch either the a.m.-detector output or the f.m.-discriminator output to the audio input of the receiver. It is not necessary to switch off the B-plus of the adapter tubes since interference from cross-talk is negligible.

On the NC-173 receiver, i.f. output is taken from the plate of an a.v.c. amplifier tube so that any detuning effects caused by the unit are not noticeable in the normal operation of the receiver. However, when the adapter is used with other types of receivers, the output must be taken from the plate of the second i.f. tube, and there will be

some detuning of the detector input transformer. The simplest way to retune the detector transformer, when no signal generator is available, is to set the receiver for maximum background noise with no signal present. When this unit is used in connection with receivers having high-impedance i.f. systems, care must be taken to have the lead from the i.f. tube to the limiter well shielded and as short as possible. Small coaxial cable, such as RG-59/U, should be used for this lead. In the event oscillation troubles are encountered in the receiver with the adapter in

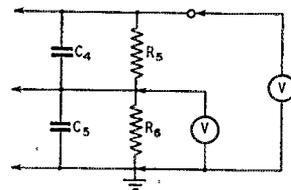
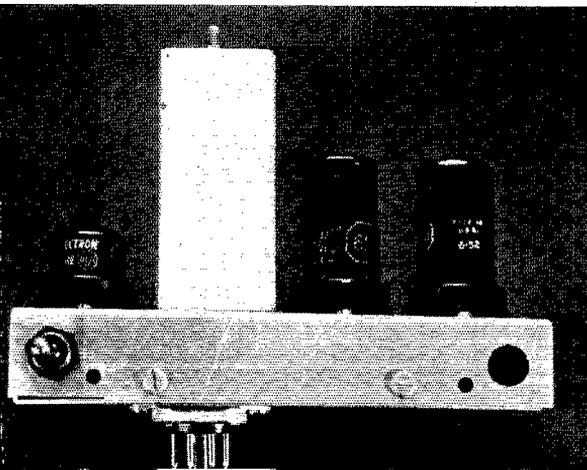


Fig. 4 — Voltmeter connections for aligning discriminator. A high-resistance (20,000 ohms or more) voltmeter must be used.

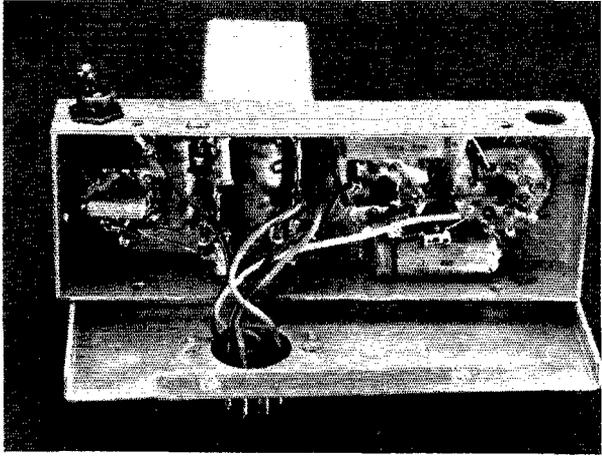
place, make sure the adapter unit is well grounded to the receiver and all shielding is attached to a good ground, preferably in the receiver if possible.²

² It is readily possible, of course, to use the socket idea on other receivers, provided there is a convenient place for it near the last i.f. transformer. The socket results in a more clean-cut job than a collection of leads tied in at various points in the receiver and brought out separately to the adapter.

This model incorporates a squelch tube to reduce interstation noise. It is also constructed so that it can plug directly into the socket on the receiver. The switch at the left (not shown on the circuit diagram) replaces the plug-and-jack system used in the two-tube model as an audio change-over from f.m. to a.m.



Wiring of the three-tube unit is practically as simple as in the two-tube adapter.



Alignment

After the narrow-band f.m. adapter has been attached to the receiver and the receiver properly retuned, if necessary, to compensate for any loading effects, the following procedure can be used to align the discriminator transformer by ear:

With one of the trimmers well detuned (slug all the way out), tune the other trimmer for maximum background noise. Needless to say, this adjustment should be made on a clear channel. Any front-end frequency will do. With the slug tuned for maximum background noise, tune the other slug for a null. Both circuits are now tuned to center frequency. Turn one slug in (clockwise) $1\frac{1}{2}$ turns and the other one out (counterclockwise) $1\frac{1}{2}$ turns. This puts one tuned circuit higher in frequency than the center frequency and the other one lower. The trimmers can now be adjusted for best response on some local f.m. signal.

The above method is the easiest way of tuning up the discriminator transformer. However, it is by no means the most accurate, although satisfactory results can be obtained. If a signal generator and a high-resistance voltmeter are available the process can be made much more accurate, and the following procedure is recommended:

Connect the voltmeter across one of the diode load resistors, as shown in Fig. 4, and tune the circuit associated with that diode for maximum reading on a strong signal that is detuned about 10 kc. If no signal generator is available, a strong local broadcast station can be substituted. Now connect the meter across the two diode resistors and, with the receiver tuned to resonance with the incoming carrier, tune the other circuit for zero reading. It is a good idea to start this adjustment with one slug all the way in and the other all the way out, to avoid tuning both circuits to the same frequency. As the curve in Fig. 2 shows, the peaks of the discriminator characteristic will be approximately 10 kc. each side of center frequency. The discrimi-

nator will be linear over about 12 kc., which exceeds the i.f. passband of most communications receivers.

F.M. Reception

The following observations will give some insight as to the type of performance to be expected. When the receiver is switched from a.m. to f.m. with no signal present, a considerable amount of tube noise will be heard and it will probably be necessary to reduce the audio gain. This is also true when listening to an f.m. signal when the carrier is suddenly switched off. However, we have found that this apparent defect is not too

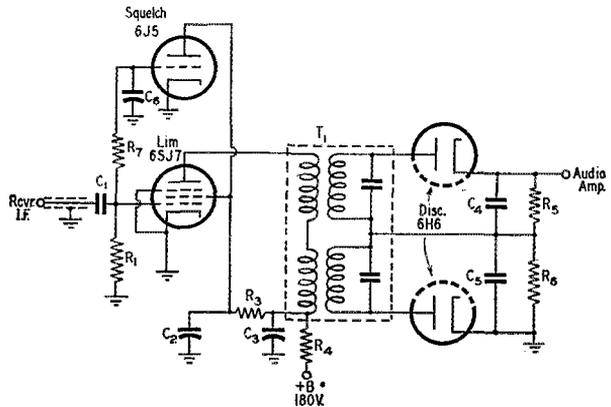


Fig. 5 — Circuit of the n.f.m. adapter with squelch tube. Values are the same as in Fig. 1 with the following exceptions:
 C_6 — 0.1- μ fd. paper.
 R_3 — 2.2 megohms, 1 watt.
 R_7 — 1 megohm, $\frac{1}{2}$ watt.

objectionable, and it can be circumvented in several ways. If the signals are tuned with the receiver set for a.m. reception and switched to f.m. only when an f.m. signal is present, most of the trouble from this source will be eliminated. Also, an additional tube can be incorporated, as described later, to quiet the receiver when f.m. signals are not present.

(Continued on page 180)

Happenings of the Month

ELECTION RESULTS

A record total of 43 candidates has been nominated for the offices of director and alternate director in each of the seven ARRL divisions currently holding elections for the 1948-1949 term. In but four instances, detailed below, were valid petitions filed for a single eligible candidate, resulting in their being declared elected without the need for membership balloting.

The Pacific Division has returned William A. Ladley, W6RBQ, as its director for the next two years. He being the only candidate nominated, under the provisions of By-Law 20 the Executive Committee has declared him elected for the 1948-1949 term.

Three candidates were nominated for the office of alternate director, Dakota Division: Adolphus Emerson, W0ITQ; Robert A. Kimber, W0BLK; and Francis Kramer, W0DEI. But Messrs. Emerson and Kramer withdrew their names by written communication to the Executive Committee. Mr. Kimber being the only remaining candidate, and found eligible, he was declared elected alternate director, Dakota Division, for the coming two-year term. The new alternate is a maintenance engineer with the Black Hills Power & Light Co., Rapid City, South Dakota. He was former SNCS, AARS, served with FCC's Radio Intelligence Division during the war, and currently is president of the Black Hills Amateur Radio Club.

There were four candidates named for the currently-vacant position of alternate director, Midwest Division: C. W. Christiason, W0FLZ; Walter B. Jennings, W0YQA; Alvin G. Keyes, W0KTQ; and H. Glenn Lipscomb, W0HUI. Messrs. Christiason, Jennings and Lipscomb were found to lack the required four-year continuous membership and were therefore declared ineligible. Mr. Keyes being the lone eligible candidate, he was declared elected as alternate director, Midwest Division, for the 1948-1949 term. OM Keyes is a lawyer, associated with the firm of Franken, Keyes and Crawford of Cedar Rapids, Iowa. KTQ's interest and capabilities in organization matters are illustrated by his record of having served as president of the local Junior Chamber of Commerce, of the Iowa Junior Bar Association, and on the executive committee of the Iowa State Bar Association. Hamwise, his most recent accomplishment was as a member of the committee sponsoring the 1947 Midwest Division Convention in his city.

The Southeastern Division returned its present

alternate director, William P. Sides, W4AUP, Montgomery, Ala., for the next two-year term. One other petition was filed naming A. Josh Tumlin, W4CAN, who withdrew his name.

For all other offices there were two or more eligible candidates. Ballots were mailed from the Headquarters the first week in October, with a return deadline of November 20th. A complete report on the results will appear in our January issue.

NEW LICENSE-CARD FORMS

For twelve years the amateur license authorization has consisted of a small pasteboard form, station license on one side, operator license on the reverse side together with endorsement showing class of privileges. Earlier this year, the amateur "ticket" took on a slightly different appearance. The face is familiar, but the structure has changed.

Something over a year ago, FCC's amateur licensing unit was faced with a backlog of several thousands of applications. Although a system was set up calling for renewal and modification applications in a gradual order based on changes of address, revised call areas, etc., FCC found the going tough. As a result, Chairman Charles R. Denny, jr., directed George E. Sterling, W3DF, now the Commission's chief engineer, to examine the entire problem and recommend any changes in the procedures necessary to speed up the flow of licenses. An important phase of W3DF's project was a visit to ARRL Hq., where discussions lasted the greater part of a day and resulted in general agreement on a streamlined system for the mechanics of license issuance. Although the backlog of license applications was almost entirely eliminated before the new system could be set up, FCC still felt that it promised more efficient handling of amateur license matters and so has adopted it.

The old license form was a sheet of heavy stock perforated into eight sections of 3 x 5 cards. Only one was the original operator license; the others were required for maintaining a complete record, both at FCC and at its field offices, alphabetically by licensees' names, by call letters, by expiration dates, and by geographical locations. The other side of the cards showed similar information on the station license. That made a minimum of sixteen typing operations necessary for each license issued simply to produce the required file records.

The new original operator-and-station license consists of a 6 x 5 form, of heavy paper, perforated across the center to permit folding not only

for easy mailing but for convenient carrying with other personal cards and papers, as at present. The feature of the new system is a specially-manufactured set of "billing"-type forms. Originals of operator and station licenses, joined at top and bottom, together with eight copies of each complete with carbons, feed continuously into a typewriter. Thus typing the licensee's name, address and date of issue twice — once for the operator and once for the station portion — produces the necessary information on all copies for subsequent filing. The license is mailed in a "window" envelope. The margin of each license form may still be trimmed so that its net size can be reduced to $4 \times 2\frac{1}{2}$, if desired.

Thus, with its biggest licensing task that of the ever-growing amateur service, FCC is prepared to keep the processing time to a minimum. From ten to fourteen days is currently required for the complete journey of an amateur application through the licensing unit in Washington — including correcting of examinations, recording, license issuance, filing and other required steps. About 2,000 applications for new, renewed or modified licenses are currently handled each month.

WHAT BANDS AVAILABLE?

Below is a summary of the U. S. amateur bands on which operation is permitted as of October 5th. Future changes will, as usual, be announced by WIAW bulletins. Figures are megacycles. A0 means an unmodulated carrier, A1 means c.w. telegraphy, A2 is m.c.w., A3 is a.m. 'phone, A4 is facsimile, A5 is television;

n.b.f.m. designates narrow-band frequency- or phase-modulated radiotelephony; and f.m. means frequency modulation, 'phone (including n.b.f.m.) or telegraphy.

3,500- 4,000	— A1
3,850- 4,000	— A3, Class A only
3,850- 3,900	— n.b.f.m., Class A only
7,000- 7,300	— A1
14,000-14,400	— A1
14,200-14,300	— A3, Class A only
14,200-14,250	— n.b.f.m., Class A only
27,180-27,430	— A0, A1, A2, A3, A4, f.m.
28,000-29,700	— A1
28,500-29,700	— A3
28,500-29,000	— n.b.f.m.
29,000-29,700	— f.m.
50.0	—54.0 — A1, A2, A3, A4
51.0	—52.5 — n.b.f.m.
52.5	—54.0 — f.m.
144	—148 — A0, A1, A2, A3, A4, f.m.
235	—240 — A0, A1, A2, A3, A4, f.m.
420*	—450* — A0, A1, A2, A3, A4, A5, f.m.
1,215	— 1,295
2,300	— 2,450
3,300	— 3,500
5,850	— 5,925
10,000	—10,500
21,000	—22,000
All above 30,000	— Pulse

* Peak antenna power must not exceed 50 watts.

ENGINEERS, TECHNICIANS WANTED

The National Advisory Committee for Aeronautics has a further need for technicians and engineers for development work in electronics as applied to aerodynamic research at its Langley Memorial Aeronautical Laboratory, Hampton, Va. The original announcement, appearing on page 27 of July, 1946, *QST* still applies. Look up that item for details. Briefly, technicians should have had experience in construction or general operation of research-type radio gear; engineering positions requiring training and experience at least equivalent to a B.S.E.E. degree. These are Civil Service openings, and application forms plus additional information can be obtained from your local post office or direct from the Personnel Officer, National Advisory Committee for Aeronautics, Langley Field, Va.

THIS MARGIN MAY BE TRIMMED
DO NOT TRIM INSIDE THIS LINE

Date of issuance: 2-31-99		UNITED STATES OF AMERICA FEDERAL COMMUNICATIONS COMMISSION WASHINGTON		FCC 609 NOT TRANSFERABLE	
AMATEUR RADIO OPERATOR LICENSE					
This license when signed by an issuing officer of the Commission, indicating privileges granted and countersigned by the Licensee, is valid for 5 years from the date of issuance, subject to the provisions of all treaties, laws, orders, and regulations that apply to amateur radio operators.					
FEDERAL COMMUNICATIONS COMMISSION					
Licensee and P. O. address: JOHN RICHARD ROE 1000 PODUNK LANE WASHINGTON 9, D. C.					
VOID				RD 50	
Privileges		Issuing Officer		Date	
Class C: <u>W3SSS</u>				2-31-99	
Class B: _____					
Class A: _____					

U. S. GOVERNMENT PRINTING OFFICE

THIS MARGIN MAY BE TRIMMED
DO NOT TRIM INSIDE THIS LINE

Date of issuance: 2-31-99		UNITED STATES OF AMERICA FEDERAL COMMUNICATIONS COMMISSION WASHINGTON		FCC 609 NOT TRANSFERABLE	
AMATEUR RADIO STATION LICENSE					
This license is valid until 3 o'clock a. m. eastern standard time, 5 years from date of issuance, subject to the provisions of all treaties, laws, orders, and regulations that apply to amateur radio stations.					
FEDERAL COMMUNICATIONS COMMISSION					
Licensee and fixed station location: JOHN RICHARD ROE 1000 PODUNK LANE WASHINGTON 9, D. C.					
VOID				RD 50	
Privileges		Issuing Officer		Date	
Class C: <u>W3SSS</u>				2-31-99	
Class B: _____					
Class A: _____					

U. S. GOVERNMENT PRINTING OFFICE

Sample of original amateur operator-and-station forms now being used by FCC.

HAMFEST CALENDAR

NEW YORK—The Syracuse Amateur Radio Club is staging its biggest hamfest on Saturday, November 8th, at American Legion Post 41 Home, 643 West Onondaga Street, Syracuse. Included on the well-planned program are technical talks, activities for YLs and XYLs, door prizes and a bang-up banquet. Registration starts at 2 p.m. and is \$4.00. Advance reservations may be made through Secretary E. S. Blenden, 435 S. Wilbur Ave., Syracuse, N. Y.

**SWITCH
TO SAFETY!**



V.H.F. Crystal Oscillators

Regeneration in Safe Form, for Improved Output and Keying

BY GALE B. SELLS,* WZAMQ

IN the past there have been serious limitations to the use of crystals on frequencies higher than 10 Mc. If the crystals oscillated at all, they were usually very sluggish in their response, unstable and generally not to be depended upon. Recent improvements, however, in both harmonic and fundamental crystal units have helped considerably in overcoming these problems. The frequency range of the fundamental-type crystal has been extended to 20 Mc. The average crystal of this type has greater activity than the harmonic type, and gives better oscillator output. Third-harmonic type crystals are available for frequencies higher than 20 Mc.

In most cases, unfortunately, the amateur has had very little information concerning the design of reliable crystal oscillators for these frequencies. To drive amplifiers that operate in the v.h.f. bands, it has been considered necessary to use other amplifiers to multiply the lower crystal frequencies, making crystal control of v.h.f. transmitters both complicated and expensive. With crystals available and oscillators easily constructed for the higher frequencies, it is now quite common to see 30-Mc. transmitters with crystals on the same frequency, without intermediate multipliers. After all the years of development of frequency-stable oscillators, crystals are still the most practical means of obtaining an extremely stable signal.

The improvement described in this paper is accomplished by adding regeneration to the circuit, in such a manner that it can be adjusted to any desired value. One objection to crystal oscillators in the past has been the possibility of the crystal exhibiting multiple-frequency response or the oscillator self-oscillating. If the following construction notes are carefully followed, there will be no danger of self-oscillation; nor will there be any tendency toward multiple-frequency response, providing a crystal is used that has been properly finished.

Crystals above approximately 10 Mc. are more critical in their oscillator-circuit requirements. They cannot be used in just any type of circuit, but the new difficulties which arise do not represent any great problem when the facts are known. This paper will attempt to acquaint the reader with these facts. Tried circuits will be described which are recommended to the amateur. Various deviations in values and choice of component

*% Engineering Dept., Radio Specialty Mfg. Co., Portland, Oregon.

• A little regeneration, properly applied, will help to make sluggish crystals perform satisfactorily. It is particularly helpful in connection with crystal oscillators that operate at frequencies higher than about 10 Mc. Here the author shows how regeneration may be added to high-frequency crystal oscillators using both triode and pentode tubes, without adding to the circuit complication, and with complete safety as to crystal current and stability. The method has been used successfully with crystals operating as high as 68 Mc.

parts can be made as long as the basic ideas are followed.

Results of Experiments

After carefully studying the tube manuals, the author selected several tubes which appeared to be the most readily available of the types that would serve for these high-frequency crystal oscillators. The tubes were tried in the circuits of Figs. 1 and 2.

These oscillator circuits are the conventional plate-tuned type, with the regeneration applied by means of coil L_2 . Table I tabulates the critical data of the experiments. The experiments were limited to voltages and currents that did not exceed the ratings of the tubes or endanger the crystal.

Circuit Details

The purposes of the various component parts of Figs. 1 and 2 are outlined below. This will allow the reader to better understand the circuits and make deviations where necessary.

C_1 — Plate tuning condenser: The capacity of this condenser should be kept low to maintain a high-impedance tuned circuit for better oscillator performance. A variable iron-core coil could be used, thereby eliminating this condenser if precautions outlined later in this article are followed.

C_2 — Coupling condenser: The oscillator output to the load increases as the capacity of this condenser is increased to a certain optimum output point, which varies with different loads. After this correct value is found, a fixed condenser could be substituted. Capacity coupling direct to the plate side of the tuned circuit should be

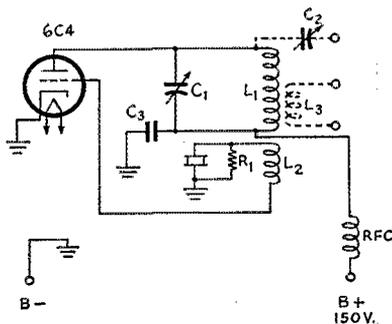


Fig. 1 — Schematic diagram of the regenerative oscillator using a triode tube.

- C_1 — 25- μ fd. variable.
- C_2 — 75- μ fd. variable.
- C_3 — 0.0047- μ fd. mica.
- R_1 — 4700 ohms, $\frac{1}{2}$ watt.
- L_1, L_2, L_3 — See Fig. 3 and text.
- RFC — 2.5-mh. r.f. choke.

used whenever the load impedance approaches or exceeds the impedance of the oscillator output circuit. For very low impedances the inductance L_3 could be used, but the capacity, in most cases, serves just as well.

C_3, C_4, C_5 — Radio-frequency by-pass condensers: These condensers should be a noninductive type, mica preferred. Their reactance should be less than 10 ohms.

L_1, L_2 — Coils: For the particular oscillator used in our laboratory, the coils were constructed as shown in Fig. 3. These coils, with the associated parts as outlined in this paper, covered a frequency range of 23.5 to 33 Mc.

For other frequency ranges, change inductance of L_1 and L_2 but keep the turns ratio the same. The Q of the coils should be high. Use low-loss materials and keep the form clear of surrounding objects by a distance equivalent to at least three-quarters of its diameter. The number of turns and spacing of L_2 with respect to L_1 control the degree of regeneration. Extra space was provided on our coil form to allow this winding to be moved in its position from directly adjacent to L_1 to approximately $7/16$ of an inch away. The adjustment of the winding is critical but is easily ac-

complished when the procedure outlined later is carefully followed.

L_3 — Coupling coil: This coil is required only if inductive coupling to the oscillator is desired rather than the capacity coupling as outlined for C_2 . The number of turns and position with respect to L_1 depend upon the impedance of the load and the amount of oscillator loading desired. It should be placed near the cold end of L_1 . Generally, unless the impedance of the load is quite low, capacity coupling is to be preferred.

R_1 — Grid bias resistor: This resistor controls the amplitude of oscillations and affects plate current. Its value should be chosen for desired plate current and oscillator output. It should not be so low in value that it will hinder the operation of the crystal by shorting it out. This could be prevented by inserting an r.f. choke in series with it. An r.f. choke tried in our oscillators indicated that the value of resistance was not low enough to cause this difficulty. A lower-frequency crystal may require the choke because the radio-frequency resistance of the crystal increases as the frequency is lowered.

R_2 — Cathode bias resistor: The purpose of this resistor is to limit the plate current drawn when the crystal is not oscillating. Its value must be chosen for the particular tube to keep its plate dissipation within its rating. Some tubes do not require this resistor if their plate dissipation is not exceeded with zero bias.

RFC — Radio-frequency plate choke: This choke is used to isolate radio frequency from the plate supply. Its value is generally not critical.

Oscillator Tube: A triode, tetrode, or pentode can be used. The screen voltage of the tetrode or pentode would be taken off the power supply either directly or through a resistor, depending on the particular requirements. Tubes designed for the high frequencies should be used.

Quartz-Crystal Unit: The crystal should have a temperature coefficient that will permit it to stay within the required frequency limits over the range of temperature at which it is expected to operate. The quartz plate should be etched the required amount to prevent future aging, and should have sufficient activity so that variation in temperature and circuit-component value will

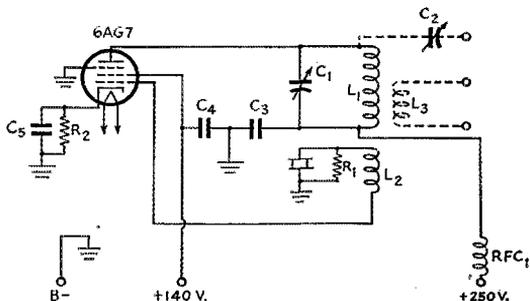


Fig. 2 — Circuit of the regenerative oscillator for pentode tubes. Values are similar to Fig. 1 except as indicated below.

- C_4, C_5 — 0.0047- μ fd. mica.
- R_1 — 3300 ohms, $\frac{1}{2}$ watt.
- R_2 — 100 ohms, $\frac{1}{2}$ watt.

Frequency in Megacycles	28.921	28.921	28.921	28.921	28.921	28.921
Circuit	Fig. 1	Fig. 1	Fig. 1	Fig. 2	Fig. 2	Fig. 2
Tube	6J4	6C4	6C4	6AG7	6V6GT	6L6
r.f. watts output	0.75	1.73	0.72	2.93	1.06	2.64
D.c. watts input (plate)	2.3	4.55	2.37	5.62	2.65	5.25
E_p d.c. volts	155	222	158	250	102	125
I_p d.c. ma.	15	20.5	15	34.5	26	42
Crystal r.f. ma.	92	92	60	48	60	60
E_{sk} d.c. volts	---	---	---	140	102	125
I_{sk} d.c. ma.	---	---	---	11.5	2	3
*Self-oscillation starts at . . .	+10 $\mu\mu\text{fd.}$	+10 $\mu\mu\text{fd.}$	+10 $\mu\mu\text{fd.}$	+10 $\mu\mu\text{fd.}$	+10 $\mu\mu\text{fd.}$	+10 $\mu\mu\text{fd.}$

* Method of indicating degree of applied regeneration — see text.

not reduce its value to such a level that the circuit will cease to function properly. If a crystal is allowed to arc, a foreign substance will form on the quartz plate causing its operation to become unstable.

During the tests the crystal showed indications of heating when it was subjected to a current greater than 80 milliamperes. It is therefore recommended that, for this frequency, this be the maximum current permitted. For a given size quartz plate the radio-frequency current through it increases and radio-frequency voltage across it decreases as the frequency is increased.

A 2-volt 60-ma. pilot light can be used in series with the crystal to indicate the current, but its resistance generally reduces the activity of the crystal to such a degree that the circuit will not deliver sufficient output. An r.f. milliammeter or thermogalvanometer is more satisfactory. It is essential that care be used in the choice and placement of parts to allow use of short lead length.

Adjustments

The grid current of an amplifier being driven by the crystal oscillator is a satisfactory means of checking radio-frequency output. If fixed bias is used on such an amplifier, it should be removed, since with a fixed bias there could be self-oscillation and the grid meter would not indicate until the bias voltage was exceeded.

The secret of applying the regeneration is to use only enough to permit the crystal to respond properly when the oscillator is turned on or keyed. The degree of regeneration¹ can be determined easily by putting a variable condenser in place of the crystal and increasing its capacity from its minimum setting until self-oscillation takes place as indicated by grid current in the succeeding stage. If the oscillator refuses to self-oscillate

¹ A very satisfactory way of stating the degree of regeneration would be to state the amount of capacity (expressed in $\mu\mu\text{fd.}$) in excess of that of the crystal static capacity necessary to start self-oscillation in the circuit. This is the method used in Table I.

even with the crystal terminals shorted out, then the circuit is nonregenerative. The feed-back coil L_2 may be found to be reversed or not coupled closely enough. The closer the coil is coupled, the smaller will be the capacity setting of the test condenser for the start of self-oscillation, and the greater the degree of regeneration.

The regeneration must not be such that the tube will self-oscillate because of the static capacity of the crystal, in case the crystal failed or the oscillator were detuned from the crystal frequency. The static capacity of the crystal is that which exists between the electrodes, holder contact plates, and pins. It can be easily measured by a capacity bridge or other testing device.

The test condenser which is substituted in place of the crystal should have the setting marked which is equal to the greatest expected static capacity of the crystals that are to be used. (The static capacity of the 28.921-Mc. crystal used in our tests was 17 $\mu\mu\text{fd.}$) It should have short leads and be equipped with pins for plugging into the crystal socket. We used a variable Erie Ceramicon 7-45- $\mu\mu\text{fd.}$ Type TS2A, mounted on a crystal holder.

After the test condenser has been marked for the static capacity of the crystal, the regeneration should then be adjusted to the proper degree. Apply only sufficient regeneration to make the crystal reliable in its response. Before making the final adjustment, the load (amplifier tube, etc.)

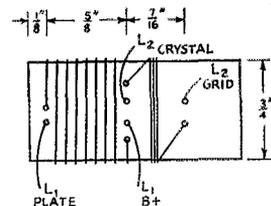


Fig. 3 — Coil assembly used in the regenerative oscillators described.

L_1 — 7 turns No. 18 enameled wire, space-wound.
 L_2 — 3 turns for triode oscillator, 2 turns for pentode, both of No. 24 d.c.c. wire, close-wound.
 Coil form is Amphenol Type 24, $\frac{3}{4}$ -inch diameter.

must be connected to the oscillator. If, after the regeneration is adjusted, it is found necessary to change the coupling (C_2 or L_3 adjustment) to the load, it may be necessary to readjust the regeneration. This is necessary because, as the load on the oscillator is increased, the degree of regeneration must also be increased. The degree of regeneration also increases as C_1 is decreased, therefore it should be adjusted with C_1 at its lowest-capacity setting. In general, it is only necessary to have the circuit self-oscillate with a

(Continued on page 126)

"Listen, Oscar . . ."

Sparks of Wisdom from an Old Short-Circuiter

BY J. P. JESSUP, * W2GVZ

LISTEN, OSCAR, do ya really wanta stick around long enough to make the postwar DX Century Club, or WAC on 2, or sumpin? Ya do, huh? Well, by golly, listen to *QST* and keep from getting bit. If the insurance guys knew what I do, you long ago wudda been classified as being engaged in an AAA1 hazardous occupation! Ya know, I been in and outta this ham game for twenty-six years now and I've practically qualified for a Silent Keys listing three times that I can remember; there were lotsa other times, too, when I probably should have. It's just dern-fool luck that I'm still around to slap a bug. One guardian angel had a nervous breakdown keeping me on the sunny side of the frost line.

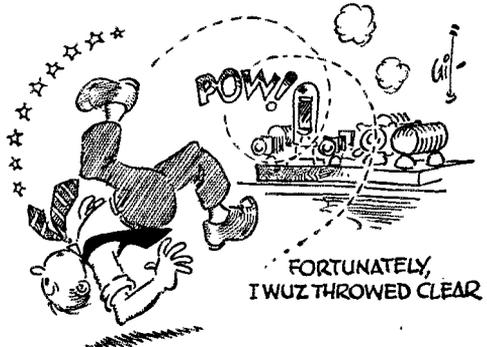
Listen, Oscar, lemme tell ya — the first wallop I got was pounding commercial brass. Only a blamed idiot would lean outta the chair in rough weather to tune up the rig. After they dragged me out on deck it took a bucket of water to bring me around. Sure, that was spark and old stuff, but how about those front-panel jacks and meters of yours? Did you really go to the trouble of putting 'em in the negative lead? Just remember, feller, that old spark rig looked and growled dangerous-like, but that innocent-looking sweet-sounding transmitter of yours also is a killer at heart.

Listen, Oscar, sure ya got cut-off switches and sure ya cut the high voltage before grabbing the tank coil. You wouldn't be so dumb as ever to forget, wudja? Maybe not, I hope, but I did! Back in '34 I built me a 203-A on a metal chassis.

* 337 Hamilton Ave., Glen Rock, N. J.



Voltage on, key down — voltage off, move tank clip — voltage on, key down — voltage off, grab tank clip . . . YOW-W-E-E!! . . . there I was . . . 1500 volts affectionately shaking one hand while me other mitt was scorching the crackle finish off the grounded chassis. Oscar, me boy, me



old food factory turned over at 120 r.p.m. and I dang near went West. As 'twas, fortunately, I was thrown clear. I sat for fifteen minutes wondering in dazed fashion — was my goose cooked or not? I say do like the book tells ya, boy, and pull the plug first.

Listen, Oscar, even with another guy helping ya it's a cinch to get outta step; in fact it's easier. Ask W3EFM — he burned a mitt down to the bone on the tank coil at W3XM while I was "safeguarding" him by throwing the high-voltage switch each time he said go ahead. It's easy to get signals crossed, especially after ya been working together a bit and things get routine-like. Better throw your own high-voltage switches and locate 'em so you'll be in the clear when the rig is hot.

Listen, Oscar, a Christmas-tree bulb made the Great Sacrifice and took the rap for me the last time. Mix 3000 volts, a tank clip, an excitation switch and a lot of fiddling back and forth and ya sure got sumpin. Me, I wudda got the 3000, only by sheer dumb luck the bulb and loop was hanging on my thumb as I went to grab the tank. When that lil old bulb melted into space I dern near dislocated a shoulder getting me paw outta there. Golly, always cut the line switches first, feller. By the way, these here new-fangled rubber jackets for clips ain't so bad as reminders, either.

Listen, Oscar, every old-timer has trusted his life to a fifteen-cent toggle switch hundreds of



THERE'S LOTS A
LIL THINGS YA DO
EVERY DAY THAT
MITE TAKE YA BE-
FORE UR TIME,
OSCAR

times. Maybe next time is the one when the spring won't work or the innards collapse and short the works. Maybe ya don't use a switch until it falls apart like I do — maybe. Also, a radiator makes a swell back rest when changing 866s, but it's just possible you won't cash in on your Social Security. Even with the filament circuit open, there's enough hop coming through from the a.c. mains to surprise ya, if nothing worse. Dern ya, break the power lines first. Supposing ya do ruin an 866 by throwing on the voltage again too soon — it's cheaper than a five hundred buck funeral, ain't it?

Listen, Oscar, there are lotsa lil things ya do every day that might take ya before your time. How about that neon bulb on the final tank? Would ya put your mitt within half an inch of the leg irons of an electric chair? Maybe you would, but not me. For a few pennies I bought me a bakelite rod and a rubber band, and now I got twelve inches tombstone clearance. And how about your test set? There's nothing magic about the insulation on test leads or test sets. Pull the line plug first, before ya connect the leads, and then remember to pull the plug again before grabbing 'em once more. It's nice to know how much voltage killed ya, but not very satisfying.

Listen, Oscar, I'll bet your rig has as many exposed high-voltage spots as a burlesque queen. If ya have an open rack-and-panel job or loose haywire, for Pete's sake put some obstacle in the way of any hazard. Being lazy, I never covered up a 3000-volt connection near my oscillator stage, but I did mount a hunk of wood in the way. Skinned knuckles will be highly superior to charred finger stumps when it comes to endorsing those old-age checks.

Listen, Oscar, 'jever get an a.c. tingle from a potential difference between your receiver and preselector, or receiver and key, or key and 'phones? Mebbe at times the microphone is a little bit hot to your lips. Perhaps it's only capacity leakage and mebbe ya ain't about to become a burned-out human fuse. But you better look into it before warm weather because perspiration is a swell conductor. Didja ever get against the antenna with your nose or ear while looking into the rig? Sure, it was only r.f. But maybe the next

time a blocking condenser will let go or the coupling coil will rub against the final tank. And don't be contemptuous of that bias supply. A good ground and a short in the transformer could do a sickening job on ya.

Listen, Oscar, I know I bin preaching to your tin ear, the one ya use only for DX, but the least ya can do is to be considerate and show the family how to cut the whole works pronto. Remember, ya may be speechless or incoherent or the frying noise may be too loud. If ya haven't been careful, mebbe ya deserve to go, but don't take any loved ones widja.

One more thing, Oscar. After educating the household don't knock any books or transformers on the floor, because the folks will come stomping up, three stairs at a time, and be kinda sore when they find ya are still an insulator and not a grounded conductor.

The 14th Sweepstakes

Annual ARRL Competition To Be Held
Nov. 15th-17th and 22nd-24th.
Rules in October *QST*

How many ARRL sections can you work in a week-end? All hams with stations on any amateur band, 'phone or c.w., are invited to get into this popular ARRL radio-operating activity. Stations may be anywhere in the League's field-organization territory (see page 6). The week-end periods starting Saturday afternoon (3 P.M. PST or 6 P.M. EST) on the 15th and 22nd of November will mark the "open season" for 71 section-wide contests for most QSOs, and most sections worked, in not more than 40 hours total operating time.

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

How to score, explanation of proof-of-QSO exchanges (such as message preambles), the form for contest logs, rules for high- and low-power classes, and other club and general requirements are all detailed in October *QST*, starting on page 47.

Mimeographed contest forms will be sent gratis to all amateurs who request them by November 7th, either by mail or by radiogram. It is not necessary to make advance entry or use these blanks, if the form described last month is followed closely. BCNU in the "SS."



The World Above 50 Mc.

CONDUCTED BY E. P. TILTON, * WIHQD

THE closing days of September find international DX on 50 Mc. and a new record for two-way work on 144 Mc. once again vying with each other for first-place billing in the news of the month. The anticipated rise in F_2 m.u.f. on the route to South America arrived on schedule, and scores of 50-Mc. QSOs took place between North and South America in the latter part of the month. On 144 Mc., the improved transmitters, sensitive receivers, high-gain antennas, and persistent effort of the 2-meter enthusiasts of the Great Lakes area and Middle West paid off; and, for the first time in v.h.f. history, the 144-Mc. record was broken by two stations remote from either coast.

South Americans Take to 50 Mc.

The first 50-Mc. DX between the Americas in the fall season was the Aug. 27th contact between XE1KE and LU6DO, reported last month. This path was open frequently during September. On the 15th, between 5:20 and 6:15 p.m. CST, XE1KE worked LU9AZ, LU1AM, LU3DD, LU9AS and LU9EV. XE1GE worked LU9AX at this same time. The following day, LU1AM and LU6DO were heard between 3:22 and 3:40 p.m. On the 17th, XE1KE contacted LU9AS, LU1AM, LU6DR, LU8BQ, LU3DD and LU8DJE between 5:30 and 6 p.m. The band was open as late as 8 p.m. on the 18th, and LU8DJE, LU1CC, LU5CK, LU3BAC, LU7AZ, LU9AS and LU6DO were worked. On the 19th, between 5:47 and 8:00 p.m., the list included LU6DO, LU9AX, LU4CD, LU3EL, LU4DT, LU1CC and LU9AS. LU5CK was worked at 5:30 p.m. on the 20th, and others were heard briefly. OA4AE was heard by XE1KE, for about 30 seconds, very weakly, at 4:50. Seven LUs, all repeat contacts, were worked in a session on the 22nd which lasted from 6:20 to 9:40 p.m. CST. The list of LUs worked by XE1KE is up to 14 different stations, and communication between Mexico City and the Buenos Aires area has become an almost routine nightly matter!

The time of these contacts is worthy of note, as it is much later than the prediction charts indicate for F_2 openings. There has been a considerable amount of intercountry work on 50 Mc. in South America by means of what appears to be sporadic- E ionization at around this time,

* V. H. F. Editor, QST.

Worldwide DX on 50 Mc.!

With maximum usable frequencies reaching new highs as the peak of the current sunspot cycle approaches, new 50-Mc. DX contacts were being reported almost daily in early October. The first 50-Mc. work from South Africa was done by ZS1P, Capetown, who worked G5BY crossband to 2S Mc., on the 3rd. Two-way contact on 50 Mc. was established on October 11th, when ZS1T and ZS1P worked PA0UN, Eindhoven, Holland, a new DX record of 6000 miles!

The m.u.f. was high across the Pacific also. On October 7th, W6UXN, Inglewood, Calif., had a partial contact with J9AAO on Okinawa at 7 p.m. PST. On October 12th, W7ACS/KH6 at Pearl Harbor worked W5VY, W7QAP, W7OWX, W6BPT, W6OVK, W6BOS, W6JRM, W6KD, W6OB, W6QG, W6NAW, W6UXN, W6BWG, W6TBS, W6NRJ and W6OHM, for the first 50-Mc. contacts between Hawaii and the Mainland.

150 Miles on the Microwaves

Operating from Grant National Park, on October 5th, W6IFE/6 regained the world's record for 3300 Mc. by working W6ET/6 on Mt. Hamilton, more than three times the distance covered in any previous amateur microwave work. More details next month!

which is just about when most of the stations get on the air, in the early evening hours. It appears highly probable that the propagation to North America may be aided by the E -layer ionization at the southern end of the path, thus opening up the possibility of two-way work between parts of North and South America over paths that do not appear too favorable on the basis of the F_2 predictions.

What is almost certainly E , work is reported by LU7AZ for September 11th. Beginning at 0145 GCT, LU7AZ worked PY2AC, crossband to 28 Mc., and LU5CK, LU6DO, LU9AS and LU8DJE worked PY2QK and OA4AE. On the 13th at 0430 GCT, LU7AZ worked OA4AE and OA4BG. The distances are about 1100 miles to Santos, Brazil, and 2000 miles to Lima, Peru. Down in Chuquicamata, Chile, CE1AH made the first CE 50-Mc. DX contacts on September 18th. Starting

at 8:50 P.M. EST (when the XE-LU contacts were still going on) LU8DJE was worked, a distance of about 1100 miles. At 9:25, PY2QK was worked, followed by a crossband QSO with PY3BY, who was on 10. PY2QK was contacted again at 10:43.

Note that these times are typical of our best spring sporadic-E sessions, and September in South America is, of course, comparable to our early spring. The coincidence of these South American contacts with the longer-distance work to Mexico City indicates that Argentina, Chile, and other South American countries may be workable from W4, W5, W6 and W7, even though only a limited area around Lima, Peru, would appear to be within range of the F_2 prediction charts.

The first South American contact reported by any W station this fall was made on September 14th by W5FSC, Houston, Texas, who worked OA4AE, Lima, Peru, at 12:43, 1:07, 2:34 and 3:00 P.M. CST. On the 20th, W4EID, Jacksonville, Fla., worked OA4AE on a CQ at 4:20 P.M. EST, and OA4BG immediately after, peaking at S5 and the signals lasting until 5:15. These contacts were repeated the following day at 1:55 P.M., with signals up to S7, the path remaining open until about 3 P.M. The c.w. signal of W5VY was heard, apparently by E-layer scattering, by W4EID at this time. A report, as yet unconfirmed, says that the signal of LU3EL was heard on Sept. 18th by W8TOB, Lorain, Ohio.

From Lima, Peru, OA4BG relates that he was putting up a new 3-element wide-spaced rotary at the time OA4AE worked W5FSC, and rebuilding his converter until the 18th, when the first signal heard was LU9EV working TG9JW, Guatemala City, at 8 P.M. EST, during which QSO the signal faded out. At 9:30 the band reopened for Buenos Aires and OA4BG worked LU1AM, LU4DT, LU6DO, LU5CK, LU8DJE and LU1CC. These signals were all very strong until after 11 P.M., the band folding around 11:20. LU5CK reported that he had worked XE1KE, TG9JW, PY2QK, CE1AH, and other LUs before his contact with OA4BG. Six countries in one night!

144-Mc. Record Moves Inland

The East Coast strangle hold on the 2-meter record has been broken! The night of September 17th, and the first hours of the following morning, provided contacts between 144-Mc. stations in Western New York and Pennsylvania and several stations in Iowa, over distances in excess of the W3EKK/1-W3KUX record of August 7th; and so, for the first time, the record for 144-Mc. DX is held by inland stations.

As early as 9 P.M. EST, conditions looked good to W3GV, Erie, Pa., as W9GGH, Kenosha, Wis., was heard coming through with a strong signal. At 9:30, W0HAQ, Davenport, Iowa, was raised, for what is believed to be the first W3-W0 con-

tact ever made on 144 Mc., and close to the existing record. At 9:50, W9PZS, Milwaukee, was worked, with an S9 signal, despite the 420 miles intervening.

The East Coast record fell at 10:40, when W0NFM, Solon, Iowa, was contacted, a distance of about 600 miles, this record being extended at 1:30 A.M. when W3GV worked W0WGW, Grinnell, Iowa, 660 miles to the west! Other record-breaking DX worked that night included contacts with Solon, Iowa, by W2GBK, Sherman, N. Y., 625 miles, and W2TTW, Jamestown, N. Y., 640 miles, these being the first W2-W0 contacts ever made on 144 Mc. Scores of contacts were made over distances in excess of 400 miles in Illinois, Wisconsin, Pennsylvania and New York.

Proponents of horizontal polarization for 2-meter work will hail this new record, the first to be set with horizontal arrays. The antenna system at W3GV is a 12-element horizontal, consisting of three 4-element arrays stacked a half-wave



Standings as of September 30th

W3CIR/1	42	W5AIL	38	W9JMS	36
W1CLS	42	W5AJG	38	W9ALU	32
W1LLL	40	W5VV	36	W9QKM	32
W1HDQ	39	W5FSC	34	W9UIA	27
W1HMS	33	W5JLY	38	W9FKI	26
W1CGY	33	W5ZZF	29	W9HSB	26
W1JLK	30	W5ESZ	28	W9AB	22
W1AEP	30	W5LJU	24		
W1CLH	29	W5GNQ	21	W0USI	45
W1AF	24			W0QIN	43
		W6OVK	29	W0ZJB	43
W2BYM	37	W6ANN	28	W0DZM	42
W2AMJ	37	W6WNN	24	W0TQM	42
W2QVH	35	W6BPT	23	W0SV	42
W2RLV	33	W6HZ	16	W0BJV	42
W2PWP	29	W6BWG	11	W0CXB	41
W2IDZ	21			W0HXY	41
		W7BQX	37	W0INI	41
W3OR	33	W7FDJ	36	W0YUQ	39
W1KMZ/3	33	W7TFE	35	W0JHS	38
W3RUE	31	W7ERA	33	W0DKS	36
W3CGV	25	W7QAP	30	W0YKX	36
		W7ACD	27	W0DYG	33
W4GJO	45	W7TXM	17	W0DNW	32
W4QN	40	W7JFN	12	W0KYF	32
W4GIY	40	W7DTB	11	W0VIK	20
W4DRZ	35				
W4EQR	34	W8RFW	25	VE3ANY	21
W4EID	33	W8TDJ	22	VE1QY	19
W4FBH	31	W8QQS	20	VE2GT	14
W4WMI	29			X.EIKE	12
W4HVV	28	W9DWU	46		
W4AVT	26	W9PK	43		
W4FJ	26	W9ZHL	42		
		W9ZHB	41		

apart vertically and fed at the center member. Spacing of the parasitic elements is 0.2 wavelength. WØWGZ used a 16-element array, similar to that described in May, 1946, *QST*, but used in a horizontal position. All the DX reported for this eventful night was worked with horizontal polarization, though this may be more the result of the position of the reflecting medium than any polarization peculiarity. W3HWN, Mechanicsburg, Pa., who has been working as far west as Cleveland with his horizontal array, was unable to hear any Western DX that night, and no DX signals were heard from the East by listeners on the western side of the Allegheny Mountains. The favorable conditions moved eastward, however, and the next night found W3HWN putting an S9 signal up into W1 on his 16-element vertical. Several W1s (including your conductor) got in their first contacts with W3HWN that night, at distances from 275 to 400 miles.

More Activity in VE1

The night of the 18th was a big one in other respects for W1s, also, as it marked the first appearance on the band of VE1QY, Yarmouth, Nova Scotia. With the aid of a 522 and the same 16-element array that was used by VE3BLZ in his July efforts at Yarmouth, VE1QY worked W1s MNE, HDQ, BCN, DAH and OUN, at distances from 200 to 350 miles, and was heard by several W2s in New York and New Jersey.

September 9th had provided an opportunity for this sort of thing, but VE1QY had only the receiver section of his 522 working; so, though he heard a dozen or more W1s rolling in, he could do nothing about working them. VE1QZ, at Halifax, 130 miles farther to the northwest, heard W1DHX, Fall River, Mass., that night, but was unable to make any contacts. The amazing session of Aug. 27th, reported last month, is the only success yet scored by VE1QZ, as he was away for much of September.

Here and There on 6

"Well, I guess the 6-meter DX is all over for another year!" This statement, in one form or another, appears again and again in the reports received from many of the newcomers to the band, who have finished a summer season of sporadic-E skip and now contemplate migrating to some lower frequency. This pessimistic view of the possibilities for 50-Mc. work in the fall and winter months would be a vast error in any year, but in 1947, when the highest sunspot peak in the history of v.h.f. communication is in prospect, it is nothing short of catastrophic. There is no part of the United States where there is not at least some chance of F_2 DX being worked on 50 Mc. in the next few months, and to abandon activity on the band at this time is to pass up a chance at some of the most interesting stuff that has ever come our way.

RECORDS

Two-Way Work

50 Mc.: ZS1T and ZS1P-PA6UN
6000 Miles — October 11, 1947
144 Mc.: W3GV-WØWGZ
660 Miles — September 18, 1947
235 Mc.: W6OVK-W9OAW/6
186 Miles — March 2, 1947
420 Mc.: W6VIX/6-W6ZRN/6
186 Miles — July 27, 1947
1215 Mc.: W3MLN/3-W3HFW/3
12.5 Miles — September 24, 1947
2300 Mc.: W1LS/1-W1JSM/1
45 Miles — August 30, 1947
3300 Mc.: W6YX-W6VOB/6
31 Miles — September 20, 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

The prospect of contacts with South American countries remains good through October and November, though September was probably the peak of the fall cycle for that direction. The rising m.u.f. curve for the North Atlantic path indicates a possibility of contacts with Europe and perhaps Africa in October, and an appreciably higher m.u.f. for Europe in November of this year than existed in the fall of 1946, when the m.u.f. went above 50 Mc. on at least one occasion. Last year we had to be content with cross-band contacts, but this fall will find several European and African countries with representation on 50 as well as 58.5 Mc.

A letter from OZ5MK states that the Danish government is willing to issue special authorizations for operation on 50 Mc. The PAØ boys are ready for business on 50 Mc. this year, and having gotten on last fall just too late to catch the November peak, they are determined to make a two-way trans-Atlantic QSO this year. South African authorities are issuing special authorizations to amateurs interested in 50-Mc. tests this fall, and it is expected that several other countries will be found in the 50-Mc. column, when things start to happen on the fall cycle. G5BY, who has 12 countries on 58.5 Mc., will be in there listening with four converters, covering 44 to 60 Mc. His antennas include a huge rhomboid, a close-spaced 51-Mc. array, a 4-element wide-spaced beam which is part of a dual 6-10 system on a common rotating device, and assorted other systems for 28 and 58.5 Mc. He will be able to transmit on either of these two bands for possible crossband or two-way contacts across the Atlantic or with South Africa.

The contact between W7ACS/KH6 and VK5KL on August 25th stirred renewed interest

in the possibilities for 50-Mc. communication over this path, and though no new VK or ZL contacts have been reported at this writing, the prospects remain good through the fall. W7ACS/KH6 is unique in 50-Mc. annals: he has worked every station he has ever heard in his band of operation. He is also at the absolute bottom of the states-worked list, being the only 50-Mc. station in the United States who has no states whatever to his credit; yet he has six contacts in three countries and two continents! But VK5KL is really isolated — except for an occasional contact with a nearby neighbor, he has never heard a 50-Mc. signal except that of W7ACS/KH6 in 13 years of experimental work on 56 and 50 Mc. And some Ws talk of giving up because the band opened only six or eight times in September!

What Is 2 Meters Good for?

November 15th marks the completion of two years of operation on 144 Mc., during which we've seen consistent coverage on that band expand from crosstown distances to more than 100-mile service areas for the better stations. We have reported, with enthusiasm, the extension of the record distance from 100 miles, first recognized in January, 1946, to 145 miles in March, 200 miles in May, 280 in June, 310 in July and 390 in September, where it remained through the winter months. In May of this year it passed 400 miles, went to nearly 600 in August, and then to 660 miles in September.

What's the limit — and what do these records mean in terms of day-to-day operation, in average locations?

W1OUN, Portland, Maine, and W1PRZ, East Milton, Mass., seeing that working over their 110-mile path seemed to be a fairly consistent matter, decided to try it on a twice-nightly (7:30 and 9:30) schedule. For two months this schedule was kept without a miss, through good conditions and bad, the latter even including several good New England thunderstorms. Tests were made at all hours of the day and night without experiencing a single failure. At the lowest point, signals went into the noise at times, but there were many periods when it ran well over S9 for hours at a stretch. It was a *communication* circuit, always.

Another consistent circuit has been that between W6OVK, Redwood City, Calif., and W6BVK and other stations in the Sacramento area, a distance of about 100 miles, where Mt. Diablo and other high peaks intervene squarely across the path. W6YLO in North Sacramento has been working into Oakland and Berkeley which are at the bases of hills that rise up to 1000 feet or more. The W6OVK-W6BVK circuit has been in operation for more than a year, with practically no variation in signal strength at any time. An interesting angle is that W6BVK gets down to Redwood City with his mobile job, when he is parked in his own driveway, but when he drives

up into the Sierra Nevada Mountains no contact can be made. Operating their respective home stations, they have reduced power to a small fraction of a watt, yet the signal remains readable — all this over a 100-mile indirect path! The success of such circuits serves to remind us that no path should be considered unworkable on the

V.H.F. MARATHON

Call	Contacts Through Sept. 15th		Score	States Worked in 1947	
	50 Mc.	144 Mc.		50 Mc.	144 Mc.
W1AF	157		1159	24	
W1BUT		214	5	998	6
W1CGY	129		1418	33	
W1CIS	288		3515	42	
W1HDQ*	238	130	1	3952	9
W1HMS	117	10		1329	1
W1KLR		149		856	5
W1LLL	224			2710	40
W1MPO		36		234	5
W1PEN		118		1024	6
W3EKK/1		98		1990	9
W2AMJ	260		2355	37	
W2BYM	294		3111	37	
W2CBB		231		1040	8
W2COT	82	155		939	11
W2DZA		209	13	1036	6
W2NLY**		516		4222	9
W2QVH	245	116		2484	35
W2RSO		193		1900	8
W3GKP	39	102		1257	10
W3HWN		216		1986	9
W3RUE	97	79		1923	4
W1KMZ/3	116	2		1393	32
W4AVT	89		1159	26	
W4FJ	72	40	1580	26	7
W4HVV	147	2	2037	28	2
W4WMI	147	2	3288	29	1
W5FSC	126	15	2260	34	1
W6BPT	60		1209	23	
W6BWG	142		909	11	
W6HZ	128	298	1	1923	13
W6OVK	107	169	4	3401	29
W6WNN	132	8		2213	24
W7ACS/ KH6	7		174	0	
W7QAP	136		2191	25	
W8QQS	64		825	20	
W8RFY	78		967	25	
W8TDJ	59	1	799	22	1
W8UKS		122	3922		7
W8WJC		94	3310		7
W9AB	67	13	845	22	3
W9AGV		65	457		5
W9ALU	98	11	932	32	2
W9JMS	234	8	2660	36	3
W9PK	238	68	3002	40	6
W9ZHL	325	5	5049	43	2
W0QIN	238		3323	43	
W0VIX	93		957	20	

* Not eligible for award.

** 3th period winner: W2NLY, 1406 points.

v.h.f. bands. It may take some experimenting, and a lot of perseverance, but we cannot ever say that two points 100 miles apart are unworkable on 144 Mc. until we have exhausted *all* the possibilities trying!

The limit of working range, for the best stations, operating under favorable conditions, is anybody's guess; but the important point, for most of us, is that we cannot possibly plug away at a band in this intensive manner without learning better ways of doing things; without improving our transmitters, receivers, and antennas; without learning more of all the factors that make for successful operation in our chosen field. One thing is certain: our v.h.f. bands offer an opportunity absolutely unequalled elsewhere in the spectrum for reliable point-to-point operation over distances up to 100 miles under almost any conditions.

If more of us realized the value of the 2-meter band, in particular, for this type of service, how much more effective we could be in emergencies such as the hurricane disaster that recently laid waste to parts of Florida and the Gulf states, when there were instances of grave difficulties in handling emergency traffic over distances as short as 15 miles by low-frequency channels, as the result of outside QRN, skip effects, and high noise levels. How a bunch of fellows equipped with 522s or similar rigs could have gone to town on such an assignment! Let's not lose sight of the potentialities of 144 Mc. in emergency communication.

Wanted: A New Record for 235 Mc.!

There is every reason to believe that the distances now being covered on 144 Mc. can be covered on 235 Mc. as well, yet the record stands at only 186 miles, and this the result of high-altitude work on the West Coast. What is needed? First of all, we need activity. Even with the simplest equipment it should be possible to exceed 200 miles under favorable conditions, and if we can get something like the performance now being attained in 144-Mc. gear, we should really step out.

W1CTW, Arlington, Mass., has duplicated, on 235 Mc., the receiver he described in March, 1947, *QST*, except that an 18-Mc. i.f. is used. Sensitivity is practically equal to the 144-Mc. model. Cal has been hearing W2HWX, Little Silver, N. J., on good nights, but has not yet been able to make it two-way for a new record, just over 200 miles. W2HWX has 200 watts, crystal-controlled, using a pair of 24Gs with half-wave plate lines in his final stage. The rig at W1CTW has an 832 in the final delivering an output of about 12 watts on 236 Mc. The antenna is a 16-element vertical array, fixed on W2HWX. A description of the transmitter and receiver used at W1CTW will appear in an early issue of *QST*.

Doings on 420 Mc.

Another surplus item that has interesting possibilities for 420 Mc. work is the BC-788-AM altimeter. It includes a 6J6 transmitter and a receiver having six i.f. stages of wide bandwidth. Both work over the 420-Mc. band without alteration other than removing the pulse equipment and changing the grid leak on the oscillator. The 800-cycle power transformer is used as a modulation transformer by connecting the center-tap of the high-voltage winding to B-plus, the transmitter tank circuit to one end and the modulator plate (a 6V6 or 6F6 will do) to the other.

W6JLE and W6ZDJ got the first of these units going during the summer, and were promptly followed by W6QT, W6ZGN, W6DSZ, W6FGL, and W6VQB, who is in Palo Alto, some 30 miles distant. W6QT has two 3-element rotary antennas on his car, and creates quite a stir as he drives through city traffic. Interesting effects result when he crosses the Bay Bridge, not the least of these being the complications that develop when he tries to aim the antennas, hold the microphone, tune the receiver, drive the car, and reach in his pocket for the bridge toll simultaneously!

Late in August, W6DZC/6 on Mt. Lassen, an 8500-foot elevation, worked W6JLE/6 on Mt. Diablo, a 4100-foot peak. The distance is 179 miles, just short of the present record for 420-Mc. work. Transmitter power inputs were two and six watts, respectively, yet the signals were very strong and consistent; evidence that a new record can be set easily by proper choice of locations.

The boys have found that the 420-Mc. gear offers wonderful opportunities for antenna work, along the lines suggested elsewhere in these pages. They are eager to develop more 420-Mc. activity, and W6DSZ offers to help interested parties with more information on the conversions of the altimeters or other 420-Mc. surplus gear.

New Microwave Records

September saw extension of the records for two-way work in three of our microwave assignments. Using 726-A reflex klystrons on 3300 Mc., 28-inch parabolic reflectors, and AN/APR-4 receivers, W6VQB/6, at Mt. Hamilton, worked W6YX at Stanford University on September 20th. Signals were solidly readable over the 31-mile path. The APR-4, available through war-surplus outlets, is an airborne countermeasures receiver. It has a series of plug-in r.f. units covering 38 to 4000 Mc. The 726-As are also surplus items. They may be modulated by inserting the secondary of a microphone transformer in series with the negative repeller-voltage supply. In the expedition to Mt. Hamilton were W6YWX and W5LHD who also worked W6YX.

(Continued on page 128)

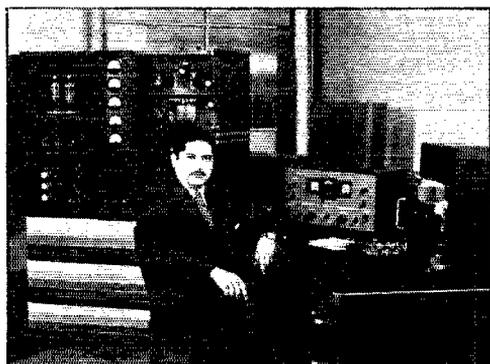
Results, 1947 DX Competition

THE opening of ARRL's Thirteenth International DX Competition last February 14th was an event long to be remembered by DX-minded amateurs the world over. A composite reaction of all participants shortly after the fracas began might run like this: "Glory, what DX, what walloping signals, what weak signals, what QRM, what fun!" There were at least as many countries on the air simultaneously during the contest as at any time in the romantic history of amateur radio. It was the first international DX competition held since 1939 to include the six continental areas and all the regular DX bands. Higher scores than ever, keener competition, clean operating, good sportsmanship and sheer enjoyment were the keynotes. But the accompanying tabulations and breakdown of results tell the story more fully than any combination of comparatives or superlatives we can concoct!

In the c.w. section the scores of 1012 entrants (714 W/VE, 298 foreign) are recorded and in the radiotelephone section 441 (365 W/VE, 76 foreign). In connection with the foreign entries, 'phone participants outside W/VE are asked to read carefully the information contained in Footnote 12 following the score tabulations.

Award Winners

The leading c.w. operator and the leading 'phone operator in each ARRL mainland section and in each country outside the W/VE area from which qualifying entries were received are



Juan Lobo y Lobo, XE1A, led the entire field, smashed all records with averages of 41 QSOs/hour on c.w. and 33.3/hour on 'phone. Transmitter: parallel 813s final, 250 watts input. Receiver: HQ-129X. Antennas: folded dipoles, constructed of 300-ohm line, on 7, 14, 27 and 28 Mc.; on 3.5 Mc. the 28-Mc. dipole was used with a counterpoise. A neat station manned by a real champ!

awarded special medallions in recognition of their performances. In the U.S.-Canada area 63 c.w. participants will receive awards and 62 go to voice operators. Outside W and VE, 65 c.w. and at least 25 'phone medallions will be awarded.



Winner of the Virginia Section awards for both c.w. and 'phone is Pressley B. White, W4OM. An NC-101X receiver was used during the contest; transmitter ran a kw. to the p.p. 250TH amplifier shown above the operating table or to 304THs in the top section of the rack shown at right. A dual 10-20 Signal Squirter and a 7-Mc. half-wave doublet were responsible for radiating W4OM's signals in the desired directions.

An accompanying tabulation of these winners lists scores, multiplier and number of contacts. Their individual victories are well deserved. We know all hands join us in extending sincere congratulations and a hearty "well done!"

The checking of all entries was accomplished mainly through the efforts of Ed Miner, W1ODY, our Communications Department contest analyst. A 28-Mc. DXer with a total of 70 postwar countries to his credit, Ed says "Working 'em is a wee bit more fun than checking up on 'em!" Nevertheless, he has never once faltered in the gigantic task of checking carefully all entries, verifying score calculations, assembling tabulations. Special questions were decided after careful consideration by an ARRL contest committee which also passed on all disqualifications.

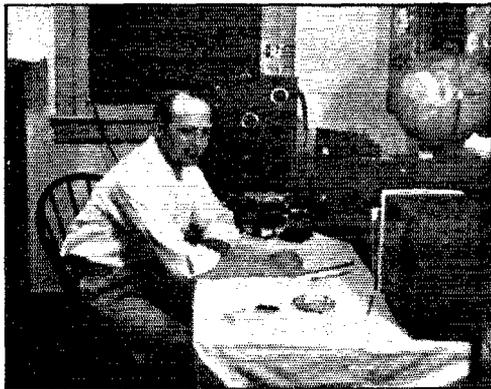
Club Scores

The Frankford Radio Club of Philadelphia, second-high in each of the previous three contests, finally crashed through in the top position — 1,145,187 points — and is the winner of the gavel offered to the amateur radio club that submitted the highest aggregate score of members. This Philadelphia gang really mean business! After several years of concentrated effort they

are rewarded with their first gavel for the DX Competition. It will make a welcome addition, we are sure, to their collection of seven other gavels won in the ARRL Sweepstakes Contests. Within the F.R.C., W3BES wins the club certificate for c.w. and W2SAI the 'phone award.

Members of the Greater Cincinnati Amateur Radio Club, Frankford's strongest competitor in club contests these days, submitted an aggregate score of 569,069 to take second place; club-award winners were W2BHW/8 c.w., W8ELB 'phone. The Northern California DX Club took third honors with 290,059 points, individual certificates going to W6RM, c.w., and W6TT, 'phone.

Other competing clubs are listed in order of scores. The calls given in parentheses are winners of the individual club certificates within their respective organizations; unless otherwise stated, award was won in the c.w. section: Associated Radio Amateurs of Long Beach (W6AM) 123,289; Baton Rouge Radio Club (W5KC) 65,514; Santa Clara County Amateur Radio Association (W6MUR) 64,404; South Lyme Beer, Chowder and Propagation Society (Hq. staff member W1DX high c.w. participant, not eligible for award) 35,541; Washington Radio Club (W3MSK 'phone) 17,164; Northwest Amateur Radio Club (Illinois) (W9BDV 'phone) 7,857; Canton Radio



Frank J. Elliott, KP4DH, Puerto Rican c.w. winner. A Signal Shifter driving parallel 807s followed by p.p. 810s running 900 watts was the combination that enabled him to lay down a very husky signal during the contest.

Club (Ohio) (W8AL) 4,473; Sioux Falls Amateur Radio Club (South Dakota) (W0ZRA) 585. Individual club awards are made only in cases where three 'phone or three c.w. entries were received from club members or local amateurs invited by the club to participate.

Disqualifications

The following are deemed ineligible for DX-score listings, or awards, in the February-March 1947 DX competition. In each case disqualification is for off-frequency operation. For the information of those amateurs not familiar with the policy of disqualification and the reasons for same, the subject is fully covered on page 16, January 1947 QST.

C.w.: W4LAP, W6GRX, W6HZZ, W8KYN, VE7FC, CE3AG, EI9F, I1KN, ON4GU, OK2EL, OZ3HR, OZ7SN, PA0VB, PA0JQ, VO6K, ZS5U, ZL3GU. 'Phone: W2EGG.*

The C.W. Section

To those members of the fraternity who have followed the postwar DX progress of Henry M. Bach, jr., W2GWE, it will come as no surprise that he finished up in the fray with the highest score made among the W/VEs — 153,450 points. Henry's outstanding signal and keen operating ability netted him 310 contacts and a multiplier



Henry M. Bach, W2GWE, turned in the highest W/VE c.w. score, 153,450 points, in addition to working 92 different countries. His transmitter utilizes bandpass circuits and frequency can be changed in any band merely by tuning the BC-221 employed as a VFO. Henry takes no chances slipping out of the band either; his VFO amplifier contains oven-controlled crystals which are selected for operation near band edges, and a receiver used for frequency measurement is kept permanently tuned to WWV.

* The following stations that did not submit contest entries were also reported off frequency by two or more observers or by FCC during the period of the competition:

C.w.: W1AFU, W1DA, W1BLO, W1NW, W1AOQ, W1AZW, W1BLE, W2CX, W2CRW, W2ABX, W2CDJ, W3DXM, W3EUV, W3RT, W4EJN, W4IKU/4, W5LGG, W5MY, W6KTH, W6LEW, W6RGW, W6YLO, W7CKY/6, W6IBD, W8IZQ, W8SEJ, W8LYQ, W8LAV, W8RRP, W0TAV, VE2IL, VE3KP, VE8EO, CO2BZ, GM3AHQ, HK3CV, HH2BL, I1ND, KP4BL, ON4PZ, ZS5BZ. 'Phone: W0JED.



The design of WIME's layout probably had a lot to do with his winning the Eastern Massachusetts Section c.w. award. Note that practically all equipment controls are within arm's reach of J. Madeiros as he sits at the operating position of his neat station. Rack at left contains a bandswitching rig ending up in 806s; the one at right two transmitters — TZ40s for 28 Mc. and 211 for 3.5 Mc. Antennas all come to a pair of 8-contact rotary switches behind the antenna tuning unit on the 806 rig. Skywires used were unterminated E-W and SW-NE rhombics, a 6-element Sterba, 28-Mc. rotary.

of 165 which represent contacts with 92 different countries. W2GWE ran 1 kw. to 250THs, operated for 85 hours on 3.5, 7, 14 and 28 Mc. The bulk of contacts was made on 14 Mc. with a four-element rotary antenna. A championship performance, Henry!

A W2-trained DXer, transplanted to Ohio, placed a healthy second. Rolf Lindenhayn, jr., this year operating W2BHW/8, made 296 QSOs with 83 different countries for a multiplier of 166 and 147,076 points. Lindy also operated 85 hours and his rig ran 950 watts to p.p. 250THs. If the antennas in use are any indication, we might guess that careful plans for the contest were made beforehand! Long wires varying from 2 to 8 wavelengths were in use on 3.5, 7 and 14 Mc. Additional antennas on 14 Mc. were an 8-wavelength "V" beam, an 8JK-2 and a double-zepp. A 3-element rotary was used on 28 Mc.

That contest operator extraordinary, W3BES, finished up in third place. His score of 147,040, 307 contacts and a multiplier of 160, was so close to Lindy's that one more contact would have given him second place. We suspect there will be a rather spirited private contest between Jerry and Lindy come February and March 1948! Like W2GWE and W2BHW/8, W3BES operated 85 hours; his final also incorporated 250THs running at 1 kw.

Here are the high scorers next in line: W2BXA

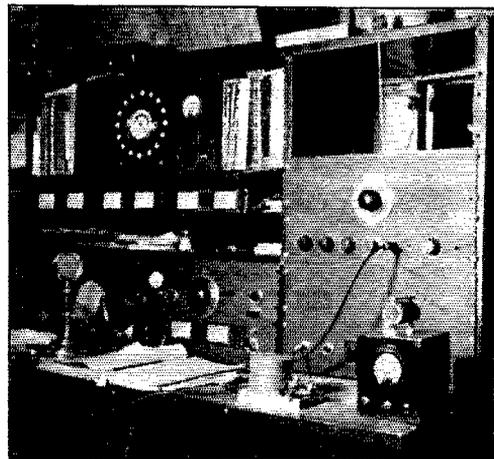
129,504, W2GUM 125,685, W6SZY 124,236, W6HZZ 108,093, W2SAI 104,805, W8BKP 99,188, W8WZ 98,955, W8JIN 98,208, W2UK 98,010, W6HX 90,440, W4OM 90,171, W4FU 83,185, W0PV 81,625, W6ITY 81,250, W2PWP 75,582, W1ME 75,231, W4BRB 75,141.

Leaders in number of QSOs: W2GWE 310, W3BES 307, W2BHW/8 296, W2BXA 287, W2GUM 285, W6SZY 274, W2SAI 255, W8JIN 249, W2UK, W8BKP, W8WZ 242, W4OM 233.

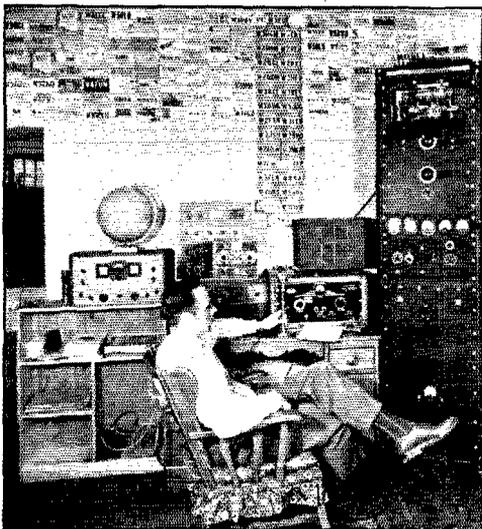
Those having the highest multipliers (total of countries worked on each band used): W2BHW/8 166, W2GWE 165, W3BES 160, W6SZY 153, W2BXA 152, W2GUM 147, W2SAI, W8BKP 137, W6HX 136, W2UK, W8WZ 135, W8JIN 132.

The highest score among participants outside the United States and Canada was made by Juan Lobo y Lobo, XE1A, who made the staggering total of 530,325 points. In 57 hours, 40 minutes, he had 2357 contacts. His performance figures to an average of 41 QSOs per hour, an all-time record for any contest! During his best contest hour XE1A chalked up 55 contacts; his best minute netted 4 QSOs. Juan also set a new record for multiplier — 75. On 14 and 28 Mc. 17 W/VE districts were worked, on 3.5 Mc. 16, 7 Mc. 15, and on 27 Mc. 10. Even without the 10 points gained from operation on the new 11-meter band, he would have topped all previous multiplier records by 8 points. Congratulations, Juan, on an amazing record and one that should stand for some time to come!

Second-highest non-W/VE scorer is KH6DD with 213,668 (1386 contacts, multiplier 52). Trailing very close behind in third place is ZS2AL — 213,456.



ZS6DW, high-scoring South Africa 'phone participant, second-high among the c.w. entrants in his country. A bandswitching exciter drives 35Ts on 14 Mc. and a 100TH on 28 Mc. Antennas are a 3-element beam on 14 Mc. and 4-elements on 28 Mc., both rotary.



Top man among the W/VE 'phone entrants, John Ransome, W2SAI, scored 135,774 points, had 397 contacts with 77 different countries. An input of 1 kw. to 450THs, AR-77 and HQ-129X receivers, a collection of antennas including half-waves on 3.5 and 7 Mc., a 2-element rotary on 14 Mc. and a 4-element job on 28 Mc., plus plenty of operating ability, were responsible for John's excellent score.

Next in line with scores worthy of special mention were KP4DH 210,728, CM2CT 201,240, KH6IJ 186,570, CM2SW 172,939, ZS6DW 167,850, NY4CM 153,712, KP4AO 142,982, TG9JK 138,489, XE1KE 116,405, ZL1BY 113,805, HB9AW 106,210, XU6GRL 104,640, KP4AA 98,046, W6VDG/KW6 96,309, LU2FC 92,404, VK2EO 90,945, K6SDM 87,204, HB9CX 81,326, KH6BM 81,244, KL7AD 75,933.

Leaders in number of contacts: XE1A 2357, ZS2AL 1483, KH6DD 1386, KP4DH 1348, CM2CT 1308, XE1KE 1252, KH6IJ 1154, ZS6DW 1124, CM2CW 1090, NY4CM 987, KP4AO 983, TG9JK 895, XU6GRL 880, ZL1BY 848, HB9AW 844, KP6AA 838, W6VDG/KW6 791, VO6F 755, HB9CX 737, KH6DM 730, VK2EO 705, VK2VA 689, K6SDM 676, KL7AD 663, LU2FC, VK2ANN 654, ZK1AH 604.

Highest multipliers following XE1A's record-breaking 75 were KH6IJ 54, CM2SW, KP4DH, TG9JK 53, CM2CT, GI6TK, KH6DD, NY4CM 52, ZS6DW 50, KP4AO 49, ZS2AL 48, ZL1BY 45, G6ZO, KL7CZ 44, HB9AW, K6SDM, KH6DK, VK2EO 43, LU2FC 42, W6VDG/KW6 41, XU6GRL, ZK1AH 40.

The 'Phone Section

Outstanding performer in the W/VE 'phone category was John Ransome, W2SAI, whose score of 135,774 points topped those of all his competitors by a comfortably wide margin. John

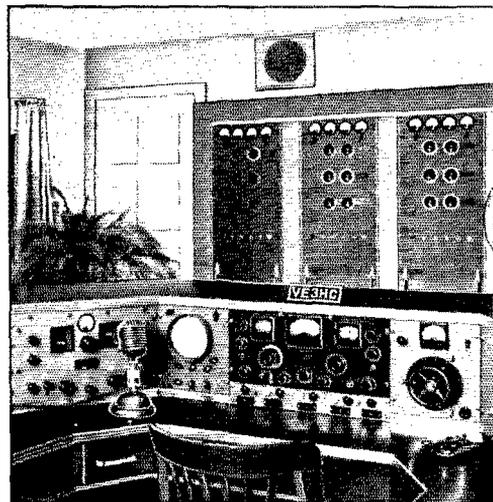
spent 88 hours in the contest, had 397 QSOs with stations in 77 different countries, wound up with a multiplier of 114. Because there is no QSOs/country quota in the 'phone section, his number of contacts is higher than that of the leading c.w. entrant. His multiplier was lower because there were apparently fewer countries to be worked on 'phone, but we'll wager that if more countries were active he would have worked them! John was no slouch in the c.w. section either, having placed eighth among the W/VEs. Our hats are off to you, OM, on a fine all-around operating performance.

A strong contender for c.w. honors, W3BES turned up on 'phone to produce the second highest score. Jerry talked his way into 278 contacts with 71 countries for a multiplier of 107 and a score of 88,917.

Third-place 'phone participant was W4SW with 74,250, followed by W3HFD 73,968, W3DHM 73,670, W6SA 73,191, W4OM 67,130, W2PWP 63,450, VE3HC 63,256, W0AIW 60,556.

Highest 'phone multipliers were those of W2SAI 114, W3BES 107, W3DHM 106, W4SW 99, W4OM 98, W1JCX 94, W6SA 93, W3HFD 92, W2PWP 90, W0AIW 88, VE3HC 84, W5GOC 82, W6DI 81, W7ESK 80, W2AFQ, W6AM 79, W1BFB 77, W6RCD 75, W2RUI 73.

Leaders in number of 'phone contacts: W2SAI 397, W3BES 278, W3HFD 268, W6SA 263, W4SW 257, W2PWP 235, W5GOC 234, W3DHM 233, W0AIW 230, W4OM 229, W6AM 223, W4DQH 220, VE3HC 212, W2AFQ 205, W6DI 204, W1JCX 200.



Here's the business-like layout of VE3HC, Ontario Section 'phone winner. Visible in the background are the 3.85-, 14- and 28-Mc. transmitters. At the operating position are a Super-Pro receiver, scope for modulation measurements, SX-28 receiver and line-voltage-control Variac.



OZ9Q, c.w. winner for Denmark, high scorer in the 'phone section. Operator E. Krosogoe had been off the air since the 1939 contest, and had little gear when he saw the contest announcement in January *QST*. With donations from the junk boxes of local amateurs, he managed to collect enough equipment to put OZ9Q on the air. Beseet with unusual difficulties such as power transformers and tubes blowing up, and even loss of line power at times, he nevertheless managed to make a fine showing.

A c.w. DXer of rare ability, XE1A turned in the highest 'phone score from outside W/VE. He also smashed all previous 'phone records on three counts: 306,504 points, 1548 contacts, multiplier 66. Juan averaged 33.3 contacts per hour during 46½ hours of operation. He believes that the W/VE stations could make more DX 'phone contacts if they used simpler phonetics to identify their calls, says many seem to pick words that are difficult for Central and South American amateurs to understand. (A good reason for all concerned to use a standard such as the ARRL Phonetic Alphabet. — *Ed.*)

As explained elsewhere in this account the announcing of winners and other high 'phone scores from outside the United States and Canada will be deferred until a later date.

— — — — —

The Fourteenth International DX Competition is scheduled for the week-ends of February 14th-15th, March 14th-15th (c.w.) and February 21st-22nd, March 20th-21st ('phone), 1948. Circle these dates on your calendar, start fixing up that new rig and put up those fancy antennas now!

**SWITCH
TO SAFETY!**



WINNERS, THIRTEENTH A.R.R.L. INTERNATIONAL DX CONTEST

Radiotelegraph

Section or Country	Winner	Total Score — Multiplier — Contacts
E. Penna.	W3BES	147,040-160- 307
Md.-Del.-D. C.	W3MSK	65,836-109- 204
So. New York	W2SAI	104,805-137- 255
W. New York	W2FBA	46,164- 98- 156
W. Penna.	W3LNE	37,096-104- 185
Illinois	W9ERU	68,320-112- 206
Indiana	W8HYC/9	63,504-108- 196
Kentucky	W4FU	83,185-127- 219
Michigan	W8LEC	71,804- 57- 156
Ohio	W2BHW/8	147,076-166- 296
Wisconsin	W9RBI	39,516- 89- 148
No. Dakota	W6FYF	24,524- 72- 139
So. Dakota	W6ZRA	462- 11- 14
Minn.	W6YCR	25,060- 70- 132
Louisiana	W5KC	46,455- 95- 168
Mississippi	W5CKY	3729- 43- 69
Oklahoma	W5EGA	72,220-115- 210
Tennessee	W4DQH	27,750- 74- 187
E. New York	W2AWF	23,892- 64- 120
N. Y. C. & L. I.	W2GWE	153,450-165- 310
No. New Jersey	W2BXA	129,504-152- 287
Iowa	W6FYF	34,602- 79- 146
Kansas	W6GDH	53,452-103- 173
Missouri	W6PV	81,625-125- 218
Nebraska	W6MHV	1462- 17- 34
Connecticut	W1QV	58,887-109- 180
Maine	W1BPX	54,240- 96- 194
E. Mass.	W1ME	75,231-119- 211
W. Mass.	W1VDY	67,354-119- 191
New Hampshire	W1BFT	49,680- 92- 180
Rhode Island	W1CJH	32,250- 75- 144
Montana	W7BWD	1512- 18- 28
Oregon	W7AYJ	15,624- 56- 93
Washington	W7DL	56,870-110- 174
Nevada	W7ONG	17,922- 58- 104
Santa Clara V.	W6MLY	46,552- 92- 170
East Bay	W6RM	57,031-107- 179
San Francisco	W6BIP	42,120- 90- 156
Sacramento V.	W6VIE	6222- 34- 61
San Joaquin V.	W6VPV	11,468- 47- 82
North Carolina	W4MR	17,577- 63- 93
South Carolina	W4LIP	462- 11- 14
Virginia	W4OM	90,171-129- 233
W. Virginia	W8JM	4557- 31- 49
Colorado	W8AZT	15,456- 56- 92
Utah-Wyoming	W7OWZ	48- 4- 4
Alabama	W4BGO	10,434- 47- 74
E. Florida	W4BRB	75,141-121- 211
W. Florida	W4JV	64,310-109- 197
Georgia	W4FIJ	60,667-103- 197
Los Angeles	W6SZY	124,236-153- 274
Arizona	W7QAP	17,422- 34- 80
San Diego	W6ITY	81,250-125- 218
No. Texas	W5RNE	45,530- 94- 165
So. Texas	W6EPZ/5	63,504-112- 189
New Mexico	W5LGS	13,833- 53- 87
Maritime	VE1EA	18,240- 60- 103
Ontario	VE3KE	54,384-103- 176
Quebec	VE2BV	8610- 41- 74
Alberta	VE6GD	4278- 31- 46
Brit. Columbia	VE7ZM	35,760- 80- 151
Vanalta	VE5NG	1428- 17- 28
Manitoba	VE4RO	52,089- 97- 179
Saskatchewan	VE5MQ	528- 11- 16
Algeria	FA8IH	64,942- 38- 576
Egypt	SU1US	632- 8- 27
Eritrea	IGUSA	1215- 9- 45
Gold Coast	ZD4AB	7344- 18- 140
Liberia	EL3A	8190- 13- 210
Mauritius	VQ8AD	1080- 9- 40

Section or Country	Winner	Total Score — Multiplier — Contacts
No. Rhodesia	VQ2GW	6954-19-122
So. Rhodesia	ZE1JI	850-10-29
Tanganyika	VQ3HJP	21,045-23-315
U. of S. Africa	ZS2AL	213,456-48-1483
China	XUG6RL	104,640-40-880
Hejaz	HZ1AB	1260-7-60
Iran Persia	EP3D	156-4-13
Iraq	YI2AM	36-3-4
Japan	J2AHI	27,642-34-271
Macao	CR9AG	25,955-29-301
Malaya	V81BX	2640-10-89
Azores	OT2AB	1104-8-46
Belgium	ON4BCK	38,665-37-433
Czechoslovakia	OK1FF	44,469-27-549
Denmark	OZ9Q	62,700-38-564
Eire	EI9J	37,774-34-374
France	F8BS	44,104-37-402
Germany	D2GQ	8100-20-135
Great Britain	G6ZO	50,248-44-384
Greece	SV1RX	4680-13-122
Italy	I1AY	36,256-32-384
Netherlands	PA0UN	59,007-39-506
No. Ireland	GH6TK	69,264-52-449
Norway	LA3GA	10,738-26-138
Rumania	YR5R	651-7-333
Scotland	GM8MN	36,975-29-425
Soviet Union	UA3DA	6720-14-160
Sweden	SM5PA	3866-19-71
Switzerland	HB9AW	106,210-43-844
Wales	GW3JI	19,368-24-269
Alaska	KL7AD	75,938-39-663
Bermuda	VP9K	15,080-20-257
Canal Zone	KZ5AZ	14,858-23-218
Costa Rica	TI2FG	42,291-37-381
Cuba	CM2CT	291,240-52-1308
Guantanamo Bay	NY4CM	153,712-52-987
Guatemala	TG9JK	138,489-53-895
Mexico	XE1A	530,325-75-2357
Newfoundland	VO6F	68,510-31-755
Panama	HP4Q	6560-20-111
Puerto Rico	KP4DH	210,728-53-1348
Virgin Islands	KV4AA	56,232-33-574
Australia	YK2EO	90,945-43-705
Cook Island	ZK1AH	70,080-40-604
Fiji Islands	VR2AB	180-3-12
Guam	W6BWS/KG6	37,120-32-390
Hawaii	KH6DD	213,668-52-1386
Java	PK4KS	2211-11-67
New Zealand	ZL1BY	113,805-45-848
Palmyra	KP6AA	98,046-39-838
South Georgia	VP8AD	441-7-21
Tonga	VR5PL	2509-13-65
Wake Island	W6VDG/KW6	96,309-41-791
Argentina	LU2FC	92,404-42-654
Brazil	PY2AJ	22,275-25-305
Chile	OE4AD	25,326-27-316
Colombia	HK1CK	45,838-26-594
Ecuador	HC1PC	2550-10-85
Uruguay	CX1FB	42,075-33-435

Radiotelephone

Section or Country	Winner	Total Score — Multiplier — Contacts
E. Penna.	W3BES	88,917-107-278
Md.-Del.-D. C.	W3FUV	33,216-64-173
So. New Jersey	W2SAI	135,774-114-397
W. New York	W2AFQ	48,425-79-205
W. Penna.	W3BWP	6156-36-57
Illinois	W9NDA	47,895-66-144
Indiana	W9JFB	8702-38-77
Kentucky	W4HAV	300-10-10
Michigan	W8KML	24,684-68-123

Section or Country	Winner	Total Score — Multiplier — Contacts
Ohio	W8BKP	69,300-110-210
Wisconsin	W9BCV	35,224-74-160
No. Dakota	W0VSK	14,742-42-117
So. Dakota	W0ZRA	462-11-14
Minnesota	W0CSU	2550-25-35
Arkansas	W5FPD	3120-26-40
Louisiana	W5GOC	56,498-82-234
Mississippi	W5HFQ	16,560-48-115
Tennessee	W4SW	74,250-99-257
E. New York	W2NSD	33,726-73-154
N.Y.C. & L.I.	W2KDX	19,992-49-136
No. New Jersey	W2OR	17,716-43-138
Iowa	W8SQQ	37,088-39-86
Kansas	W6VAT	31,680-64-165
Missouri	W9AIW	60,558-88-230
Nebraska	W6GDB	1615-19-29
Conn.	W1ATE	29,480-67-148
Maine	W1KJJ	13,178-61-101
E. Mass.	W1JCX	54,708-94-200
W. Mass.	W1ZD	9594-39-82
New Hampshire	W1CRW	13,000-50-120
Rhode Island	W1BFB	40,425-77-175
Oregon	W7HIA	13,311-51-87
Washington	W7ESK	33,760-80-141
Nevada	W7JJO	1024-16-23
Santa Clara V.	W6MLY	36,708-69-178
East Bay	W6TT	41,748-71-196
San Francisco	W6BIP	12,138-42-97
Sacramento V.	W6EJC	40,110-70-191
San Josquin V.	W6VPV	37,411-29-43
No. Carolina	W4AIT	147-7-7
So. Carolina	W4IMW	13,669-49-126
Virginia	W4OM	67,130-98-229
W. Virginia	W8VAN	2860-22-44
Colorado	W6CDP	12-2-2
Utah-Wyoming	W7UOM	5148-29-54
Alabama	W4GVP	5460-28-65
E. Florida	W4FUM	20,790-63-110
W. Florida	W4EQR	17,710-46-131
Georgia	W4EWY	13,156-46-96
Los Angeles	W6SA	73,191-93-263
Arizona	W7PUM	2205-22-35
San Diego	W6RCD	36,675-75-163
No. Texas	W5YF	30,246-71-142
So. Texas	W5LWV	13,592-56-114
New Mexico	W5LGS	2262-26-29
Maritime	VE1ET	15,050-50-101
Ontario	VE3HC	63,256-84-212
Quebec	VE2DX	5365-29-63
Alberta	VE6FK	1173-17-23
Brit. Columbia	VE7AJN	30,976-64-162
Manitoba	VE4IF	6171-33-65
Saskatchewan	VE5OM	240-8-10

SCORES

Thirteenth International DX Competition

Operator of the station first-listed in each section and country is winner for that area, unless otherwise indicated. . . . Asterisks denote stations not entered in contest, reporting to assure credit for stations worked. . . . The multiplier used by each station in determining score is given with the score — in the case of W/VE entrants this is the total of the countries worked on each frequency band used; in the case of non-W/VE participants it is the total of the W/VE districts worked on each frequency band. . . . The number of contacts established is next listed. . . . The letters A, B and C approximate the power input to the final stage at each station; A indicates power up to and including 100 watts; B indicates over 100 watts, up to and including 500 watts; C indicates over 500 watts. . . . In cases where power is varied, this is shown by the use of more than one letter. . . . The total operating time to the nearest hour is given for each station and is the last figure following the score. . . . Example of listings: W3BES 147,040-160-307 —C-85, or, final score 147,040; multiplier 160; 307 contacts; power over 500 watts; total operating time 85 hours.

C.W. SCORES

Thirteenth International DX Competition

ATLANTIC DIVISION

<i>E. Pennsylvania</i>			W3BVO	27- 3- 3- B-12
W3BES	147,040-160-307- C-85	W3HH*	21- 3- 3- ---	
W3HFD	73,428-116-211- C-71			
W3FCB	64,566-102-211- B-1			
W3KT	46,629-99-157- B-20			
W3GHD	31,464-76-139- B-28			
W3FUF	39,720-80-128- B-41			
W3CPV	30,400-80-128- B-1			
W3IXN	25,047-69-121- B-63			
W3GRS	14,364-57-84- B-15			
W3GHM	12,546-51-82- B-40			
W3RNO	12,056-44-92- C-22			
W3FLH	8901-43-69- V-31			
W3BKE	6912-48-48- A-18			
W3ARK	6562-34-99- B-41			
W3CPS	4176-29-48- B-38			
W3ZLN	3888-27-48- B-13			
W3AGV	3666-17-37- B-22			
W3ADE	3654-29-42- B-20			
W3EER	1653-19-29- A-12			
W3JN	1512-18-28- B-10			
W3QJV	1440-20-24- C-23			
W3MLV	1056-16-22- A-23			
W3MOY	854-14-21- B-20			
W3IFR	189- 7- 9- A-18			
W3HIV	90- 5- 6- A-12			
W3MFW*	12- 2- 2- ---			
W3DZ	3- 1- 1- B- 6			
<i>Md.-Del.-D.C.</i>				
W3MSK	65,826-109-204- B-65			
W3IYE	49,602-101-164- B-63			
W3BEN	38,541-87-151- C-56			
W3EVP	35,816-88-137- B-39			
W3KRI	29,562-78-127- C-27			
W3SKO	22,824-72-108- B-36			
W3BEB	18,676-58-108- B-51			
W3DRD	17,030-65-88- B-8			
W3EIV	16,017-57-95- B-60			
W3BKZ	15,903-57-93- B-25			
W3BWN	13,035-55-79- B-6			
W3MCH	5184-32-54- A-12			
W3AFU*/3*	4752-33-48- B-21			
W3FTB	3525-25-49- B-13			
W3HMM	3450-30-39- C-24			
W3WU*	2952-24-41- B-25			
W3DPA	2448-24-34- ---			
W3MFP	2109-20-35- B-19			
W3FDJ	1200-16-25- B-9			
W3FCG	1056-16-22- B-19			
W3FY	819-13-21- B-9			
W3KJY	792-12-22- B-8			
W3HLO	741-13-19- C-13			
W3AFU*	420-10-14- A-12			
W3GOL	192-8-8- B-14			
W3MCD	48-4-4- ---			
<i>So. New Jersey</i>				
W2SAI	104,805-137-255- C-88			
W2PWP	75,582-114-221- C-73			
W2RDK	28,670-70-127- B-1			
W2AQW	19,215-61-105- B-14			
W2QCM	12,240-40-74- C-35			
W2GRV	17,227-58-99- C-30			
W2AIU	16,587-57-97- B-1			
W2GGL	13,650-50-99- B-51			
W2QJK	12,331-47-93- B-53			
W2QKE	6840-40-57- V-15			
W2QCL	4416-32-46- B-11			
W2QXX	4032-32-42- B-17			
W2IRMU	1425-19-25- ---			
W2BEI	986-17-20- ---			
W2HAZ	924-14-22- B-10			
W2TPJ	798-14-20- B-1			
<i>W. New York</i>				
W2FBA	46,164-98-156- B-59			
W2DSB	32,964-82-134- B-60			
W2PVI	12,816-48-91- C-41			
W2RPP	30,440-40-67- B-43			
W2AW	7524-38-66- B-1			
W2QHH	4590-34-48- A-39			
W2PTS	4332-38-57- C-29			
W2KEI	3780-23-38- B-1			
W2QKS	3240-30-36- ---			
W2WE	3150-25-43- B-10			
W2BJH*	2376-24-38- B-30			
W2PUD	1050-30-35- B-18			
W2LJF	576-12-17- B-6			
W2NOY*	180- 6-10- ---			
W2YA	120- 5- 8- A-41			
W2UVE	90- 5- 6- B- 5			
<i>W. Pennsylvania</i>				
W3LNE	57,096-104-185- C-84			
W3LOE	42,840-85-160- C-58			
W3LW	36,692-81-154- B-35			
W3LPE	13,365-55-81- C-47			
W3AFW	11,051-43-87- B-30			
W3KWL	6583-29-80- B-28			
W3TXO	4320-30-48- B-1			
W3KQD	3168-24-44- B-1			
W3AVY	627-11-19- B-22			
W3AVY	390-10-13- B-5			
W3AAX	308-10-10- B-5			
W3WNN	279-9-11- B-10			
W3LJS	48-4-4- A-9			
W3RWJ	36-3-4- ---			
W3NRE*	6-1-2- ---			

W8DAE	27,832-71-136- B-57	W8KYY	507-13-16- B-10
W8LFE	21,504-64-112- C-35	W8CXF	429-11-13- C-2
W8STL	14,596-51-96- B-44	W8BRS	414-9-17- B-33
W8BYE	10,224-48-71- B-1	W8LFB*	330-10-11- B-1
W8MCC	9328-42-91- B-27	W8ZLB	8-13- B-22
W8SDD	9315-45-69- -19	W8GVL	225-9-9- B-15
W8LJY	8820-42-70- B-26	W8PM*	210-7-10- ---
W8YHO	8610-41-70- B-39	W8ZPX	120-5-8- A-1
W8WUU	8077-41-68- B-31	W8YHE	96-6-6- A-5
W8LPD	6930-42-56- B-44	W8EWF, 8	18-2-3- B-2
W8WYC	19,416-28-59- B-23	W8VDF	12-2-2- A-4
W8WSS	4114-22-63- B-20		
W8AL	3321-27-41- B-24		
W8QHV	3300-25-44- C-1		
W8ROX	3296-22-44- A-15		
W8VOT	3105-27-43- B-38		
W8OBS	3078-27-38- A-60		
W8PCS	2586-22-40- B-14		
W8UW	2178-22-33- B-26		
W8JFC	2112-22-32- A-40		
W8JJA	2046-22-41- B-23		
W8KCC	1860-15-42- B-27		
W8BHM	1170-15-26- A-14		
W8RNC	936-24-39- A-24		
W8DWS	882-14-21- B-12		
W8UUL	270- 6- 7- ---		
W8MIR	612-12-17- A-12		
W8SLH	576-12-16- B-10		

DAKOTA DIVISION

<i>North Dakota</i>		W8WUU	48-4-4- A-11
W8FYF	24,524-72-139- C-43	W8CRY	3-1-1- ---
W8ZTL	11,844-33-94- A-40		
W8YSL	3048-24-43- C-30		
W8OJH	1155-15-26- ---		
W8LHS	819-13-21- B-9		
<i>South Dakota</i>			
W8ZRA	462-11-14- B-2		
W8ACT/0	60-4-5- B-4		
W8PHR	60-4-5- B-2		

DELTA DIVISION

<i>Louisiana</i>		W5MCG	5841-33-59- B-31
W5SK	46,455-95-168- B-48	W5BK	3270-30-37- B-26
W5BRR	19,849-61-103- B-34	W5CUB	1980-22-30- A-16
W5SWG	15,345-55-93- B-37		
W5KQY	3402-27-42- B-21		
W5CEW	1909-17-38- B-30		
W5YTF	1404-28-26- B-1		
W5DAQ	550-10-19- B-1		
W5GEA	297-9-11- B-6		
W5LWO	210-7-10- A-11		
<i>Mississippi</i>		W5EGA	72,220-115-210- C-80
W5CKY	8723-43-69- C-43		

HUDSON DIVISION

<i>E. New York</i>		W2ETT	216-8-10- A-9
W2AWF	23,892-64-120- C-42	W2NCG	210-7-10- A-10
W2BEW	3645-27-135- C-32	W2HQP	105-5-7- B-5
W2OYI	1056-16-22- B-8	W2SR*	75-5-5- ---
W2PXL	429-11-13- C-1	W2RQJ	60-4-5- B-2
W2GMM	3-1-1- ---	W2CNC	36-3-4- ---
<i>N. Y. C. & Long Island</i>		W2OLG	36-3-4- B-3
W2GWE	153,450-165-310- C-85	W2APZ	27-3-3- ---
W2WLB	53,261-100-150- B-60	W2DBI	27-3-3- A-1
W2NFR*	40,296-73-184- B-6		
W2PBG	32,340-77-140- C-1		
W2IOP	21,692-68-132- B-65		
W2AYJ	14,685-55-89- B-28		
W2GTL	13,377-49-91- B-44		
W2VND/2	11,914-46-87- B-6		
W2IFA	11,628-51-76- A-40		
W2WC	8592-44-73- A-30		
W2SEI	7876-44-61- C-14		
W2AIS	7518-42-60- B-17		
W2ICO	5915-35-57- B-18		
W2HJL	1909-20-35- B-20		
W2CUQ	4140-30-46- -17		
W2EQG	3975-25-53- B-29		
W2WES	2730-26-43- B-16		
W2ZP*	2688-28-32- B-23		
W2TAY	2247-21-37- B-20		
W2KIR*	1909-20-35- B-20		
W2BO	1944-24-27- -9		
W2ARE	1734-17-40- B-26		
W2AWH	1428-17-28- A-25		
W2UPT	1260-15-28- B-21		
W2HSP	1073-13-22- B-10		
W2MSP	1056-16-22- A-10		
W2GGN	1053-13-27- B-22		
W2PPF	960-13-22- A-1		
W2RZP	854-12-19- A-23		
W2KJY	594-11-18- B-7		
W2OBS	270-9-10- A-10		

CENTRAL DIVISION

<i>Illinois</i>		W9DUY	21,567-67-107- B-39
W9ERU	68,320-112-206- C-43	W9HKR	13,818-49-94- ---
W9AHE	66,933-111-201- B-68	W9CWO	8370-45-64- B-1
W9FB	50,925-97-175- B-68	W9HTU	6684-38-60- ---
W9UIG	41,429-88-157- C-34	W9BAM	5050-30-63- B-30
W9GRV	37,845-87-145- B-59	W9WCE	3402-27-42- B-19
W9TH	26,110-70-125- B-40	W9CTT	2112-22-32- B-17
W9LW	23,247-63-131- B-67	W9ZPT	2049-22-21- A-33
W9NRB	21,420-68-102- B-48	W9UMI*	1404-12-39- ---
W9CIA	20,196-66-102- B-57	W9EGQ	1248-16-26- V-1
W9WEN	17,980-60-104- B-47	W9BOE	990-15-22- C-13
W9MUX	10,800-21-37- B-30	W9ATS	858-11-26- B-9
W9QIY	7872-41-64- B-60	W9SVH	576-12-16- B-10
W9NDA	6780-35-65- C-17		
W9FSR	4872-29-56- C-17		
W9HIN	4082-26-55- B-28		
W9AND	3906-31-42- B-10		
W9MXP	3828-29-57- B-27		
W9FID	3550-25-48- C-42		
W9BVV	3276-26-42- B-1		
W9FCX	3168-24-44- C-25		
W9CY	2550-25-44- B-23		
W9GDI	2376-24-33- B-9		
W9KMN	2331-21-37- B-14		
W9JVC	2232-24-31- A-19		
W9TUM	1653-19-29- A-10		
W9FTN	1512-14-36- ---		
W9BGC	1420-20-25- B-10		
W9KDI	1326-17-27- A-24		
W9RJS	1296-16-27- B-1		
W9VPD	1080-15-		



Do we copy Europe?" . . . Who will be the first amateur to hear England and France? . . . speculates November 1922 *QST*, as completion of arrangements for the Third ARRL Transatlantics is announced. With preliminary transmitting tests already under way, there has been intense preparation among our stations in an effort to achieve the exclusive status of a Transatlanticer.

The Beverage Wire antenna, used successfully by Paul Godley during last year's tests, is described in this issue by one of its developers, H. H. Beverage of RCA. Because of the special emphasis placed on reception of signals from abroad this year, the theory, design data and field patterns presented should prove invaluable. Assisting Mr. Beverage in the compilation of data for a practical 200-meter model were R. B. Bourne of 2BML, H. O. Peterson and A. B. Moulton.

Practical considerations for "A 1/2-Kw. Radiophone and C. W. Set" are outlined this month by Editor Warner. Using the commercial Type 6371 Radiophone as a subject, MOPA circuits and Heising modulation are fully discussed. A. L. Groves' one-tube superregenerator, first-prize winner in *QST*'s recent construction contest, is described down to the last nut and bolt. Other contest winners announced are James Wood, jr., 2ALG, New York City, Leon W. Bishop, 1XP, Athol, Mass., and William Englebretson, St. Paul, Minn. To complete the month's technical bill, methods of "Prevention of Sparking at Key Contacts" is the timely offering of H. P. Corwith, 2BRC.

The Department of Commerce Amateur Cup has been formally presented to Louis Falconi, 5ZA, by Secretary Hoover. The award carries the engraving "For the best all-around amateur radio station in operation during 1921, the major portion of which has been designed and constructed by the amateur himself." Incidentally, the Secretary's son, Herbert Hoover, jr., 3ZH, will soon be on the air with a 500-watt c.w. transmitter.

From *QST*'s files for 1917 is reprinted one of T.O.M.'s masterpieces, "Rotten QRM." Let young squirts take heed and avoid the tortures of the Wouff-Hong, Rettysnitch and Ugerumph!

Thanks to c.w., 1CCZ, the station of Edward C. Crossett, Wianno, Cape Cod, has worked all U. S. districts in one night! W. W. Remy of 2KV was the operator turning in this creditable performance. All of which should lend inspiration to our new attempt at a Daylight Transcon, which starts Thanksgiving Day.

Not to be outdone by the West Coast stations now successfully relaying into Hawaii, East Coast stations — 4FT and 4BX of Wilmington, N. C. — are now feeding traffic nightly over the 1300-mile span to 4OI, Puerto Rico.

A further contribution by amateurs to international understanding is recounted in "A Radiophone Job in China," which tells of the experiences of Robert F. Gowen, 2XX, recently returned from China where he installed radiophones and founded a radio school.

A number of prominent c.w. stations are described in this issue: 9XAAQ, University of Colorado, Boulder, Everett W. Thatcher's 6AWP, Santa Ana, Calif., and the joint station of F. M. Louwaert and F. N. Wright, 8VY, Kalamazoo, Mich.

Strays announce — in upside-down type! — that *QST*'s assistant editor, Boyd Phelps, 9BP, has turned Benedict. And down University of Maine way, Handy of 1BDI is reported firing up with 100 watts on c.w., in preparation for the coming Transatlantics.

Silent Keys

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

- W2LOG, Jessie M. Aycock, Richmond Hill, N. Y.
- W2VR, Charles S. Rosenthal, Watermill, L. I., N. Y.
- W4ASC, Carson J. Lovett, Jackson, Tenn.
- W4DDJ, Morgan G. Hooper, Nashville, Tenn.
- Ex-W6DDE, Joseph A. Brown, Sunland, Calif.
- W6NDD, Oscar W. Ericson, Pacific Beach, Calif.
- W6OZV, J. Parker, Los Angeles, Calif.
- W6PQU, Stuart Walcott, Wilmington, Calif.
- W6RXQ, Paul B. Lawhead, Prescott, Arizona
- W7FZK, ex-W9RKH, Leonard Schultz, Portland, Oregon
- W81PX, Leonard Wittlinger, Linden, Michigan
- KL7HH, ex-K7HXW, Theodore G. Bystedt, Anchorage
- KP4AB, Raymond A. Call, San Juan, Puerto Rico
- Ex-G2FLL, Claude L. Willeox, Warminster, Wilshire
- G3AZH, Frank Moore
- VE1SV, James H. Sargent, Moncton, New Brunswick
- Full Member Charles A. W. Handy, Secy. MARA, Clarksburg, W. Va.



CONDUCTED BY JOSEPH E. GRAHN, WICH

How:

There are a half-dozen or more evergreen arguments that always crop up during a confidential meeting of two or more DX chasers. One of these perennials is the "CQ DX" routine. Generally this column has scoffed at the deal, but there are many who don't go along with the attitude. Let's try to rationalize it.

During the "hot" periods on the band, when a rare piece of DX will have ten or fifty Ws calling him on every stand-by, a "CQ DX" by a W will often raise a G, ZL, VK, ZS or something else in countries where there are plenty of stations. Now there is nothing in this chrome-and-plastic world that says a fellow can't work VKs when C8s and PK6s are coming through, if he wants to. In fact, it helps the guys who are after the rare stuff. While it is often annoying to have a W open up with "CQ DX" right on top of a weak CR6 or ZD1, at least you know that there is one W that won't be calling the rare one. Many of the juicy "kills" are only possible because the DX was badly interfered with, and most of the band didn't hear the DX.

One argument against "CQ DX" is that a foreigner hearing you call it has no way of knowing if he is what you mean by DX. The usual interpretation is that you are interested in anything outside of your own country, so you have no squawk if a G or VK replies to your "CQ DX," unless you call "CQ DX no G" or some such

thing. This latter technique seems to be popular among the quasi-big-shot group, and it probably does impress the guy down the street who has never worked a G. To the guy after real DX, it only means that for a minute or so you won't be listening, and that gives him a break.

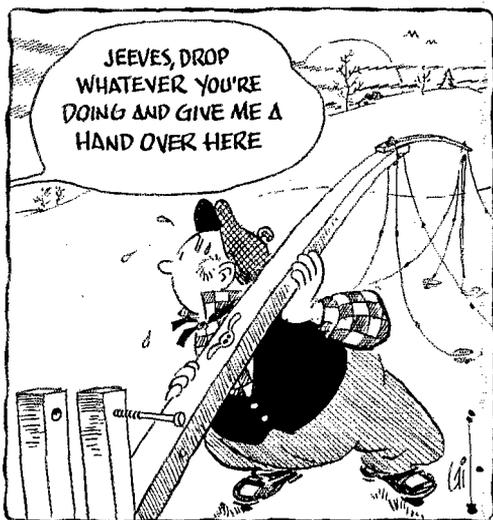
Most of the savvy DX men we've discussed this business with admit that they like to call "CQ DX" occasionally, just to see what will pop up. If a common one comes back, they chew the fat with the guy just like anyone else, because actually what they are interested in is a rag-chew with a station outside their own country. When they're out to add countries to their totals, they rely on the old listen-first technique. A few stations that have really outstanding signals can occasionally pull a plum out of the pile on a CQ, but the average journeyman DXer has to work for all that he gets.

Let's leave it this way: When you call "CQ DX," you're announcing that you want a rag-chew with a station outside your country and, since this is a free country (in spite of the current prices), you are free to call it anytime you want to. If you don't make DXCC by this method, you should at least get RCC out of it.

What:

Either the 80- and 40-meter boys are very modest, or there just isn't any DX getting through on these bands worth mentioning. However, W2PGU grabbed some 7-Mc. stuff like G3BAQ, G5LZ, HK5CR, TI2AJ, G3CHR, G3APN, CO6AV, ZD3B, I1AFL, UA3KAE, I1PL, OX3BG, KH6EV and CM6AI, and heard a few dozen others W2VGW's 40 watts snagged G4QC, HR1JB, CT1AZ, KZ5CB and G5GK.

As usual, the DXCC aspirants are ganging 20 and they have come up with some nice stuff. At W4CQR the best are LX1AS, J9SIR, ZB2B, KL7UM, K6SCJ/KP6, GD2FRV and EL3A W4TM says Sept. 10th was his day, paying off with YO5J, UA9CC, EP3D, VS1CB, UR2KAA, UA6KFC, ZD1JI and VQ3JHP W2HZY — indoor folded dipole and all — knuckled up to 124 postwar with C1DK, C7US, PK3PL, PK3CK, VS1CE and CR4AX VE1EA added J3AAD, K6SBU/KG6, UH8AA, TA3SO, UB5AL, CR6AI and VP5HN to his list, making him two shy of the century mark The pick of a nice assortment at W5KMZ includes J2EAR, J2ACW, VK6HT, KA7GC, J2JQC, KG6AV, J5AAJ, J3GWT,



VK9NK, CT2AB, J9CIP and W3JRF/KG6
 W6WNI managed to wangle CR7AL,
 ZE2JN, VQ2QW, UA1AR, GI5UR, UAØKQA,
 KA1ABT and J4AAO after returning from a bat-
 tle with the nursies and sawbones. Some
 of the choicer ones at W9KOK are UAØUA,
 UA9CB, UQ2AB, UG6AB, VR5IP, I6USA,
 W2WMV/C9, UB5KAC, EP1AL and ZD4AB
 W5LAK is still using 90 watts on his
 6L6s, and with the aid of a new folded dipole
 sneaked up on J2IMR, W6NQG/KM6, CN8EG,
 VO8AR, W8LXN/KG6, VP9E and HB9AW
 W9FNR complains about conditions
 but grabbed stuff like PK6HA, UG6AB, UA1BE,
 UA6AA, ZM6AF, UI8AA, YI2AM, VQ2HC and
 a bunch of VKs. W8KPL is tickled over
 working UA3DA, VK9BI, RAEM, W6WSC/
 KW6, TF3EA, UA1KEB, LA1M, KH6MP,
 UQ2AB and IIAIV, and adds "Bless that 138-foot
 wire" W9JJD finally made WAC with
 ZD4AB, J3AAD, YV5AP, OK1ZB, VK2HZ and
 VE1RF, which tickles Bill no end. The
 pile at W8STL now stands at 106 postwar, the
 new ones being YA3B, FT4AE, ET1JJ, UA9CH,
 YN1LB, ZM6AF and UH8AF. Says
 W4CWH, "Have lost my rabbit's foot and only
 managed to get ZK1AB, ZC6AA, HS1SS, I6ZJ,
 UH8AA, VP7NK, VS7RL, UQ2AB, ZE2JI,
 VS2CB and CR6AL" W6UZX upped
 his figure to 105 postwar, with FASIH, EQ2L,
 VQ5JTW, J8AAA, VP5FR, CT1A, KM6AB,
 CR7BC, CT2AB, GD2FRV and HH2CW
 W1LVH raised it to 126 postwar with
 CR6AI, SU1US, ZD1WB and EP2DS.
 W2PUD, between painting the house and work-
 ing on a new beam, managed to reach 89 postwar
 with LI2JC, ZD3B, ETIIR, TF3MB, UC2AC
 and UD6AG. D2CD broke in a new 3-
 element rotary by swapping sigs with KH6CT,
 VU7AB, W6VTO/C1, YV5AB, VK2AIK,
 CO2KB, W6SA and W6MLY, and mentions he is
 amazed at the reports obtained with 150 watts
 W5ACL is now up to 82 postwar, with
 J2AAO, PK6TE, ZS6DF, VP5AK, WØTKK/
 VK9 and OX3GE. W4MR's latest gems
 are VK9OU, SVØAC, ZD1WB, EA7RA, OH3NA,
 FT4AE and UI8AA. W6OMC has added
 KB6AA, OQ5AV, CP1AT, TAIAD and EQ2L,
 for a total of 120 pw. From his new an-
 tenna farm, W4BPD has got into the swing of
 things by working a swell bunch. Some of them
 are HZ2FI, VU2FJ, ZD6DT, AR1YL, EP2DS,
 PK3JF, VU7JU, VS1AQ, UA4FC, FT4AN,
 MD1E, J8ACS and UI8AB.
 On 20 'phone W2MPA got his share again with
 stuff like J8AAB, W6YOT/C6, KH6KH/KB6,
 W6OQ/KG6, ZS6EU, J2VFW, J5AAJ, J2AIA,
 J2AAO, ZL4GA, ZL1NT, VR3A and a flock of
 VKs. W3DKT wiggled the whiskers
 with CN8AB, CP5EA, CT1QA, EL5A, GC8MF,
 HZ1AB, IIAHL/Sardinia, J9CRP, KG6SC,
 LX1JW, VP3LF and XAMC/Trieste.

W2ITD stirred up J3WGT, J2CAL, J5AAD,
 KG6AD, W6WCN/Saipan, J9ABE, J2EVT,
 VU2RV and YS1JR, thanks to a new rotary.

Where:

CTTK, Box 52, Peiping, China.
 GD2DF, Fred Vost, c/o Ronaldsway Airport, Isle of
 Man, C. I.
 HS1LN; via W6WLG, 811 Page St., San Francisco, Calif.
 HZ1AA; via W6RAS.
 I6ZJ; via R.S.G.B.
 J8AAG, N. K. Maxwell, 1st Infantry, APO 6, c/o PM, San
 Francisco, Calif.
 K7JDA/KP4, Box 3725, Santurce, P. R.
 KA1ABU, No. 6D Santiago St., Manila, P. I.; or via
 KH6LF, below.
 KA1VVS, 81,302 Service Detachment, Cavite Navy Yard,
 P. I.
 KA6FA, Box 392, Iloilo, P. I.
 KG6AAF, Major General F. H. Griswold, Hdqtrs. 20th Air
 Force, APO 234, c/o PM, San Francisco.



There are some juicy DX calls represented in this
 shot of a recent get-together of civilian and service-
 men members of the 19ers Radio Club, Kadena Army
 Air Base, Okinawa. Left to right, back row, J9ABX,
 J9AAU, J9AAI, J9AFA, J9AJB, Sgt. R. B. Martin, Sic
 R. T. Mobley; center row, J9ABC, N. S. Sievers,
 J9AED, J9AAO, Miss L. M. Kuehn of USO Troupe
 954, J9AJR; front row, R. G. Martin, J9AAP, J9AGT.

KG6BA, APO 234, c/o PM, San Francisco, Calif.
 KH6LF, Box 1377, Honolulu, T. H.
 LA1EB; cards to 11 Berwick Lane, Cranston, R. I.
 LA4LA/Spitzbergen; cards to Ingvar Solberg, Jorgen
 Moesgt. 1, Oslo, Norway.
 PK3CK, 5 Slamet St., Surabaya, Java.
 VP4TAE, ex-W9ANA, P. Bertelli, Naval Operating Base,
 Trinidad, B. W. I.; or Navy 117, FPO, New York, N. Y.
 VS2CB, c/o Telecoms Dept., Kuala Lumpur, Malaya.
 VS3AF, P. O. Box 803N, Banco, Malay States (insists he's
 legit).
 VS9AB, A. E. Brookes, 7 Beaconsfield Road, Hastings,
 Sussex, England.
 VU2RV, c/o Nr. 2 High Speed Wireless, Eastern Command
 Signals, Ranchi, Bihar, India.
 W8WEA/Truk, Harry Phillips, Navy 3410, FPO, San
 Francisco.
 YA3B, Box 5, Kabul, Afghanistan.
 ZC6AA, SHQ Signals, RAF Station, Aqir, Palestine.
 ZC6RR; cards to 60 Harvey Road, Meir, Stake on Trent,
 England.

Tidbits:

W4JMQ reports that QSOs with HZ1AB up to
 June 15th of this year are legit; for contacts after

(Continued on page 148)



Hints and Kinks

For the Experimenter



COMBINATION BIAS SUPPLY AND STATION CONTROL SYSTEM

THE circuit shown in Fig. 1 makes use of several 24-volt d.c.-operated relays and a transformerless bias supply in an arrangement suitable for use with a low-power transmitter that uses 6L6s or 807s in the final amplifier. The relays are currently available at small cost in the surplus market.

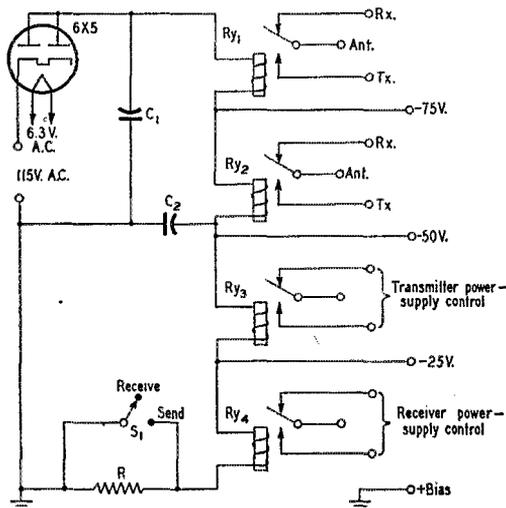


Fig. 1 — A novel method of using surplus low-voltage relays in a bias and control circuit for the low-power rig. C₁, C₂ — 20- μ fd. 150-volt electrolytic. R — 2500 ohms, 10 watts. Ry₁, Ry₂, Ry₃, Ry₄ — See text. S₁ — S.p.s.t. toggle switch.

As shown in the diagram, the coils of the relays are connected in series, and are used as a tapped bleeder across the bias supply. A 2500-ohm resistor is used to reduce the current through the coils to a point below that required for them to throw. A toggle switch shorts this resistance, causing the relays to throw to turn the transmitter on. The voltage drop across each relay coil may be used as a source of bias voltage in cases where the grid-current requirements of the transmitter are low. The voltages indicated in the diagram are typical of those obtained. When the switch is thrown to the receive position, the bias voltage increases above these figures, because the drain on the rectifier is then reduced.

Since the relay coils are connected in series, damage to the transmitter in case of bias failure is prevented, as the relays will not close. Similarly, if the coil of one relay opens, power cannot be applied to one part of the transmitter while it is not applied to another.

With the transformerless supply shown, a polarized a.c. plug must be used. There is no reason why the series-connected relay idea cannot be used with the standard transformer-type supply, however.

— Rod Grant, W1MDS/6

VARIABLE END-LINKED COILS

WHEN high-power tetrodes are used in a single-ended amplifier circuit, it seems wasteful to use a split-stator tank system to obtain a variable link. Since no variable end-link coils are on the market, one was made in the following manner.

A standard B & W 500-watt TVL jack-bar was used to hold the plug-in coils. The associated split-center TVL coils were altered by removing one of the two identical windings on the 80-meter coil, and substituting in its place one of the windings from the 40TVL coil. The result is a coil that can be used on 80 meters when it is plugged in one way, or on 40 meters when it is plugged in after 180° rotation. A 20-10 meter coil was made in like manner from the 20- and 10-meter TVL coils.

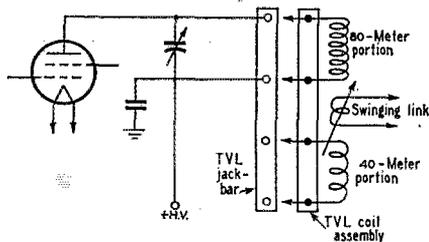


Fig. 2 — Method of obtaining variable-link coupling with single-ended circuits. Two bands are covered with a single coil assembly, as described in the text.

Fig. 2 shows the circuit connections necessary to permit this arrangement. The inoperative portion of the coil assembly has no effect on the performance of the amplifier, as it is not connected to the circuit in any way, and is isolated from the operative portion by the swinging link. [In rare

instances, the "floating" coil might be self-resonant at the operating frequency, resulting in a wavetrap action, but if this is the case, it can be detuned with a condenser or shorted to ground to eliminate the trouble. — *Ed.*]

This arrangement is not applicable to single-ended triode stages where a balanced circuit is needed for neutralization.

— *Walter Zuckerman, W2LBF*

MAKING THE MOST OF 'PHONE JACKS IN THE SMALL RIG

FIG. 3 shows a method for using two closed-circuit 'phone jacks to provide an inexpensive keying and metering system for a small two-stage transmitter. With the circuit wired as shown the following may be accomplished: A meter may be inserted to read oscillator cathode current, amplifier current, or the total of both. Either the amplifier alone, or the entire transmitter, may be keyed.

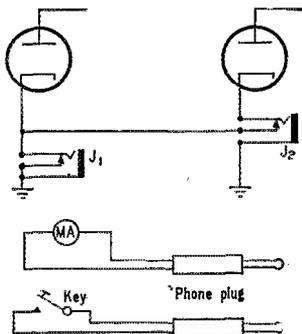


Fig. 3 — Simple arrangement of 'phone jacks to provide a flexible keying and metering set-up for a small transmitter.

J_1, J_2 — Closed-circuit jack.

MA — Plate milliammeter of suitable range.

To read oscillator current, plug the key into J_2 and the meter in J_1 . To read amplifier current, plug the meter in J_2 . To key both stages simultaneously, plug the key in J_1 .

An open-circuited 'phone plug may be used to turn off the oscillator during periods of reception when the amplifier alone is being keyed. The dummy plug is pushed into J_1 to kill the oscillator.

— *Harold Held, W9OCK*

MULTIPLE WAVETRAPS TO CURE BCI

HERE'S a wavetrap for those who operate 'phone on more than one band. It is simple to construct, inexpensive, and once set, it need not be readjusted. The circuit and construction are shown in Fig. 4. A tuned circuit for each band used is connected as shown between the antenna and the b.c. receiver. All coils are wound on a

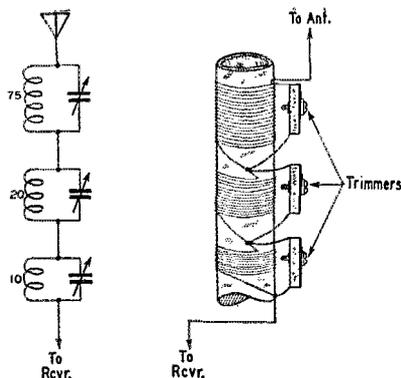


Fig. 4 — A three-band wavetrap for BCI reduction. Separate tuned circuits for the three bands are used, connected in series. Tuning is broad enough to permit VFO operation.

single form 3 or 4 inches long. Small trimmer condensers serve for tuning.

The traps can be adjusted at the home station before they are installed. Connect the trap to the communications receiver, tune in a signal in the middle of the band, and adjust the trimmer until the signal strength reaches minimum. Repeat this procedure for as many bands as the set-up requires. It is then ready to be installed.

The trap will not impair broadcast reception, and tunes broadly, so that ECO operation in each band is possible.

The coils are as follows: 75 meters, 25 turns; 20 meters, 8 turns; 10 meters, about 5 turns. All are wound on a form 1 inch in diameter.

— *James R. Hagen, W9EDF*

Strays

Though its package was pretty well banged up, a GE Type GL-211 which survived a 10,000-foot fall from an exploded Flying Fortress is now enjoying more peaceful days in the final stage of the transmitter of the V.E.R.O.N. (Netherlands amateur group) station.

FCC has granted Ernest Melvey, Seattle, special permission to change his call from W7HVS to that of his late son, W7HUX. In waiving \$12.81, which requires that calls be issued systematically to insure impartiality, the Commission made it possible for Mr. Melvey to perpetuate fittingly the memory of Robert Melvey, a World War II hero, who died in action aboard the cruiser *Nashville*.

**SWITCH
TO SAFETY!**



More on the BC-348-Series Receivers



Modifying the BC-348-O

BY W. B. BERNARD,* W3IWX

OF LATE a considerable quantity of the various models of the BC-348 series have been put upon the surplus market at prices of \$45.00 and up. These receivers have two stages of r.f. and three stages of i.f., and with a few changes can be made to compare favorably in electrical performance with much higher-priced receivers. As supplied to the Army, the receivers were designed to operate from a 28-volt d.c. supply, but since all the tubes used in the receiver have 6.3-volt heaters the sets may easily and inexpensively be modified to operate from a 115-volt a.c. supply.

The receiver described in this article is a BC-348-O. However, except for the receivers built by Wells-Gardner (BC-348-J, Q and N) all models of the 348 are electrically and mechanically quite similar to the Model O, so that the changes made to it may be made to most of the other models.¹ A number of the models of the BC-224 series differ from the 348s only in the heater circuit, so most of the changes described here can also be made to the 224s.

Power Supply

The one essential change is in the power supply to the receiver. First, the dynamotor chassis is

removed and all the parts stripped from it. The terminal strip is the only part to be retained for installation. By the gentle use of a hammer and a block of wood the dimples that held the heads of the dynamotor mounting blocks can be flattened

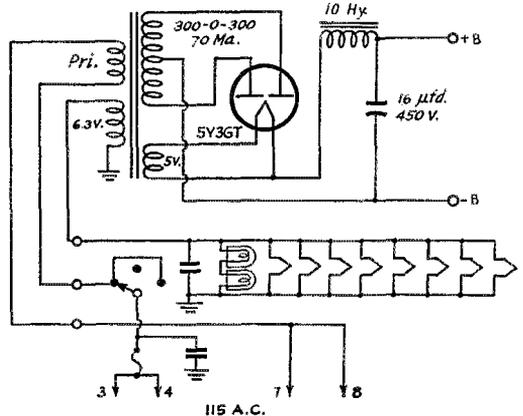
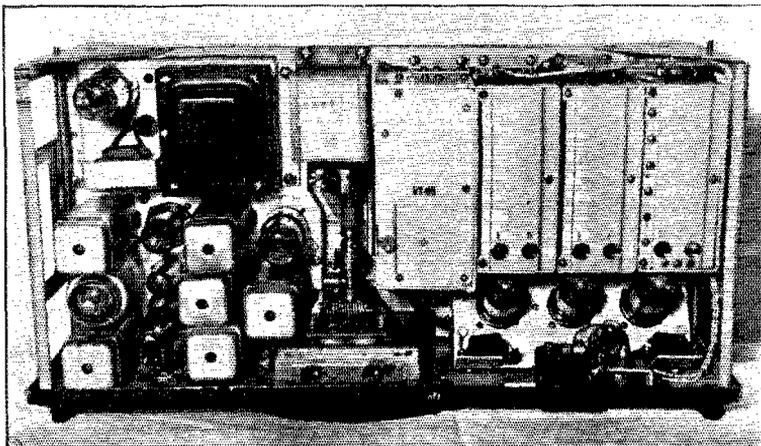


Fig. 1 — Circuit diagram of the power supply, showing rewired heater and dial-light circuit. The 115-volt connections can be made to the former 28-volt d.c. terminals.

* 2004 Ingraham St., Avondale Terrace, Hyattsville, Md.

¹ Owners of BC-348s who do not have circuit diagrams can obtain them by sending six cents in stamps (to cover mailing) to the Radio Shack, 167 Washington St., Boston 8, Mass. The instruction-book schematics of both types of receivers are printed full size on one sheet, with circuit values indicated. — Editor.

out so they will not interfere with the mounting of the new parts. The power supply diagramed in Fig. 1 may now be built on the old dynamotor chassis.



A top view of the re-wired receiver, showing the power supply (upper left) that replaces the dynamotor and the S-meter with its potentiometer for zero adjustment (lower right). The meter is mounted in the space formerly occupied by the dimmer control. This view also shows the miniature power amplifier between two of the i.f. tubes.

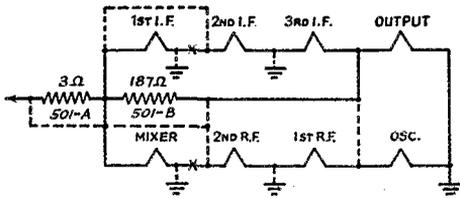


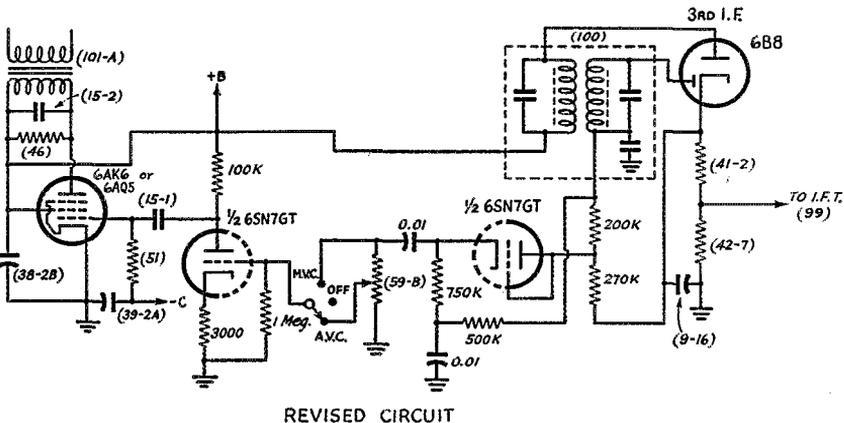
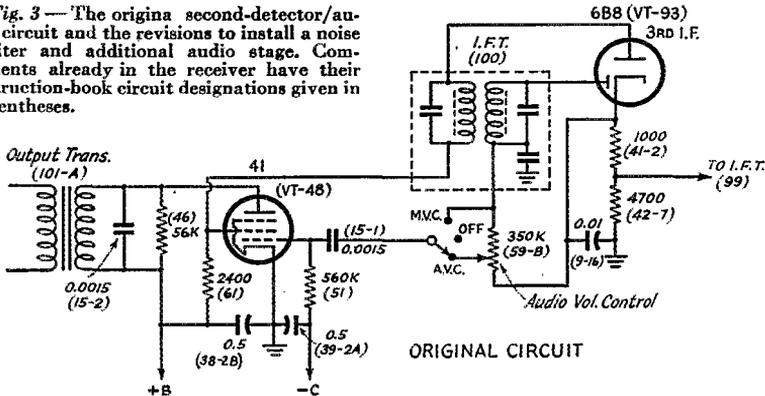
Fig. 2 — Rewiring the heater circuit. The original wiring is shown by the solid lines. Dashed line indicate the changes to put all heaters in parallel. Xs indicate the only points where the original wiring need be opened. The changes in the lower row of tubes can all be made in the r.f. section; it is not necessary to open the oscillator shield can.

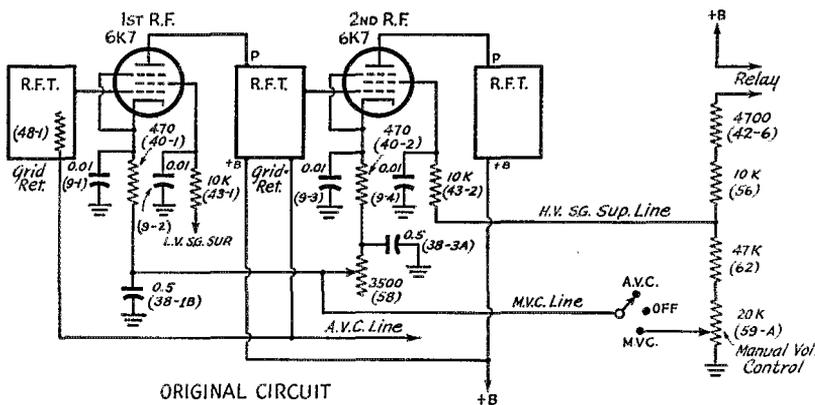
It is then necessary to separate the original 28-volt wiring into 115-volt power-supply wiring and 6.3-volt heater wiring. By clipping the ground connection loose from Terminal 7 of *50-143* on the back of the chassis and removing the dial-light supply wire from Terminal 1 on the front section of the "AVC-OFF-MVC" switch, the original 28-volt supply circuit can be used to lead in and switch the 115-volt supply. Next, the

• It is no doubt well known by this time that there are two versions of the BC-348, both made to the same performance specifications but differing considerably in circuit design. One group is identified by the suffix letters J, N and Q; the other by the letters E, M, P, O, R and S. Modification of the Q was covered in January *QST*; here are some further suggestions, along with corresponding treatment of the O series.

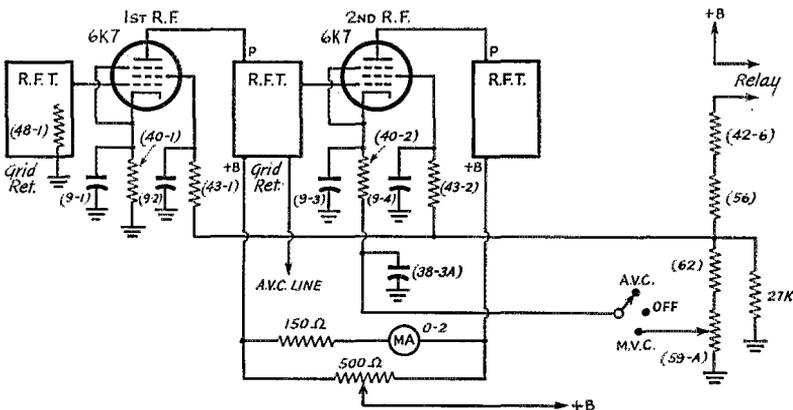
tube heaters must be wired in parallel and *R-501*, the tapped resistor for heater balancing, removed from the circuit. Fig. 1 shows the rewired heater and dial-light circuit. *R-500* and *R-503*, the fixed and variable resistors in series with the dial lights, are disconnected and removed from the receiver. Changing the heater wiring for parallel operation is relatively simple if the method shown in Fig. 2 is followed. It is necessary to break the old heater wiring only at the two points marked with Xs; the two sections of resistor *501* can simply be shorted out.

Fig. 3 — The original second-detector/audio circuit and the revisions to install a noise limiter and additional audio stage. Components already in the receiver have their instruction-book circuit designations given in parentheses.





ORIGINAL CIRCUIT



REVISED CIRCUIT

Fig. 4—R.f.-circuit changes to take the first r.f. stage off the gain control and to install an S-meter.

By connecting a jumper between Terminals 2 and 6 and connecting 115 volts a.c. to Terminals 4 and 8 of *SO-148* the receiver is all ready to go and is pretty hot. However, it does lack some of the features usually available in amateur receivers, such as a noise limiter and S-meter, and the operating voltages applied to the r.f. stages do not allow operation at the most-favorable signal-to-noise ratio.

Noise Limiter

Since the author's QTH is badly beset by noise, the noise limiter was the item of the highest priority. A germanium diode was considered, but the back resistance of these crystals is lower than that of some of the resistors in the audio input circuit and it was thought that they would not serve satisfactorily in a series-limiter circuit. A thermionic diode seemed to be the only solution to the problem. Since most limiter circuits result in a loss of audio gain it was decided to

install an additional audio stage. Space for one miniature tube was found in the center of the i.f.-audio chassis. At the time the conversion was made there was no miniature twin triode available that had independent cathodes, so the easiest solution seemed to be to install a 6AK6 or 6AQ5 output tube in the new socket, and install a 6SN7 twin triode in the space occupied by the original output tube. (Recently RCA has announced the 12AU7 twin triode using a nine-pin socket slightly larger than the regular seven-pin button base. This tube has a center-tapped heater so that it can be operated on a 6.3-volt heater supply. If this tube is used for a noise-silencer-and-first-audio stage it is not necessary to move the output stage.) The modified audio system is shown in Fig. 3. The numbers in parentheses are the original circuit designations for parts already in the receiver. Actual values also are shown for assistance in identification. New parts are identified by their actual characteristics.

Front End and S-Meter

In general, the best signal-to-noise ratio can be obtained from a receiver when the first r.f. stage is operated at maximum gain. To obtain this condition the first 6K7 is removed from the a.v.c. and m.v.c. busses and is connected to the higher-voltage screen supply. When the first r.f. stage is removed from the a.v.c. bus, resistor 48-1 (0.1 megohm) in series with the grid return is left in the circuit to protect the grid of the tube from drawing excessive current should the receiver be overloaded by the local transmitter. The bottom end of resistor 40-1 is removed from the m.v.c. bus and grounded. The supply end of screen filter resistor, 48-1, is disconnected from the blank pin of the first r.f. socket and connected to the blank pin on the second r.f. socket, which is the higher screen-voltage supply. After making these changes the receiver was tested on strong local stations and with a high-gain converter for six and ten meters no overloading was detected. All changes are completely diagrammed in Fig. 4.

When a strong signal is applied to the receiver and it is operating with a.v.c., or when the manual volume control is turned down, the screen voltage on the tubes increases to quite a high value. This causes no difficulty when the tube bias is also increased, but since the first tube now operates at a constant bias it is necessary to improve the regulation of the screen-supply circuit. This is accomplished by connecting a 27,000-ohm resistor from the junction of resistors 56 and 62 to ground. In the b.f.o. section, the 10,000-ohm resistor that shunts the plate supply should be removed from the circuit to prevent lowering the screen voltage when the b.f.o. is

turned on. This resistor is 48-4 in the original circuit designations.

Once the above changes are made, it becomes very simple to install an S-meter circuit. The variable resistor (53) on the end of the tuning condenser is removed and the connections shorted together. The mounting bracket for this rheostat should be saved to mount the S-meter zero-set control. A 1½-inch meter with a full-scale deflection of 2 ma. or less is installed in the space originally occupied by the pilot-light dimmer control, and the zero-set potentiometer is mounted to the right of it. These parts must be carefully fitted into the available space. The meter is then connected in a bridge circuit between the first and second r.f.-amplifier plates. As the grid bias of the second r.f. amplifier is varied, either by a.v.c. or m.v.c., the bridge will be unbalanced and the meter will indicate the unbalance current. Since the tubes in the two r.f. stages are alike and are operated at the same electrode voltages in the absence of any a.v.c. or m.v.c. voltages, the drift of the zero point because of line-voltage changes is much smaller than would be the case were only one arm of the bridge circuit a vacuum tube.

A cable socket to fit SO-148 could not be found, so it was replaced by a six-pin Amphenol plug. The casting that held SO-148 was drilled so that the long No. 4 bolt could be located only ⅛ inch from the outside edge. Then with a little filing and drilling the six-pin plug was fitted into the available space and secured by the long No. 4 bolt. The output, relay (send-receive switch) and 115-volt connections are made to the plug.

Once the changes listed above are accomplished the receiver leaves little to be desired in the way of a stable and easy-to-operate amateur receiver.

Calibrating the BC-348

BY A. F. PRESCOTT,** W8DL D

By a simple process the BC-348 receiver can be provided with calibrated bandspread. The dial is divided into over two dial divisions per kc., even at 14 Mc. It is possible to read frequency off the dial with an accuracy that is satisfying to the critical. The calibration of dial divisions *versus* frequency is quite linear, so warm-up shift corrections become a constant at any spot in the band.

Here are the steps necessary:

1) Buy or make a dial plate 2¾ inches in diameter with markings of 0 to 100 for 360-degree rotation. Fasten this plate to a suitable knob to replace the present 348 tuning knob or, if you wish to retain the original tuning knob, Bud Radio, Inc., makes a dial plate, Type D-1944, which works very nicely. This plate has a

collar attached that is ¼ inch thick and ¾ inch in diameter. The center of the knob must be recessed to make room for this collar. This can best be done in a lathe and is a very simple operation. Either way will be satisfactory.

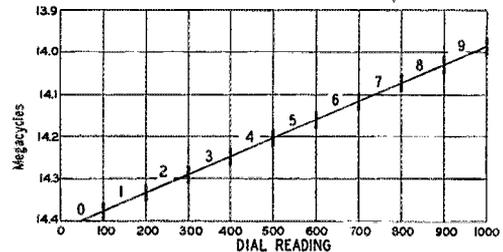


Fig. 5 — Frequency calibration of the BC-348 for the 14-Mc. band.

**1349 Ford Rd., Lyndhurst, Ohio.



The 360-degree dial and knob installed on the BC-348.



frequency than 14.4 Mc. To obtain the next calibration line, rotate the tuning dial 360 degrees lower in frequency and mark another line on the main dial. Again rotate the tuning dial 360 degrees lower in frequency and mark on another line. Repeat this process until 11 small lines have been recorded on the main dial. Now return to the point directly between the first and second line drawn on the dial. This is at 14.4 Mc. where the tuning dial reads 50. Write a small 0 (zero) on the dial at this point. Turn 360 degrees lower in frequency and write in figure 1 (one). Repeat until you have the following:

0	1	2	3	4	5	6	7	8	9
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2) Mount this new dial scale and knob on the $\frac{1}{4}$ -inch tuning shaft. Put a white-ink line above the dial as a marker to allow accurate reading of the 0-to-100 scale, or a metal hairline marker may be used.

3) Loosen the thumbscrews and remove the dial-viewing plate, which exposes the different calibrated band scales of the BC-348.

An example of calibrating the 14-Mc. band now follows:

4) With the receiver well warmed up, tune to 14.4 Mc. as closely as possible by crystal or other standard. If the receiver reads slightly off the indicated 14.4 mark it may be reset to read exactly 14.4, but this is not too important. Next set the tuning dial on the shaft so that it reads 50 on the scale, and tighten the setscrew. Be sure that the receiver is still tuned to 14.4 Mc. Now rotate the tuning dial 180 degrees higher in frequency, in other words, to the zero mark on the scale.

At this point it should be mentioned that new calibration points are going to be drawn on the main dial. These may be made in white ink. Alternatively, a piece of white paper may be cut out to fit over the 14- to 14.4-Mc. portion of the scale. This may be glued on and black ink used to draw in the markings. Put them in first with pencil, then with ink.

5) The first mark drawn on the dial is at the point where the receiver had been tuned in the final part of Step 4. This is slightly higher in

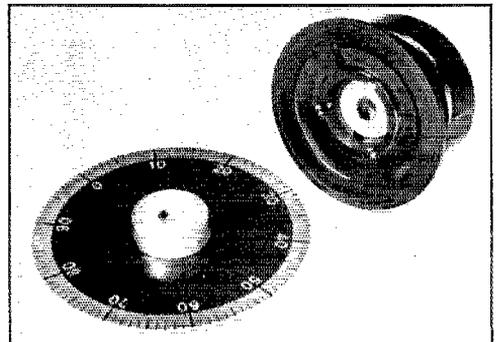
6) Actual calibration in kilocycles may now be made. A crystal standard giving 100-kc. markers should be used.

<i>Freq. Std. On</i>	<i>Main Dial Reads</i>	<i>0-to-100 Dial Reads</i>	<i>Calibration Point Is</i>
14,400	0	50	50
14,300	2	78	278
14,200	5	06	506
14,100	7	34	734
14,000	9	62	962

Plotting the above figures gives the curve in Fig. 5. This is an actual calibration of the 14-Mc. band on my BC-348 receiver. The scale is linear, so corrections for temperature can be applied over the entire scale.

The 3.5- and 7-Mc. bands are calibrated in like manner. Make two bands — 4000 to 3850 and 3500 to 3850 — out of the 3.5-Mc. band to allow a shorter calibration scale.

The small effort and expenditure to do this job is well rewarded — you have a real communications receiver.



A recess is turned out in the tuning knob to fit the hub of the dial plate.

Curing Noise-Limiter Troubles

BY R. WAYNE PARCEL

THE following may be of value to owners of surplus receivers who are interested in installing noise limiters.

About a year ago I tried almost every type of diode noise-limiting circuit that had come to my attention. The results were uniformly poor, and friends reported similar results. Recently a final attempt was crowned with success.

In the process of making the necessary alterations, I discovered that strong signals came through at comfortable headset volume even when the connection to the i.f. transformer (shown as a broken line in Fig. 6) was open. Local interference also found its way into the output with this part of the circuit uncompleted. Obviously any limiting device between the transformer and the output stage would be useless in such circumstances.

This set, a BC-348-P, uses a 6B8 as a second detector, a.v.c., and third-i.f. tube. The cathode is by-passed for i.f. only, not for audio. Apparently strong excitations, whether signal or noise, developed enough audio across the 6B8 cathode to modulate the output-tube grid. Accordingly I by-passed the cathode with a 50- μ f. 25-volt condenser, and my troubles were over. In the presence of strong noise, signals that were moderately clear with the 50- μ f. by-pass in place were completely obliterated when the capacitor was removed. This condenser was the only one I had

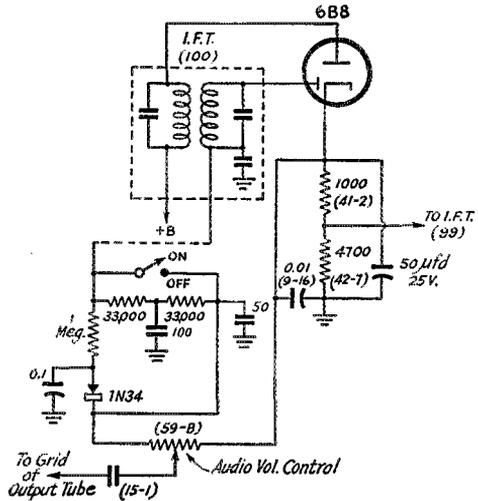


Fig. 6 — Noise limiter and cathode by-pass condenser for receivers of the BC-348-P and similar series. The a.v.c.-m.v.c. switching is not shown.

above 0.25 μ f., so it was soldered in place. Probably 5 or 10 μ f. would do.

The limiter circuit used in this instance was essentially that which appeared in January 1947 *QST*, in the original article devoted to revamping the 348-Q.²

A Further Note on the BC-348-Q

BY PAUL M. KERSTEN, M.D., *** WØWIT

THE many inquiries concerning the original changes made in my BC-348-Q as described in January *QST*² made it seem worth while to supplement the original article with a postscript covering further beneficial changes made since that time.

Beginning at the r.f. end and working back, the 0.002- μ f. mica condenser in the antenna lead (circuit designation 22) was removed, as was also the 75- μ f. unit (41) which parallels the antenna coils. Each can be reached by removing the bottom shield plate of the antenna-coil compartment. The "Antenna-Ground" terminals were removed from the panel and a small 100- μ f. variable condenser was placed in the hole left from the "Antenna" terminal. This was wired between the antenna input and ground, thereby

making it possible to tune the antenna coils for added gain.

In the first r.f. stage an 1852 was substituted for the 6SK7, with a remarkable improvement in signal-to-noise ratio. In the original article it was shown that the first r.f. tube was run "wide open" as a pentode instead of as a triode. In addition to changing the plate and screen resistors to allow the 1852 to operate at nearly rated voltages, it was removed from the a.v.c. circuit. This was accomplished by grounding the bottom end of the 1-megohm grid resistor (87-1) and removing the lead which previously connected it to 98-1 and 96-2, 25,000- and 50,000-ohm resistors respectively. The resulting circuit is shown in detail in Fig. 7.

In the second r.f. stage, the cathode resistor (108) was decreased from 250 ohms to 100 ohms. In order to raise the screen voltage on this stage the series screen resistor (98-4) was decreased

*** Winter General Hospital, Topeka, Kansas.

² Kersten, Paul M., "Converting the BC-348-Q," January 1947 *QST*, p. 19.

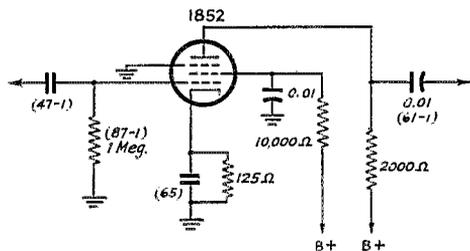


Fig. 7—R.f. stage converted to use an 1852. In addition to the changes described in the author's previous article, the lower end of the 1-megohm grid resistor (87-1) is removed from the a.v.c. line and connected to ground.

from 100,000 ohms to 27,000 ohms. Since this made the S-meter read "high," the 150,000-ohm resistor to ground in the S-meter circuit was increased to 240,000 ohms. Fig. 5 of the original article³ will make this clear.

In order to keep the S-meter from going off scale when the r.f. gain was decreased when using m.v.c., a toggle switch was placed in one lead to the meter so the meter can be disconnected. The switch was mounted on the panel just to the left of the meter.

The i.f. gain was increased by decreasing the bias on the first and second i.f. stages. This was done by reducing the cathode resistor (113) from 400 to 200 ohms.

"Send-receive" switching is accomplished by cutting the center-tap of the power transformer. The panel switch is paralleled by leads brought to a plug on the rear of the chassis for remote-control operation.

The author is indebted to many fellow hams from all parts of the country for these suggestions and they are offered so that more can benefit by them.

Strays

Harry C. Hickin, chemical engineer of Sydney, Australia, visited New York recently and learned to his surprise that there was a Keller Hickin in the same profession. Harry introduced himself to Keller, whereupon they found a common English ancestry, Harry's forbears moving to Australia in 1800 while Keller's came to America in 1880. Thinking to be funny, Harry said, "I suppose you are also a ham." In the dead silence that followed, W2OUT exchanged a card with Harry, second op at VK2ACX. Taking note of this, a bystander exclaimed, "I'll bet your wives have the same names!" To this the two hams answered in chorus — "Marjorie." Being in the RCA Building, there was only one thing to do: the boys adjourned to the Down-Under Bar, where skeds were arranged over a "Sydney Sling."

'Phone-Band Phunnies

The Bucolic Boy



This fellow is a refugee from a barn dance. He is determined to be the "homey" type if it kills him and to walk painstakingly in the footsteps of Abe Martin, with perhaps just a touch of Will Rogers thrown in for good measure.

He affects a vocabulary that he fondly believes is the very essence of Haystack Number Five. It is redolent with such expressions as "you fellers," "I sez to him," "By gummy," "I was just a-tellin' Ma," etc., etc. His illustrative anecdotes are filled with stories about "haws" and other farm animals, and many references are made to his "chores" that apparently await patiently to be done while he goes yackety-yackety on the air.

He pretends to know little or nothing about his transmitter, which is pictured as entirely haywire, or even "barb-wire." The "antenny" invariably runs out to the henhouse and does double-duty as a clothesline on Mondays, on which days his signals are "damped" waves instead of c.w. Few are his conversations without a reference being made to his scorn of such enervating luxuries as shoes.

In his chosen rôle of rural philosopher, he comments with what he hopes is shrewd and salty wit upon various matters of daily interest, always being careful to present the barnyard point of view. Keep an ear out for this type. You have not heard his equal since the straw-chewing characterization of gaslight vaudeville.

—John T. Frye, W9EGV

**SWITCH
TO SAFETY!**





Correspondence From Members-

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

OPERATING PRACTICES

4158 Ridge Rd. W., Spencerport, N. Y.

Editor, *QST*:

In the *Radio Amateur's Handbook* is printed "The Amateur's Code," by Paul M. Segal. As evidenced by the letters published in this section of *QST*, there is reason to believe that many amateurs have either forgotten the Amateur's Code or never read it. Perhaps it would be a good idea to print it prominently in *QST* repeatedly. Possibly, it may help to placate some of our "prima donnas" and make them less sensitive to the exposure of conditions that could be corrected so easily.

— Charles I. Otero, W2UPH

45 University Pl., Staten Island, N. Y.

Editor, *QST*:

Congratulations to W2ORS for his letter, "CQ Artists," which appeared in the August *QST*. Too much emphasis cannot be placed on any aid that will keep our hands as free as possible from the useless kind of QRM.

Most of us who work the higher-frequency bands, particularly 14 Mc., are fast becoming aware of and plenty fed up with another species of operator who doesn't even merit membership in our fraternity. This character parks on a DX station's frequency, plants his fanny on the key (except for brief listening periods) until the DX QSO is completely busted up, and then proceeds to call the DX himself.

Unless I'm mistaken, this is a flagrant violation of FCC rulings against causing willful interference, using more power than is necessary to maintain communications, etc. FCC can always enforce its regulations, but that gives us all a black eye. If any *QST* listings of "Determined Lids" are contemplated, by all means let's let this type of operator know how the rest of us feel about it!

Coöperation is the spirit and an absolute necessity toward keeping our hands the way we want them. All the writing in the world, however (including this), seemingly won't change some people. Therefore, nasty and embarrassing as it might be, I'm all in favor of a means to enforce *reasonable* operating where other methods fail.

— Geoffrey S. Vore, W2ULY, ex-W9QBJ

Reidsville, Georgia

Editor, *QST*:

I have been a ham at heart since 1914, served in World War I as a brass pounder and still enjoy ham radio as a hobby. For the past several days I have been listening on 75 meters. Much to my concern, I have taken note of several fellow hams who were discussing politics, both national and international, over the air. One in particular was airing his views most energetically — which of course is the right and privilege of each and every American citizen and for which privilege I am very proud and happy. But I wonder if political conversation of this sort is conducive to the furthering and advancement of the amateur's privileges on the air.

I wonder if some of the sponsors of national and international policies might take exceptions to this particular procedure and use their political influence to curb the rights, privileges and scope of amateur radio operation.

As you know, radio transmissions are world-wide. This is just an opinion of mine and I am fully in accord that every American citizen has the privilege of free speech; yet I

wonder if judicial prudence should not be exercised by each individual ham who loves, cares for and respects his privileges on the air.

— W. S. Fry, W4GZY

ATLANTIC CITY, ETC.

R. 2, Box 358, Clearfield, Utah

Editor, *QST*:

Best of luck on the battle you are no doubt having. We are all very glad that we are as usual so well represented in what will be of the greatest benefit to us all, and feel assured that every amateur who is an *amateur* is behind everything you do one hundred per cent.

To be frank, we were a little concerned with the possibility that we would wind up in the hole, before you got around to meeting the increased costs of everything by revising the *QST* rates as all the secondary magazines have done. What we can't understand is why you did not go to five dollars per year. Golly, if some of these other so-called radio magazines are worth three and five dollars per year, the other services we get with *QST* are worth ten to any amateur.

— C. W. DeRemer, W7FST

122 W. White Ave., San Antonio, Texas

Editor, *QST*:

It appears from the usual veiled manner in which *QST* and WIAW are disseminating the news that the rumors are true, and that ARRL has done a very good job of losing unbelievably large portions of the most important ham bands.

If this is true, and it must be, you know that all confidence in ARRL, both in this country and abroad, will be lost. Also, you know that it will mean the beginning of a new national and international amateur organization.

In case there is still a little doubt, why don't you realize that Warner, Bailey and Segal are not all-powerful, and use all the expedients of diplomacy to maintain the frequencies? The most important thing is assistance, with money, transmitters, and legal advice, to the amateurs and amateur organizations of every small country that has a vote.

England is hopeless, as is obvious from their attitude toward amateur radio and anything that does not involve large British-dominated corporations. Let England go, and work on all the small countries.

ARRL is supposed to be worth six million dollars; spend it all if necessary. A broke ARRL with frequencies intact is a healthy, invigorated organization, ready to really get going, and holding the respect of all the hams of the world; ARRL, with six million dollars and no frequencies, is just a shell, just a magazine publisher, who has no consideration for its alleged members.

If there were any real effort going on to propagandize the foreign countries so that their votes would at least not cut down the frequency bands, I would put a hundred dollars in the fund, more if necessary, but I wouldn't donate one cent for pensions for a bunch of guys I do not trust. In discussions some months back, when ARRL was about to let the State Department be against us (they still probably are), practically every member expressed a willingness to contribute to a fund that really had something behind it. It seems that radio amateurs have more money invested per kilocycle than any other service. Why isn't that enough money to propagandize properly? Any commercial organiza-

(Continued on page 160)



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
J. A. MOSKEY, WIJMY, Asst. Comm. Mgr.
A. E. HAYES, JR., WSLVY, Natl. Emerg. Coördinator

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

Clearing Traffic. One of the most precious individual amateur privileges is that permitting messages to be exchanged by amateurs. As long as no compensation, direct or indirect, accrues to an amateur for handling a message through his station, third-party messages may be relayed throughout the United States. Amateur exchanges also may be made with Canada, Chile and Peru, where there are specific international agreements to legalize such work.

There are specialists who devote their amateur lives to handling messages for themselves and other amateurs, just as there are amateurs who are just interested in DX contacts or experimenting. Without proper experience or knowledge, some amateurs will gripe about "poor message service" without any attempt to take advantage of the facilities available. The way to get a message to a friend beyond immediate direct contact is to file the message with a fellow ham with traffic know-how and connections, using the bands that are best for the purpose. Or the message can be originated at your station, if you go about it correctly. The traffic gang will welcome you to their groups, with your message as sufficient introduction. One who wants to work DX puts his transmitter on 20, 10 or 40. He doesn't bellyache because the DX isn't on 80. Conversely the chap with intelligence who wants to move a message will use the General Traffic Period—or even better will look in on ARRL section-net and trunk-line frequencies at times before or after net operation for the right stations to work. The February, April and June issues of *QST* provide a directory of such network operations. A new listing of nets thus far known to be active this season is published elsewhere in this issue. The Station Activities section summarizes traffic at the end of each section report. One can 'phone a local traffic handler after looking him up in *QST*, or (it's more fun) put the transmitter on the 3.5-4 Mc. band and with *Call Book* in hand eavesdrop until the desired net or station is heard for best QSP of any special traffic you have. The frequency plan (see directory, page 65, April *QST*) lists many different sections and will help you. Don't *crash* nets during their sessions; be courteous and take your turn—you will find your messages welcomed, and if you follow up, your interest and skill will increase and you

may well be invited to become a member of some of the network groups for which you have most regular business. It's all voluntary work on a nonguaranteed basis, one ham relaying for another, all "of, by, and for" amateur radio. Surprisingly fast circuits and dividends in friendships and results will develop through skeds and periods of net operations, as the season develops and we get back in the groove.

Long Calls vs. Break-In. "My 35 watts in the last SS snagged a high percentage of the stations called. CQs using low power don't raise the entire band. If the other guy hears and answers when called, why CQ? I started lackadaisically, chased some DX, did some rag-chewing, no great effort to amass a score, but before the end of the contest got bit by the bug. In what else could I make Nevada and three Utah contacts to say nothing of other hard-to-get states. I learned a lot about how to operate and how not to operate. *I wonder how much time we hams waste in fruitless long calls?* It was a revelation to me that even with crowded bands and low power, *break-in can be so consistently successful.*" — WØFGW.

Listening and well-timed short calls (with break-in) instead of repeated and long-winded CQs, got results for FGW and many another station. The italics are ours. Break-in is recommended for all stations, all amateur bands, 'phone or c.w. Call it push-to-talk if you like. Break-in by either name will meet your approval once you have it working. Best intimacy in rag-chews, snappiest pick-up after QRM interruptions, fastest completed fully-accurate message handling, highest efficiency in calling—all these dividends are possible when you have your station arranged to permit full break-in.

On Use of Q Code. Our amateur radio today is more nearly 50/50 'phone-c.w. operation than ever in its history. We are *not* urging Q Code for 'phone; instead our slogan is "Say it with words." With the continuing reliance on c.w. for accurate copying of calls and information over extreme distances and through difficult interference, however, we still need and use International Q Code to a very great extent. An abbreviated list of Q signals whose meaning most often needs to be expressed with brevity in amateur work is given in *Operating an Amateur Radio Station*. This publication is free on request

of League members. (Network operators who handle traffic may ask for a more specialized list.) A military group known as the Combined Communications Board restudied all military procedures during the war. The list of Q Code abbreviations was expanded to include additional needful meanings for military use. But in so doing the CCB embraced the already long list promulgated by the Bern Bureau of the Telecommunication Union which list has always been the basis for abbreviated international usage in all services.

These paragraphs are to encourage telegraphing amateurs to make a wider use (where they fit in) of all these existing abbreviations. In particular new radio operators should be more familiar with some of the meanings. For example, we had occasion to say "QRV" to a new ham the other night — to tell him we were ready either for his chit-chat or a message. Much to our surprise and slight embarrassment he sent a string of Vs. Since the report and other indications showed 100% readability we could only conclude that our language was unfamiliar and had been taken for QSV. ZS2AG suggests reviving for present-day use at least two special signal meanings we hams used to use by combining International Q Code with an added letter to make four-character combinations, such as:

- QTHR? — Is your call-book address right?
- QTHR — My call-book address is correct.
- QSLL? — Will you please acknowledge this contact by card? I will return the favor.
- QSLL — I will QSL on receipt of yours.

WIAW Modifies Code-Practice Schedule. Attention is invited to the complete WIAW operating schedule presented elsewhere in these columns. The automatic transmissions for code practice at 15, 20, 25, 30 and 35 w.p.m. continue to be sent on Tuesdays and Thursdays starting at 10:00 P.M. EST to aid advanced learners. The Monday-Wednesday-Friday schedule, which also starts at 10 P.M. EST, has been revised to give more practice for the large number advancing step-by-step from the lower speed ranges. Speeds of 9, 12, 18, 25 and 35 w.p.m. are sent Monday, Wednesday, and Friday, 10 minutes at each speed. Additional nightly practice can of course be secured by listening to Official Bulletins at 8:00 and 11:30 P.M. EST. All transmissions are

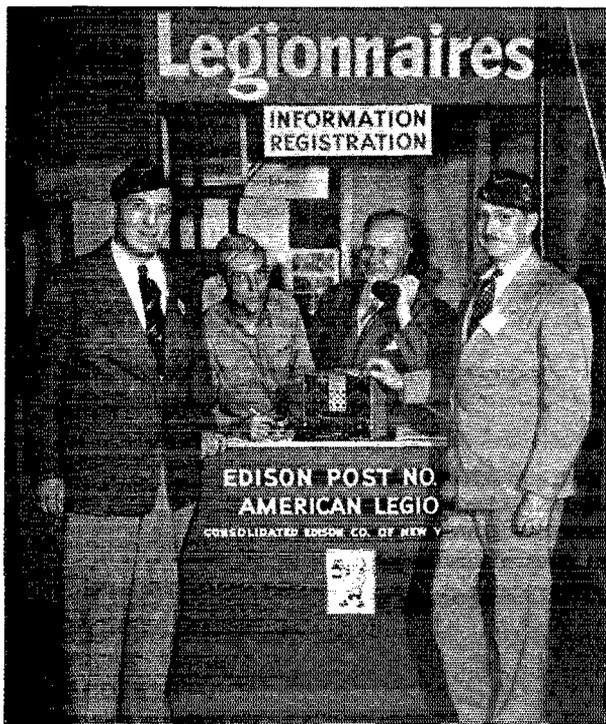


New York amateurs cooperated with the National Convention of the American Legion held in New York City, August 28th-31st. Messages filed by Legionnaires at a Pennsylvania Hotel lobby booth were transmitted via 144-Mc. link to K2AL, a 500-watt station set up on the 17th floor, whence they were relayed on low-frequency bands. About 1000 messages were cleared during the convention. Demonstrating how traffic was transmitted from the lobby to the station atop the hotel are, left to right: Henry T. Hayden, W2FO, D. E. Lindsay, W2PL, Nils P. Michaelson, W2LSD, and Dr. A. L. Walsh, W2BW.

sent simultaneously on 3555, 7145, 14,150, 23,060 and 52,000 kc.

Keep a Separate File for Your FCC Correspondence? Did you ever have occasion to write FCC that cards received indicated that some other chap was bootlegging your call? Could you produce a copy of your filing of intentions to operate portable with FCC, if necessary? We wonder how or where most amateurs keep their records of correspondence with FCC. A manila folder is a most handy thing to keep all such FCC correspondence in *one place* where it can be found as desired. Things you may want: Copies of station-operator (Form 610) application, carbons of advance notifications given on portable set-ups (required by \$12.92), any correspondence on advisory notices, citations, special authorizations. Some amateurs keep such correspondence in the back of logbooks, the dated periods on the covers indicating where to look in the stack for any needed information. Carbons of "advance notifications" can be clipped to left-hand pages appropriately opposite notations of the portable or mobile work that follows. However, we recommend that you have all your records of license date, etc., in one place. OTC members now looking for information on date of first license think so too.

Sportsmanship and Contest Rules. ARRL contests and awards include the necessary rules for guidance of participants. Recently, the seven members of ARRL's Operating Practices Committee were called upon to examine suggestions that participants in the SS and DX Competitions notarize statements about their power, frequency and operator complement. Power and frequency, of course, are matters for FCC enforcement



when we think of these things in terms of the maximum limits. The listing of "second operators" and a statement of frequency bands and power are required by the contest rules. It is a matter of sportsmanship to observe all rules and maintain individual standards of operating ethics and procedure on a high plane in all respects. In place of "notarizing," the Committee feels that "sharp" practices and poor operating ethics are best treated by "local public opinion." Radio clubs and local ARRL members are *not* negligent in their appraisal of the stature of contest winners! As for notarizing, a sportsman's word, we think, is as good as his deposition. Amateur operation goes forward for the most part on a very high plane. When our "public opinion" *doesn't* keep it so, shouldn't we revise our schedule of activities to discontinue those that give rise to most complaints?

DXCC. With pleasure, we present the first large listing of DXCC claimants in the new form. Forty-eight DXCC certificates have now been issued since the war, four of them for radiotelephone operating work. Each certificate is numbered in the turn the written proofs are presented to ARRL for examination.

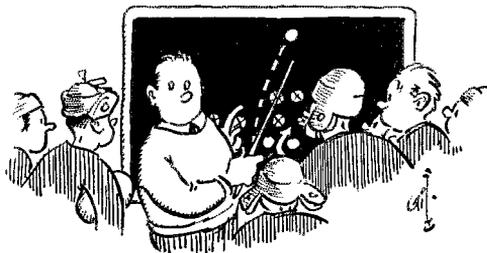
Sweepstakes. The "SS" will be the top ARRL activity during November. See October *QST* for detailed rules, and get in there for at least an afternoon or evening of operating fun. Give it a whirl and see how your contacting ability stacks up. A radio message to ARRL will bring you a convenient worksheet to assist operation and reporting. See you in the SS! — *F. E. H.*

ADVANCE PLANNING FOR EMERGENCY

As we go to press, in the middle of September, a tropical hurricane is lashing the Florida coast. For the past two days ARRL headquarters has been alerting Emergency Corps groups all along the Eastern Seaboard. All SCMs and SECs in the areas likely to be hit have been contacted and preparations are being made. Two stations, W3ECP and W3EIS, have been designated to serve National Headquarters of the American Red Cross, and W3EIS is scheduled to set up in the National Red Cross Building in the event that amateur assistance is found to be needed. Major traffic nets, including ARRL Trunk Line C, under the leadership of W1EFW, the Rebel Net, under W5IGW, the Hit & Bounce Net, under W4PL, and the Traffic Outlet with W2TYU as NCS are prepared to go into action. Emergency Corps leaders in the probable disaster area have been perfecting their liaison between local v.h.f. groups and the big h.f. traffic channels. If advance planning can help, this storm should show it.

By the time this appears in print the Hurricane of 1947 will be history and you will all know how efficiently made our plans were. If we are shown to have been lacking in perspicacity in our prior

arrangements, in any small instance, it will be the duty of the EC nearest to the trouble to learn *why*, and to lay his plans more carefully for possible future contingencies. The Emergency Corps



ADVANCE PLANNING IS NECESSARY!

will not work efficiently on a national scale unless it is firmly rooted in a foundation of effective local groups.

QST will have the whole story of how we contributed to the disaster relief picture in a subsequent issue — let us hope it will be an unmarred presentation of amateur activity "in the public interest" with nothing for us as a group to regret about the conduct of our fellows.

— *A. E. H.*

BRIEF

As part of a Signal Corps exhibit, the Fort Monmouth Radio Club operated an amateur station at Atlantic City, N. J. W2SOX reports that the display was excellent and created lots of interest. Many international telecommunications conference delegates had a chance to look it over.

A.R.R.L. ACTIVITIES CALENDAR

Nov. 12th: CP Qualifying Run
 Nov. 15th-17th and 22nd-24th: Sweepstakes Contest
 Dec. 16th: CP Qualifying Run
 Jan. 19th: CP Qualifying Run
 Jan. 23rd: Frequency-Measuring Test
 Jan. 24th-25th: ARRL-Member Party
 Feb. 13th-16th: DX Competition (c.w.)
 Feb. 19th: CP Qualifying Run
 Feb. 20th-23rd: DX Competition ('phone)
 Mar. 12th-15th: DX Competition (c.w.)
 Mar. 17th: CP Qualifying Run
 Mar. 19th-22nd: DX Competition ('phone)

— . . . —

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.)

PRIZE-ARTICLE CONTEST

• The article by Mr. E. T. Ledin, W6MUF, 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 U. S. Savings 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 work 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."

PASSING THE GAVEL

By E. T. Ledin,* W6MUF

Without fear of logical rebuttal it is safe to say that election night is the most important meeting of the year for any organization and certainly for an amateur radio club. Since all of the activities for an entire year are dependent upon the initiative and ingenuity of the elected officers, elections certainly merit a sober approach and a serious consideration of individual capabilities.

In any organization, the attitude toward election night can be indicated by a cross section of the membership. There is a small percentage that considers this meeting a bore, and one to skip. Luckily this group usually consists mainly of the semiactive members, seldom on deck when work is to be done.

Contrasting with the apathetic members are the steam-roller boys who delight in the not-very-difficult game of railroading elections. Devices ordinarily used are: (1) closing nominations before any distinctive opposition develops; a clause in the constitution can eliminate this possibility; (2) nominating "dummy" candidates in the hope that they will attract some votes away from the opposition; constitutional requirement of a majority before election will prevent this. The candidate so elected enjoys two strikes from the disgruntled even before taking office.

The perpetual decliner is an old stand-by and it is difficult to know whether it is better promptly to recognize the nominee's unwillingness to serve, or to "draft" him. It would seem discretionary to follow the former course, as nothing is more harmful to morale than purely titular officeholders.

Rotation of executive personnel is a great help in keeping up interest in club activities. Some are born organizers and should be kept in office but others have unknown capabilities that will

never be revealed if reflection follows reflection. As often as not the quiet chap in the "third row back," if given responsibility, would turn into a spark plug instead of a spectator. On the other hand, magnanimity should not be allowed to bind the club to inefficient leadership for a year or more. Common sense follows impulse very closely, so think twice. There is a long time between elections.

The next time an election is held, approach it in a sensible and unprejudiced manner. Here are a few points to keep in mind on election night:

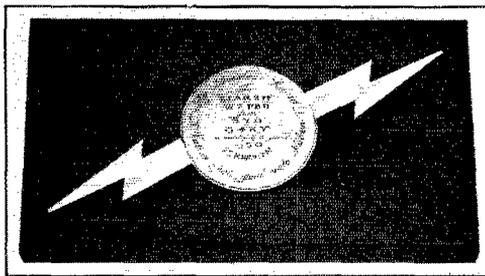
- 1) Keep out of ruts. Rotate the offices.
- 2) If you decline a nomination, common courtesy requires that you state your reasons.
- 3) Don't make a nomination that is based entirely on friendship or personalities.
- 4) Don't accept an office unless you are prepared to give it your best.
- 5) Show up at the meeting even if you disagree.

BRIEFS

Reliability: W1DQ keeps two schedules daily with G6BY on 14-Mc. 'phone. The contacts have been going on for several years and have been more than 90% successful.

— ... —

ARRL Director Harold C. Bird, W8DPE, is offering replicas of the traditional Wouff-Hong as awards to the club in each section of the Great Lakes Division that turns in the best 1947 Sweepstakes performance. The score for each competing club will be arrived at by totaling the scores of individual members taking part and dividing by the number of licensed amateur members in the club.



The plaque shown above is probably one of the most unusual QSLs ever sent by one amateur to another. It commemorates a contact between G4KY of London and W7PBD, Douglas, Arizona. The materials of which it is constructed provide some interesting anecdotes: the background is a piece of wood from a bombed police station in London; the striking medallion was fabricated from silver, the remainder of the same batch of metal from which was wrought the Sword of Stalingrad. G4KY, a London police sergeant, and several of his police friends, all amateurs, created and executed the QSL design. To top off the story, the plaque was brought to the United States by the parents of an English girl who married an Arizona GI friend of W7PBD.

* 73 Hillside Avenue, Mill Valley, Calif.

TRAFFIC TOPICS

The San Joaquin County Fair, August 16th to 24th at Stockton, California, produced some nice traffic totals in that part of the country. With the cooperation of the Pioneer Net (c.w.) and the Mission Trail Net ('phone), 400 messages were handled to 42 states and GIs overseas. Three transmitters were operated at the fair, W6MHD/6 and W6WBZ/6 on 3.85-Mc. 'phone, W6VSI/6 on 7-Mc. c.w. W6QUE handled traffic from his home station through the Pioneer Net.

The Northern New Jersey Net now has outlets for GI traffic to Europe and Africa through W2OEC, Fort Monmouth. The boys are also keeping regular schedules with the Hit and Bounce Net.

It is learned from W7IWU, Idaho SCM, that the Gem Net is operating Monday, Wednesday and Friday, on 3745 kc. at 9 P.M. MST. Stations are needed in Pocatello, Moscow, and farther north. Anyone interested contact W7IWU.

The Buckeye Net, out Ohio way, had a grand opening October 1st. It keeps schedules Monday through Friday, at 7:30 P.M. EST on 3730 kc.

The Oklahoma Traffic Net is operating nightly Monday through Saturday on 3682.5 kc. The OLZ net is publishing a live bulletin which is quite a morale builder for the gang. Swell work!

We see in the OLZ bulletin that the Kansas State Net made its debut on September 15th on 3610 kc.

The Virginia Net is open for business on 3680 kc., 7 P.M. EST Monday through Friday, according to information received from RM Ev Battey, W4IA. All Virginia "hams" are cordially invited to participate.

Word from W5FNY indicates that the Southern Texas Emergency Net plans a simulated-emergency drill some Sunday with the 11-meter Hurricane Net of Corpus Christi, 10-meter mobile units in the Valley and other Emergency Corps members interested in participating. There is talk of "message-center" plans for Corpus Christi, with equipment for all amateur frequencies and links to Red Cross, Weather Bureau, and appropriate city and county officials.

The ARRL-Net "QN" Signals are used by practically all amateur traffic-handling nets. Most of the signals in the list are applicable to other types of nets as well; their use aids speedy and orderly net sessions. Every net operator should post a copy at his operating position. Copies of the "QN" list are available upon request from the Communications Department.

BRASS POUNDERS LEAGUE

(August Traffic)

Call	Orig.	Del.	Ed.	Extra Del. Credit	Total
W4PL	11	172	1010	162	1355
W2TYU	20	38	660	26	744
W6REB	6	23	462	20	511

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

W0QXO 216

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."

DIRECTORY OF ACTIVE NETS

We present a list of nets thus far known to be active this season. The tabulation was compiled from information sent us by RMs, PAMs, ECs, and net organizers. If your net is not listed herewith, please drop a note to Headquarters giving the net name, times and days of operation, and frequency so that your group may be included in supplementary lists which we hope to publish from time to time.

Arizona State Net	3515	7:00 P.M. MST Daily
Ark. Emerg. Net	3885	6:00 A.M. CST Mon.
Atlantic-Pacific Trunk ¹	3630	9:30 P.M. EST Mon.-Fri.
Buckeye Net (Ohio)	3750	7:30 P.M. EST Mon.-Fri.
Buzzard's Roost Net (Mich.)	3930	5:30 P.M. EST Mon.-Fri.
Dog House Net (Ohio-Ind.)	3860	6:00 P.M. EST Mon.
Gem Net (Idaho)	3745	9:00 P.M. MST Mon., Wed., Fri.
Hit and Bounce Net ²	3637	5:00 A.M. CST Daily
Indiana C. W. Net	3656	6:30 P.M. CST Mon.-Fri.
Md.-Del.-DC Section Net	3650	7:30 P.M. EST Mon., Wed., Fri.
Michigan QMN Net	3663	6:00, 7:00 P.M. EST Mon.-Fri.
Mission Trail Net (Calif.) ³	3854	7:00 P.M. PST Daily
New England Net	3640	8:00 P.M. EST Mon.-Fri.
New Jersey 75-Meter Emerg. Net	3900	9:00 A.M. EST Sun.
Northern New Jersey	3630	7:00 P.M. EST Mon.-Sat.
Northwest Texas Emerg. Net	3950	8:00 P.M. MST Mon.
Nutmeg Net (Conn.)	3640	7:00 P.M. EST Mon.-Fri.
Okla. Traffic Net	3682.5	Mon.-Fri.
Pioneer Net (Calif.) ⁴	3725	7:00, 10:00 P.M. PST Mon.-Fri.
Round-Up City Net (Ore.)	3910	7:30 P.M. PST Daily
South Texas Emerg. Net	3860	6:30 P.M. MST Mon.
Southern California Net	3695	8:00 P.M. PST Mon., Wed., Fri.
Southern New Jersey Net	3700	7:00 P.M. EST Tues., Thurs., Sat.
Traffic Outlet ⁵	3705	10:00 P.M. EST Mon.-Fri.
Trunk Line "C" ⁶	3790	8:30 P.M. EST Mon.-Fri.
Trunk Line "J" ⁷	3780	
Virginia Fone Net	3940	9:00 A.M. EST Sun.
Virginia Net	3680	7:00 P.M. EST Mon.-Fri.
Washington Sect. Net	3695	7:15 P.M. PST Mon.-Fri.
Western Mass. Net	3760	7:00 P.M. EST Mon., Wed., Fri.
West Va. Net	3770	7:30 P.M. EST Mon.-Fri.

¹ Conn., Mass., N. Y., N. J., D. C., Md., Pa., Miss., Calif., Ohio, Mich., Ill., Wis., Iowa, Nebr., Colo., Ky.

² Tenn., Calif., Tex., Mich., W. Pa., Miss., Mo., N. N. J., N. Y. C., Mass., Hawaii.

³ Calif., Ore., Wash., Nev., Utah, Colo., Mont., Ariz.

⁴ No. Calif., with connections to Wash., Idaho, Colo., Alta.

⁵ Conn., N. N. J., S. N. J., E. N. Y., W. N. Y., E. Pa., W. Pa., Md., Va., Mich., W. Va.

⁶ Maine, N. H., Conn., N. Y., Md., S. C., Fla.

⁷ Wisconsin to Florida.

If Bartlesville, Oklahoma, should find itself cut off from the outside world because of a communications emergency, W5GOL, ARRL Emergency Coordinator for Washington County, should have little trouble coping with the situation. Visible in the photo are an NC-240D, DB-20, n.b.f.m. exciter, Signal Shifter, panoramic adapter, TR-4, and a 300-watt transmitter with T-55s final for 14- and 28-Mc. a.m., n.b.f.m. and c.w. Additional equipment includes a 3.5-Mc. 'phone-c.w. rig running 400-800 watts to 813s, a 200-watt 813 rig for 7 Mc., and a 2.5-kw. gasoline-powered generator.



DX CENTURY CLUB

A new form of DXCC listings has been adopted. The purpose in choosing this presentation is to credit more prominently the progress of the live-wire DXers toward higher totals. Prewar listings grew to such proportions that a large accumulation of "deadwood" obscured the progress of DXCC award holders whose totals showed improvement from month to month. Henceforth the listing will credit the top ten DX men in a Century Club Honor Roll. New members will receive an initial listing. Further listings will be made under "Endorsements" only as progress to or past the 110, 120, etc. marks is shown. It is hoped that the new listing method will encourage members to submit additional confirmations above the 100 mark.

The new postwar DXCC certificate and appropriate endorsement stickers are now being prepared. The new awards will be issued as replacements to postwar DXCC members for temporary ones that have been issued thus far.

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.

HONOR ROLL

W1FH.....168	W3BES.....138
W8HGW.....151	W8RDZ.....136
W2BXA.....144	W1TW.....131
W4BPD.....143	W6VFR.....130
W1CH.....141	ZL1HY.....122

NEW MEMBERS

W2GWE.....121	W7AMX.....104
W2GUM.....111	W6TT.....102
W1ME.....109	W2COK.....101
W6SAI.....106	W6AMA.....101
W5KC.....105	W4BRB.....100

ENDORSEMENTS

W5ASG.....115	W6GHU.....111
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RADIOTELEPHONE

W1FH.....120	W8LO/2.....100
W1HKK.....106	W1JCK.....100

CODE PROFICIENCY AWARDS

ARRL's Code Proficiency Program provides certificate awards for those proving ability to copy code at any of five speeds, 15 through 35 w.p.m. Endorsement stickers for the certificates are awarded later, if first qualification is at less than 35 w.p.m.

The next qualifying run will be on November 12th at 10:00 P.M. EST. The text on that date, 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.

Do you need practice? If you want to "brush up" before trying the official "qualifying run," use the W1AW practice transmissions. See the W1AW Operating Schedule elsewhere in this issue for a list of speeds and frequencies used.

QST lists in advance the text to be used on several of the CP schedules. 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.

Date	Subject of Practice Text from September QST:
Nov. 4th:	<i>How Sensitive Is Your Receiver?</i> , p. 13
Nov. 6th:	<i>Interference with Television Broadcasting</i> , p. 24
Nov. 10th:	<i>Atlantic City Report</i> , p. 32
Nov. 12th:	Qualifying Run, 10:00 P.M. EST
Nov. 14th:	<i>A Hydraulic Antenna Rotator</i> , p. 36
Nov. 18th:	<i>Medium Power — Living-Room Style</i> , p. 37
Nov. 20th:	<i>An Antenna That Multiplies by 50</i> , p. 50
Nov. 26th:	<i>Do It Inductively</i> , p. 58
Nov. 28th:	<i>2, 6, and 10 with Crystal Control</i> , p. 66

BRIEF

Dr. M. W. Greenbaum, W1OKT, and Dr. J. E. Greenbaum, W1LIG, both are members of the Bridgeport (Conn.) Radio Amateur Club, but are no relation to each other.

MEET THE SCMs

Irvin L. Emig, W6GC, SCM of the San Diego section, was granted his first license in 1931, at which time he was issued the call W6CYS. In addition to his amateur license, he holds telephone-first and telegraph-second commercial licenses, with one year's experience on the latter as an operator on tuna boats.

At the time of the 1933 Long Beach earthquake Emig was living in Long Beach and took an active part in emergency work, handling considerable disaster traffic. In 1941 he was awarded a Code Proficiency Certificate for copying on a typewriter at the speed of 25 w.p.m. He is a past officer of the Associated Radio Amateurs of Long Beach and a present member of the San Diego Amateur Radio Club. Besides his work as SCM he is an active Class I official observer and made an average of 28.7 p/m in the first postwar Frequency Measuring Test.



Irv's vocation is research engineer for the Consolidated Vultee Aircraft Corp., San Diego Division. His avocations are photography, astronomy, magnetic "doodle-bugging" (Emig is shown with one of his "doodle bugs" in the accompanying photograph), and celestial navigation. He participates in tennis and water sports, is a fairly good diver and swam the breast stroke on the University of Southern California swimming team during his college days.

The third bedroom in his house has been converted into a combination workshop and ham shack. Equipment at W6GC consists of two transmitters, the first a modified AN/ART-13 used on 3.5-, 7-, and 14-Mc. 'phone or c.w.; the second using a modified 7-Mc. BC-274 VFO driving a 6L6 into a 35T final operates only on 28

Mc. Receivers are a home-built 28-Mc. converter into a BC-348 and an SX-25. Antennas in use are a half-wave folded 80-meter doublet, a two-section 20-meter beam and a three-section 10-meter beam. For emergency use there is available a BC-474 transmitter and receiver which operates on 3.5-Mc. 'phone or c.w. and 7-Mc. c.w. The receiver is battery-powered, while the transmitter operates from a 6-volt Vibrapak.

In 1942 Emig was commissioned a Naval Reserve lieutenant (jg) and called to active duty at that time. After attending California Institute of Technology, Bowdoin College, and Massachusetts Institute of Technology, he was ordered to duty with the Pacific Fleet and spent one year and a half in the Pacific area. In March, 1946, he was returned to inactive duty, having previously been promoted to lieutenant commander. At present he is active in the Naval Reserve and has orders to a local "Electron Warfare Battalion."

TRAINING AIDS

New Code Recorders. We are happy to be able to announce that two Type BC-1016 recorders have been procured for use of ARRL-affiliated clubs as a part of the Training Aids Program. Information on how these equipments can be borrowed will be supplied (along with a request form) to any affiliated club upon request. In order to avoid as much shipping and receiving time and labor as possible, we expect that direct transfer of recorders and keyers from one club to another without being returned to Headquarters will be the rule rather than the exception. This means that the responsibility of taking care of the equipment while in your possession, of shipping it on time, and of seeing that it is in as good working condition when shipped as when received will rest squarely on the shoulders of the club borrowing it.

This is your opportunity to give code proficiency a boost in your club by letting each member see what his fist looks like on paper, and giving him an opportunity to improve it. Better not pass it up.

Forms. In addition to our mimeographed lecture outlines and reviews, we have now devised "request" forms by means of which affiliated clubs can make requests for films, code records and tapes (Request Form No. 1) and keyers and recorders (Request Form No. 2). Use of the former is optional (i.e., a letter request will suffice if it contains all required information), but the latter is mandatory for requesting keyers and recorders. If your group plans to make use of ARRL Training Aids, it behooves you to acquire these forms for your own convenience and ours. They are answered by another mimeographed form, unless some special consideration is involved which requires a personal answer. Also in line of mimeographs, we now have complete lists of ARRL Training Aids and rules for their use, all available

upon request. This material is for your convenience in supplying yourself with information on the ARRL Training Aids Program, what it offers and how it works. Drop us a postcard if you are interested and do not already have this information on file.

Tentative Bookings. A few clubs have expressed or indicated confusion concerning "tentative" bookings of motion picture films, and we herewith explain. In order to accommodate clubs who have foresight enough to make plans far into the future, and notwithstanding the "three-month" rule, we have been booking their requests for motion-picture films beyond the three-month limit on a "tentative" basis. This is a device for assuring the club of *probable* availability to them when the tentative date comes within the three-month period. On the other hand, tentative booking will not bring you the film without further action on your part. We make every effort to avoid assigning that booking to any other club, but once it comes within the three-month period, it is open season, and unless you "clinch" it by dropping us a postcard saying you *want* to clinch it — and this as soon as possible after it comes within reach — you will very likely lose it.

So if you want to plan your motion-picture program further ahead than three months, it can be done if you make *tentative* bookings beyond the three-month period and clinch each one as it comes *within* the three-month period.

ARRL Training Aids rules would be useless if they were not strictly observed. If some of them seem unnecessarily stringent, bear with us, please.

HAMS AT HEADQUARTERS WIAW, ARRL Headquarters Station

The following calls and personal sines belong to members of the Headquarters gang:

W1BAW	R. T. Beaudin, "rb"
W1BDI	F. E. Handy, "fh"
W1BUD	A. L. Budlong, "bud"
W1CEG	H. M. McKean, "mac"
W1DF	George Grammer, "gg"
W1DX	Byron Goodman, "by"
W1EH	K. B. Warner, "ken"
W1FTX	R. M. Smith, "rs"
W1FVH	W. E. Bradley, "wb"
W1G5	F. C. Beekley, "beek"
W1HDQ	E. P. Tilton, "ed"
W1JEQ	C. V. Chambers, "vc"
W1JJR	J. T. Rameika, "jr"
W1JMY	J. A. Moskey, "joe"
W1KKS	Wm. H. Matchett, "bm"
W1LVQ	John Huntoon, "jh"
W1MFA	H. K. Isham, "hk"
W1NJM	George Hart, "geo"
W1ODY	E. E. Miner, "em"
W1PEK	L. T. Waggoner, "roy"
W1QMI	A. F. Hill, jr., "al"
W1TS	D. H. Mix, "don"
W1VG	L. A. Morrow, "pete"
W3LVY	A. E. Hayes, jr., "dh"
W9BRD	R. H. Newkirk, "rod"
VE3BLZ	J. W. Paddon, "jack"

WIAW OPERATING SCHEDULE

Operating-Visiting Hours

Monday through Friday, 8:30 A.M.—1:00 A.M.

Saturday, 7:00 P.M.—2:30 A.M.

Sunday, 3:00 P.M.—9:00 P.M.

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

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

Frequencies: 3555, 7145, 14,150, 28,060 and 52,000 kc. (voice — 3950, 14,280, 52,000 kc.)

Times: Monday through Friday, 8:00 and 11:30 P.M. EST (0100 and 0430 GCT, Tuesday through Saturday)

Sunday 1:00 A.M. and 8:00 P.M. EST (0600 Sun. and 0100 Mon., GCT)

Bulletins are sent simultaneously, first at 25 w.p.m. and then repeated at 15 w.p.m., on all frequencies during the early schedule to facilitate code practice. Telegraph bulletins are followed, in turn, by voice transmissions on 3950 kc. and 52,000 kc. simultaneously, and then on 14,280 kc. Any changes from this schedule will be announced.

Code Proficiency Program: Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. are made Tuesday and Thursday on the above-listed frequencies, starting at 10:00 P.M. EST, and on Monday, Wednesday and Friday at 9, 12, 18, 25 and 35 w.p.m. Approximately ten minutes practice is given at each speed. Next certificate qualification run is scheduled for Thursday, September 18th.

General Operation: WIAW engages in two-way work with amateurs, as follows:

Monday through Friday, all times EST —

11:00 A.M.—11:30 A.M.	.....	28,060-kc. c.w.
11:30 A.M.—12 noon	.....	29,150-kc. voice
3:00 P.M.—3:30 P.M.	.....	14,280-kc. voice
3:30 P.M.—4:00 P.M.	.....	14,150-kc. c.w.
5:30 P.M.—6:00 P.M.	.....	3850—4000-kc. voice
6:00 P.M.—6:30 P.M.	.....	7210-kc. c.w.
7:30 P.M.—8:00 P.M.*	.....	3555/7210-kc. c.w.
9:30 P.M.—10:00 P.M.	.....	3555-kc. c.w.
12:15 A.M.—1:00 A.M. (Tues. through Sat.)	.....	7210-kc. c.w.

Saturday and Sunday (excepting dates of official ARRL activities).

Saturday: Midnight—1:00 A.M. (Sun.)	.....	3555-kc. c.w.
Sunday: 1:45 A.M.—2:30 A.M.	.....	7210-kc. c.w.
6:00 P.M.—7:00 P.M.	.....	3850—4000-kc. voice
7:00 P.M.—8:00 P.M.	.....	7210-kc. c.w.

The station staff:

John T. Rameika, W1JJR, "jr"

Wm. H. Matchett, W1KKS, "bm"

R. H. Newkirk, W9BRD, "rod"

WIAW is not open on national holidays.

* Traffic schedules are kept during this period.

BRIEF

Amusing but confusing: W2NHH called CQ on 28-Mc. 'phone one evening and was answered by W2OSH and W2EPZ, both of whom are named Martin Schwartz.

• 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 — Members of the Lancaster Radio Transmitting Society supplied 144-Mc. communication equipment and operators at the three local airports for the Lancaster Aero Club's recent breakfast flight. New calls in the Lancaster area are: NMR, the club call of the LRFS, NOI in Litz, NPS in Marietta. Many stations in that area are using 522s on 144 Mc. with excellent results. EWR runs 600 watts on 3.5-Mc. c.w. The York Road Radio Club's transmitter hunt was won by BYB and ERF, who took the ten dollar prize. Others finished in this order: HIO, AJF, LDV, IGR, MQU, and JOO. DMQ and QJP have new jr. operators. KSM is building a super 144-Mc. station. UWQ and TLH will be on 420 Mc. MGL has a 2C26A on 144 Mc. MXE uses an 813 on 28 Mc. The SVARC held a ham picnic in Sunbury. The members are contemplating a new club house and a plot of land. Their 144-Mc. net now consists of QJP, MXE, MXT, WBL, SEL, and KSM. EOP will be on with his exciter while awaiting his kw. from Virginia. KZ is experiencing self-oscillation in his new push-pull TZ-40 final. Our condolences. CL is on 28-Mc. n.f.m. with an indoor antenna in a shielded building. No, he doesn't work out well. ABN's antenna was hit by lightning but with only superficial damage. CAA has deserted 14 in favor of 28 Mc. The Deleo Club's application for ARRL affiliation is being held up until the recovery of PX, the secretary, who is ill. The Eastern Pennsylvania traffic net is resuming. Let us all give it support this season. LKL, Olyphant, and QEW, Scranton, desire 144-Mc. schedules. QEW handled American Legion traffic. VMF is a new ORS in the section. 1AXA is moving to the Philadelphia area to show the local lads how the DX is really worked. BES received his DXCC certificate. BXE is putting on a pair of 813s. CPV is elated with his new beam. FLH's Selsyns spin at 10,000 r.p.m. NAH is EC for Delaware and Philadelphia Counties. Thanks to all for supplying material for the column. Traffic: W3QEW 26, QP 25, KT 16, ELI 10, CAU 5, DZ 4, VMF 4, BES 2, BXE 2.

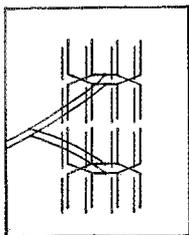
MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Eppa W. Darne, W3BWT — The Argument Radio Club held its August meeting at Rehoboth Beach, Del. After the meeting, the group was entertained on the yacht of PM. The ARC members plan a 50-Mc. net in the fall. New officers were elected at the September meeting. The Washington Radio Club had a slide-illustrated talk given by MAX at its first August meeting. Subject was the Maxim Memorial Station, W1AW, and previous League Headquarters stations. EIS, Washington Area Emergency Coördinator, discussed Emergency Corps equipment. The second August meeting was devoted to general discussion of Emergency Corps matters, fall plans, etc. EIS continues his fine work as Washington Area Emergency Coördinator. FPQ, our Regional Coördinator for the Potomac Valley Emergency Net, and the swell net membership, have continued their regular drills throughout the summer. USN is new Naval Reserve station in Washington area, at present on 7 Mc. with 25 watts. QL and MJQ are rebuilding. EFZ is on 14-Mc. c.w. with 300 watts and recently made his Asia contact. KUX broke his previous record by working Maine on 144 Mc. JMA and NFC now have a two-element rotary beam on 14-Mc. c.w. and 'phone which works swell. MAX lost his antenna, indirectly due to lightning and directly due to landlord. Dick and Barbie vacationed in the South with a new car and a mobile rig on 28 Mc. HG puts

out a fine signal on 28-Mc. 'phone. AKB and BWT handled the Washington end of the Kon-Tiki Expedition traffic during August, assisted by CDQ and LSX. NMQ gets out nicely on 14 Mc. AKR has had power supply troubles. WU ran schedules with KP6AA. NIH schedules VE3BIG on 3.5-Mc. c.w. NHT continues to get out nicely with 20 watts. ECP vacationed in search of the elusive small-mouthed bass without benefit of any radio equipment whatever. KCA and FLG vacationed at Skyline with 144-Mc. equipment, worked thirty stations in six states the first night. JYS recently made WAC. AM can now be called "grandpap." MSK and MHW have new 1500-watt gas-engine generators. AKB leads the section in traffic this month. Traffic: W3AKB 31, BWT 16, JJD 8, USN 8, EFZ 7, AKR 6, WU 6, KBX 5, QL 4, FEB 1, NIH 1.

SOUTHERN NEW JERSEY — SCM, George W. Tunnell, W2OXX — Many thanks to GCU, our outgoing SCM, for his good work. The Cumberland Radio Club holds special meetings on 145.4 Mc., Mondays at 7 p.m. OQN is chairman of the SJRA interference committee. RGV is on c.w. and reports that UYA is new secretary of LARA. WAD was 3JIX. OUB was 3BHB. SIV's XYL passed her exam. QEM reports 14 members now on 3.85-Mc. 'phone net. ZI is starting winter traffic schedules. EH, HX, and PAU have new beams. BEI and RDK have theirs in the design stage. RPH has the DX bug. SXX is working into three nets. EQ is in the hospital. RG is gunning for new traffic men for the S.N.J. net, 3700 kc. QCM has new jr. operator. FXN has new location. RJQ and JRO made a one-mile contact on 235 Mc. QHM is back in town. SAK has emergency nets running on 3.5- and 144-Mc. bands, has the cooperation of the Hunterdon County Club, and ties in with fire companies and State Forestry Commission. The Flemington group has arranged a Public Relations Exhibit citing advantages of emergency communication. VRF and WBE are new hams. VMX has chalked up forty states and some traffic with it. Keep your appointments active by being active yourself. Traffic reports via radio are welcomed. Traffic: W2SXX 28, ZI 10, HX 7, RPH 4, VMX 4, BEI 3, OXX 1, RDK 1.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — Giving credit where credit is due. WBM performed his duties as Erie EC faithfully until the pressure of business required his resignation. QN and TFX will carry on as EC and AEC. NCJ is set with a p.p. 813 final. From Pittsburgh we have reports of the great success of the SHBP&M hamfest with 605 paid registrations. LDB is having fun on 28-Mc. mobile. AMY, from Philadelphia, visited the old gang in Pittsburgh. KVL gives code practice Mon. Wed. and Fri., 7 to 7:30 p.m. on 28,400 kc. MML has a new VT-127A final on 28-Mc. 'phone. BL needs two more units to finish BC-610 from surplus. KWN has new four-element beam for 28 Mc. but lacks pipe for mast. UVD is proud of new monitor. Rumors are that the Greensburg Radio Club will be activated this fall. NWB runs 400-watt c.w. and worked 30 countries with it. RCQ now has 131 countries. UST's three-element is working swell. KQF and OFO are competing on DX. KPO is looking for "Ham's Paradise" QTH. OUM finally was heard in Hawaii. NXW is newcomer in Pittsburgh area. OTY expects to move. VSY's YL won a D-104 at the hamfest. KRL soon will become OBS. LSU will try for Class A. LFM took Class A exam and is ready for 14- and 3.85-Mc. 'phone. OLY has 28-Mc. wide-spaced beam. WAN is rebuilding 813 final. LWT can be heard on n.f.m. LGL is experimenting with 144 Mc. DNO reports the Steel City Radio has transmitters on 28-, 14-, 3.85-, and 144-Mc. 'phone. RXT is red hot on 144 Mc. OMY is working on a four-element wide-spaced beam for 28 Mc. YA is QRL with LI2B schedules. The Horseshoe Radio Club enjoyed a successful picnic. DX in Altoona shows TXQ leading with 67 countries, KQD with 65, RBH 24, BWL 37, KFD 12, LJQ 21, and MYN 10. The Mercer County Radio Assn. picnic was well attended. NCD won an 829B. 144-Mc. activity in Mercer is growing, with GEG, NCD, CJF, NDD, TNG, KQA, LBZ, QCN, and KWL taking part. MVV is proud papa of a new jr. operator. CJB

(Continued on page 84)



AFTER having thoroughly exploited their favorite six or two meter bands, many VHF men are casting about for something new or different. Of course, he might drop down to one of the "VLF" bands of ten meters or lower, but this thought will make the dyed-in-the-wool VHF man shudder. The other alternative is to go higher in frequency. Next up comes the highest VHF band at 235 to 240 mcs. sometimes called the $1\frac{1}{4}$ meter band. Then crossing, at 300 mcs., into U.H.F. territory, he considers the 420 to 450 mc. band often called the $\frac{3}{4}$ meter band. Which of these bands should he try next and what can be expected? How do they compare with 2 meters, for example?

First, the efficiency of tubes and circuits becomes poorer as the frequency is raised and tube types that operate satisfactorily become fewer. Experience gained on two meters during the past few years has demonstrated conclusively the improved performance obtained by using stabilized transmitters, good super-heterodyne receivers and good antenna arrays. With this technique, and the help of the weather man, the two meter record has been extended to nearly 700 miles.

It is not particularly more difficult to build a good stabilized transmitter (yes, even crystal-controlled), a good superhet and a good high gain antenna array for $1\frac{1}{4}$ meters. It is much more difficult to extend this technique to the $\frac{3}{4}$ meter band. It would appear then that although the $\frac{3}{4}$ meter band which is 30 megacycles wide is well suited for simple equipment, the $1\frac{1}{4}$ meter band should appeal particularly to the more advanced experimenter.

Why was not the record for $1\frac{1}{4}$ meters extended this year to compare with the 2 meter record? Simply, we believe, because of the lack of occupancy of the band by amateurs using really good equipment and high gain arrays. A 32 element beam for $1\frac{1}{4}$ is only four-fifths the size of a 16 element beam for 2 meters and will unquestionably out-perform it. Curves show that for equivalent power under "standard" air conditions two meters should give only slightly better coverage than $1\frac{1}{4}$ meters. This difference should be more than overcome by the possibility of building a higher gain array in a practical space. Temperature inversion is, if anything, more effective at the higher frequency. The writer's $1\frac{1}{4}$ meter circuit from Arlington, Massachusetts to W1DAH in North Scituate, R. I., 45 miles, with S9 signals most of the time is quite convincing. DX? W2HWX, Little Silver, N. J. (about 200 miles) has been heard several times this fall.

CAL HADLOCK, W1CTW



is knocking off DX on 3.5-Mc. c.w. KQA was the first to QSO Pittsburgh and Erie on 144 Mc. Traffic: W3YA 114, GJY 17, DNO 12, MOT 12, KWL 3.

CENTRAL DIVISION

ILLINOIS — SCM, Wesley E. Marriner, W9AND — Chief RM: EVJ. RM Central: SXL. RM Southern: JTX. PAM: UQT. Southern SEC: FIN. Special SEC: EXB. Our ILLN 3765-kc. net operated throughout the summer. SXL is getting lined up to get back on the net and managed to get up a 132-footer for 3.5 Mc. ODT divides his time fifty-fifty between DX and experimenting. ASN schedules CVX and wants more dope on Emergency Corps. EVJ attended the Clinton and Chicago hamfests as a representative of your SCM and spent a night with FKI at Chanute Field. LNI says not much DX there. UPW has been sick in bed for several weeks. DBO is operating mostly on 14 Mc. FNR operates mostly on 14-Mc. c.w. but with some 14-Mc. n.f.m. Listen for those Official Bulletins from QBH. NN is back on duty at WGN. WEA and NN are back on 7 Mc. and open for Chicago traffic. JVI, Joliet, says MMU got an NC-173, built a VFO and 1852 preselector DO lost 3000 volts filter in his kw. BAF is a new ham on 28-Mc. 'phone. RCJ is up and around following an auto accident. HOD received a pinkie from Hawaii. ODT worked a W5 on 50 Mc. PHE is on 7 and 3.5 Mc., trying to organize an emergency net. Thanks for this news. JVI, TZQ, Waukegan, reports that the hams of Lake County have formed a club and three meetings have been held. JBH, on 28 Mc., is pres.; TZQ, vice-pres.; OQT, on 28 Mc., is secy.; VO is treas.; BBR, on 28 Mc., and MRJ are directors. QGH is interested in ORS appointment. There is quite a bit of interest on 144 Mc. at Waukegan with 100- to 200-mile contacts. TZQ and his XYL went to Hamfesters picnic. PCI sends in the news from down Centralia way; HNL and QMJ are on 28-Mc. 'phone. HAB, VZM, and VLS are operating on 50 Mc. VZM has worked several states and both coasts on this band. QLJ has moved to the country. Director Richelleu, ARE, attended our Aug. 22nd club meeting. QEQ has the rig on 14 Mc. QHM still likes 28 Mc. From Starved Rock Club paper *Static*, we learn that a nice hamfest was held at Weldon Springs. ARE, UQT, and EVJ were speakers. JVC, ZEN, and QLZ accompanied ARE to the picnic. JAU soon will be a married man. NGG had members of the SRRC at a meeting at his home in Pontiac Sept. 7th. ATA, CDG, YBY, QLZ, NIU, ZEN, JVC, and their XYLs attended Hamfesters picnic. Congrats to JGC, the proud father of an eight-pound baby boy. From Tucson, Ariz., comes greetings from 7JGL, ex-90AO, of Rock Falls, who enjoys reading the Illinois news and passes on his regards to GNU, FUR, GBT, and the rest of the Dixon-Sterling gang. DYX is on all bands, 'phone-c.w., with a pair of 75TLs, but because of a non-radio landlord he has to use the 274N rig on 7 Mc. with 9½-ft. inside antenna. New OBS: WDD, OO: TAL. Emergency Corps: ASN, BRX soon will be on 144 Mc. He is changing the rig for all-band (below 30 Mc.) operation. SYZ soon will be on 144 Mc. with SCR-522 job ZHB came to Dixon and got GNU, AWA, and AND set up and going on 144 Mc. 'phone with FB results. VJN has a caged-in affair for the driven element of his 14-Mc. beam. 7NGD soon will be on the air again from Dixon. 6HJF/9 will be on from Amboy. OMA has a Millen exciter. FKI is QRL 144 Mc. BON is operating on 28 Mc. exclusively. NCJ and his XYL are operating a rural telephone exchange in Stockwell, Ind., and will be on 3.85-Mc. 'phone this winter. The Cahokia Amateur Radio Club meets the 2nd and 4th Wednesdays and likes to have visitors. DX Totals: ERU 128, AND 91, GNU 86, FNR 82, AWA 83. AWC moved from St. Louis to Rockford. YRI is on the air with 1 kw. Traffic: (July) W9BUK 6, OOE 2. (August) W9PKI 21, SYZ 13, WFS 4, EVJ 3, YTV 1.

INDIANA — SCM, Ted K. Clifton, W9SWH — RDU, of Indianapolis, is our newest OO. His equipment includes a 5" panoramic receiver. HXZ has finished at VTI and is back in Michigan City. TWC was high scorer in c.w. and GWL high in 'phone during the SS Contest. WCE, of South Bend, is chairman of the "QSL Bragger Club," which is a DX club. YDA is using the new b.c. station, WTOM, as a marker on his frequency meter. The Evansville Club has named its club paper the *Tri-State Sparks*. QLW has worked 69 countries. He also worked 9GNW aboard a B-29 bomber out of Terre Haute bound for New Mexico. MDX worked VR6AA on Pitcairn Island. BXZ is a new ham and works as engineer at WEOA. JDW has been found at Losantville. UIA has

worked 29 states to date this year on 50 Mc. All of the Evansville Club members are working hard in the local club contest. NZZ has worked 49 countries since April using 50 watts. The Fort Wayne Radio Club is installing a complete station furnished by the Navy, with whom it will be used jointly. The QIN has started with DEJ as NCS. Any clubs wishing information on the Indiana Radio Club Council should write MVZ, the chairman. All the 144-Mc. boys of the State have been having open season. CLF has a new 1-kw. final. TWC has moved to Cleveland. OYO reports that he is on the air at Angola with an Italian Transceiver on 27- and 28-Mc. 'phone. LLA has moved to Indianapolis. VSI has an addition to the family. Ex-AHL now is APJ. EGQ is converting a 522 to 50 Mc. ENB is at the Indianapolis Veterans Hospital. WCE, of South Bend, runs 160 watts to a three-element beam on 28 Mc. and 200 watts on 14-Mc. c.w. into a folded dipole. John has sold his cousin the hobby and the cousin now has the call PDF. GTL has moved from Indianapolis to New Haven and has requested membership in the Atomic Radio Club. TKV, home on vacation from Harvard, caught up on DX with 120 DX contacts on 14-Mc. c.w. in his first 15 days on the band. KPN has had 221 QSOs this year and only one of these with a W. He uses a pair of 818s in final with 600 watts on 14-Mc. c.w. only. Traffic: W9DGA 6, CLF 2, NZZ 2.

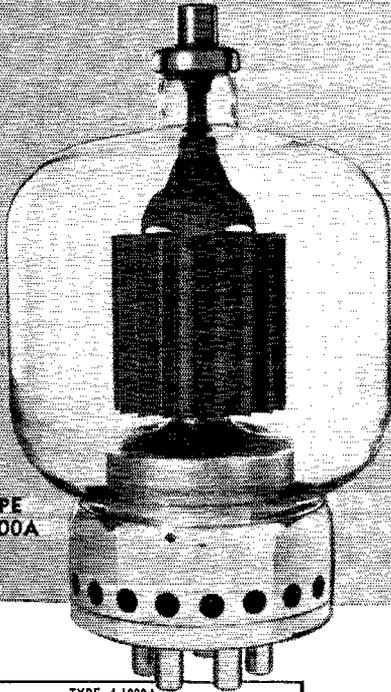
WISCONSIN — SCM, Reno W. Goetsch, W9RQM — YCV, temporarily located at LaCrosse, is new ORS. LFK is on with 3-watt VFO while rebuilding. AFT, our new OES, got an R5 SS report from Michigan on 144 Mc. MUM is Eau Claire outlet from State net. KBU moved to Washington and has his old call, 7EYD. GTT schedules 9HA/8 in Dayton, Ohio, on 3.85 and 14 Mc. OUT moved and now works 4 and 14 Mc. NSX is back on 3.5-Mc. c.w. 0OCT, formerly of Kansas, is located at Prairie du Chien. MSJ reports 28-Mc. portable-mobile aircraft to ground work at Kaukauna. BAA is a new ham at Little Chute. AEQ, a new ham at West Allis, worked 18 states the first month with 25 watts on 7 Mc., and now is on 28-Mc. 'phone with a new HT-9. WDK is having fun with his new BC-610. The Central Division Director, ARE, has been busy making all the hamfests, and in his spare time has been working on 14 Mc., and putting up a new beam. SZL is doing an FB job as EC at Racine, and is organizing a 144-Mc. emergency net using SCR-522s with a tie-in to the 3775-kc. Wisconsin State Net. WYA built an f.m. unit phase modulating a Meissner e.c.o. and reports FB results with 17-ft. vertical antenna modified for 14-Mc. ground plane. EXH is working on n.f.m. rig. BGB bought n.f.m. Sonar exciter from WYA. AKY, OGT, LKL, and EWY have SCR-522s forming the backbone of the 144-Mc. net. The LaCrosse Club is gaining momentum in activity. SFL is working out FB on 28 Mc. PKY is building a new receiver which will include f.m. QJW, FZC, and GAA have new Gon-Set converters for mobile 28-Mc. operation. LED got 599X report from OAA. CGO built a converter for 50 Mc. Anyone interested in traffic-handling is invited to report in to the Wisconsin C.W. Net, which meets nightly, Monday through Friday, 6 p.m., on 3775 kc. Traffic: W9YCV 17, LFK 15, ESJ 14, RQM 6 ARE 5, MUM 3.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Paul M. Bossoletti, W0GZD — AJH is new call in Minot. ONM has new VHF-152 and RBS a new R-9. CGM will have new 500-watter on. SSW is getting terrific reports on 28-Mc. 'phone with 15 watts. AZN is new call in Bismarck. EVP is busy supering new KGCU transmitter building. JPW and GJJ have FB mobile rigs on 28 Mc. DM is building 815 rig. WBY, Fargo, will attend U.N.D. school of medicine. JOA and VE4SH visited RGT and GZD in Grand Forks. VAZ is kept busy on summer highway construction job. ZRT's four-element beam is knocking off ZLS. OCI is putting up new 3.5-Mc. antenna. Carrington has an operator now. AKF is aiding in section organizing. ILT has new HQ-129 and will be on 28 Mc. TUF says it's tough building new basement shack. NAW will be back on soon. Urge that 3500 to 3550 kc. be used as North Dakota QSO channels to reestablish those FB rag-chews in the State.

SOUTH DAKOTA — SCM, P. H. Schultz, W0QVY — HDO has a new Sonar VFX-680 ready to go on all bands; also surplus BC-654 complete for emergency and standby use. GCW is managing the new Power City Radio Shop at Rapid City. At this time I have the sad duty of reporting

(Continued on page 86)



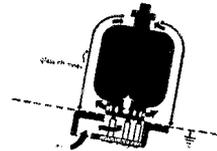
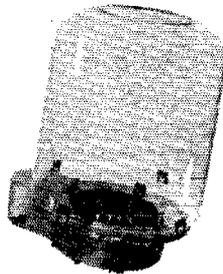
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OUTPUT 3 Kw. WITH 14 WATTS DRIVE

Workhorse for communications and industry, the recently announced type 4-1000A is presently the largest of Eimac radiation cooled power tetrodes. High power-gain capabilities, on the order of 230 times, fit the tube to applications requiring high power output with low driving power needs.

The tube has been ruggedly designed to withstand the abuse of the most severe application and abnormal overload. Eimac "know how" of vacuum tube design provides long life expectancy and overall economy of operation. Virtual isolation of the input and output circuits has been achieved, simplifying associated circuit design. Short, low-inductance leads, Eimac's non-emitting grids, and rugged plate impart a high degree of operational stability. High efficiency may be maintained well into the vhf, above 110-Mc. As an example, two tubes operating well within ratings, have provided 5 kw useful output power at 110-Mc.

As a functional accessory, a unique socket design to assist in adequate cooling is available. Illustrated below is the complete unit and a diagram indicating the control of air-flow past the terminals, base seals, around the envelope and to the plate seal. The pyrex glass chimney is included with each socket.



TYPE 4-1000A	
ELECTRICAL CHARACTERISTICS	
Filament: Thoriated tungsten	
Voltage	7.5 volts
Current	21 amperes
Grid-Screen Amplification Factor (Average) 7.2	
Direct Interelectrode Capacitances (Average)	
Grid-Plate (without shielding, base grounded)	0.24 μ fd
Input	27.2 μ fd
Output	7.6 μ fd
Transconductance ($I_b = 300$ ma., $E_b = 2500$ v., $E_c = 500$ v.)	
	10,000 μ mhos
RADIO FREQUENCY POWER AMPLIFIER AND OSCILLATOR	
Class-C Telegraphy (Key-down conditions, per tube)	
MAXIMUM RATINGS	
D-C Plate Voltage	4000 Max. Volts
D-C Screen Voltage	1000 Max. Volts
D-C Grid Voltage	500 Max. Volts
D-C Plate Current	700 Max. ma
Plate Dissipation	1000 Max. Watts
Screen Dissipation	75 Max. Watts
Grid Dissipation	25 Max. Watts
TYPICAL OPERATION (Frequencies below 40 Mc.)	
D-C Plate Voltage	4000 Volts
D-C Screen Voltage	500 Volts
D-C Grid Voltage	200 Volts
D-C Plate Current	681 ma
D-C Screen Current	141 ma
D-C Grid Current	41 ma
Screen Dissipation	71 Watts
Grid Dissipation	6.1 Watts
Peak R-F Grid Input Voltage (approx.)	348 Volts
Driving Power (approx.)	14.3 Watts
Plate Power Input	4086 Watts
Plate Dissipation	746 Watts
Plate Power Output	3340 Watts

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the passing of ZBU, Larry Simmons, of Platte. He was one of the most faithful of all correspondents to this column and his reports will be sorely missed. Larry was EC for Charles Mix County and has stations lined up in that vicinity for any emergency work. He leaves a widow, two small daughters, and a brother to mourn his passing, as well as the entire South Dakota ham fraternity.

MINNESOTA — SCM, Walter G. Hasskamp, W9CWB — What with a terrific heat wave in these parts during the month of August, ham activity in Minnesota reached an all-time low for 1947. JDC received his Class A ticket and is on 3.85-Mc. 'phone with a pair of 80's modulated with 6L6s. BMX has a new power supply and p.p. VT127As going. QIO is building a VFO, 6F6, 6L6, and 807 final. He was in Chicago recently and met 9SPD, SWO, and SVO. FAH spent a rugged six days on Gunflint Lake with 9SBR of Rockford, Ill. By rugged he means canoeing, shooting rapids, portaging and fishing. RPT is all lined up with Iowa, Missouri, and South Dakota for traffic this fall. OOU is back at Deer Creek. 6EJLP/8 has a new three-element "Workshop Rotary" in operation on the 28-Mc. band. DK, ex-9VVN in Northern Minnesota, now is 6AAQ in California. Warren Taylor, ex-9FMA of Minneapolis, now is 7GHI in Seattle, Wash. He would like to work the boys back in Minnesota. You will find him on 7- and 14-Mc. c.w. The Arrowhead Radio Amateurs held its annual ham picnic on August 31st at Enger Park, Duluth. AZE has a sixteen-element beam on 144 Mc. EPJ has new NC-173 receiver. SW and HEO have McMurdo-Silver 703 transmitters coming to their shacks. YBM has n.f.m. on 3.85 Mc. AQU and MKI handled a nice bit of traffic from guard at Camp Ripley. CCF has rebuilt his rig in a 6-foot rack and moved his shack to the basement. If any of you Minnesota boys made good checks on the September Frequency Measurement Tests from WIAW, an appointment as OO is awaiting you. If interested, please write your SCM. Minnesota needs more OOs. By the way, our Director, Tom Davis, SW, is resigning as a candidate for reelection to that post as he is accepting a position with a new b.c. station at Breckenridge. Traffic: W9PT 59, FAH 22, CWB 9, QIO 6.

DELTA DIVISION

ARKANSAS — SCM, Marshall Riggs, W5JIC — MRD is on 3.5 Mc. with 60 watts to an 807. AQF has been appointed Net Control for Arkansas C.W. Net. JAX is looking for suitable QTH. HNU has finally gotten on 50 Mc. with 829. JIC is putting dream rig together after all these years, p.p. 100ths. The Arkansas Emergency Net, 3885 kc., has had excellent attendance all summer. Keep it up, boys. LRE is trying to soak up some knowledge. IWL has brand-new boy, his first. HPL and GAS took Class A exam at convention. HPL is building 250-watt 'phone rig.

LOUISIANA — SCM, W. J. Wilkinson, jr., W5VT — SEC: KTE, RM: KUG, PAM: CEW. MXP is getting a big kick working 28 Mc. KYK has Class A ticket and new Meck transmitter on 3.85 and 14 Mc. KTB is ready for fall with 500 watts and a four-element beam. MX is on 28-Mc. 'phone. MSL keeps his eye on 28 Mc. while everyone else is working. HHT watches 50 Mc. KMB and JWI have daily schedule. AXS, DHE, IUG, and BV are on 3.85 Mc. JFR is active along with BSR in Lake Charles. LCA has begun operation in Donaldsonville. ASJ has again gone to sea on the *S.S. Charles Draper*. MXJ has roped HOU and GWZ into 144-Mc. activity and others are due to follow. FPO has 32-element dream beam on 28 Mc. MXH is moving to W1 district. IN recently was congratulated on having been an ARRL member for 25 years. BUK has new four-legged tower and is awaiting suitable beam. LVG leads the N.O., La., Pajama Net. P. O. Box 7151, New Orleans, La., will reach any ham in the vicinity. In Shreveport, P. O. Box 877 will do likewise for that area. Contact the SCM for application blanks for ORS, OPS, OBS, and other appointments. KUG is moving to Florida. KTE will take over as RM and act as SEC until a successor can be appointed. KXP is engineer for WJMR/WRCM f.m. LDH spent six weeks in California. FDH had a motor bike accident. He now has a new '47 Studebaker. The SCM wishes to thank the gang for the many kind expressions of sympathy during the recent illness and death of his mother.

MISSISSIPPI — SCM, Harold Day, W5IGW — PAM: VJ, RM: WZ. AMR is running a BC-610E on 14 and 7 Mc. Of interest is AMR's little 25L6 with 5 watts; he has worked from coast to coast with it! BZG is still around and running low power. RY, ex-BNW, the only OES in the State, is

having fair luck on 50 Mc. and has received his Class A ticket. WZ, DEJ, DNS, LAK, EGE, and KUT are back in harness with the Rebel Net. The Delta Amateur Radio Club was organized in July, and holds meetings the second Tuesday of each month. Officers are: GLZ, pres.; IGW, vice-pres.; HYV, secy, and treas. Each meeting is held at a different locality. Was certainly glad to see the nice turnout of Mississippi hams at the Delta-West Gulf Division Convention. A nice hand to LN and the Delta 75, who have kept the Net active through the summer months. We need more ECs. Write for an application, or call me "collect." I mean it!

TENNESSEE — SCM, James W. Watkins, W4FLS — TM is working on 14-Mc. c.w. GEH and CYP are on 14 Mc. JMW received his Class A license. FA is using a pair of 813s on 14-Mc. c.w. AQV is active on 14-Mc. 'phone. It looks like HXC will win the Jackson WAS Contest on 14-Mc. 'phone. AAW is on 28 Mc. AWB is building a new triode oscillator to eliminate 28-Mc. harmonic. BMC is building a new beam for 28 Mc. DKX has the new kw. almost finished. EBQ is active on 3.85 and 112 Mc. HRS worked XEIOE. FWH is active on 50 Mc. KH is using a new dipole on 14 Mc. GYE is building a new VFO. GQQ is new president of NARC. Other officers are ILZ, vice-pres.; HOJ, secy.; DDF, treas. MEQ worked his first out-of-state contact, a VE1. GXD bought a surplus airlines c.w. rig and will have 750 watts on 7 Mc. on any of four channels. FWH has a new sixteen-element beam on 144 Mc. with an Abbott TR-4. MB is on 28 Mc. with a kw. MKB has a new final using 4-250As. HHQ and EKA are trying to organize the Knoxville Emergency Corps. FCF is new SEC. The Mid South Radio Assn. has resolved to buy emergency-powered equipment. PL has been taking traffic from a number of fairs and the Legion Convention in N. Y. C. At the Mid South Amateur Radio Assn. picnic LC showed up with 28-Mc. mobile job and CV with 144-Mc. mobile. FCF is on 14-Mc. 'phone with 25 watts. AQR has new 14- and 28-Mc. beams. IY has new VFO for all bands. MKS is on 3.5-, 7-, and 14-Mc. c.w. running 40 watts to an 807. Traffic: W4PL 1355.

GREAT LAKES DIVISION

KENTUCKY — SCM, Joseph P. Colvin, W5IEZ/4 — (Reported by W4BAZ). NDY has FB 813 p.p. amplifier. CIC works both KYN and KYP. CMP gets lots of DX on 14 Mc. GPT, newest member of KYP, is building a VFO. IXN gets on KYN regularly. FQQ is trying to get amplifier working. YPR is the most consistent KYN member. KRY is trying 50 Mc. again. MLW sticks to 3.5-Mc. c.w. YGS is portable-mobiling. ITC is official volt-reader and standing wave-checker. KNX is on the air again. SXP is 27-Mc. fiend. SXP, KDR, MAU, KVH, ITC, and TUT all live in a one-block radius. KVH and KVK plan to increase power. KFE is working 28-Mc. 'phone and 7-Mc. c.w. JEB is building beam for 14 Mc. MFI has a pair of 807s on 28-Mc. 'phone. KFI is working n.f.m. 28-Mc. 'phone. When telephone service went out to Louisville, BAZ got the 28-Mc. boys to make his dates for him. MFQ is working 28-Mc. 'phone. RPF came on the air after an absence of five years. KFE is having trouble with his 28-Mc. 'phone. MDB was excited over working W2AL. JFP is trying 28-Mc. 'phone. KIV divided time between 3.5-Mc. and 50-Mc. 'phone. JXK is heard on 28-Mc. 'phone. JEI is working plenty DX on 14-Mc. c.w. YAL put n.f.m. on 28 Mc. using 810 p.p. final. LQI sticks to 28 Mc. JYX is using converted SCR-274N. VHU has moved into new shack with three-element beam. BNW wants 144-Mc. contacts, particularly Lexington and Louisville. UWR gets on KYP at times. MRF and NJY are working 28-Mc. 'phone.

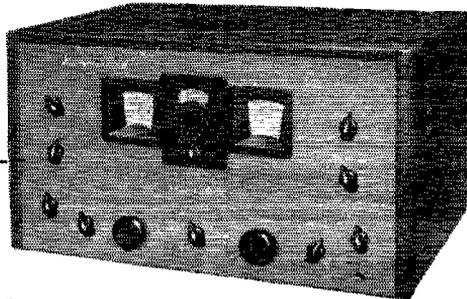
MICHIGAN — SCM, Joseph R. Beljan, jr., W8SCW — SEC: SAY. SAY reports the emergency set-up for the State is shaping up nicely and wants those who have been putting off contacting him to do so immediately. Congrats to the newly-formed club at Sault Ste. Marie and best wishes for its every success. UCG won the Muskegon Club trophy for being the first club member to work out of the State on 144 Mc. Nice going, Chuck, and the gang is pleased to see your fine work rewarded. ZEB is interested in forming a daytime QMN net and those so interested should contact Paul. AYV is new call at Paw Paw and worked all call areas in six days. AXP is new call in Grand Rapids and belongs to the hard-working editor of the Grand Rapids bulletin, QRM. Mac is running 120 watts on 28 Mc. WXX is proud of the way his BC-312 pulls them in on 14 Mc. RTN is active on

(Continued on page 88)

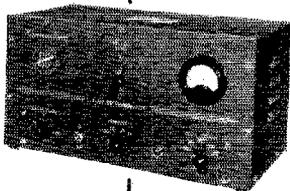
HQ-129-X



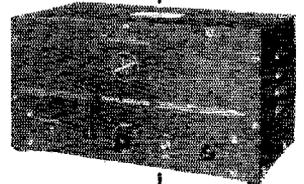
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QMN and a much-needed outlet from Flint. YBL will soon have her own rig on 28 Mc. DOV moved to his new house and is about set to raise masts. PUV moved to his new home, which is located in one of the highest spots in Grand Rapids. Congrats to LSR on the arrival of the jr. operator and to ZQZ on the arrival of the YL. SWF is getting ready for DX with a four-element beam fifty-three feet off the ground. QFF is doing a nice job as OBS and relayed important information direct to KP4AM. The Allegan Radio Club had a booth at the County Fair which attracted a lot of interest and traffic. SOO finally completed his station layout with a pair of 24Gs at 300 watts n.f.m. on 28 Mc. ZBI is rebuilding and will use a pair of HK-257Bs in the final. YJU is sporting a new VFO and is doing a nice job on QMN. Congrats to UKV, who is doing a swell job as NCS on the 5 p.m. Net and has kept the net active all summer. UFH is all set to tie the knot in November. Don't forget to send in your activities report the first of each month covering your activities for the past month. Traffic: (July) W8FX 8, ZHB 2. (Aug.) W8UKV 38, NOH 24, RJC 19, YJU 14, FX 9, ZHB 5, WXX 3, MGQ 2, YDR 1.

OHIO — SCM, William D. Montgomery, W8PNQ — UPB didn't have to write this after all — I am still around and will be for a few months. This should be the last poor month for news, traffic, and reports. EFW reports that he was able to give FFK a "Hooperating" recently when he was polled over the phone as to what radio station he was listening to. QBF reports that he and YHR, NWM, MVZ, COG, and ZQC were again set up for the Cleveland Air Races with 28-Mc. and 144-Mc. equipment at each pylon, at the judges' and timers' stand, in the grandstands, etc. SFT won the Steubenville Transmitter Hunt in 45 minutes. CBI is back in shape now after a long illness. PBX is a father for the second time with the arrival in August of the newest jr. operator. PNJ celebrated his 25th wedding anniversary in September. The Central Ohio Radio Club had a swell Labor Day picnic at Prospect Park. AXF is a new ham near Piqua. A newly-organized club is the Springfield Radio Amateurs Club, with JRG, chairman; OG, vice-chairman; SXQ, secy-treas. AOH and APY are newbies in Urbana. The Piqua Radio Club and the Dog House Net combined forces for a swell picnic on Aug. 10th. There were about 150 licensed boys present, plus their XYs, Ys, and jr. operators. Even VE3CP drove down from Windsor, Ont., for the event, as did 41XN from Greenville, Ky. WRN reports that Columbus has been invaded by SCR-522s. Not many are working yet, but there are plenty of plans for 144 Mc. with them. ZHS tried aeronautical mobile 28 Mc. on Aug. 9th, and was able to maintain contact with ZCQ in Columbus as far as the Pennsylvania line. Traffic: W8QBF 57, RN 42, UPB 18, PUN 17, EFW 7, WAB 5, EBJ 4, AQ 2.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Ernest E. George, W2HZL — During the summer months all things seem to slow down, including reports. Here are the highlights of what trickled in, in my own absence. The Albany gang is becoming interested in microwave work with two lighthouse oscillators. DSK electrified the club by announcing that there still is such a thing as 144 Mc. 8VSJ/2 and CJS verified the fact; so says OMD. The Schenectady Assn. started its fall activity on Sept. 8th with regular meeting. A hamfest was held Oct. 18th. BRS, ex-editor of *SARA News*, now lives in Rotterdam and at last has room for an antenna! While motoring through Vermont KLM and HZL dropped in on 1MMU to see his super deluxe 80-meter folded dipole 75 ft. high. Speaking of antennas, condolences to NIV on the loss of a new 85-ft. plywood tubing mast by a little lightning. NES reports the Cohoes-Troy area gang is doing some semi-DX on 144 Mc. NSD, LWR, and NHS are working all the mountains from Canada to New York City. After six years QRT MHW, who has been OXIA, OXIC, and OXIZ, now is on 3.5, 7, and 14 Mc. From Hudson, Harry Miller, SWL, reports HUM is back on 3.85 Mc. but is building a new house. VCY is a new ham on 7-Mc. c.w. IXX, from Poughkeepsie, is busy on a general coverage superhet 75-1250 megacycle, f.m., p.m., a.m., and c.w. NOF was elected pres.; LXX, treas.; BJX, secy.; NCI and Edward Pritchard, vice-presidents, of Mid-Hudson Amateur Radio Club. Activity there is running very high. Traffic: W2LRW 36.

NEW YORK CITY & LONG ISLAND — SCM, Charles Ham, jr., W2KDC — More than 25 stations are reporting into the Nassau 144-Mc. AEC Net. During one drill when

Control FI blew a transformer, Mobile ORZ immediately drove to FI's and kept in touch with Alternate Controls FQW and IER. Most Nassau AEC stations are operating crystal now on 144.3, 145.8, 146.52, and 147 with control on 146.1 Mc. New station members are AUU, AST, VKS, and TVZ. Recent additions to crystal-control are GQP, QBS, LPJ, and BTA. ORZ operates mobile crystal-control. OBH has a good supply of crystals, now all he needs is a rig to accommodate them. Even while on vacation 200 miles north KTU reported into the net via 7-Mc. c.w. and SMX. KNA's QTH is on the dividing line between Nassau and Suffolk Counties and he wants to know which net he is in. RH, Rye, N. Y., acts as "outpost" station for the Nassau Net each Monday at 9 p.m. Under EC FI the Nassau AEC is progressing nicely. In Suffolk regular weekly drills on 144 Mc. continued through the summer with three mobiles and ten fixed stations turning out. Fall activity is well under way and special tests are being arranged. The SCR-522 is by far the most popular rig in Suffolk with SAH being the most recent addition to the long list of users. EBT is working to get his on the air and OQI has one in his car converted to 6-volt operation running 5 watts. HEU has a five-element beam to get his SCR-522 signals out. PDU's crystal job will be heard any day on 144 Mc. JWO is active on 235 Mc. All Suffolk AEC members are requested to operate above 147 Mc. NCS ADW is on 147.19 and EC OQI on 147.721 Mc. 80-Meter C.W. Net: Last season's drill schedule is still in effect and any changes will be announced in this column. RTZ reports into Group One every Monday night. The 80-Meter C.W. Controls meet on 3600 kc. at 3 p.m. every Sunday. EC KYO, Bronx, has included Manhattan in his territory, so all Bronx and Manhattan stations are requested to contact him. From Brooklyn, OHE reports August activity did not drop greatly, 8 fixed and 1 mobile was the average attendance. Meetings are held Monday nights from 9-10 p.m. with the third Monday each month reserved for inter-county activity. A new v.h.f. club has been formed with ER, pres.; AUF, secy.; and OHE, activities mgr. Its name is "The Amateur VHF Institute of New York," and its aims are to promote better use of our frequencies above 50 Mc. Club call is WCR. KU and HG are joined by GWL on 225 Mc. BFD has an F/B 144-Mc. converter. NXT has modulation for his 144-Mc. rig in addition to f.m. JSJ gave up 144 Mc. in favor of the i.f. since he got his Meissner Signal Shifter. JBQ has given up fixed operation but gets out mobile. EPF finally has the old 522 cookin'. OHE just worked his 500th station on 144 Mc. UGZ abandoned his 6 watts in favor of a BC-459 with 16 watts. OUT, Class I OO, is building 300-watt rig ending with an 813. While recuperating from a broken leg, MPC works 144-Mc. rig, K2AL, with rigs on 3.5, 7, and 28-Mc. 'phone, handled 1000 messages in four days during the American Legion Convention. RTZ, OBU, and TUK assisted. WQX bought an HQ-129X. TUK has joined the NYC-LI Net and is working on 14-Mc. c.w. rig. SQD is on 7-Mc. c.w. AIQ is doing good OO work. EC is assisting as the Eastern outlet for "Vetograms." BO has added n.f.m. on 14 Mc. using 300 watts. RBZ is using 522 in mobile rig on 28 Mc. RQJ recently made 30 w.p.m. for C.P.A. PRE operated K2AL. Traffic: W2TYU 744, BO 225, OBU 146, TUK 53, RQJ 10, PRE 8, LGK 6, HXT 4, KJU 4, RTZ 4, SQD 4.

NORTHERN NEW JERSEY — SCM, John J. Vitale, W2IIN — NNJ Net, 3630 kc., daily except Sunday 7 p.m.; NJ 'Phone Net, 3900 kc., Sundays 9 a.m. and Wednesdays 7 p.m. AEC organization work is well under way here and if your community has not an Emergency Coordinator, select one of your group to apply to the SCM for appointment. Recent appointments of Emergency Coordinators are as follows: NKD for NNJ (C.W.) Net; QEM, 75 meter 'Phone Net; PCX, Essex County; CQD, Union County; IIN, Elizabeth; TZY, Bloomfield; BYC, Newark; EWL, Verona; JN, Montclair; FDL, Irvington; IKS, Maplewood; APL, Jersey City; OSQ, Roselle Park; EUI, Roselle; NLJ, W. Orange. HZY has 124 countries. JC is all out for the next SS Contest. EGM is on 28-Mc. mobile. OUS is on 50 Mc. LOP has gone back to school in Idaho. Operators at OEC are QEM and UQH. 9EHR/2 has left OEC. UZC is on 28-Mc. 'phone. APL, the EC of Jersey City, moved to 63A Baldwin Ave., Jersey City. Introducing our new OOs: MRG, NCY, and ANW. CWK has new 829 rig on 7, 14, and 28 Mc. The Northern New Jersey Radio Assn. is starting its second year with a membership of 100. Meetings are held the 2nd and 4th Mondays of each month at the Hackensack YMCA. UZN is on 3.5 and 7 Mc. and is secretary of the Ridgewood

(Continued on page 90)

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Radio Club. TWO is president, WCF is vice-president and treasurer. The Club is interested in emergency operations. The most active on the NNN Net are ANW, BZJ, CGG, CQB, GVZ, LFR, LX, NAK, NCY, NKD, OEC, OXL, NIY, NDL/3, SXX, TUK, TYU, DRV, CWK, and TZY. Those in the 3.9-Mc. 'Phone Net are QLP, HX, LZZ, EGM, QEM, KMK, LOP, SAK, TUA, OCC, ZI, and MKN. K2AL was the American Legion Convention station in the Pennsylvania Hotel during the National Convention in N.Y.C., clearing almost a thousand messages. UCARA now meets the 2nd and 4th Mondays of every month at Elizabeth YMCA. The Bloomfield Radio Club meets every Wednesday night at the Community House. Margretta Mueller is taking up ham radio and will put back on the air the rig of her father, GIZ, who passed away recently. The UCARA gave her Honorary Life Membership in the Club and will ask the FCC for Carl's call for the Club in memory of him. He was vice-president of the UCARA. Traffic: W2CGG 272, OEC 254, TZY 152, NKD 88, CWK 81, CJX 42, NCY 34, CQB 18, QEM 17, LFR 16, IIN 12, KMK 10, UZN 10, HZY 9, EGM 7, OXL 7, JKH 4, OOC 4.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — The Cedar Rapids gang with mobile CVU, RQN, GIM, and ZQL and with fixed stations ARW, AUQ, ADQ, NQM, ROW, and JIR held the first Iowa 28-Mc. mobile party with good success. Good contacts were had through all parts of the city. With CVU as EC, Cedar Rapids has a natural set-up for the Emergency Corps. The Iowa City gang, UTX, NTI, RSI, TWX, IFB, and FQY, have a fine emergency set-up with six 144-Mc. mobile and portable units and six 3.85-Mc. portable and a 3-kw. generator set capable of running any of the rigs. They are prepared! They say they have the best emergency set-up in the State. What do the rest of you say? In Des Moines, UOP, OLY, LRY, MCK, REN, WIJ, and GBB keep their 28-Mc. mobile rigs working overtime. Des Moines is prepared for that emergency. REN is at National Guard encampment as assistant communication officer. UOP was heard in Davenport by HAQ on 144 Mc. CK says he has the best receiver made. PP finally got big stick up for 28-Mc. beam. DIB worked China on 14-Mc. c.w. AEH is wrapped up in 144 Mc. activity. NMA is tuning up 116-Mc. stations for CAA. Organizational work is going nicely for the SCM but I must hear from you c.w. men and DXers. Come through, fellows, I want to cooperate with you. The Iowa 75 'Phone Net meets daily. Will welcome daily contact with c.w. nets in the State. New appointments: AUL and HMM as RM; OM, PP, and KSS as OPS; AYC, AEH, and FKB as OBS; OM, THP, and AYC as EC. Traffic: WØPP 35, HKN 2.

KANSAS — SCM, Alvin B. Unruh, WØAWP — KVRC, Topeka, has chosen NCV as Assistant EC, and is organizing a 29.5-Mc. emergency net using both fixed and portable mobile. This plan has met with great success in Wichita, where a spot frequency of 29.6 Mc. is used, and a dozen car installations take part in drills. NCV has pair of 812s, final QV and KRZ have wide-spaced three-element beams. KRW has erected a beam at his new QTH. The Garden City Amateur Radio Club is preparing to take an active part in Kansas ham affairs, and requests application blanks for ORS-OPS, and information on the QKS Net. The SEC, Bill Schrenk, PAH, 1528 Pierce, Manhattan, requests correspondence from all interested in organized emergency work. DEP delivered a message of greetings from ex-KCS, who now is 4IYT in Miami, and is looking for Jayhawkers on 28 and 14 Mc. LFB made a trip to California to attend police communications officers' national convention. He reports nearly all police supervisors in attendance were hams. Plans are going forward for extra special activity in the state (QKS) traffic net this season. Drop a line to the SCM if interested. We would like to have two members in every Kansas town of 5000 population. QKS meets Mon., Wed., Fri., on 3610 kc. In Wichita, the EC, REB, has a new call, WØAB. OZN built another new VFO, better than the last. OKD and CES reworked BC-459s, AWP reworked an ART-13, LFB has Millen Variarm, and BXZ has VFX-680. Traffic: WØDEF 2.

MISSOURI — SCM, Mrs. Letha A. Dangerfield, WØUD — Let's blame it on the weather — this lack of activity. It might easily have scorched the signals right off the antennas, burned 'em to a crisp and left 'em fluttering about like bits of soot from a chimney. But there were a few hardy souls — well-cured hams, no doubt, who kept

right on even while the bug smoked. QXO, for instance, piled up a huge traffic total, mostly from the American Legion Convention in N. Y. C. ARH helped with a lot of that traffic — handled more this month than any one of his eighteen years on the air. He also worked two new countries on 14 Mc., OX and OK. SKA listened in on this traffic work, passed a few himself and wished he had some machine screws to finish his new rig. TXP and several other Willow Spring hams are rebuilding with an eye to AEC operation. VMO is the new EC for Springfield. KIK is taking it easy, working 14-, 7-, and 3.5-Mc. c.w. NNH sold his rig and is using a Meissner Signal Shifter with good results. WIS is just getting back on the air with 50 watts to an 807 on 7 Mc., and is building 28-Mc. 'phone. GCL soloed this month; he had time for few 7-Mc. contacts. PYI is on 7 Mc. and is going to college this fall. GBJ moved the rig to another part of the house so he has to construct two new antenna supports while he waits for QSLs for Century Club qualification. The latest project of ZIS is 144-Mc. equipment. He has four beams on one tower with a single control. OUD has more or less regular schedules with brother IGW on 7 Mc. — the antenna must be plugged up as signals don't get out well. Traffic: WØQXO 356, ARH 227, SKA 26, CMH 11, DEA 7.

NEBRASKA — SCM, William T. Genmer, WØRQK — DMY has a new 810 final with 330 watts input on 14 Mc. Ex-7HZI now is ØCMO, located in Gothenburg. NXF is radioing as a hobby again after six years in the Navy and plans to be on 14-Mc. 'phone soon. VHR installed 28-Mc. rig in auto. RQS has five-element beam installed running competition to his eight-section Sterba on 28 Mc. DYG has mobile 28-Mc. rig. FQB has a 7-Mc. center-fed Zepp and will be active on all bands. OAE is on 3.5-Mc. c.w. with 100-watt rig consisting of 15 tubes and 1623 final. UBN is building 813 push pull final. OHU has a 701 Silver transmitter for local and portable operation. SAJ's jr. operator took the exam; his XYL is preparing for the exam. LKE is on 28 Mc. with 150 watts into half-wave dipole and is expanding operation to 7-Mc. c.w. EXP has been putting up hay instead of antennas. BBS has three out of four "64 footers" with ladders attached erected for his square rhombic. CBH has HT-9, S-20R and three-element Workshop beam on 28 Mc. OHK has new SX-18 and works 3.5, 7, and 28 Mc. ERM has new 173. AUX is on 3.5-Mc. c.w. with 6J5-6L6 and Super Pro. DNW and RQK have LM-12 frequency meters. The Aksarben Radio Club hamfest was a huge success. Thanks, FQB, for the nice report. The Pioneer Radio Club held its August meeting at the home of OED. VMP, of Cedar Bluffs, works all bands available! AYO is on 7-Mc. c.w. RCH has new rig on 14 Mc. ACZ works his son in the Air Corps regularly. Let's hear from you, gang.

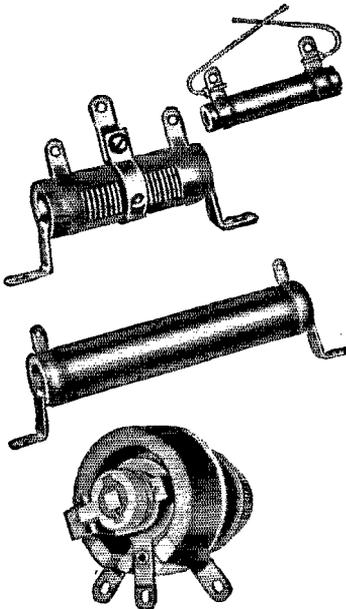
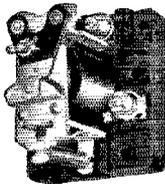
NEW ENGLAND DIVISION

MAINE — SCM, F. Norman Davis, W1GKJ — SEC: LNI, PAM: FBJ, RM: NXX. New officers of the Eastern Maine Amateur Radio Club are: OIQ, pres.; QEK, treas.; MAW, secy. The Club held a Field Day late in August. Activities included softball, horseshoes, 144-Mc. portable rigs and an SCR-399 was operated on 3.85-Mc. 'phone. EIY is on 3620-kc. c.w. with 6L6-807-p. p. 809s and a BC-312M receiver and has daily schedule with NR. KMG, formerly in Massachusetts, now lives in Hancock. OHY had a visit from MGP. VE2CB visited NXX and made contact on 38.5-Mc. 'phone with his home town. EFR has built a VFO and is now exploring on 3.5-Mc. c.w. EJS uses a 6V6-807-813 rig running 450 watts. JCT is in the Coast Guard and stationed at Honolulu. KTT has a 250-watt rig on 3.85- and 14-Mc. 'phone. FZD and EJS are building 50-Mc. rigs; they also work 144-Mc. band using four-element rotary beams. FZD has a Millen exciter driving a pair of 808s for 3.5- to 28-Mc. bands. GGF now has an HQ-129 receiver and is top man on 28-Mc. 'phone DX in the Rockland area. PVY is on 3.5- and 7-Mc. c.w. FQJ now has his Class A ticket and is knocking off the DX on 14-Mc. 'phone. FBJ and MBR work out fine with their portable mobile 28-Mc. rigs. LNI would like to have more ECs. Write to him if you are interested in being EC for your locality. If your community now has an EC, why not see him about joining the Emergency Corps? Traffic: W1OHY 11.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — HP is EC for Merrimac. The following have renewed their appointments: HWE as ORS, ONZ
(Continued on page 98)

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as OBS and OO, EK and MSAF as ECs, HXX as ORS, OPS and OBS. LAO is new OPS. We note a few new radio clubs in Boston: PUN is call of the Field Station Radio Club, the Navy Lab on Atlantic Ave.; PTC is call of the Wentworth Inst. Amateur Radio Club, Huntington Ave. PMX is ex-7IGY. QCM is Pt's son-in-law. AXA is moving to Philadelphia. PS is ex-2PL. HX has new QTH and bought AXA's beam. 9GSQ is working in Cambridge. LKM left the ranks of the single men and has an XYL. Naval Reserve Drill Quarters in Beverly has the call QIO. QIE is a new ham in Lynn. LMP has 1st-class commercial license; JNE has 2nd-class commercial license. OLC is going portable-mobile on 28 Mc. The Yankee Radio Club held its first meeting of the season. MRQ worked two new countries, one being KS4AC, and says new QTH has plenty of room for antennas. NF has modified an AN-APS13 420-50 Mc. and has four-element beam for 420 Mc. AQE has an SCR-522. JSM and ILS set a new 2300-Mc. record, 44 miles. HJ has VHF-152A converter. LAO, ASN, and JTJ have new BC-457As on 3500 kc. LAO is on 27 and 28 Mc. JTJ has new rig on 28 Mc. TY has new HQ-129. JFS is running hamfest at LN's QTH. The T9 Radio Club held a meeting at GGV's. NKW is on 28 Mc. with Hammarlund 4/20 exciter and 4/11 modulator. AAL has been on 14 Mc. OJM has 105 countries for Century Club but is waiting for cards. His new four-element rotary works FB. MDU has been on 14 Mc. a lot. EMG is working on SCR-522, also SH-GGH. We will have a new RM for the 3.5-Mc. band before the next report. PMG is staying at a cottage on Great Neck, Ipswich, and is on 144 Mc. with four-element beam. JOJ is building new superhet for 144 Mc., and will be on 144.08 Mc. with a Bendix 50-watt crystal rig. PIM is on 144 Mc. ONZ spent some time at West Point, N. Y. More hams with SCR-522s are MGI, PUR, KVX, BR, AGR, RM, and LMU. KVX and LMU have BC-645 rigs for 420 Mc. FKS has returned to work after nine months of enforced rest and wants to thank the gang around Boston on 144 Mc. for their help and daily QSOs. KID has an SCR-522. IQY has a revamped TR-4 but his boat keeps him busy. GNE has new QTH in Arlington and is working the rare ones on 14-Mc. c.w. DPV, in Woburn, has quite a beam at his QTH for 144 Mc. KID has three-element Mims beam and on top of that has 144-Mc. "J." HXX has an SCR-522 and a rotary beam for 144 Mc. EL has a new yacht. NYH has his new boat in operation. NEX will be back on 144 Mc. soon from new QTH in Cambridge. Hams at Cottage Park Yacht Club in Winthrop are: BHD, GGP, MSH, EL, HXX, and QEC. QPI, the Coast Guard Auxiliary at Winthrop, wants more licensed hams. See BHD. CTW has a new sixteen-element beam for 224 Mc. NDA is going to college at Columbia in N. Y. C. Traffic: (July) W1JOJ 7. (August) W1BDU 169, EMG 47, AAL 42, OJM 20, HA 7, BB 6, JOJ 4, LM 3, MDU 2, PYM 1.

WESTERN MASSACHUSETTS — SCM, Prentiss M. Bailey, W1AZW — RM: BVR. SEC: UD. BVR is tickled pink with his new NC-173. Although inactive during the summer, EOB got his Class A ticket and is rebuilding for the coming season. JE is new ORS. At last count JE had 21 tubes in his 75-watt c.w. transmitter. Are there any awards for that accomplishment? JGY finally got going on the 14-Mc. band and has worked some real DX — four continents the first week. We hear CH is working all his DX the long way around just to be different. Mr. and Mrs. HFO had a jr. operator the last of June and since that time Harold has been pretty busy. He says he soon will be blasting the bands again with his sub-miniature-apartment-size rig. COI has heard Ipswich, Cape Cod, and N. Y. C. from Greylock with his 522 using ground plane antenna. He plans a beam for better DX. Seems good to hear KZS back on the WM Net. NGE also is reporting occasionally. IHI converted a 522 and it works swell. BIV writes a nice letter stating he has been traveling for his company during the summer. JAH traveled 2000 miles on his vacation and took lots of good color shots to prove it. He spent most of his time at Gaspe Peninsula, Quebec. LUA and FNY joined in the fun at the Pittsfield Radio Club picnic. JLT has 110 countries postwar and felt pretty good when he received a QSL from UA9 recently. Notable happenings here at AZW were a visit to BVR, a visit from PNY, and confirmation for WAC. Traffic: W1BVR 44, MIV 24, IHI 13, AZW 10, JAH 5, JE 5.

RHODE ISLAND — SCM, Clayton C. Gordon, W1HRC — DWO has finished a combination c.w. transmitter-receiver-monitor-and-antenna tuner with vibrapak which he took on vacation to Bangor, Me. He says the rig

will be available for AEC on 3.5-7-14-Mc. when he gets back. AJQ observes that with the opening of the 28-Mc. band DX edge-slipping becomes more prevalent. QR has been using the TR-4 portable-mobile. QIP is new call for 4KEV/1 and he has organized the Nitwit Network in the Newport area with MMX, OIK, PXI, HPE, and QIP for members. More wits to you, fellows. The PRA held a dinner-dance at Oates Tavern in Providence Sept. 6th. QZB has new SCR-522, swelling the fast growing ranks of c.c. 144-Mc. men. Guess that's all the news, folks, and yours truly has a few more mountains to climb so, so long until next month. Traffic: W1QR 12, DWO 3.

VERMONT — SCM, Gerald Benedict, W1NDL — PSD is experimenting with battery tubes in emergency rigs. EKU has wide-spaced his 28-Mc. beam. OAK is on 28 Mc. in Barre. MCQ is moving his beam higher and is building a new wide-spaced three-element, NDL has n.f.m. unit. MMU is trying to develop a new ham in Randolph. Let us hope that cold weather will bring greater Vermont ham activity on all bands. Traffic: W1PSD 4.

NORTHWESTERN DIVISION

ALASKA — SCM, August G. Hiebert, K7CBF — The Anchorage Radio Club highlighted the Alaska Fair with an amateur exhibit which included a complete station operating on 14-Mc. and 3.5-Mc. 'phone. W6VMB, newly arrived at Anchitka with the AACS, is operating portable KL7 with 650 watts to a Collins BC-401 and pulls in the DX with a Super Pro receiver. DM traveled to Anchorage to attend a dinner given for General Eisenhower. Also attending was CBF, now situated in Anchorage for the construction of a new broadcast station, KENI. BD has licked his crystal problem by turning to VFO on all bands but 14 Mc. JV, formerly stationed at Shemya, is with ACS at Adak. W2SLW/KL7 listens on the half hour and calls on the hour, trying to contact 7RT and other Northwest and British Columbia stations on 144 Mc. Note SCM's new address: Box 1540, Anchorage. Traffic: KL7BD 23, DM 1.

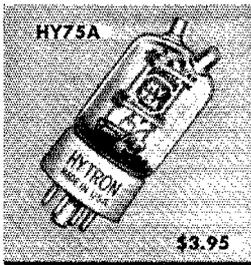
IDAHO — SCM, Alan K. Ross, W7LWU — Aberdeen: FBD knocked off seven new countries and hopes for more with new DX antenna in the making. He claims the SW-3 really drags them in. Firth: BAA is mighty proud of his new RME-152. Caldwell: EYR had to dry out equipment after the basement was flooded, but is rebuilding and plans activity this winter. Boise: The hamfest was a success despite the rain prior to 2 p.m. JQQ won the longest distance prize, a pair of 807s. Other visitors were ENC, Weiser, and IAN, Ontario. The oldest ham, ABK, won a soldering iron; the youngest, LEB, won alligator clips. KJO's XYL won a can opener by throwing a rolling pin 68 feet; OM GVN won two 6AK5s with 144 feet. The main event, the auction, was highly successful netting the Gem State Radio Club money for future plans. Navy gear, ham exhibits, and the big feed added to the enjoyment of all. Traffic: W7EMT 24, IWU 22.

MONTANA — SCM, Albert Beck, W7EQM — SEC: BWH. The hamfest at Livingston was a grand success. A lot of credit is due BWH, who worked hard to put it over. FGB was elected president, and Mrs. James Godward, XYL of KJX, secy.-treas., Livingston was selected for the event next year. JHR and LHU are new calls in Great Falls where the gang is planning a lot of 144-Mc. activity. AYC has a new HRO. BHB is rebuilding. KPY was transferred to Auburn, Wash. CPY has new 14- and 28-Mc. beams. If you want to work a good operator and a swell guy give LCM, of Huntly, a call. Earl is a shut-in and has been on his back in bed for ten years. The Billings gang built a transmitter for him and the post office employees gave him an HQ-129X receiver. You'll find him a lot on c.w. LER works 14- and 7-Mc. c.w. and 28-Mc. 'phone. The Butte Amateur Radio Club voted to donate a prize for the hamfest in Glacier Park next year. BQM took a 4-Mc. rig to work portable at Silver Gate near Cook City. BKM is in Great Falls after a spell in Seattle. FOM and JFI took in the hamfest at Spokane. Wish the BBC would get up in the mornings.

OREGON — SCM, Raleigh A. Munkres, W7HAZ — Klamath Falls: GLF has returned after vainly trying to find a place to settle in Salem. If some of you fellows from other places around the state would report, we could build up a mighty swell Oregon column. The big project in Klamath Falls for the summer was keeping the Boy and Girl Scouts in touch with their parents while at their summer camps. All operation was on 3.85 Mc. and worked out almost 100

(Continued on page 84)

Five NEW ONES!



HY75A IMPROVED VERSION OF HY75 VHF TRIODE

To improve upon the HY75 was not easy. But the new HY75A does the trick. Maximum plate current of the HY75A is increased to 90 ma. Grid-to-plate capacitance is sharply reduced to $2.6 \mu\text{mfd}$. An HY75A substituted for an HY75 in a 144-mc quarter-wave line oscillator raises the resonant frequency by 20-30 mc. Efficiency is up; 25% more useful power output at 144 mc. How was this accomplished? By a shorter mount, smaller elements, special high-voltage processing of the lava insulators, redesigned vertical bar grid, and zirconium-coated graphite anode. All at no extra cost to you. Substituted for the HY75, the HY75A requires only pruning of the tank circuit and a higher value of grid resistor. For replacement or new vhf equipment, the rugged, instant-heating HY75A is your logical choice.

5514 ECONOMICAL VERSATILE ZERO-BIAS TRIODE

The new 5514 supplants the HY30Z, HY40, HY40Z, HY51A, HY51B, and HY51Z. Economies of standardization give you the low price of \$3.95. A tube to grow with — the 5514 is efficient at plate potentials from 400-1500 volts. Associated components are economical and still usable as power is increased. At conservative CCS ratings, two 5514's handle 525 watts class C input; deliver 400 watts class B output. One HY69 or 807 can overdrive at maximum input two 5514's in class C. No costly protective fixed bias is needed for this all-purpose, zero-bias 5514. Features: zirconium-coated graphite anode, low-loss lava insulators, dual plate connections, ceramic bushing for plate cap, grid leads to pins 2 and 3, convenient 4-pin medium low-loss base and 7.5-volt filament.

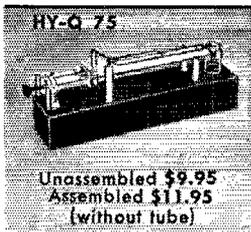
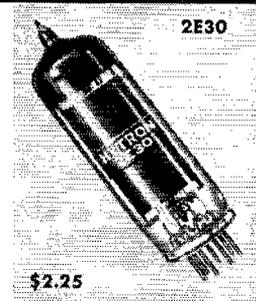


5516 INSTANT-HEATING 165-MC BEAM AMPLIFIER

Designed for frequencies beyond the capabilities of the 2E25, the new 5516 plate-modulated delivers useful power outputs of 21, 16, and 12 watts at 75, 125, and 165 mc respectively. No neutralization is needed in properly designed circuits. All electrode potentials may be applied simultaneously for minimum battery drain in mobile and aircraft use. A dish-pan stem gives short leads with low inductance and capacitance. The zirconium-coated plate and specially treated grids permit higher power outputs. Three separate base-pin connections to the filament center tap provide for lowest possible cathode lead inductance. Excellent r-f screening, high power sensitivity, conservative CCS ratings make the 5516 ideal for your mobile equipment.

2E30 INSTANT-HEATING VHF MIN. BEAM DRIVER

Fine illustration of the 2E30's versatility is Ed. Tilton's article beginning on page 31 of QST for June, 1946. Mr. Tilton uses the 2E30 as crystal oscillator, frequency multiplier, speech amplifier, and class AB₂ modulator. Primarily for mobile and aircraft vhf equipment, the 2E30 is an excellent driver or final amplifier for h-f or vhf fixed stations. Designed, manufactured, and tested for transmitting, the 2E30 has a husky, instant-heating filament and generous maximum plate dissipation (10 watts). It develops high efficiency at only 250 volts plate and screen. Imagine doubling to 144 mc with 4 watts output and 0.2 watt drive. The miniature bulb is compact, has low base losses, lead inductance, and capacitance. You can find many uses for the economical 2E30 — a peanut for size, a power-house for output.



HY-Q 75 1¼-2 METER VHF VFO

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TYPE MH Moulded Bakelite, Mica Dielectric. 18 values from .0001 mfd to .02 mfd in working voltages from 600 to 2,500.



TYPE MX Porcelain Cased, Mica Dielectric. 7 values from .001 to .1 mfd in working voltages from 2,000 to 12,500.



TYPE TZ Round Can Type, Paper Dielectric. 10 types, in working voltages from 600 to 2,000.



TYPE TX Rectangular Can Type, Paper Dielectric. Broadcasting station quality, but priced so that the amateur can afford them. 36 types, capacitors 1/10 to 10 mfd in working voltages from 600 to 6,000.

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per cent. Active participants were IRT, JRJ, FJD, HMG, KCI, WV, HYD. Special mention goes to GNJ, who handled the Bend end for local Scouts. The XYL of KCI now is LKG and is on 28 Mc. Cutler City: RM APF looks for good activity on the net this coming winter. LaGrande: HBO and KVG attended a meeting of Pendleton Club. HBO is guarding CAP frequency of 2374 kc. with BC-348. IMM visited in Baker and brought along a new National 2-40D for try-out. Pendleton: FPDH, who has been on leave of absence with the CAA to attend school, is maintenance technician with the local office. Baker: HAZ and JFM just got call letters painted on back window of brand-new Oldsmobile and are looking forward to seeing some of you in October. HWY, from Seattle is relieving the maintenance technician in charge while the latter is on annual leave. Would appreciate having reports in by the first of the month so they won't have to be held over. Traffic: W7APP 443, FNZ 8, JLU 2.

WASHINGTON — SCM, Laurence M. Sebring, W7CZY — GR, Yakima, is going to a trade school and has daily schedule with BBF, Lyman. The Yakima gang has a 50-Mc. and a 144-Mc. net covering the valley as far as Walla Walla. At Ellensburg LLU received his ticket and is on 7 Mc. AAH is working 7 and 3.5 Mc. EG is back on the air. EGR moved from Coules Dam to Ellensburg. DRT is on 3.5 Mc. and dropped in on CZY for a visit. GXP is operating from Medina with low power on 3.85-Mc. 'phone. DYD, "at Bothell," is looking for DX on 50 Mc. and says that the band does not open when it is supposed to. ATK and RY are operating 3.85-Mc. 'phone from Bainbridge Island. FVY, Tacoma, is trying n.f.m. on 28.5 Mc. FWD, Olympia, took a message from OX3GE and relayed it via long distance telephone to Pampa, Tex., and had the reply in Greenland in an hour. FRU, Woodinville, spends his time handling traffic on the Section Net and the Pioneer Net. APS, Seattle, has schedules with Annette Island and Ross Inlet, Alaska. JPK, Seattle, does his traffic work on the Mission Trail Net. He found a new pair of 810s with the aid of DGN, Seattle, and LIL, Tacoma. ACF, Auburn, is busy as Net Control of the Section Net on 3695 kc. CWN, Seattle, has been on 14 Mc. chasing the DX, but is getting set for the fall traffic season. LFA, Anacortes, is trying to work all bands from 3.5 to 144 Mc. JKB, Sedro Woolley, JBH, Mt. Vernon, LAN, LFA, and KGV, Anacortes, of the Skagit Amateur Radio Club have a net going. BLX, Everett, has a rotary three-element beam for 28 Mc. going strong. KWX, Everett, bought a Micromatch to make his standing waves lie down. EKW, Seattle, has daily schedule with FWD/FWR. DXF, Seattle, has a new rig with bandswitching push-pull 814s. DGN, Seattle, handled traffic for the JKB/7 fishing expedition north of Boise, Idaho. LIA, Seattle, tried 14 Mc.; his first DX was ZS and ZL. LEC, Puyallup, worked his rig over. The Valley Radio Club meets in IVJ's shack in Puyallup. KWC, Bellingham, ex-W9DLA, worked OH, ON, OK, HB, and LA during one session on 14 Mc. JFB, Mukilteo, has a fluorescent tube on her antenna. We should be getting new reports of flying disks soon. Please send in your activity reports on the first of each month. Traffic: (July) W7FWD 35, (Aug.) W7CZY 108, FRU 106, APS 67, DGN 55, JPK 48, ACF 31, LIA 25, JFB 6, LEC 3.

PACIFIC DIVISION

HAWAII — SCM, John Souza, KH6EL — The Honolulu Amateur Radio Club had a grand picnic on Aug. 24th. New hams: LD with 65 watts and three-element on 28 Mc.; NE using ART-13; NA on 28 Mc. with single 807. QRM on 28 Mc. around Schofield is fierce with AR, SC, MI, FC, IG, LP, GT, 6TIW, 4CCJ, 1QDS, and 6NRD. AM is using Sterba with three-element on 28 Mc. FC tacked six elements on 28 Mc. AR, at Kemoo, has 900-ft. wire on 28, 14, and 3.85 Mc. GT is working DX with 829 on 28 Mc. CL has mobile on Oahu on 28 Mc. GF has two finals with p.p. 250THs on 28 and 14 Mc. CT uses p.p. 450THs to three-element beam on 14 Mc. BW's new 14-Mc. rig is on the air. DF is on 28 Mc. looking for schedules for students and staff of Navy Electronics School. LG is looking over newly-acquired ART-13. EV is portable on Kauai. IJ is knocking over DX. DK, IL, and EL are operating 28-Mc. mobile on Maui. Traffic: KH6BW 41, DF 6.

NEVADA — SCM, N. Arthur Sowle, W7CX — Asst. SCM, Carroll Short, jr., 7BVZ. SEC: JU. ECs: OPP, TJY, KEV, QYK, and JLV. RM: PST. PAM: KHU. OES: TJL. JUO has resigned as OBS. TJY runs a kw. on Mission Trail Net. BED reports from Tonopah. KHU has another

(Continued on page 96)

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500 Ohm Line to any Class B Grids

Primary to Secondary Ratio Variable from 1:13.3 to 1: .7

Type	Power Rating	Case No.	Weight	List Price
T-261	7 Watts	3A	2¾ lbs.	\$ 9.70
T-262	18 Watts	4A	5¼ lbs.	13.20

Any Line or Single or Push Pull Plates to Class B Grids

Primary to ½ Secondary Ratio Variable from 7.0:1 to 1:9.0

Type	Audio Rating	Case M Size	Max. Pri. D.C.	Max. Sec. D.C.	Weight	List Price
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T-263	18 Watts	4A	200 MA	200 MA	5¼ lbs.	15.25

FILAMENT TRANSFORMERS

Primary 115 Volts, 50 to 60 Cycles

Type	Sec. Rating	Insul. Test	Case No.	Weight	List Price
T-393	5/5.1/5.25 V. — 26 ACT	2000 V.	5A	9½ lbs.	\$17.30
T-394	5/5.1/5.25 V. — 32 ACT	2000 V.	5A	10½ lbs.	18.65
T-395	6.3 V. — 20 ACT	2000 V.	5A	9 lbs.	15.30
T-396	6.3 V. — 30 ACT	2000 V.	5½A	12 lbs.	21.00
T-397	6.3 V. — 12 ACT	2000 V.	4A	5¼ lbs.	10.90

PLATE TRANSFORMERS

Primary 115 Volt, 50 to 60 Cycles

Type	Primary Conn.	Secondary Volts		M.A. D.C.	Case No.	Weight	List Price
		D.C.	A.C.				
T-673	High	3000	3400-0-3400	400	10A	82 lbs.	\$110.00
	Low	2500	2840-0-2840	500			
T-674	High	3000	3400-0-3400	800	Special End Castings	135 lbs.	155.00
	Low	2500	2840-0-2840	1000			

These Units are designed for Continuous Duty on Low Voltage Taps at 85% of D.C. Current Rating.

REACTORS

Type	Inductance At Rated D.C.	Rated D.C. MA.	D.C. Resistance	Insul. Test	Case No.	Weight	List Price
T-180	10	500 MA.	60	7000 V.	8A	26¼ lbs.	\$43.00
T-181	5	1000 MA.	18	7000 V.	9A	50 lbs.	63.00
T-530	6/20	500/50 MA.	60	7000 V.	8A	26¼ lbs.	43.00
T-531	3/10	1000/100 MA.	18	7000 V.	9A	50 lbs.	63.00

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Type	Audio W. Pri.	Class C W. Sec.	Max. Pri. D.C.	Max. Sec. D.C.	Max. D.C. Voltage	Primary Range Ohms	Sec. Range Ohms	Case No.	Weight	List Price
T-441	125	250	250 MA.	250 MA.	1500	2000-20000	200-20000	6A	15½ lbs.	\$25.20
T-442	600	1200	400 MA.	400 MA.	3000	500-18000	200-19000	9A	45 lbs.	67.50

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Preferred by amateurs for antennas and transmission lines, Twin-Lead transmits signals with minimum loss, is durable and inexpensive. The Ethylon-A dielectric is full thickness edge to edge, minimizing impedance changes caused by moisture collecting on the surface. Amphenol Twin-Lead is unaffected by acids, alkalis and oils. Flexibility remains unimpaired at temperature down to -70°F .

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(Continued from page 94)

antenna and is putting up some big sticks he obtained from PST. BVZ shows activity on Mission Trail and 3.5- and 7-Mc. c.w. JU reports activity on Pioneer and OLZ Nets and also progress on the club. JLN has ex-police transmitter and converter on 28-Mc. mobile. PGD has a top-loaded 65' vertical. CDM has his high power on 7 and 3.5-Mc. c.w. DVJ now is 5DVJ on 3.85 Mc. at Farmington, N.M. LCK has a new antenna and plans a long wire across the canyon that will be 1000 ft. long! KUP is on 3.5-Mc. c.w. in Vegas. NIV needs only Nevada for WAS! He reports a new man in town is LCF on 7-Mc. c.w. Traffic: W7KHU 87, JU 62, TJJ 50, BTJ 10, BVZ 7.

SANTA CLARA VALLEY — SCM, Roy E. Pinkham, W6BPT — Asst. SCM, Geoffrey Almy, 6TBK. RM: CIS. PAM: QLP. WNM has added the fourth element to his beam and reports some additional gain. ZZ has new HRO and is working good DX with it. HC is digging post hole for his mast and is ready to raise a new antenna. SYW and party attended the ORC Hamfest. MUR plans to attend party at Shasta driving his new Ford. NX is installing new beam for 28 and 14 Mc. RFF has added ten new countries to his DX list. LCF returned from a trip to Los Angeles and reports lots of surplus gear in evidence in that locality. OVK is organizing 50-Mc. round table for Wednesday nights. TBK has his rotating motor installed on beam. WUI is building five-element beam for 14 Mc. Reports are not coming in on time, so please be sure and get yours in the mail not later than the third of the month. That will insure your report being included each month. Traffic: W6RFF 26, HC 23, DZE 13, TBK 8, SYW 2.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM, C. P. Henry, 6EJA. SEC: OBJ. RM: ZM. EC: QDE. Asst. EC u.h.f.; OJU. The Richmond Golden Jubilee was held Aug. 22-23-24, celebrating the 50th birthday of the City of Richmond. LMZ had the best set of face fur in the wiskereno contest. The Richmond Amateur Radio Club was given space in the Industrial Exhibit Building. Low-power rigs were installed operating on 144-, 28-, 7-, and 3.85-Mc. 'phone. Several other pieces of gear were on display and in order that more than one station could be used at the same time three calls were used — EJA/6, KEK/6, and NJX/6. Coast-wide traffic was given to the Mission Trail Net on 3.85-Mc. 'phone and other traffic was handled on 7-Mc. c.w. according to EJA. On Sept. 7th the Oakland Radio Club held its hamfest at the Alameda County Zoological Gardens with over 500 attending. The usual races, baseball game, speed contest, 144-Mc. transmitter hunt, dancing, and raffle drawings were enjoyed. John K. Chapel, of KROW, was master of ceremonies. OLL was general chairman and was ably assisted by HHM, KTI, MNG, KLO, ELW, NTU, SSN, UHM, OBJ, ZIG, AHG, AKB, WGE, WKL, YMO, MFZ, KZN, ZGA, YTM, JYR, ZLX, TUN, QBL, UFD, EE, SMF, BF, and ZM. ZAC has a new call after all these years — ZB. QBU's new call is US. NZ is putting up windmill tower and three-element beam to help him get that DX. IKQ has new four-element beam on new tower for 28 Mc. QDE is building two rack and panel jobs and reports the Richmond gang going FB on AEC tests. YDI has an HK257B in the final running 250 watts on 'phone and 300 on c.w. CRF installed a 28-Mc. rig in the family car. CDA is getting ready to rebuild to higher power. The combined membership on both 'phone and c.w. of the Northern California DX Club, Inc., has worked close to 200 different countries. TT still leads the East Bay Section with 136 postwar countries worked; TI is in second place with 118. UPV wins anywhere from one to five prizes at all ham doings. He won the first prize, a Hallicrafters SX-40, at the ORC affair. BUY's XYL would not let him operate his rig while on vacation this year. SS is moving to Montana, so get ready for some QRM, you W7s. FXX is an expert with the slide rule. OBJ had one of his balloon antennas shot down at the hamfest. Let's get those reports in, gang. Traffic: W6EJA/6, KEK/6, NJX/6, 59, YDI 21, CRF 15, EJA 9, TI 8, EY 4.

SAN FRANCISCO — SCM, Samuel C. Van Liew, W6NL — Phone 7-0457. RM: RBQ. SEC: PTS. CEC: SRT, KNZ. MHF is going in for traffic and is building a new rig to work 7- and 3.5-Mc. traffic nets. VPC, ex-9WWR, is going strong on the Pioneer Net nightly at 7 P.M. EYY reports working six new countries during August and now has fifty-six countries in all. From Pt. Reyes, VKT hooked his first LU on 7 Mc. and the LU came back on a straight CQ. He also claims the forty contact with VK2PW. George is ex-AQJ. From Eureka we received the following: FYY

(Continued on page 100)

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4C35

These Hydrogen Thyratrons are hot-cathode grid-controlled gas rectifier tubes especially designed for zero bias pulsing service at high repetition frequencies, high peak currents, and high voltages.

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Average anode current	200 ma. max.	100 ma. d-c max.

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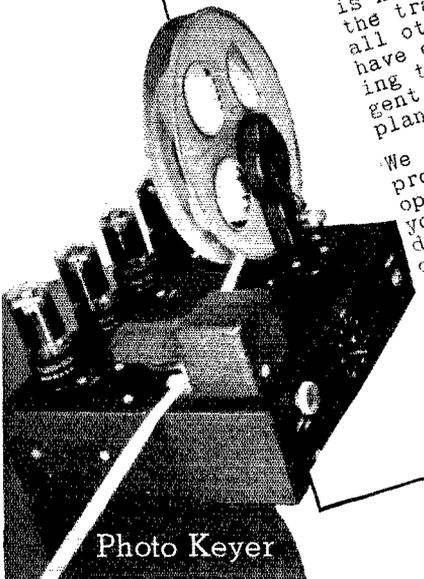
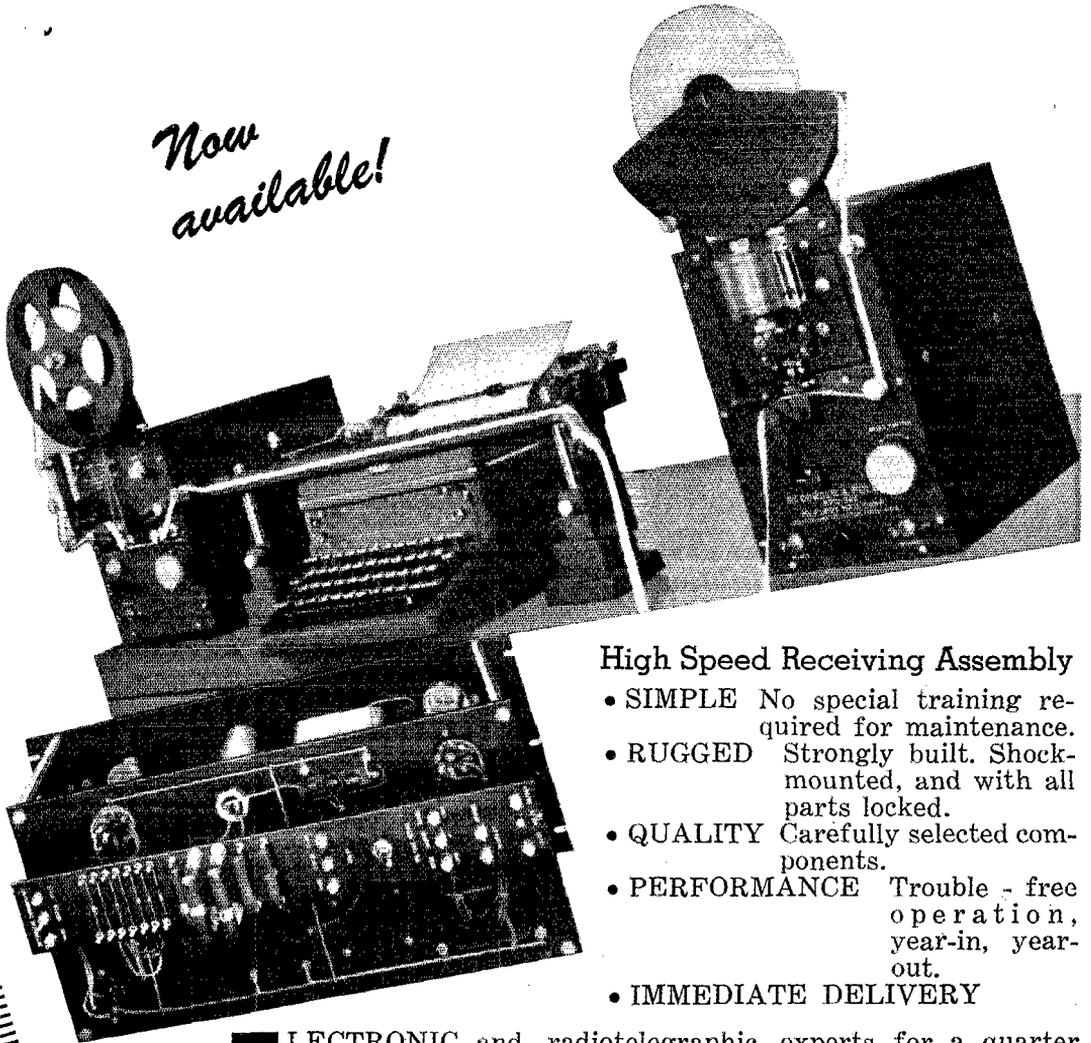


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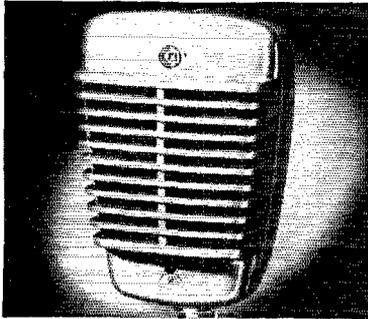
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(Continued from page 96)

has taken Class A License exam. CWR is rebuilding final on transmitter. QBC is taking life easy, fishing and hunting for a spell. DQA moved to Eureka from Porterville. ZZK is going to put up a new beam for 14 Mc. SLX is trying to get bugs out of his surplus gear. Jack Thompson, an ex-W7, now is located in San Francisco with the call 6ADQ. NL just returned from his vacation in the southern part of the state. KG6AM is recuperating in the Oak Knole Hospital, Oakland, California, from a plane accident. Paul would appreciate hearing and seeing some of the many friends he has contacted in the past. He may be reached by phone WA 1-1166 or WA 1-7969. Paul Evans is in Ward 41B. IILF was in San Francisco for a short visit working a schedule with his friend 3DD from 6NL. Gunnar Ahlstrom, JQJ and VK2AQJ, sends the following information: JQJ is assistant chief engineer of broadcast station 2TM at Famworth, N.S.W., Australia. 2TM is a 2000-watt station with broadcast, short wave and very high frequency experimentation. The ham rig soon to be completed is 807s modulated by 6L6s. JQJ intends using three-element rotary beam on 14,008, 14,164, and 14,392 kc. He may be reached at P.O. Box 233, Famworth, N.S.W., Australia. Gunnar sends 73 to all his friends in the U. S. ham fraternity. The San Francisco Naval Shipyard Radio Club is looking forward and preparing to participate in the coming Navy Day program Oct. 26th. The San Francisco Radio Club and the Bay Region are looking forward with pleasure to the visit to this city of ARRL President, Mr. Bailey. The club has called a special meeting and program for the occasion. Traffic: W6NL 115, VPC 29, MHF 10.

SACRAMENTO VALLEY — SCM, John R. Kinney, W6MGC — Aest. SCM, R. G. Martin, 6ZF. SEC: KME. RM: REB. OES: PIV. OOs: ZF, OJW, and ZQD. REB is clearing traffic for county and the California State Fairs and still is top traffic scorer for this section. ZQD is a new Official Observer appointee located at Central Valley. Watch your signals, fellows. AF reports again that he turns out Official Broadcasts four times per week and that he copies directly from Headquarters. OJW went deep sea fishing off the coast of Southern California. He plans 75Ts for the rig and is building high gain preselector for receiver. WEG has 500-watt rig and plans to put up beam for 28-Mc. and also take his Class A exam. ZY is proud papa of new jr. YL. RMT is expecting a junior harmonic, either YM or YL. VDR operated portable in Oakland while looking for a new QTH and stated that messages handled were delivered, while at his Colfax QTH they are relayed, which he says is a better deal. VDR says he has replaced his 81s for 866s and has received a QSL from ZL2MM, but still needs a Delaware card for WAS. He states that he is fighting HCI with neighbor's Universal a.c.-d.c. table model b.c. set. YTN is on 14-Mc. c.w. with 75 watts with an 807 final to a 14-Mc. folded dipole antenna and has an NC-173 receiver. FW has a rig on 28, 27, and 50 Mc. WTL and YTN expect to operate at the SARC booth at the California State Fair, under the call of W6JN. Traffic: W6REB 511, VDR 13, ZF 11.

PHILIPPINES — Acting SCM, Craig B. Kennedy, KA1CB — The monthly meeting of the Philippine Amateur Radio Assn. was held July 27th at the residence of Teddy Kalaw, jr., in San Juan Rizal. The meeting was presided over by CB, the Acting SCM, who spoke on the Rhode Expedition in the Antarctic. The following new officers were elected: Teddy Kalaw, jr., pres.; Earl Hornobstel, vice-pres., Elpidio G. de Castro, secy.-treas. Among those present were Harry T. Chaney, 1RT1, 1RP, 1RC, 1ABU, 1NR, 1CB, 1ABV, 1ABT, John M. Lee, Earl Hornobstel, James Gourovich, James B. Lindenberg, Hack Sanataromana, Rodolfo E. Conception, Fred A. Carino, and Alfredo Hashim. Members of the Association may be contacted by communicating with the secretary, c/o Radio Training Institute, 345 Palma St., Quiapo, Manila, P.I.

ROANOKE DIVISION

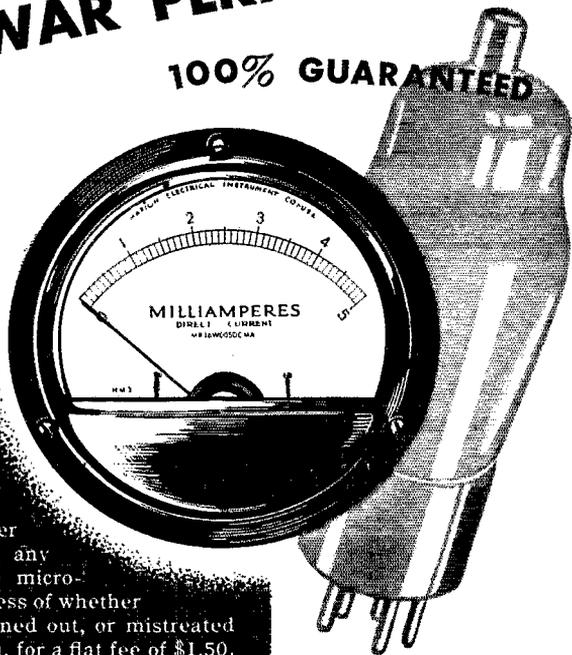
NORTH CAROLINA — SCM, W. J. Wortman, W4CYB — BYA has slowed down considerably, but still is devoting more time to the work than most. BCS is doing a lot of work on 50 Mc. NI, with a new beam on 14 Mc., is getting out FB. JRZ has a new receiver about ready for airing. KJS is trying to iron out the bugs in a new high-powered rig. IDO plans plenty of 28-Mc. activity this coming winter. If house painting doesn't interfere, HUL will be on with a gallon one of these days. IZR, LAH, and DCW are in

(Continued on page 108)

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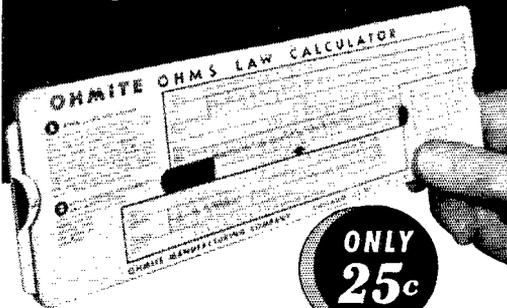
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a three-way race for the DXCC. May the best man win! EAA is running an 813 after DX on 14 Mc. BXX is busy trying to engineer a long antenna on a short lot. We have that trouble, too. EIU works plenty of DX on 14 Mc. with a half-gallon. GEO has a new QTH, teaching radio at Taccoa Falls, Ga. Turn down the gain, Ed. A new jr. operator has slowed down the activities of GQY. HVO is a nightly voice on 3.85 Mc. IFI splits time between 3.85 and 7 Mc. LSB has had her ticket for four months and already has 42 states confirmed on 7- and 14-Mc. c.w. EAM occasionally gets to operate 14-Mc. c.w. when the XYL (LSB) will let him use the rig. Guess you will have to build another rig, Herman. Several appointments have expired because of no request for renewal. Better check yours, and file a request for endorsement if you haven't already done so.

SOUTH CAROLINA — SCM, Ted Ferguson, W4BQE/ANG — TFP is working 28 Mc. with a converted police rig with 20 watts, and had a visitor in the person of 3NMA. FMZ has changed his QTH to Orangeburg. The Columbia Club will miss his support. DPN can be heard on 3.85-Mc. 'phone and keeps schedules with EZF, IZS, and GUZ. HJR reports that his activities are confined to 7Mc. BPD comes through with a letter. He has worked 172 postwar countries. Nice going. Boys, September brings on the beginning of real ham activities. May we all strive to do something for amateur radio this coming season. Let's play the game fair. Give the little fellow his chance and above all let's do something for the good of our country and the community in which we live. We must justify our rights and the privileges that we enjoy by being more than just amateurs for a hobby but of real value to our fellow citizens. Let's join a net, become an official station, improve the emergency set-up in your city, form a club and teach a course in code and radio for the benefit of those who would like to become a part of us. And last but not least, report your activity to the SCM. Thanks, fellows. Traffic: W4DPN 9.

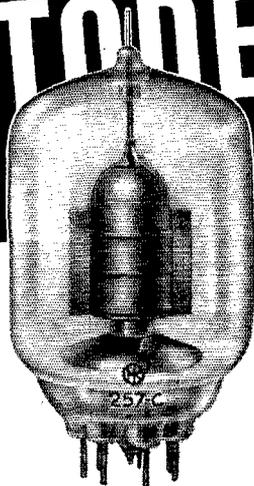
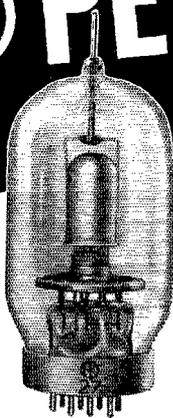
WEST VIRGINIA — SCM, Donald B. Morris, W8JM — The Charleston (KVARA) Radio Club elected following officers: CSF, pres. and delegate to State Radio Council; QHG, vice-pres.; UEB, secy.; AVW, treas. For WACWV, two more counties now have active stations, ALR in Tyler and HUG in Wood. Both are active on 3.5-Mc. c.w. Congrats to MOP on obtaining radiotelephone 1st class. New ORS: EZR, Huntington. New OPS: QHG, Charleston. AVW, a new amateur, has new HRO receiver and HT-9 transmitter. VMK built an e.c.o. which is a pleasure to hear. GBF, RM and NCS for 3770-kc. State Net, has installed additional frequency measuring equipment and uses fixed frequency receiver on net work. CSF has BC-624 receiver for use in u.h.f. tests between Charleston, Huntington, and Morgantown. SGO, ex-NY4AC, visited MARA and spoke on ham radio in NY4 Land. MARA elected JM and ESQ as delegate and alternate to the State Radio Council. KWI visited ARRL Headquarters while on vacation. EHA has new rotary beam antenna on 28 Mc. REH has rebuilt and operates 14 Mc. with an 813. Don't forget to register your emergency equipment with your EC. Do it now. Traffic: W8GBF 12, JM 5, FMU 3.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Glen Bond, W0QYT — TPU, formerly 5HYQ, is engineer at KSFT and is operating on 28 and 7 Mc. with 40 watts. He has a new 8-40 receiver and is building an 813 final. SXI is on 7 and 3.5 Mc. and is taking advantage of the FB 28-Mc. skip. ZXL will be on 28-Mc. this fall. He took his old post at the bank after the Marines turned him loose. OWI is with KSFT and is on 28 Mc. with an 829. Lloyd is a new-comer to Trinidad. NVU is back on 28 and 7 Mc. after a sojourn in Corwin Hospital in Pueblo. He has acquired an SX-28A and is building a mobile rig. LZV reports that the c.w. emergency net in Colorado Springs is going in fine style on 3700 kc. The gang welcomes anyone who wishes to join them on Monday and Friday at 7:30 p.m. IQZ got in some good work this month with the emergency messages to and from the Bighorn forest fire with the splendid help of 7HDS in Cheyenne. Mitch has some good 14-Mc. c.w. DX such as RK6HA, Bikini Air Strip, KV4AA, K84AF, VR6AA, PA6PN, SM5TZ, and a couple of Russians. Charley Thurin was a visitor at a special meeting of the Electron Club at the home of VGC. Charley is taking his 28-Mc. rig back to Oak Ridge and will be on with a W4 call soon. Everyone who has portable or emergency equipment is requested to register

(Continued on page 104)

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MAX. FREQUENCY, Mc.: Power Amplifier	200	125	150
INTERELECTRODE CAP: C _g -p.u.f.	0.035	0.04	0.08
C Input u.u.f.	5.7	6.2	11.9
C Output u.u.f.	2.9	4.5	4.6
FILAMENT: Volts	6.3	5.0	5.0
Amperes	3.0	7.5	10.0
PHYSICAL: Length, inches	4	5 1/8	6 1/2
Diameter, inches	1 3/8	2 1/8	3 1/2
Weight, Oz.	1 1/2	3 1/2	7
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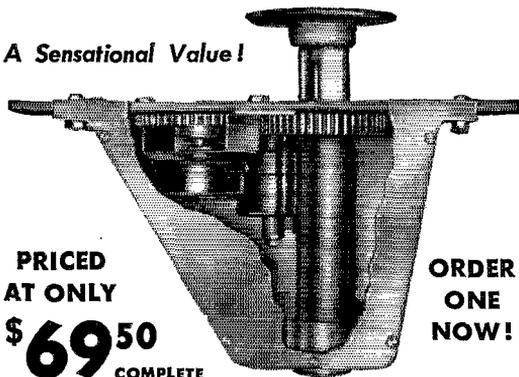
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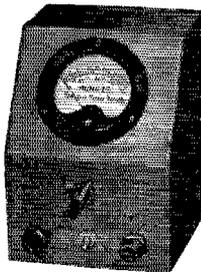


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same with your SCM so we can get some state-wide emergency nets going.

UTAH-WYOMING — SCM, Alvin M. Phillips, W7NPU — KHI, a new-comer, works DX and traffic with a pair of 616s and has only a few states left for WAS. FYR, a prewar traffic man, sunk his teeth into some choice DX this month. MQL reports accomplishing the impossible in Ogden — getting a reply to a 144-Mc. CQ. UTM is interested in traffic and schedules 5LSN Monday through Friday, and has applied for ORS appointment. DAD is back from vacation and has applied for OO appointment. KTY is experiencing the well-known "bout" with his new 807 final, getting it ready for full action. FST moved QTH to Clearfield, Utah. BLE has new 14-Mc. rotary. TRM is moving to Provo. JHH received OPS appointment. CGK has SCR-522 fired up on 144 Mc. OWZ and JHL tried to work 90 miles on 144 Mc. but signals were not quite readable. HDS, EUZ, and 00KF went to Denver Hamfest. ICZ has new NC-200. KIM was transferred to California. There are several appointment certificates overdue for SCM endorsement. Please check date and submit to SCM if necessary. Also as a reminder, the deadline for activity reports is the first day of the following month. Traffic: (July) W7UTM 30. (August) W7UTM 15, KHI 1, MQL 1.

SOUTHEASTERN DIVISION

EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — Cortez: GIC and DQW have 144 Mc. under control with SCR-522s. DQW is assistant SEC to JQ. Deland: A ham club has been formed with WS, pres.; GY, LXO, and KOA. Emergency communications will be the watchword. Ft. Myers: CQZ is again active. KET is rebuilding. Jacksonville: NARTU at NAS is on with MBI, PI, EHU, and IVX, with call K4NAR. IVX, FJC, and CFO are working hard on 144 Mc. EID told JARS about 50 Mc. and MUF, which is timely news these days. GIP is back with new layout of p.p. TZ-40s on 7 Mc. KRT, ex-J9ACS, is on 28 and 50 Mc. Watch this fellow; he hung up a good record while in Okinawa. Congrats to HWA, on 3.85 Mc. at last. LCG is on 28 Mc. and JKI on 50 Mc. with 813s. It's back to U. of F. for HRB. Miami: It's OO for BYF, and Class I, too. HIU is doing FB job with Red Cross communications. Look for KZ5MX, ex-4IP, on low end of 14 Mc. It's back to college for KPW. See September *Dade Radio Club Bulletin* for ARRL achievement roll on Miami hams if you want to know who's who there. Orlando: QN is really laying them low on 50 Mc. St. Petersburg: Tampa and St. Pete Clubs joined hands at the home of FPC for junior hamfest. Tampa: 144 Mc.? Here's the dope. 7:30 a.m. and 8:00 p.m. daily with KM, BYR, ALP, QA, and FPC at St. Pete. SCR-522s and UHP-2s are used with three- and six-element beams. The Tampa Club is on with new rig. DES is president. Nets: The USCGA net is running smoothly on 3855 kc. with ES at the helm. Able assistants are GJI and QR. Deck hands include HGO, DQW, AFO, ISR, EHZ, FUM, BB, and FWZ. This Shore Radio Net will fill the gap as an aid to mariners. JQ and WS have the Florida Emergency 'Phone Net ready for anything on 3910 kc. Look for the c.w. gang on 7185 kc. for a good rag-chew. Traffic: W4BT 92, FWZ 28, IKI 13.

WESTERN FLORIDA — SCM, Luther M. Holt, W4DAO — JBH and JM visited Pensacola. KJE scheduled her husband, JV, while in the hospital. FAX, from Crestview, attended Pensacola Amateur Radio Club meeting. QU keeps busy with Naval Reserve Unit. KFP got a pair of 807s from JPA. EGN moved from 14- to 28-Mc. 'phone. CNK visited his folks in South Carolina. DNA visited AXP. MFO is newest Pensacola call. HQ made a business trip to Venezuela. 5NDB/4 built new rotary beam. MHK, from Birmingham, visited in Pensacola and operated mobile while there. MEN added more power. MS spent two weeks active duty with Naval Reserve at Norfolk. MFX is new ham at Fort Walton. ACB is getting on 50 Mc. and is anxious to work the Pensacola gang. FHQ shipped Signal Shifter to DLE in Tokyo. HIZ has 144-Mc. rig. Your SCM would appreciate reports from everyone, and especially from the fellows in the eastern part of the section. Traffic: W4IQV 61, BYF 50.

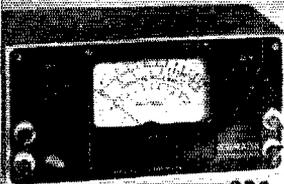
WEST INDIES — Acting SCM, Everett Mayer, KP4KD — W3DCZ/KP4 now is KP4FK, K7JDA/KP4 is KP4FH, W7IQS/KP4 is KP4FC, and W9UGU/KP4 is KP4EU. KP4BE, BM, ES, and W3DCZ/KP4 worked PK1MF on

(Continued on page 108)

SILVER

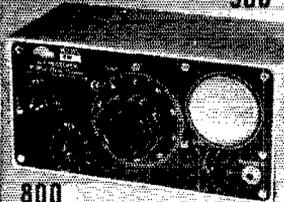
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MODEL 701 TRANSMITTER goes into more amateur stations to produce more CW and phone DX than anything else, it seems. A 6AQ5 Tritet drives an 807 to 75 watts CW, 30 watts phone, input, 80 through 6 meters. Modulator is built-in. Less coils (3 per band at \$.50 ea.), power supply, 4 tubes and crystal, it's the outstanding transmitter "buy" at **\$36.95**.



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MODEL 801 RECEIVER covers 450 kc. through 60 mc., consisting of r.f. stage, regenerative detector, two a.f. stages and built-in speaker, it's the old reliable standby — just the thing for portable, emergency, test — and serious ham reception. **\$29.95** for 6.3 volt operation; **\$28.95** for 1.5 volt dry battery tubes; coils, **\$1.00** per pair.



801

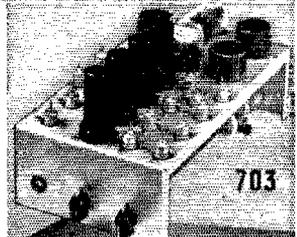
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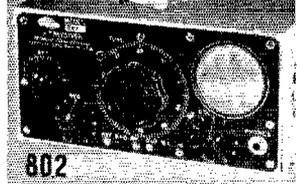
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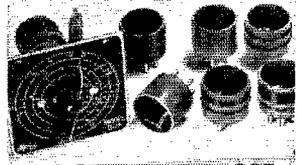
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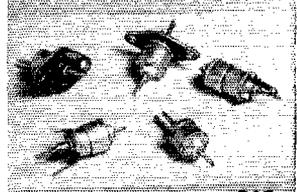
802



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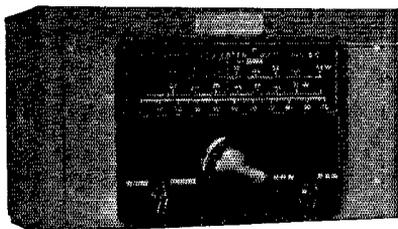
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28-Mc. 'phone. W3DCZ made a nine-hour WAC on 28-Mc. 'phone with his 40-watt Meek rig. AM worked ZS4, 5, 6, SU1, LU2, I1, C2, 3, 6, OA4, XE1, TG9, VO2, and KP4ES on 28-Mc. 'phone with 25 watts input. DH, KD, and KV-4AA worked each other on 14-Mc. short skip. FC has a pair of 807s running 80 watts. CZ heard ES on 28-Mc. 'phone. FH worked UH8, UC2, TFI, VU2, and UB5 with 100 watts. NY4CM reported by radio via WITW. The Santurce gang has organized the Borinquen Amateur Radio Club with CC, pres.; BY, secy.-treas. BJ is going VFO. DT has BC-312 receiver and Signal Shifter. KD worked 52 countries during August. CC, CU, CN, JA, CD, AZ, DC, DP, ES, BI, and BQ are active on 28-Mc. 'phone. Traffic: NY4CM 10, KP4KD 8, FH 2.

SOUTHWESTERN DIVISION

ARIZONA — SCM, Gladden C. Elliott, W7MLL — PDA and JYJ are on 3.85 Mc. at Flag, JMQ has 500 watts on 3.85 Mc. SBN has a new e.c.o. and bandswitch rig running 125 watts. LIJ has a pair of 807s on 28 Mc. The Williams gang is going high power: RU has p.p. 813s for 500 watts; GYK and JZD have p.p. 810s for 1/2-kw. each. JPY worked C9JW, CR7AL, CR9AN, and ZS2C on 14-Mc. c.w. in an hour. 3HKC/7 has 300 watts on 28 Mc. at Benson. 4MGD, ex-6IIG, at Craigfield, Ala., is on 14-Mc. c.w. LLO, Tucson, has p.p. T55s on all bands. LMS, ex-9DZA, is on all bands. Tucson has a new XYL operator, ORD, ex-2ORD. LLX and LIH are new Tucson hams. 0NKW reminded GV of a 1908 QSO in a recent 28-Mc. contact. UPR worked 6RZA/MM, who used 3 watts in the Indian Ocean. SLO is back in Tucson. OAS kept RU advised twice a day on his XYL's condition while she was in the Phoenix Hospital. JNN uses a walkie-talkie for mobile work on 28 and 50 Mc. CDX is on high power in Bisbee. KWP ran his antenna to the top of the canyon in Bisbee. PEY has 71 countries with 60 watts. VOZ worked a lot of Europeans — he flew over in a B-29. KAG has a Meek T-60 on 3.85 Mc. 5NAP/7 has a new four-11 rig. See you the third Sunday of each month.

SAN DIEGO — SCM, Irvin L. Emig, W6GC — VJQ and YXI have 500 watts and a new four-element beam on 28 and 7 Mc. and are starting on a 50-Mc. rig. BGF schedules Pioneer Net at 10 p.m. week days. LUJ worked another country, OX3BD. YYW is putting the 28-Mc. doublet up again. QG and DEY have a set of 723 AB Klystrons. BAG and YBI are active on 144 Mc. MKW has deserted 144 Mc. temporarily for 7-Mc. c.w. GSZ is active on 14-Mc. 'phone. DKN has been conducting horizontal polarization tests on 144 Mc. ZAK and ZBE are new Santa Ana calls. NGN, of Buena Park, is on 144 Mc. with TR-4B, but has SCR-522 coming up. BWO is trying to get bugs out of 6AG7s in new all-band exciter. YWS is active on 28 Mc. at Fullerton. ZWY has pair of 35Ts on 28 Mc. and is getting his share of DX. IZ, of Balboa Island, has VHF-152 converter. BWO and MKW attended council meeting at Wilmington on August 25th. UNJ and VSG are on 14 and 28 Mc. at Laguna Beach. ZON, of Anaheim, is on 7 Mc. with converted BC-459A rig. FCI is on 7 Mc. with Signal Shifter. BAG, of Newport Heights, has SCR-522 transmitter and ARR-5. YBI works 144 Mc. with SCR-522 while spinning platters at KVOE. ZWL is doing good work on 7 Mc. with BC-459A, as is UEF with similar rig. QKT swung his 28-Mc. beam around on UYA and burned out latter's 8-meter! The LDJ-LEN combination continues to garner new countries with 14-Mc. gallon. QG has some Klystron gear. HWJ has m.o.p.a. rig with 832 on 144 Mc., plus new 522 receiver. VKA, at Newport Beach, is active on 144 Mc. with 522. TIK, at Orange, continues with many Pacific schedules on 28 Mc. MKW put a Signal Shifter on 7 Mc. and snagged a KL7 in Bering Sea. WKX is active on 144 Mc. at Oceanside with SCR-522 and beam. Traffic: W6LUJ 56, VJQ 18, BGF 12, YYW 11, FMJ 10, LDJ 8, YZD 2, RZD 1.

WEST GULF DIVISION

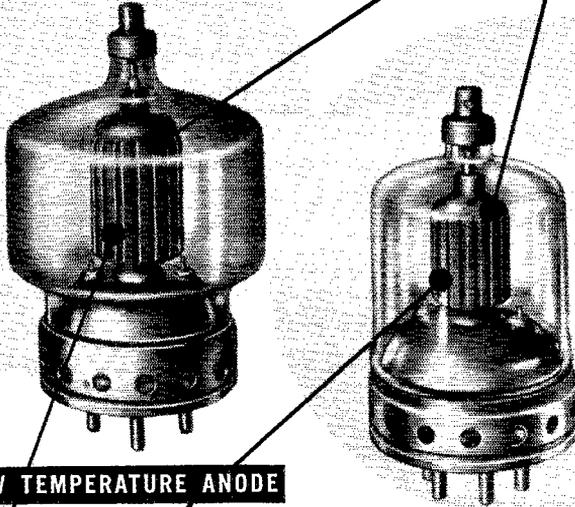
NORTHERN TEXAS — SCM, N. C. Settle, W5DAS/MNL — Asst. SCM, Joe Bonnett, 5III, SEC: QA. PAM: ECE: RM. CDU. Among other West Texas hams at the convention were QA, DVQ, SP, IHG, GNE, NW, BJ, and FPH, NW won the most useful prize. BJ won a much-needed Signal Shifter. LNK, from Dallas, recently visited his old home town, Sweetwater. RG and LKL are working plenty of DX on 14 Mc. GFN is about to get set for portable.

(Continued on page 108)

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mobile on 28 Mc. The Northwest Texas Emergency Net now has 28 members: AOT, IDB, BJ, HPR, DSV, LDG, FPH, GNE, AMU, AWT, BFA, EGJ, EYX, IJQ, IZW, JQD, KTX, WV, GDX, HZX, IHG, FNQ, GUD, PO, KYB, GFN, DN, and QA. Net Control for this net is DN. The Net operates on 3950 kc. at 8 P.M. every Monday. Thanks for the privilege of being your guest reporter this month — DN. DZ is near Lake Waco with a rhombic. LYX is on 28-Mc. 'phone. JUN is on 3.85-Mc. 'phone. GDV, at Vets Hospital, is on all bands. LTY reports the Ft. Worth Club has SCR-299 truck complete. ARV worked 77 DX stations last month. OJ has J9 and CE schedules. The SCM's new mailing address is 2922 Elm St., Dallas. NFZ has an HQ-129X. JQY has a new Silver 701. MC has a new Collins 30K, and an HRO-5. FDI has a new HQ-129X. GGD has a new Supreme. KI has a new beam. NEK has a Silver 701 on 28-Mc. mobile. EVI is on 3.85 Mc. BJ is on mobile. CI is on 28 Mc. BG is on 7-Mc. c.w. Traffic: W5OJ 35, ASA 21, CDU 21, GZU 21, MVX 17, GUD 10, ILZ 9, LOS 9, FMZ 8, BYX 6, MJN 6, BBH 5, LTY 3, ARV 1, NFZ 1.

OKLAHOMA — SCM, Bert Weidner, W5HXI — Asst. SCM, George Bird, 5HGC. The following report was written by HGC. MJN went into double harness Aug. 6th. A part of the honeymoon was spent with IGO, and with GZU, HVL, EGA, GVS, ISE, and their XYLS, a regular hamfest was held. FOM, Bartlesville Radio Club, held a birthday party for EST, MXB, and MLF at the-shack of GOL, EC of Washington County. GOL's air conditioned shack, complete to Panadaptor, caused lots of drooling among other club members. HXU gave his emergency gear a real test on a recent trip throughout Colorado, New Mexico, and Texas by maintaining a nightly schedule with IGO on 3.5 Mc. The Lawton-Ft. Sill Amateur Radio Club organized with HXU as president and IGO as secretary. COX, ex-5GFT, former Oklahoma SCM, is reporting into OLZ Net from Minneapolis. 6VMV/0 is reporting into OLZ Net from Denver with traffic from Fitzsimons General Hospital. ISE is getting ready for 3.5- and 7-Mc. operation this fall. ADC is using a BC-457A while rebuilding for more power. EAK has a new 250-watt rig. ATJ, ITF, KDH, HFW, EIH, GOL, and HGC have been active on 3.85- and 14-Mc. 'phone despite QRN and hot WX. FDQ is new EC for Tulsa County. TARO has 2.5- and 3-kw. emergency generators. HXU, GOL, and KDH are new ECs in Pomanche, Washington, and Pawnee Counties respectively. OLZ Traffic Net is in fine shape for the load of traffic which we hope cooler WX will bring. Traffic: W5JKS 31, AHT/AST 24, GVS 20, IGO 19, ADC 7, FMF 7, IOW 3.

SOUTHERN TEXAS — SCM, Ted Chastain, W5HIF — SEC: HQR. PAM: EYV. Bob Cooper, PAM for this section, is trying to work up a 'phone traffic net. Any of you who are interested, contact him or myself for further details. HZJ is on 14-Mc. 'phone using n.f.m. and reports a list of postwar countries for the following San Antonio stations: FNA, 124; BE, 123; GKI, 90; LGG, 66. JLY has 38 states and 3 countries on 50 Mc. KZT is new ORS and OPS in Houston; his rig ends in p.p. 8006s. PNH is secy.-treas. for STEN. JBZ, editor of STENSCOPE has moved to New Braunfels — new QTH is Box 248. BZL now is Class A. STEN is to be complimented on the splendid manner in which it responded to the alert during our two recent threatened emergencies. The c.w. section of STEN has ten active stations; CVQ is NCS. MCZ is EC in Kenedy. LWV reports that the El Paso Amateur Radio Club has new club rooms at Fort Bliss with a transmitter for all bands. MKL, with 30 watts, worked a VK2 on 7 Mc. HJB, OPS in Orange, has been transferred to Mexico and will be on with an XE call. JFC is back on after a session at the hospital. During a recent storm in Houston, GLS lost all of his antennas and part of the roof of his house. EWZ has new 28-Mc. rotary. FBC has new Meissner Signal Shifter and has 53 countries on 28 Mc. CCD has 55 countries on 28 Mc. New calls in Corpus Christi are: NKI, IBT, NIF, EAE, 7KPT/5, and NHV. KMV reports for the Laredo gang: IDT works 28 Mc. with three-element beam. HSV and LFG also are on 28 Mc. BFT is building VFO and works on 7 and 3.85 Mc. LOE's radio supply house was destroyed by fire. MZH, NLG, and NLS are on 7 Mc. Congrats to NET and NES on new jr. operator. MKY has 1/2-kw. on 7 Mc. CU, in Zapata, has a Meck T-60 going on 7 Mc. In answer to numerous questions concerning eligibility for LO-Nite, if you hold the necessary appointment, even though your name is not on the list, you are eligible. Quite a few com-

(Continued on page 110)

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If a veteran, check here

munities in this section do not have EC, ORS, OPS, OES, and OBS appointees. Interested parties, please contact me. Traffic: W5MN 81, JPC 20 CVQ 19, ACL 6, HJB 4, CCD 3, MKL 3, HQR 2.

NEW MEXICO—SCM, J. G. Hancock, W5HJF—ZM/ZU is SEC. MXF is new EC for Clovis-Portales area. LAJ is new OBS. KAO is new OO. ZA is completing his new kw. rig while recuperating from an operation. 9DXW is awaiting a W5 call and will be active from Clovis. ZM and HJF attended the Delta-West Gulf Division Convention at Texarkana. The National Radio Club conducts code classes every Tuesday night from the Benson Radio Institute Building in Clovis. MOU is assisting ZA with his new rig while building one of his own. JYW is trying to WAS while keeping KWEE on the air at Hobbs. Following is a list of those responding to my July inquiry up to September 6th: AK, BNT, CTP, CXP, DAD, DKD, DLG, DVH, ELL, ENI, EUT/5, FAG, FHO/4, FJU, FKP, FMM, FVY, GCC, GGO, GGX, GHG, GSD, GXL, HEG, HPT/4, HPZ, HSO, HZE, IXX, JAR, JQR/5, JRE, JYW, JZT, KAO, KMI, KUN, KWP, KWR, KYL, KYT/6, KZR, LAD, LAJ, LBV, LFR, LGS, LKX, LLS, LMV, LNQ, LPA, LQM, LQW, LWH, LZD, MDX/KG6, MJS, MLE, MLX, MML, MMW, MMX, MNN, MOU, MOX, MPO, MQT/6, MSG, MUS, MXF, OL/5, VN, ZU, and ZM. The c.w. net was a direct result, and a 'phone net will be operating before you read this. Traffic: W5MXF 2, ZM 2.

CANADA

MARITIME DIVISION

MARITIME—SCM, A. M. Crowell, VE1DQ—A nice outing recently was provided the Halifax gang at Fall River by the HARC. In addition to the usual line of sports at Circle "J" Ranch, movies of ham stations by W2CO were greatly enjoyed. BH and old-timer Jack Marr were visitors to Halifax. HJ has added RB, Sable Island, to his list of schedules. An ORS application has been received from V06G, Goose Bay. On 50.1 Mc. QZ has worked 88 different stations and 19 states. On 144.30 Mc. he has made many good W contacts using the sixteen-element vertical beam. In his spare time Oscar has piled up 51 countries on 14Mc. c.w., including ZD6, ZC6, and HE. The 14-Mc. 'phone gang welcomed MZ back after a complete rebuilding job. ET is knocking off the DX on 28-Mc. 'phone whenever the band is open. DQ is working on the new tower. FQ, our QSL Manager, asks for your LARGE stamped envelope so he can send your DX cards to you. RR is rebuilding to super high power. A new club is active in Dartmouth with a membership of more than 20. TH soon will be an OMM (Old Married Man). KY has a new R9-er. LH was a recent visitor to Halifax. MS has been doing some 'phone work on 14 and 28 Mc. Traffic: VE1HJ 23, QZ 2.

ONTARIO DIVISION

ONTARIO—SCM, David S. Hutchinson, VE3DU—Please note the new QTH of your SCM, which is 90 Wellington Road, London. We welcome to London our friend G2BMR, who now is making his home here. This report will be short this month as your SCM cannot make reports out of thin air. ATR schedules BMG but finds things very slow. BMG reports activity at a minimum. BQF increased power to 300 watts. AWJ is on 7 Mc. when conditions are good. VD is making a few improvements to the rig and antenna and grounding system. KM reports the Hamilton gang has 50-Mc. Emergency Net drill every Tuesday night and expects a 144-Mc. net by the time cold weather arrives. The Hamilton Club sponsored the Soapbox Derby on Sept. 1st and used two walkie-talkies, which drew a lot of attention from nearly 8000 spectators present. BQL, as a member of the permanent Army, changed QTH to Picton and may now be reached at the following QTH: SB15637, Bdr. Veale, E. C., 128th H.A.A. Battery R.C.A., Picton, Ont. He reports 50-Mc. activity in Belleville and Trenton so our dream of a v.h.f. net from Montreal to Windsor may be a reality before winter is over. BAJ reports QRL for August due to departure of WB for Gore Bay. AWE has new S20-R receiver. OJ has to give up EC appointment due to lack of cooperation of the Ottawa gang. What is the matter, Ottawa, are you just interested in your own personal station contacts, working DX, etc.? Another fall and winter season is with us. Let us make it a banner season

(Continued on page 118)

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5773.3	6306.7	6840.0	7373.3	7906.7
5806.7	6340.0	6873.3	7406.7	7940.0
5840.0	6373.3	6906.7	7440.0	7973.3
5873.3	6406.7	6940.0	7473.3	8006.7
5906.7	6440.0	6973.3	7506.7	8040.0
5940.0	6473.3	7006.7	7540.0	8073.3
5973.3	6506.7	7040.0	7573.3	8106.7
6006.7	6540.0	7073.3	7606.7	8140.0
6040.0	6573.3	7106.7	7640.0	8173.3
6073.3	6606.7	7140.0	7673.3	8206.7
6106.7	6640.0	7173.3	7706.7	8240.0
6140.0	6673.3	7206.7	7740.0	8273.3
6173.3	6706.7	7240.0	7773.3	8306.7
6206.7	6740.0	7273.3	7806.7	8340.0

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5773	6140	6573	7425	8050
5800	6173	6606	7475	8100
5825	6200	6650	7540	8125
5873	6225	6700	7575	8150
5900	6250	6740	7625	8225
5925	6273	6775	7673	8306
5940	6306	6825	7706	8340
5975	6340	6873	7773	8375
6025	6373	6906	7840	8425
6050	6406	6973	7873	8500

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for the Ontario section. What say, fellows? Your SCM is on the air nightly so give him a call if you hear him on 3534 kc. Traffic: VE3ATR 20, BQL 13, BMG 10, KM 5, AWJ 1.

QUEBEC DIVISION

QUEBEC—Acting SCM, Gordon A. Lynn, VE2GL—BE made his 100th VK contact on Aug. 25th. EC reports schedule with French Canadian 'Phone Net on 3816 kc. twice daily. This net includes OD, QA, ZG, VX, EV, AV, RA, GU, DV, AO, and AW. TH has new NC2-40 receiver and is still chasing bugs in 304TH final. GL has 35 w.p.m. Code Proficiency Certificate. AX made his 79th contact contact with VK3NC. TA, using battery powered gear, schedules W6PD twice weekly on 7 Mc. since early spring and W5HUK and VE6DK frequently join with them in round table. W6PD's parents and friends visited TA recently during a QSO and heard W6PD for themselves. KS has joined the early morning gang on 14 Mc. hunting VKs. FO has a 144-Mc. mobile rig in his car. RL was heard calling a VK on 7 Mc. XA schedules VE1IE daily on 3.5-Mc. c.w. or 'phone and ZB schedules VE1CU daily on 7-Mc. c.w. ZF is heard frequently on 14 and 7 Mc. QB is erecting new rotary 14-Mc. beam with the help of NM, JD, UJ, UA, FT, XL, and YF are heard on 14 Mc. and MT, OZ, and VB on 7 Mc. EA had BCI troubles and UO is active on c.w. but has trouble with 'phone rig. WIHQ5, W1GED, and WIAR visited HB and LZ in Quebec. IB has rig about completed and about ready to get on the air. Gang, only one activities report card was received this month. How about sitting down right now and mailing me a card with your activities, together with those of other VE2s you know of? There still is time to beat the deadline. Traffic: VE2EC 15.

VANALTA DIVISION

ALBERTA—SCM, W. W. Butchart, VE6LQ—BW has been keeping 7-Mc. c.w. busy. He says the band has been neglected by most of the gang. EY was confined to the hospital for a few weeks but now is progressing favorably. AL rated an FB write-up in *Edmonton Journal* on his assistance in getting serum to Pacific Island recently. VX, of Medicine Hat, works in Edmonton temporarily. ZW has ordered a new motor to rotate beam. MJ is collecting parts for 28-Mc. beam. EL ran into BCI using 600-watt rig. YN, of Provost, puts a consistent signal out on 3.8-Mc. 'phone using 17.5 watts input! BU keeps a schedule with Kwajalein on 14-Mc. c.w. QE got out on 3.8-Mc. 'phone in spite of summer static. EF is getting ready for Varsity. MP talks of a boost in power. PP officiated at the recommissioning of HMCS *Eeeter* after it was rebuilt. LQ has new NC-173. HY has 300-watt rig on the air and gets FB reports on 14 Mc. OD spends more time on 3.9-Mc. 'phone than any other VE6! UT is busy building double conversion super which would appear to be more than just another brain-storm. We need traffic men for the Alberta Net, boys! How about getting in touch with the SCM right away? WG is getting his antenna rigged for 3.5-Mc. c.w. Traffic: VE6WG 3.

BRITISH COLUMBIA—SCM, W. W. Storey, VE7WS—Collingwood Club: A number of interesting events took place this past month, one of which was the Annual Picnic of DJ at Deep Cove. ADV and UU report a visit to Victoria and saw many ham shacks. AIG was one of their contacts. MH is on 14-Mc. c.w. handling messages. OJ is using a 132-ft. flat top on 14-Mc. c.w. BE, VF, AKK, and Doug Gordon represented DJ at the transmitter hunt sponsored by the VRC. KK is on 7-Mc. c.w. with low power. XT reports his beam is very flat when the weather is damp. AKW is on 28 Mc. and has given up c.w. for talk. BE, on 28-Mc. c.w. with about 150 watts, is sporting 813 final. AZ is on 28 Mc. UU came back from Seattle with a nice frequency standard from war surplus. AKK, on 7- and 14-Mc. c.w., still enjoys QSOs with anybody. DJ has a new sky wire, a Hertz 134 ft. in length, and is sticking a nice signal out on 7 Mc. UU is another VFO user. He is using cathode modulation and about 100 watts input in the r.f. end. ADV is working on a new base for his beam. VF is on 3.5-Mc. c.w. BE is on 7-Mc. c.w. with 150 watts and also on 28-Mc. 'phone. MH is scooping in the DX on 14-Mc. c.w. using a VFO and runs about 200 watts into sky wire. OJ is working ZLs and VKs by the dozen as well as other DX. ABP is on 7-Mc. c.w. AZ is on 28-Mc. 'phone. LF is working 7-Mc. c.w. steady and also is on 50 Mc. XT put up a scaffold to get up and tighten the slack in a 14-Mc. beam. AKK is on 14- and 7-Mc. c.w.

(Continued on page 114)

SPRAGUE TRADING POST

WANTED — Dec. 1946 QST containing BC-375-E data. Want complete diagram. Robert Sleyster, 203 S. Walker Ave., Blair, Nebr.

SELL OR TRADE — FB Q meter, receiver BC-1068-A ready to go, with S meter and converted for Q meters; also few 6 element Q meter beams for sale. Need army communication receiver BC-348 or BC312. Elson's Radio Service, Lerna, Ill.

FOR SALE — Factory reconditioned Hallcrafters S-39 portable receiver with .55 to 30 meg frequency range, \$100. B. S. Black, 407 Spring Street, Hamlet, N. C.

SELL OR TRADE — Sky Buddy. Want Rimco Dynalyzer VY 73's, W6VZS, 1440 E. 70th St., Los Angeles, Calif.

WANTED — B. C. 683 in 27-39 Mc. range with or without a-c power supply. B. W. Velander, 6400 16th Ave., S. Minneapolis 9, Minn.

SELL OR TRADE — Text books, NRI radio-television course, Call signal tracer. Want recorder, tube tester, BC-348 or what have you. Fred Kirehner, W9RMZ, 333 Kensington St., Chicago, Ill.

WANTED — Rider's manuals 7 to 10, Fred M. Merrill, Box 92, Callicoon, N. Y.

FOR SALE OR TRADE — TN-10/APR-4 VHF tuning unit, 975 to 2200 mc, new in case, with 703A doorknob tube, motor driven dial; covers 1215 mc amateur band, \$30 or will trade for surplus receiver or SCPI or other cathode ray tube. R. C. Young, 129 E. 4th St., Hastings, Nebr.

WILL TRADE — S20R communications receiver in new condition with 6AC7, RF, 6AC7 I.F., two-meter and HQ-129X noise limiter. Need sig. gen. similar to Silver 906, Silver Vomax, oscilloscope, Mutual conductance tube checker or capacity analyzer. Herb Tuell, W4IRA, 156 Waverly Way, N.E., Atlanta, Ga.

WANTED — Plate trans. 300v C.T., 350 ma; plate trans. 1000v, C.T., 400 ma. Also need Selenium dry disc, rectifier stack, 40 plate or any bridge type unit rated at 15 amps and 40v will be satisfactory. Russell W. Carpenter, Mutual Radiophone Station, Box 7, Makena, Mavi T. H.

WANTED — Diagram and other data on Phillips radio, mod H.M.Z.L. 34/K-II made in Holland. Louis F. Kralik, 522 Paine Ave., Toledo 5, Ohio.

FOR SALE — BC375-E transmitter, complete with dynamo, 7 tuning units including antenna unit, plus instructions on how to convert to 110v AC operation

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\$60. Used Confidence C tube tester, \$25. L. G. Kolsen, W7FCX, Box 309, Rawlins, Wyo.

WANTED — Complete transmitting unit RC-56 or RC-56A. J. W. Temple, 624 S. Palisades Drive, Signal Mt., Tenn.

FOR SALE — A-1 Hallcrafters, S-41 receiver \$28. Philco Pt-2 plastic cabinet, \$3; small electric clock and several pieces of radio gear. Need amateur parts and 10 meter beam. Eddie Howell, Route 2, Dillon, S. C.

WANTED — Communications receiver SX-15, SX-17 or equivalent that covers at least to the 20-meter band. W. Goldberg, W0GZF, 907 South Pine, Grand Rapids, Nebr.

WANTED — 80-20 meter phone xmtr complete with power supply, to \$100. Specify output, tube lineup, physical size. C. R. Henry, Jr., W8WJN, 8089 Miller Road, Swartz Creek, Mich.

FOR SALE — Brand new BC-348R re-

ceiver converted to a-c; ARC 4, transmitter with mounting rack, switch and terminals plus two sets of tubes (40) in all. Excellent for 2.5 meters. Also code practice oscillator and instructor graph with tapes. Will sell all or part. Charles Mowat, 1223 O'Farrell St., San Francisco, Calif.

FOR SALE — Veteran in college must dispose of Triplett 2432 sig. gen., 4 months old, excellent condition; also Simpson 305 tube tester. I. E. Jarstfer, Lake Odessa, Mich.

FOR SALE — Complete transmitter phone — e-w 60w input, modified Millen exciter, uses separate power supply for osc. and final. Modulator has its own power supply, 6L6, p.p. in black plywood cabinet with relays and mike, working on 10 phone now. Can work all bands. \$110. Charles R. Costa, Box 97, Woodstock, N. Y.

FOR SALE OR TRADE — Triumph scope, a-f sig. gen., RCA, 28 Mc xmting and receiving xtals, Sig. Corps, 610 transceiver. Need communication receiver, phono motor, pickup or auto code machine. G. W. Langdorf, Jr., 618 N. Davis, Helena, Mont.

FOR SALE — Stancor 60 N. transmitter, used but 3 months before the war. Ray Goebel, W0WSN, 609 S. Lake Ave., Sioux Falls, S. Dak.

FOR SALE — NC44 with separate speaker in matched black wrinkle cabinet; good condition, \$30. Robert B. Kelly, W8UYU, Box 474, Route 1, Akron 12, Ohio.

SELL OR TRADE — Hallcrafters S-20H used 16 hours, in perfect condition, \$55. Used 2-6-10 meter converter, 10 meter preselector, good recorder or audio amplifier. R. L. Spitzer, 224 Park Place, Decatur, Ill.

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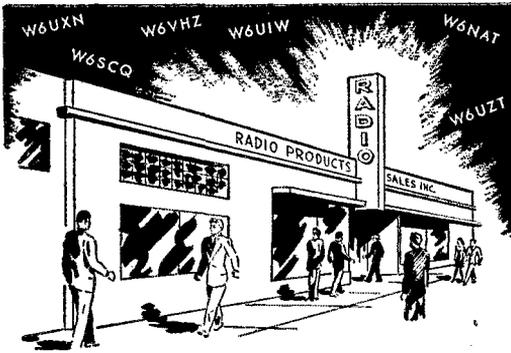
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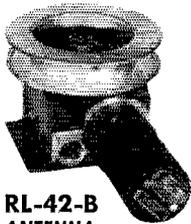
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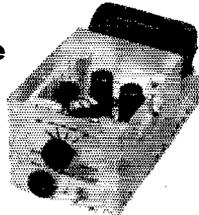
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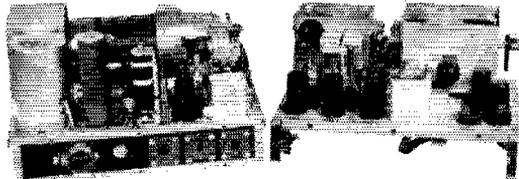
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PRAIRIE DIVISION

MANITOBA — A. W. Morley, VE4AM — More than 300 amateur operators from Manitoba, Ontario, Saskatchewan, and the United States gathered at the annual hamfest of the Winnipeg Amateur Radio Club held recently at the St. Vital fair grounds. Thirty out-of-town amateurs attended, W5MIO, of San Antonio, Tex., coming farthest. Among the exhibits were cathode ray equipment and v.h.f. equipment. Also on display was the operation of antique radio equipment by D. R. P. Coates. A.C. Jebb, chairman of the meet, took first place with a call to Halifax in the distance contest, which was carried out under fair conditions with a 500-watt ex-RCAF transmitter. Second prize went to Bill Burton, president of the club, and third prize was awarded to Fred Baker. In the exhibit of special equipment, Harold Rasmussen took the prize with a special 10-centimeter display. A transmitter built by A. C. Jebb was judged the best on display, while Mike Kudlac took first place in the receiver section. During the afternoon those present enjoyed races, sports events, and an archery display. The hamfest concluded with novelty events and a prize draw. Your SCM is ill in the hospital at this writing, but hopes to be out soon.

Beam Stuff

(Continued from page 89)

pine. If one piece is used horizontally and another piece screwed on vertically in the shape of a "T," the crossarms will be strong and light and will not warp easily. If materials can be found in war surplus, all-aluminum construction of boom and elements will result in a lighter and easier-to-maintain installation.

Elements

Now for the elements themselves. Undoubtedly the best material for the elements is Dural tubing. This requires very little care and will withstand the weather a long time.

Some special precautions must be taken if you intend to use steel tubing, because steel will rust very easily. When the elements are purchased, remove the corks from the ends of each element and paint the inside of the tubing with aluminum paint. Sounds hard, doesn't it? It really isn't. Use a spray gun, or if you don't have one, pump the paint in by hand with a fly sprayer. Use the slow-drying type aluminum paint or the paint will dry before it can cover the metal if it is sprayed. If no spray can be had, pour the paint in one end while rotating the tube, and catch the surplus in another can as it comes out the other end. Then repeat the process until you are sure the inside is covered. Now put the corks back in and seal them with Glyptol varnish. This should be done every other year as the moisture, caused by condensation, will cause the steel to rust from the inside out. Also, give the outside several coats of aluminum paint every other year. I have seen steel elements deteriorate in a short time when these precautions were not taken. Even copper-coated elements require painting, as in most cases the copper coating is very thin and the weather will cause them to oxidize after a short time. Conduit, when used for elements, requires the same care as commercial elements made of steel. If adjusting straps are used to tune the

(Continued on page 116)



INTERNATIONALLY KNOWN AMATEURS USE ASTATIC MODEL D-104 MICROPHONE

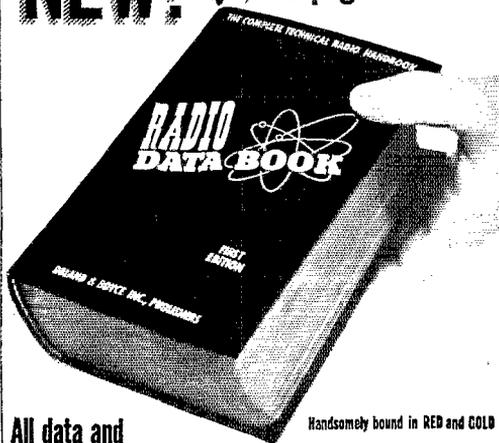
● This interesting photograph shows Mrs. Dorothy Hall, W21XY, of Springfield, Long Island, enjoying the thrill of talking by wireless to her friends back home from C. G. Allen's amateur Station G81G, "Home Lea," 76 Nightingale Lane, Bromley, Kent, 48 hours after arriving for a recent visit in England. In a letter accompanying this photograph, Mr. Allen, who holds an enviable record for amateur communication with most of the countries of the world, expressed his delight in having Mrs. Hall visit his station, and mentions the fact that the microphone used was an Astatic Model D-104.

It so happens that in a world contest among amateurs, conducted by The Astatic Corporation in 1938, top prizes went to these two famous hams, Mrs. Hall receiving a "first" and Mr. Allen a special award of merit. In both instances, the winners were shown, in photographs, using Model D-104. After these many years, this model is still their favorite.

Mr. Allen's QSL card, shown in the accompanying illustration, bears an outline drawing of Astatic "Conneaut" Model Crystal Microphone, in connection with his station call letters: G81G.



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elements, make them of copper. If iron straps are used, be sure to give them several coats of aluminum paint after the adjustments have been made and the contacts are all secured. Use brass screws and nuts for the hardware. Don't use the chrome-plated variety, as experience has taught the author that about ninety per cent are chrome-plated iron and will rust very easily. So stick to the brass ones and avoid trouble.

When you clamp the elements in the stand-off insulators, be sure not to pull them too tight or you might crimp and ruin the element.

If these suggestions are followed your beam will give long, efficient service and will require very little maintenance other than an occasional coat of paint to keep it in top condition.

Triode Mixer

(Continued from page 51)

Almost any receiver may be used as an i.f. channel. It will help if there is ample gain, a low noise level and high selectivity. Particularly interesting for this purpose are the military receivers and fixed-tuned aircraft receivers.

Performance

By way of a preliminary listening check the converter was compared with a well-known communications receiver having two stages of tuned preselection. With the converter in and the receiver fixed at 6.8 Mc., about double the number of signals were readable on "ten" as when the receiver alone was tuned to "ten."

Subsequent precise measurements served to point up and define the following. A Hammarlund Comet Pro (of 1934 vintage) was used as the 6.8-Mc. i.f. channel. This receiver has no r.f. preamplification and a noisy mixer having an e.n.r. of about 50,000 ohms. With the converter connected and all voltages applied, the resultant increase in noise output was 0.25 db. This is an insignificant figure and indicated that the signal-to-noise performance would be limited by the noise level of the Comet Pro.

Nonetheless, a 1-microvolt signal at 29 Mc., modulated 30 per cent with 400 cycles, averaged 5.5 db. over noise. This figure was obtained without b.f.o. or crystal filter. This is a superior value but might further be improved by the use of a quieter i.f. channel than the Comet Pro.⁵

Images are negligible. With the untuned antenna circuit shown, image rejection was better than 62 db.

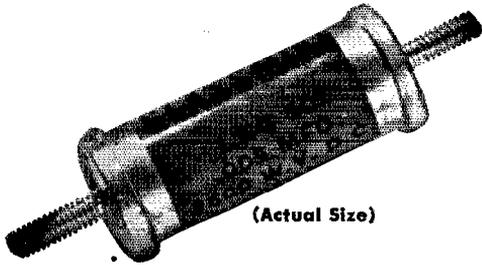
In conclusion, the converter described provides important signal-to-noise benefits with a notable economy of means. The improvement in reception of weak signals obtainable with it, over the "straight-through" operation of the finest com-

(Continued on page 118)

⁵ Thanks to Robert Woolsey, W9RO, for his painstaking measurements of the converter's performance. I also wish to thank Earl Barrett, W9MGY, for many helpful suggestions during the course of this project.

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LSG101	.0001	1 $\frac{1}{32}$ " x 1 $\frac{1}{16}$ "	.03	.09	.31	.94	1.50
LSG251	.00025	1 $\frac{1}{32}$ " x 1 $\frac{1}{16}$ "	.05	.25	.5	2.2	1.50
LSG501	.0005	1 $\frac{1}{32}$ " x 1 $\frac{1}{16}$ "	.15	.5	1.6	3.0	1.50
LSG102	.001	1 $\frac{1}{32}$ " x 1 $\frac{1}{16}$ "	.31	.94	2.5	4.5	1.70
LSG202	.002	3 $\frac{1}{4}$ " x 1 $\frac{1}{16}$ "	.62	1.9	4.5	7.0	2.45
LSG502	.005	3 $\frac{1}{4}$ " x 1 $\frac{1}{4}$ "	1.6	3.1	6.0	7.0	3.50
LSG602	.006	2 $\frac{1}{32}$ " x 1 $\frac{1}{16}$ "	1.9	3.5	6.2	7.0	3.75
LSG103	.01	2 $\frac{1}{32}$ " x 1 $\frac{3}{4}$ "	3.1	5.0	7.0	7.0	4.25

*PLASTICONS — Plastic Film Dielectric Capacitors



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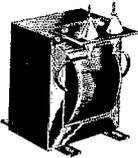
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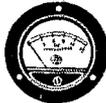


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mercial receivers, is about equivalent to raising the sending station's power by 4 times. This represents a gain in signal and not just noisy gain. There is no reason why the same circuit should not perform comparably well in the 50-Mc. band.

Atlantic City

(Continued from page 37)

appointed by countries that have been elected, by a worldwide conference vote, to have that right of appointment. And they are to be paid good salaries by the ITU as a whole, to serve as the international custodians of a public trust and not as representatives of their own countries. Given an existing list, they can carry it on per the rules. But where is the initial list, a list that is engineered and not politically stuffed, and that is based on the new allocations of ACy? To form that initial list, to handle that most formidable task of rearranging the world's commercial and government fixed and broadcasting stations both on the basis of what they honestly rate on a technical basis and in terms of the new allocation ladder, the conferences have created a temporary organization known as PFB. This provisional board, to shorten a long story, is to consist of IFRB plus representatives from each country that cares to send one. Sitting at Geneva beginning next January, and working on lists of "requirements" sent in by every country, it is to create the new international frequency list. It is expected that it will take all next year to accomplish its job. Then the list will be circulated to the administrations and, if all goes on schedule, a special administrative conference will assemble in Geneva in the spring of 1949, and if it finds the list worthy and well qualified, then it will put it into effect upon a decreed date — and with it the ACy allocation table — say about September 1st. Now you will see why the effective date of ACy, including that new 21-Mc. band you so badly want, is deferred until well into 1949: it has to wait for this PFB job to be done. Then, assuming everything rosy, PFB is dissolved and, taking possession of its new list, IFRB carries on from there. It is a brave idea, a most sensible one, one that is deserving of the fullest support and the richest success.

Now just a concluding note. Divided into four regions to equalize representation, ACy saw regional caucuses and regional nominating meetings to put forward candidates (countries) both for the Administrative Council and for IFRB. Picking from the nominations, a world-wide plenary session then made the necessary number of elections to both bodies. The United States was elected to each. You'll be interested in the U. S. appointments. For the Administrative Council (which will meet once a year or on special call), U. S. named Francis Colt deWolf, chief of the telecommunications division of the Department of State and vice-chairman of the three

(Continued on page 120)

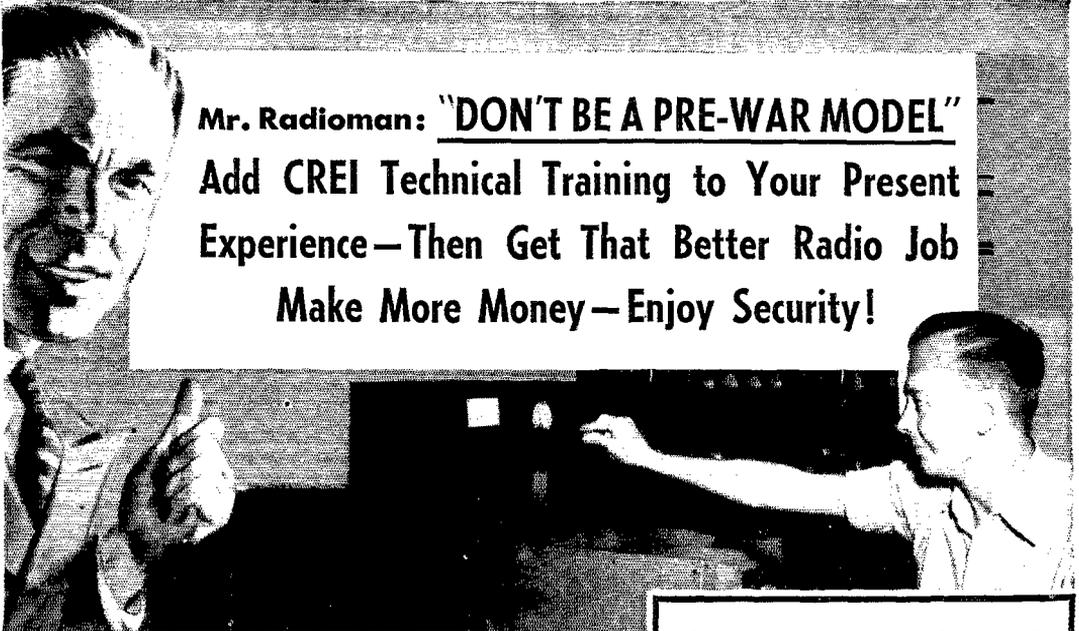


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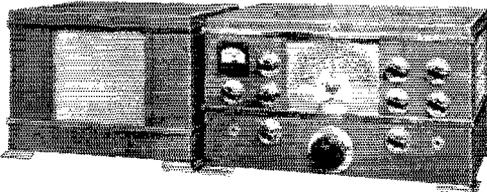
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ACy conferences. For the IFRB (permanent salaried posts the expenses of which are prorated among the nations), U. S. named Captain Paul D. Miles, previously extensively mentioned herein, a richly-deserved appointment. As its representative to PFB, to serve at least until the ball is well rolling, U. S. appointed a member of FCC, Commissioner Ewell K. Jett, also herein-before mentioned, highly-skilled veteran of affairs of this sort, former chief engineer of the Commission. The appointments have met with general acclaim in this country as they greatly merit.

The other elected countries similarly announcing their appointments, it became possible to have the first organizing meetings of both Administrative Council and IFRB in the closing days of the ACy conferences. Alexander D. Fortoushenko, U.S.S.R. deputy minister of postal and electrical communications and head of the U.S.S.R. delegation here, was elected chairman of the Administrative Council. Paul D. Miles, the U. S. appointee to IFRB, was unanimously elected chairman of that body, which means that he is chairman of PFB also. Both bodies are to reassemble in Geneva in January.

From time to time we have mentioned a third conference going on at ACy. It was an international high-frequency broadcasting conference, a major objective of which was the orderly placing of the world's broadcasting stations to make effective use of broadcasting allocations. It was early seen that there was no hope of completing this work at ACy, so the assembly changed itself into a preliminary conference to lay down principles and make plans, a further conference to be held in Mexico City next October. Meanwhile a planning committee of Mexico, India, U. K., U. S. and U.S.S.R. carries on the preparatory work.

And now if you knew the hours we'd been keeping in ACy these several months, you'd agree with us, folks, that this is enough for a while, at least until we have some further thoughts and news next month.

N.F.M. Reception

(Continued from page 41)

The use of the S-meter is particularly desirable when tuning to an f.m. signal because it is important to tune to the exact center of the incoming f.m. carrier. If the signal is tuned off center, considerable distortion may be caused by working on one side of the i.f. selectivity curve of the receiver. If no S-meter is handy, a little practice in tuning through f.m. carriers will aid the operator in determining when the proper center operating point has been reached.

It is possible to secure very effective limiting on f.m. signals without the distortion that usually accompanies severe limiting of a.m. signals. In noisy locations it has been observed that with the adapter f.m. signals are much improved and generally more enjoyable to listen to

(Continued on page 124)

Atlantic City Documents!

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WE HAVE PLEASURE in announcing, jointly with the General Secretariat of the International Telecommunication Union, that the League has been designated as the distribution agency for the public sale in the American Region (Western Hemisphere) of the Final Acts of the Atlantic City International Telecommunication and International Radio Conferences. By special arrangement with and at the request of the Secretariat of the Union, the League is performing this duty on a nonprofit basis as a public service to the telecommunication interests of this region.

These documents consist of the new International Telecommunication Convention, the International Radio Regulations, and all of their respective Appendices, Annexes, Protocols, Resolutions and Recommendations. The page size will be approximately $5\frac{7}{8} \times 8\frac{1}{4}$ inches, white paper, set in type, facing pages in parallel texts in English and French, the total approaching 1,100 pages, heavy paper covers. Ready for distribution in early December.

Representing the work of 79 nations in two world conferences lasting over $4\frac{1}{2}$ months, these documents, in their explicit detail, are the source material on which the regulation of international radio communications will be based for some years to come. Here is the exact language of the basic treaty between the countries of the world, the exact language of the detailed regulations which they undertake to apply to their various radio services. The amateur and the general stu-

dent of the art will find them of great interest and help in understanding the problems of world government of communications. For all persons concerned with the administration and control of international communications they are of course indispensable.

The price, set by the I.T.U., is \$1.20, carriage prepaid, to governments and government agencies, \$1.50 to all others (such as private operating agencies and individuals). Remittances must yield the appropriate amount net in United States funds, and should be made payable to the undersigned society. *Remittance must accompany order.* The exact name and address to which shipment is to be made should be clearly and legibly stated.

However, the League is the distributing agency for the Union not only to individuals and private enterprises but also to the governments of the American Region. Government agencies which find themselves unable, through their internal regulations, to send remittance with order are assured that the League will honor the order and at the same time advise the General Secretariat of the Union at Bern to bill the government agency concerned for the shipment received directly from the League.

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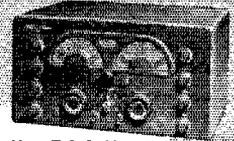
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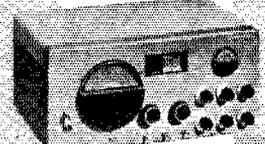
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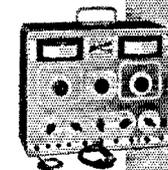
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156, Indic. Tracemeter	160.20	32.04	11.32
532P, Tube Tester	121.20	24.24	8.56

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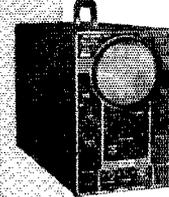
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637, Dyn. O'put Tube T.	82.00	16.48	5.79
652, Audio Osc.	117.00	23.40	8.27
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140-B, 5" Oscilloscope	185.00	37.04	13.07
162-C, Channalyt	162.50	32.54	11.46
WY-75A, Volt Ohmyst	125.00	25.04	8.83
170, Audio Channalyt	345.00	69.00	24.36
WO-79A, 3" Oscilloscope	550.00	110.08	38.86
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McMURDO SILVER			
906, AM-FM Sig. Generator	89.90	17.98	6.35
702, VFO Oscillator	49.90		
703, Band. Pass Multi.	49.90		
900, Vomax V T V M	59.85		
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915, T. & Bat. M'dser.	82.72	16.60	5.84
954P, Post. T. & Set Tester	97.22	19.46	6.87
10-20P, Tube & Bat. Test—V/ohm	109.10	21.82	7.71
10-12P, Elect. Tube Master. E-200C, Signal Generator	86.15	17.23	6.09
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561, Oscillator	133.87	26.83	9.46
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TRIPLETT			
2432, Signal Generator	86.73	17.37	6.13
1632, Signal Generator	107.80	21.64	7.61
2450, Elec. V/O. MFD MA	97.51	19.51	6.89
SIMPSON			
330, Mut. Cond. T. Tester	96.53	19.37	6.81
335, Pl. Cond. T. Tester	83.30	16.70	5.88
264, Vac. Tube Voltmeter	47.91	15.63	5.50
415, Signal Generator	112.70	22.58	7.96
445, Pl. Cond. T. & Set Test	107.80	21.64	7.61
WESTON			
798, T. Check & Analyzer	187.09	37.45	13.22
779, Analyzer	76.45	15.37	5.40
785, Circuit Tester	103.59	20.79	7.32
SYLVANIA			
131, 3" Oscilloscope	78.50	15.70	5.55
132, 7" Oscilloscope	124.50	24.90	8.80
134, Poly-meter	69.50		
140, Port Tube Checker	79.50	15.90	5.62
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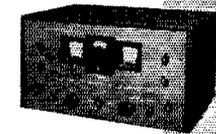
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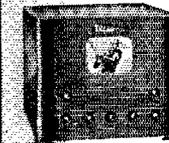
HICKOK



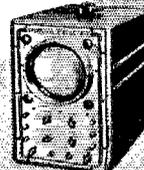
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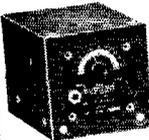
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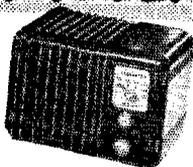
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Truly sensational buy for Hams, Experimenters! Some are 5-tube, some 6 tubes! Tunes 195 to 420 Kc. A-N beam signals. Operates on 28V DC; easily changed to 110V. 4"x4"x6 1/2" long. Wt. 3/4 lbs. Complete with tubes, slightly used, A-1 condition, and it's all yours for only . . .

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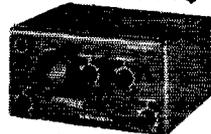
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OC3, VR105	.75	1665/2050	.90
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807	1.35	8013A	2.78
809	1.50	8020	3.38
811	1.95	9001	1.05
813	9.00	9002	.60
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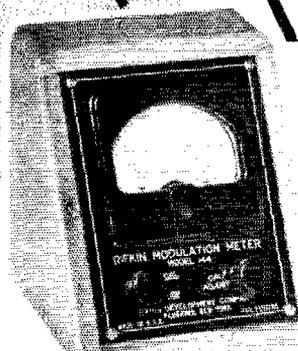
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(Continued from page 120)

when heavy ignition noise is present. This is also true when there is heavy interference, because it is possible to tune to the center frequency of the incoming f.m. signal and avoid the off-center tuning necessary with i.f.-slope detection. The improvement in signal strength is generally in the order of 6 db. or better, and this can be the difference between a readable f.m. signal and one that is lost in the general background noise and QRM:

When receiving strong and weak f.m. signals simultaneously it will be found that the strong signals mask the weak ones when the two carriers are very close. However, there is very little heterodyning, and the received carrier is generally much more intelligible than would be the situation with two a.m. signals of comparable strength.

At times it may be found that an incoming f.m. signal is badly distorted. This is not attributable to the characteristic of the discriminator transformer, but to the selectivity curve of the receiver. Any incoming signal that deviates beyond the selectivity curve of the receiver will be distorted, and the adapter should not be blamed for this distortion because it originates in the receiver i.f. The remedy is to have the operator of the f.m. transmitter reduce his speech gain and thereby reduce the frequency deviation, thus conforming to FCC regulations.

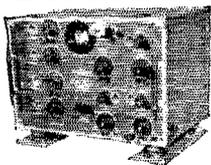
Squelch Circuit

As an improvement in the original narrow-band f.m. adapter, the circuit shown in Fig. 5 was developed to eliminate some of the "off-signal" noise when the f.m. adapter is in use. This circuit simply adds another tube as a squelch. A 6J5 tube is used with its grid in parallel with the 6SJ7. It is necessary to change the value of R_3 and to eliminate R_2 to provide proper operating voltages for the added tube. R_7 and C_6 form a filter circuit so that only direct current is applied to the 6J5 grid.

In operation, with no signal present the 6J5 plate draws current and drops the voltage on the 6SJ7 screen to a point where limiting occurs down in the actual noise of the receiver, thereby eliminating much of the noise formerly present. However, when a signal is present rectification in the 6SJ7 limiter grid circuit develops a negative voltage across R_1 that cuts off the 6J5 and allows the voltage on the 6SJ7 screen grid to rise to a point where the limiting is adequate for the incoming signal. Since the 6J5 draws no current, once cut off by the incoming signal, the limiter screen voltage and, therefore, the limiter characteristic remain constant over a wide range of input signals. The addition of this tube adds little to the B+ drain on the receiver. However, because of the added filament current it is advisable to ascertain that the receiver with which the adapter is to be used is capable of withstanding the additional drain before adding the squelch tube. Alternatively, a separate filament transformer can be used.

(Continued on page 126)

HOT RADIO VALUES *at Sun Radio*



100 WATT BENDIX TRANSMITTER TA12

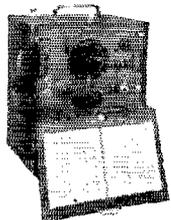
CHECK THESE VALUES: Three 807 Tubes, four 12SK7, one 2 inch 5 amp. RF meter, four Separate Master oscillators. (These can be easily changed to cover 20-40-80 meters and by using crystal for the 10 meter band you will have a complete coverage transmitter.)

Four separate output tanks.
One 4 position selector channel switch having seven sections which changes the ECO, IFA 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 35 1/4 lbs. Complete, simple instructions for conversion \$49.95 furnished. Complete with tubes



SUPERHETERODYNE RECEIVER:

This crystal fixed frequency receiver comes with full conversion instructions 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 Output and Noise Suppressor, 80 Rectifier. Dimensions — 3 1/2 x 19 x 1 1/2 inches. Comes complete, brand new, with one set of coils and two sets of tubes. \$16.95
Extra set of coils \$2.95



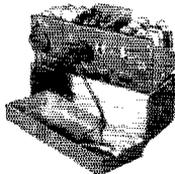
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A1 \$54.50
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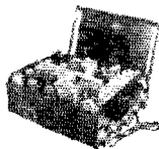
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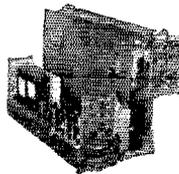
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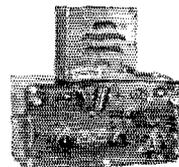
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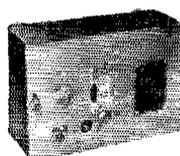
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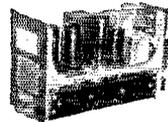
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Comes completely wired with 1-1K5, 1-174, 1-1S5, 2-384 tubes and 2 455 kc iron core I.F. transformers and antennae less receiver and output coil and crystal. \$9.95



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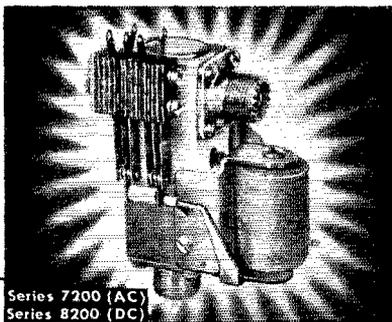
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In practice, at W1JEL it has been found that speech clipping can be used to advantage in the f.m. transmitter. Speech clipping tends to give the impression, at the receiver end, that an excessive amount of deviation is being used, although the signal is clear and lacks any trace of distortion caused by exceeding the i.f. bandwidth of the receiver. Undoubtedly similar methods can be used to advantage in n.f.m. transmission.

No doubt many refinements and alternatives could be used to advantage with this narrow-band f.m. adapter; it is possible that cascade limiters, ratio-type discriminator transformers, germanium crystals and similar devices will lead to even more compact, if not more effective, units. However, we feel that the need for a simple and inexpensive narrow-band f.m. adapter is the urgent thing at the present time. It is hoped that more hams will give f.m. a break by building similar units.

Oscillators

(Continued from page 46)

test capacity equivalent to the crystal static capacity plus 25 to 75 μ fd. An extra amount of regeneration beyond the point of reliable response does not materially affect the oscillator performance. Therefore, going beyond this point is neither necessary nor advisable.

Performance

The oscillator of Fig. 1 was tried with no regeneration applied (L_2 removed and grid tied direct to crystal). Out of eighteen crystals tested, only three oscillated, and these three required the tuning to be backed off on the low-capacity side of resonance in order to make the crystals respond properly. When regeneration was applied, all the crystals responded 100 per cent and were as reliable as the lower-frequency crystals we have all used in the past.

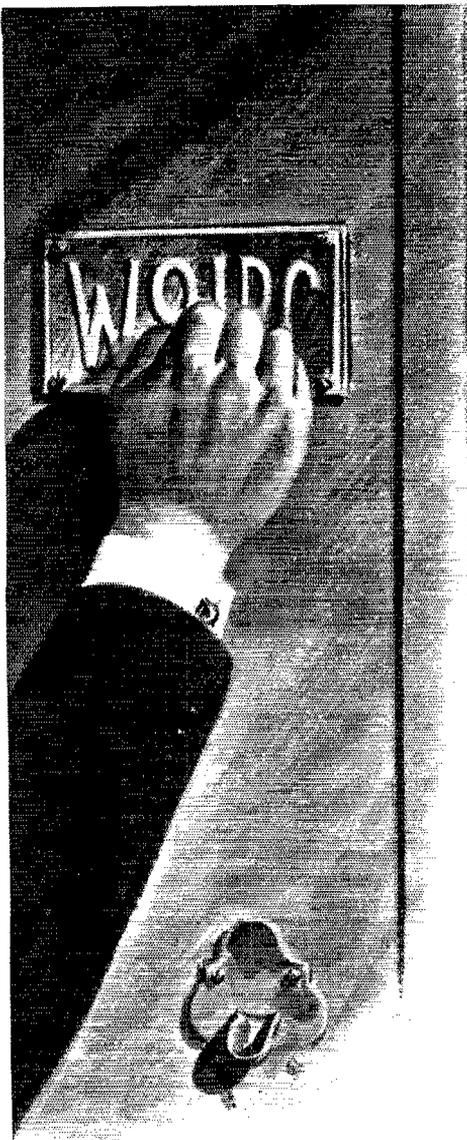
The information in Table I allows us to reach the following conclusions:

1) Of the tubes tried, the 6AG7 tube delivered the greatest power output for the lowest crystal current. Since the main limiting factor in the design of high-output crystal oscillators is the crystal current, the 6AG7 tube represents a step in the right direction.

2) Of the three pentode tubes tried, the performance improved as their transconductance increased. This was not true with the two triodes; the 6J4 tube gave the poorest performance and it had the highest transconductance. However, the higher-transconductance tubes generally result in greater output for a given crystal current, providing other factors such as lead length, interelectrode capacities, etc. are not causing losses.

3) Tests in Table I were all conducted with the same degree of regeneration applied as noted. Other tests proved that the same results would have prevailed if the regeneration was decreased to a lesser value, stopping of course where the

(Continued on page 128)

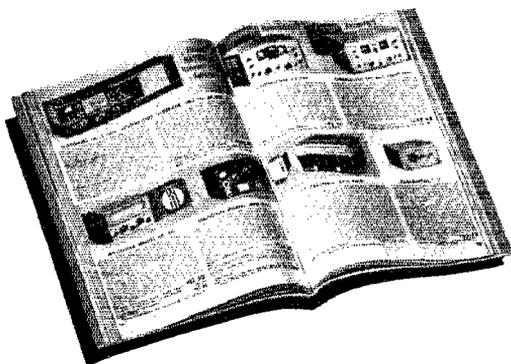


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crystal showed indications of improper response.

The circuit of Fig. 1, using a 6C4 tube and other coils, was tried with crystals as high in frequency as 68 Mc., with satisfactory results. It should thus be possible to have crystal-controlled transmitters without multipliers on frequencies as high as 60 to 100 Mc., opening possibilities for crystal control with less multiplier stages on frequencies higher than this.

From tests conducted with these and other oscillators, the author recommends that the reader use the grid current of the following amplifier to indicate the oscillator output. The plate current is not a satisfactory indication, since the oscillator's maximum output does not occur at minimum or maximum plate current.

The radio-frequency crystal-current peak was observed to be not at maximum output of the oscillator, but slightly on the low-capacity side of the adjustment of C_1 . Therefore it is advisable to tune the oscillator to its exact maximum output setting or slightly to the high-capacity side.

50 Mc.

(Continued from page 53)

The 1215-Mc. record was raised to 12.5 miles on September 24th by W3MLN/3 near Axeman, Pa., and W3HFW/3 near Pine Grove Mills. The transmitters both employed 703-As in shielded-line oscillator circuits. The receiver used by W3MLN was an APR-4, while that of W3HFW was an APR-5. The boys are now looking for other locations from which to extend their range of operation.

Just too late for inclusion in last month's column came news of the breaking of the 2300-Mc. record. On August 30th, W1ILS/1 operating from the Blue Hill Observatory, Milton, Mass., maintained communication with W1JSM/1 atop Mt. Wachusset, near Princeton, Mass., a distance of 45 miles. Since this is a line-of-sight path, signals were very solid, despite the output power of only about 100 milliwatts.

Who, in working on radar equipment, has not wondered how far he could work with two radar installations trained on a common target, with a keying system in the transmitters and a pair of 'phones across the output of the receiver? W5MKN and W7LLD, both AETM2c, USN, in two laboratories separated by only about 200 yards at Ward Island, trained their outfits on a group of oil tanks at Ingleside, 10½ miles across Corpus Christi Bay. Though the two buildings are thoroughly shielded from one another, preventing direct pick-up even if the beams were not razor-sharp, they were able to work very nicely on the small amount of power reflected by the distant targets. The frequency? 10,000 Mc.!

A V.H.F. Program for 1948

For some years this department in *QST*, and the operating activities sponsored by ARRL in the v.h.f. field, have followed a fairly fixed pattern. The objectives have been, of course, to

(Continued on page 138)

TERMINAL IS YOUR BEST BET for FM, TELEVISION & TRANSMITTING ANTENNAS

ELINCOR FM Antennas are made of $\frac{3}{8}$ " aluminum tubing and furnished with steel pole for easy mounting. Exceptionally high performance and sturdy construction.

200D	Straight dipole	3.49
200DR	Straight dipole w/reflector	6.43
200FD	Folded dipole	4.23
200FDR	Folded dipole w/reflector	7.17

AMPHENOL FM Antennas feature mast, swivel mounting bracket and mast head permitting adjustment in two planes. Strong and light, professional appearance.

107-114	Dipole antenna	3.23
107-113	Dipole w/reflector array	6.17

BELDEN FM Antenna, popular folded dipole with mast, neat and practical with 65 feet of 300 ohm twin lead.

#8320	Folded dipole	4.93
#8321	Reflector kit for #8320	1.93

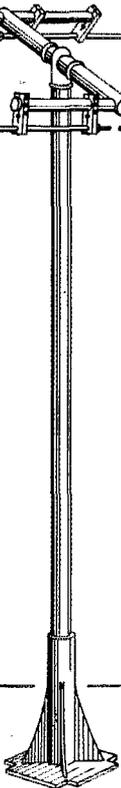
AMPHENOL'S All-Wave Antenna out-gains the best double doubler. Combines FM dipole with broadcast and shortwave antenna. Complete with mast, base mtg. bracket, two separate lead-ins, all hardware (except guy wires), guy wire clamp and installation instructions.

#124-001	17.69
----------	-------	-------

WARD folded dipole television antenna, complete with mast and 60 ft. 300 ohm twin lead.

TV-94	Folded dipole	7.05
TVR-92	Reflector kit for TV-94	3.79

WE ARE ANTENNA SPECIALISTS — Consult us on your antenna needs — we have them all for every application. Bring your antenna problems here to Frank Miller, W2BUS and Ed Mandelberg, W2OTV.



ELINCOR Television antennas are constructed of $\frac{5}{8}$ " aluminum tubing tapering to $\frac{1}{2}$ ", fully adjustable for length and tilt. Supplied with 1" diameter steel mast. These antennas will give the finest performance possible both electrically and mechanically.

300D	Straight dipole	4.68
300DR	Straight dipole w/reflector	8.82
300FD	Folded dipole	6.44
300FDR	Folded dipole w/reflector	10.58
310FDR	Folded dipole w/reflector $\frac{1}{2}$ " tubing non-adjustable	9.05
250	13 channel Amy Aceves & King type for multi-band television.....	17.64
250R	Same as 250 w/reflector	24.69
350SA	"H" stacked array—quality regardless of price	17.64
310SA	Similar to 350SA but $\frac{3}{8}$ " tubing at an economy price	12.64

SHUR Intereceptor antennas are popular for dependable television reception. Supplied with $\frac{1}{4}$ " dia. wood poles, impregnated and treated for weather endurance.

I-62	A two element television dipole and director w/mast.....	5.58
ID-62	Same as I-62 but folded element..	7.35
DID-62	Deluxe folded dipole—two element—variable spacing	9.70
JID-62	Two element — folded dipole — simple and almost instant assembly	8.52
3E-62	"Hi-Gain"—3 element	14.11
SH-65	Stacked double "H" array.....	13.52

Most of the antennas listed here are more fully described in recent ads in QST and other radio magazines, but we'll be glad to mail you complete literature on any antenna in which you are interested.

FAMOUS "SIGNAL SQUIRTER"

AMPHENOL 140-005—The ultimate in deluxe rotary beam antennas is Amphenol's famous Signal Squirrel, dual 3-element beam for 10 and 20 meters. Kit includes Rotator (117 volts, 50/60 cycles) with double mounted pair Inductostubs assembly, Direction Indicator, center section, elements, insulators and all hardware ready for installation. For economy in shipping, the center section is shipped with cross arms unmounted. Holes are drilled for assembly. The kit is complete ready for installation excepting the tower or other support, motor control wires and the open wire feed line.

35800 Net

HI-LITE Folded Dipole Beam ANTENNAS

3E10F—3 element, 10 or 11 meter beam with cast aluminum supporting frame and cross arms $\frac{3}{4}$ " to $\frac{5}{8}$ " aluminum elements may be varied from 12 to 19 feet. Element spacing is also easily and quickly adjustable. Supplied with 6 ft. steel mast.....

32.83

4E10F—Same as 3E10F but four elements

40.67

Antenna ACCESSORIES AMPHENOL

300 ohm twin lead, per 100 ft.....	2.85
150 ohm twin lead, per 100 ft.....	2.37
75 ohm twin lead, per 100 ft.....	1.96
75 ohm twin, kilowatt, per ft.....	.07
For twin lead, screw eye standoff .....	.09
For Coaxial, screw eye standoff.....	.09
For twin lead, polystyrene clip.....	.09
Polystyrene Feeder Spreaders	
2" — 9c. 4" — 12c. 6" — 15c.	

SOLID ENAMELED Antenna Wire, per 100 ft.

#14—95c. #12—1.35 #10—2.10

SHUR MC pole mount for mast poles of $\frac{1}{4}$ " diameter. Sturdy construction of cast aluminum, permits easy mounting on roof tops, sloping sides, straight sides, anywhere! Complete with universal brackets.

4.98
(See illustration above)

ELINCOR 10 METER BEAMS

400 EA—3 element 10 meter beam, .1 wavelength spacing for director and .15 for reflector. Driven element is folded dipole for broader response and may be fed with 50 ohm coaxial. Furnished complete with aluminum ladder. Elements are $\frac{3}{4}$ " aluminum telescoping to $\frac{3}{8}$ ". Each element adjustable 14 to 18 feet. Wt. 17 lbs.

30.57

400 BA—2 element 10 meter beam with .2 wavelength spacing. Designed to be fed with RGB/U or similar cable. Furnished complete with 7 ft. aluminum ladder. Wt. 12 lbs.

19.98

200 EA—5 element beam for 2 meters. Folded dipole driven element. 3 directors and 1 reflector. All aluminum with steatite insulation.

8.23



GUARANTEE

Every item, regardless of its low price, is fully guaranteed by **TERMINAL**.

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If unable to visit our store, send us your mail orders. Please remit in full all orders under \$5.00. 25% deposit for COD's. Prices are FOB New York.

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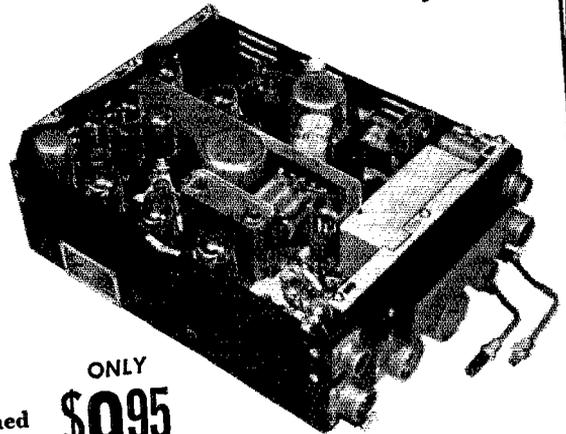
*The one and only original RADIO SHACK is located in Boston and has no branches or affiliates elsewhere.

LET'S GO . . . on four-two-oh!
with the BC-645A

You can get right on this most interesting u. h. f. band . . . with a couple of thousand dollars worth of erstwhile supersecret xmtr-rcvr (original cost) . . . for less than ten bucks plus a simple, painless conversion job. It's the BC-645A . . . so enthusiastically acclaimed, editorially, in QST last May.

See these Features

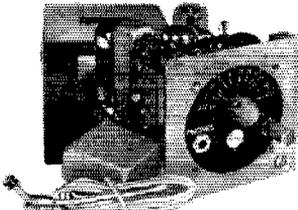
- Brand new — never used.
 - Xmtr for phone or i.c.w.
 - Superhet receiver.
 - Easily converted for 420-450 mc.
 - 15 tubes included.
 - Beautifully constructed.
 - Supplied by General Electric.
 - Detailed conversion instructions furnished with each BC-645A.
- Shipping weight—29 lbs.



ONLY
\$9.95
LOW PRICE

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 mills at 28 v. d-c. Container in metal case; shielded battery lead passes through RF filter. Can't be told from new.

CO-AX CABLE SETS

Fifty-foot RG-8/U co-ax cable with PL-259 connectors attached each end **\$1.95**

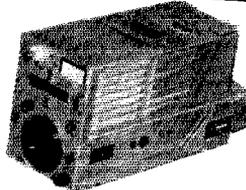
One hundred-foot RG-8/U cable comprising two 50-foot cables **\$3.90**

GOVERNMENT SURPLUS TUBES

Type	Net	Type	Net	Type	Net
2C34	1.12	811	1.95	958	.75
2C40	.90	813	6.75	959	.75
2D21	.60	886	1.18	954	.75
VR105	.75	866A	.75	955	.75
VR150	.75	872A	2.25	9001	1.05
3B24	.75	874	1.95	9003	1.05
3BP1	3.00	928	.45	9004	.90
5BP4	3.87	981A	1.87	9006	.60
6AK5	.90	1619	.75	822	2.25
6C21	18.50	1624	.90	(VT118)	2.25
8005	\$3.15	1625	.75	(VT222)	.60
801	1.72	1626	.60	2X2A	2.25
803	9.00	1851	.75	(VT287)	3.00
807	.90	957	.90	3E29	3.00
809	1.79	9002			

5-inch Oscilloscope tubes
5CP1—\$2.25 each 6 for \$13.00

MOBILE RCVRS \$5.95 • XMTRS \$9.95



RCVRS Great for stand-by on 40-80 meters; phone or CW; ample hand-spread; complete with 6 tubes

BC-454-B 3- 6 MC \$5.95
BC-455-B 6- 9.1 MC each

XMTRS Furnished with 4 tubes, including 1629 magic eye, 1626, and 2-1625's; also calibrating crystal.

BC-696-A 3-4 MC 9.95
Shipping Wt. — rcvr or xmtr — 15 lbs. ea.

SUPER SPECIAL



3C24 (HK 24C)
90c each
6 for \$4.50

ORDER 'EM NOW!

HS 33 HEADPHONES



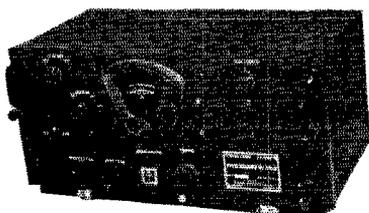
only \$1.95

With headband, rubber cushions, cord, extension cord, and plug. Used but A-1 condition.

Radio Compass SCR-269F

Complete radio compass with loop, control box, pilots indicator, cables, plugs, loop dehydrator, charts, and instruction book. Just the thing for your boat. Brand new — in original cases. \$65.00

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NEW! BC-348 COMMUNICATIONS RECEIVER

\$6950

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.

DON'T WAIT—ORDER YOUR BC-348 TODAY!

Shpg. wt. 61 lbs.; size, packed 3 cu. ft.
Kit for conversion to 110 volt a-c operation, with full instructions\$6.50
Transformer for 220 volt stepdown to 110 volts, 60 cycles\$6.50

A RARE BUY . . . SCR-522 XMTR-RCVR With PE-94B POWER SUPPLY and Push-to-talk MIKE

\$2450

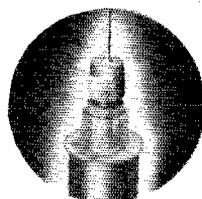


Makes an ideal set for working the 100-156 mc spectrum. Ten-tube Superhet receiver has 3 microvolt sensitivity. Seven-tube xmtr delivers 8 watts. Power unit has 28-volt d-c input. For mobile use, you can rig the power unit to drive from the fan belt of your car; for fixed-station use, couple it to a 115 volt a-c motor. Used, but in good shape. Complete with tubes.

Spare 832's for SCR-522

Now available at low cost; order today\$2.25 ea.

CO-AXIAL DIPOLE



Was \$12.50
Now only **\$6.50**

For fixed-station or mobile use. Matches 50-55 ohm coax cables. Continuously adjustable for use with your SCR-522.

POPULAR RECEIVERS

Now available on easy terms

Model Number	Cash Price	Down Payment*
HALLICRAFTERS		
S-40-A complete	\$89.50	\$17.90
SX-42	275.00	55.00
HT-9 xmtr, with tubes, 350.00		70.00
less coils and crystal		

NATIONAL

NC-173 with spkr	189.50	37.90
NC-46 with spkr	107.40	21.48
NC-240D with spkr	241.44	48.28

HAMMARLUND

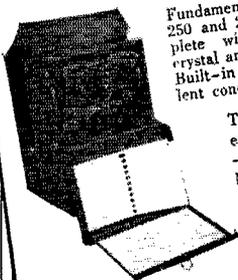
HQ-129-X complete	173.25	34.65
SP-400-X complete	342.00	68.40

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.

BC-221 A K 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.

\$7950

We carry complete line of SONAR, GONSET, MIMS-AMPHENOL, MEISSNER SIGNAL SHIFTER, and all popular amateur accessories. Write us for delivery and low price quotations.

XMTG CAPACITORS

Nationally known, high-voltage, oil xmtg capacitors, all in rectangular cases, with stand-off insulators.

Mfd.	Volts d-c	Net Ea.	Mfd.	Volts d-c	Net Ea.
4	600	\$0.71	2	1500	\$1.20
6	600	.79	2	1000	1.49
8	600	1.19	6	1500	1.79
10	600	1.39	2	2000	2.95
2	1000	.71	8	2000	3.75
4	1000	1.19	2	2500	3.25

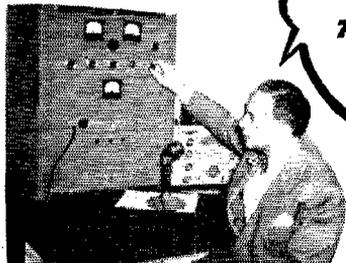
Speed delivery and save C. O. D. charges — send full amount with order. 50% deposit required on all C. O. D. orders.

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Amateurs Everywhere ...

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ENTER THIS BIG CONTEST TODAY!

NEW GLOBE KING XMTR KIT

Get on the air with Leo's 275 watt sensation of the year. Gives top performance on C.W. and fone—6 through 80 meters. Contains RF Exciter section, RF Final, Speech Amplifier and Modulator, and Dual Power Supply section. Comes in gray crackle finish cabinet, 28 3/4" high, 22" wide and 14 3/4" deep.

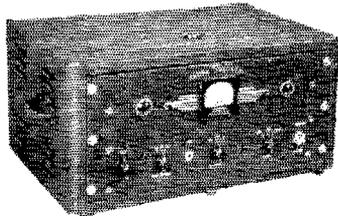
Write for prices on individual sections.

Complete with all parts, tubes, meters, cabinet, 1 set of coils:

KIT FORM WIRED AS LOW AS
\$351.45 • \$376.45 • \$70 DOWN

Here's all you have to do: Write a letter telling us about your shack, your equipment, your experiences, and send us photos QSL cards and anything else you have that will help you win this "Most Interesting Ham Shack Contest." See the examples below. Contest ends midnight December 20. First prize—the new 275 Watt Globe King Xmtr Kit. Second prize—WRL Globe Trotter Xmtr Kit. Third prize—WRL Exciter Kit. Many other valuable merchandise prizes. Get your entries in early. No entry blank needed.

Here's some good examples:



2ND
PRIZE

WRL GLOBE TROTTER XMTR KIT

Amateurs the world over are praising the performance of this high quality, low cost rig. It's a 40 watt input kit including all parts, power supply, 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 of coils, meters, tubes, extra..... **17.15**



3RD
PRIZE

WRL EXCITER KIT

From our own labs. Uses 6L6 regenerative Osc. into an 807 driver or final. Similar to unit described in A.R.R.L. Handbook. Output 35 to 40 watts. Comes mounted on standard relay rack panel 2 1/2"x19".

Cat. No. 70-302 less accessories..... **\$17.95**

Cat. No. 70-310 same as above, wired..... **\$23.95**

Set of coils, meter, then.....extra, **\$10.18**

Herb Barnes, W1OTO, sent in this photo showing his rig set up by his hospital bed, together with an interesting letter about his many contacts throughout the world.

Here is another good snapshot of a swell ham shack.

Make your entry brief. A short letter, any snapshots, your QSL card and whatever else you want to send may do the trick to win for you.

The Best Letter or Photo Wins.

World Radio Laboratories
Department Q-8
Council Bluffs, Iowa

- Send latest Free Flyer
- Send data on WRL 275 Watt XMTR
- Send more data on the Globe Trotter

Send more data on.....
Name.....
Address.....
City.....
..... Call letters.....
..... Zone..... State.....

FREE



All fellows! Send in your letters, pictures and QSL cards today. We'd like to get better acquainted with you and your experiences as Hams. And, remember, the three first prizes shown above are our own units. Their values no one else can offer. They're tops in performance, tops in quality, and low in price. Let's get acquainted.

Sincerely,
Leo E. Meyerson
W0GFG



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STANDARDIZED METAL EQUIPMENT FOR ELECTRONICS

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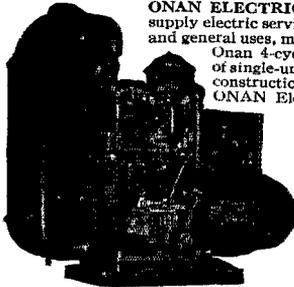
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ONAN Electric Plants are available in many sizes and models. ALTERNATING CURRENT: 350 to 35,000 watts in all standard voltages and frequencies. DIRECT CURRENT: 600 to 10,000 watts, 115 and 230 volts. BATTERY CHARGES: 500 to 3,500 watts: 6, 12, 24 and 32 volts. Write for detailed literature or engineering assistance.

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Maine	WIBPX 54,240-96-194- C-76	WIBOD 288- 8- 13- B-18
	WIBFA 8560-40-77- B-44	WIMD 279- 9- 12- —
	WIGKS 8320-40-70- B-32	WINY 216- 8- 9- A- 9
	WICGJ 6771-37-61- A-35	WIAJA* 63- 3- 7- B- 1
	WIPMY 18- 2- 3- —	WIOD* 36- 2- 6- —
	WIMDF* 9- 1- 3- —	WINZB 3- 1- 1- —
E. Massachusetts	WIME 75,231-119-211- C-51	W. Massachusetts
	WIAKA 69,597-111-209- C-62	WIVDY 67,354-119-191- B-77
	WITW 52,089-97-179-AC-53	WILJT 21,609-63-115- B-55
	W1JHC* 26,070-66-133- B-54	WIZD 17,169-59-97- C-28
	WIBDS 24,752-44-77-BC- —	W1JYH 15,921-61-87- B-33
	W1AQT 22,869-63-121- B-44	W1CXL 7560-37-72- B-12
	W1PEG 19,323-57-113- B-49	W1DQH 6650-35-64- C- —
	WICLDM 12,152-49-104- B- —	W1MUN 6090-35-58- B-35
	WIDDO 7812-42-64- B-40	W1FXF 5751-27-71- —
	WIKMY 5250-35-50- B-28	W1EOB 3441-31-37- B-14
	W1ONV 2415-23-35- B-36	W1EFP 1425-12-25- B-40
	W1JHJ 2376-22-36- B-28	W1BWR 884-17-18- B-15
	W1IIB 1422-18-27- B- 9	New Hampshire
	W1IIS 1224-17-24- B- 7	W1BFT 49,680-92-180- B- —
	W1LOF 758-14-18- —	W1CRW 6993-22-28- C-19
	W1LOQ 672-14-16-AB- 9	W1DUK* 5115-30-55- —
	W1BB 576-12-16- B- 6	Rhode Island
	W1MTG 576-12-16- B- 4	W1CJH 32,250-75-144- C-70
	W1BDU 495-11-15- —	W1POM 2438-23-44- B- —
	W1MQX 360-10-12- B- 7	W1AWE 1092-14-26- B- —
		W1AOP 72- 2- 12- A- 5

NORTHWESTERN DIVISION

Montana	W7EWD 1512-18-28- B-20	W7BE 15,012-54-94- B-34
	W7EWR 702-13-18- B- 9	W7KEM 14,410-55-88- C-28
	W7CJE 689-13-20- B-10	W7GUI 14,300-55-88- C- —
	W7HDM 270- 9-10- A-12	W7ESN 13,158-51-88- C-44
Oregon	W7AJJ 15,624-56-93- C-37	W7AJS 8190-39-70- C-38
	W7AMX 3840-32-40- C-49	W7AVR 5312-32-56- C-32
	W7AC 3528-28-42- B-21	W7DHC 5088-32-53- C-40
	W7BTH* 612-12-17- —	W7KWC 2898-23-42- B-48
	W7EPK 351- 9- 13- B- 6	W7EJD 1057-16-23- C-18
	W7EHT 12- 2- 2- B- —	W7HLU 684-12-23- A-15
		W7JNR 649-11-20- B-30
Washington	W7DL 56,870-110-174- C-84	W7HPQ 162- 6-10- B-18
		W7JKO 38- 2- 6- A- 9
		W7CWN 3- 1- — —

PACIFIC DIVISION

Nevada	W7ONG 17,922-58-104- B-41	W6EJA 2520-21-40- B-10
	W7KEV 12,750-50-85- B-26	W6LMM 2457-21-39- B-10
	W7CXC 1242-18-23-AC- 7	W6CTL 1890-20-29- C-14
	W6WPI* 1134-14-27- —	W6T1 1720-20-32- C-10
Santa Clara Valley	W6MLY 46,552-92-170- C- —	W6RVU 1512-18-28- C- 5
	W6MUR 31,236-76-137- B-80	W6NJJ 1577-17-38- B-24
	W6LCF 22,311-67-111- B-61	W6MJO 675-15-15- B- —
	W6CEO 14,685-55-89- C- —	W6BIL 380-10-14- A- 2
	W6ZT 10,837-47-77- C-32	W6BL 168- 7- 8- —
	W6KMM 5975-33-61- A-32	W6BZU* 12- 2- 2- —
	W6DZE 1881-19-33- C-15	San Francisco
	W6PBY 1200-16-25- C- 6	W6BIP 42,120-90-156- B-73
	W6GQH 192- 8- 8- B- —	W6CIS 27,588-76-121- C- —
	W6CHE* 101,192-139-244- —	W6VBY 15,120-56-90- C-24
	W6CEM* 71,760-120-207- C-90	W6KNH 12,672-48-88- C-41
East Bay	W6RM 57,031-107-179- C-60	W6MUF 2709-21-43- B-11
	W6TT 55,848-104-179- C-70	W6LV 1575-21-25- C- 8
	W6MEK 35,280-80-149- C-61	W6ATO 1140-15-30-BC-32
	W6UZX 29,196-66-102- B-31	W6ERS 510- 3- 17- B-11
	W6DUB 15,675-55-95- C-42	Sacramento Valley
	W6LDD 15,390-54-95- —	W6UIE 6222-34-61- A-36
	W7HXG/6 4031-29-47- B-24	W6GHU 1800-20-30- C- 9
	W6MHB 2904-22-44- B-35	W6OJW 450-10-15- B-13
	W6OBD 2904-24-41- A- —	San Joaquin Valley
		W6PVP 11,468-47-82- B-33

ROANOKE

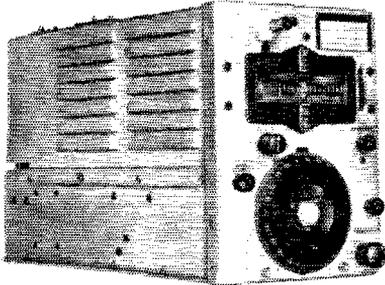
N. Carolina	W4MR 17,577-63-93-BC-27	W4KPV* 27,504-72-129- C-88
	W4GXB 10,763-47-77- C-23	W4KXN 7785-44-59- B-32
	W4AIT 9568-46-73- C-22	W4NH 6882-37-62- B-18
	W4TP 4320-36-40- C-15	W4JUO 2142-21-34- B- —
	W4OG 3444-28-41- B-30	W4EHI 2046-22-31- B-19
	W4WX* 162- 6- 7- A- —	W4JUK 1258-17-25- B-11
		W4JUQ 765-15-17- B- —
		W4FV 324- 9-12- A- —
S. Carolina	W4ILP 452-11-14- B-31	W4HXO 270- 9-10- B- 6
		W4IPC* 12- 2- 2- —
Virginia	W4OM 90,171-129-233- C- —	W. Virginia
	W4OSW 59,941-111-174- C-31	W8JM 4557-31-49- B-24
	W4KFC 51,198-106-161- B-48	W8CWW 4320-32-45- C-19
	W4IWB 39,864-83-151- B- —	W8VAN 3375-27-43- B-20
	W4CC 28,728-76-126- B-30	W8PQQ 561-11-17- B- 3

ROCKY MOUNTAIN DIVISION

Colorado	W6AZT 15,456-56-92- B-44	W6IQZ 27- 3- 3- B- 2
	W6PGS 2340-28-26- A- —	Utah-Wyoming
	W6JGF 1920-20-32- B-25	W7OWZ 48- 4- 4- A- —
	W6GKW 256- 8-11- B-18	

(Continued on page 136)

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Half wave, high vacuum rectifier. Filament 2.5 volts, 5 amps; peak inverse 5500 volts; peak current .8 amps; surge current 2.5 amps; average plate current .130 amps. List price \$7.50, Harvey special price, while they last...95¢

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SM17 milliammeter.....\$6.50
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Coils for 10.....\$16.50 Coils for 20.....\$15.50
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 or for 10 — 14000 to 14850.....\$3.95
AX3 xtals for 6 — 25000 to 25500.....\$3.95
 or for 2 — 24000 to 24333.....\$3.95
6AG7 tube.....\$1.66
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Deka Xtal, up to 10 xtals in one mount, 10 frequencies with the flick of a wrist. Deka holder, less xtals.....\$5.95
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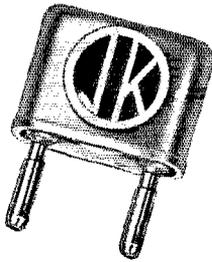
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CRYSTAL



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WABGO WAGVP WAIKK	Alabama 10,434- 47- 74- B-39 2135- 23- 28- B-3 144- 6- 8- B-3	W4ITD* W4FNR* W4BYF W4LJT	1584- 22- 24- — 1188- 18- 23- B-22 624- 12- 18- B-7 231- 7- 11- A-3
W4BRB W4QIN W4FPK W4CD W4LVV W4NN W4DKA W4DOO W4F5J W4IEH	E. Florida 75,141-121-211- C-46 43,920- 90-167- B-48 22,646- 68-116- B-47 17,934- 61-120- B-48 15,960- 57- 95- B-39 9900- 44- 75- B-36 9712- 44- 66- C-50 3960- 30- 44- C-21 3448- 31- 36- C-28 3328- 26- 53- B-36	W4LJV W4FJJ W4DCZ W4KV W4DIA W4DXI W4IPX4	W. Florida 64,310-109-197- C— Georgia 60,667-103-197- B-69 19,467- 64-103- C-35 7380- 41- 60- — 5508- 34- 54- B-25 2550- 25- 34- — 611- 13- 15- C-9

SOUTHWESTERN DIVISION

Los Angeles W6SZY W6HX W6GAL W6AM W6OOL W6ANN W6PHZ W6BLX W6BPD W6FLR W6ACL W6SN W6EYH W6BJU W6LVQ W6WKU W6EJF W6KEK W6EVM W6CQK* W6YQV W6ID W6TNIH* W6TFL W6UXF* W6AX	124,236-153-274- C-86 90,440-136-223- C— 67,716-114-198- C-58 67,174-116-193- B-60 49,300-100-165- C-59 47,094- 94-167- C-54 15,972- 66- 82- B— 15,960- 56- 95- —26 13,008 48-111- C-40 8610- 42- 69- C— 7872- 41- 64- B-46 6273- 41- 51- A-14 6253- 37- 57- A-17 3948- 28- 47- B— 3780- 28- 45- B— 3690- 30- 41- C-35 3450- 30- 39- B-9 3312- 24- 46- A-17 2139- 23- 31- B-24 2052- 18- 38- A— 1938- 17- 38- C— 1716- 22- 34- B-20 1326- 17- 26- A-5 1320- 15- 30- — 1008- 14- 24- B-13 968- 17- 19- B— 882- 14- 21- B-6	W6VAO W6DOZ W6JOB* W6WNB W6YDU* W6UUB	858- 13- 22- A-20 648- 8- 14- B-2 312- 8- 13- B-8 36- 3- 4- A-4 3- 1- 1- — 3- 1- 1- —
W7QAP	Arizona 17,422- 34- 80- B-30	W7QAP	Arizona 17,422- 34- 80- B-30
San Diego W6ITY W6BAM W6LRU W6MI W6LVN W6FHW* W6YXW W6BXD W6JLI* W6AMO W6BLZ W6YYW W6UWL* W6TGC W6LJ6* W6LDJ6*	81,250-125-218- C— 35,020- 85-139- C-16 13,515- 24- 41- A-61 10,560- 44- 80- B-35 7954- 41- 66- C-26 5920- 37- 54- CA— 4818- 33- 49- B-30 3864- 28- 48- B— 3076- 25- 41- B— 2880- 24- 40- A-35 2664- 24- 37- B-24 1122- 17- 22- B-16 990- 15- 22- — 663- 13- 17- A-16 60- 4- 5- A-7 90,914-131-232- —		

WEST GULF DIVISION

No. Texas W5ENE W5FRD W5LIU W5BXM W5DWO W5GSE W5BGP W5LYT	45,530- 94-165- C-52 40,608- 96-141- B-45 4371- 33- 52- A-30 2691- 23- 39- B-17 2052- 19- 36- A-17 1152- 16- 24- A-18 945- 15- 21- B-30 189- 7- 9- A-10	W5LBC W5ACL W5FOS W5KJB W5VW W5EWZ W5BDI W5JPC W5LGL* W5MLP	10,878- 49- 67- — 7488- 39- 92- B-33 5616- 39- 48- B-22 2850- 24- 40- B-23 1914- 22- 29- B-12 1680- 20- 30- A-11 1242- 18- 23- B-14 756- 12- 21- AB-14 273- 7- 13- A-11 147- 7- 7- A-32
So. Texas W6EPZ/5 W6DAA W6SFA W6GKI*	63,504-112-189- C-55 13,750- 50- 92- B— 13,674- 53- 86- C-47 12,880- 56- 77- B-42	W5LGS W5IOA W5MLX*	New Mexico 13,833- 53- 87- B-28 702- 13- 18- B-10 18,600- 62-101- C-96

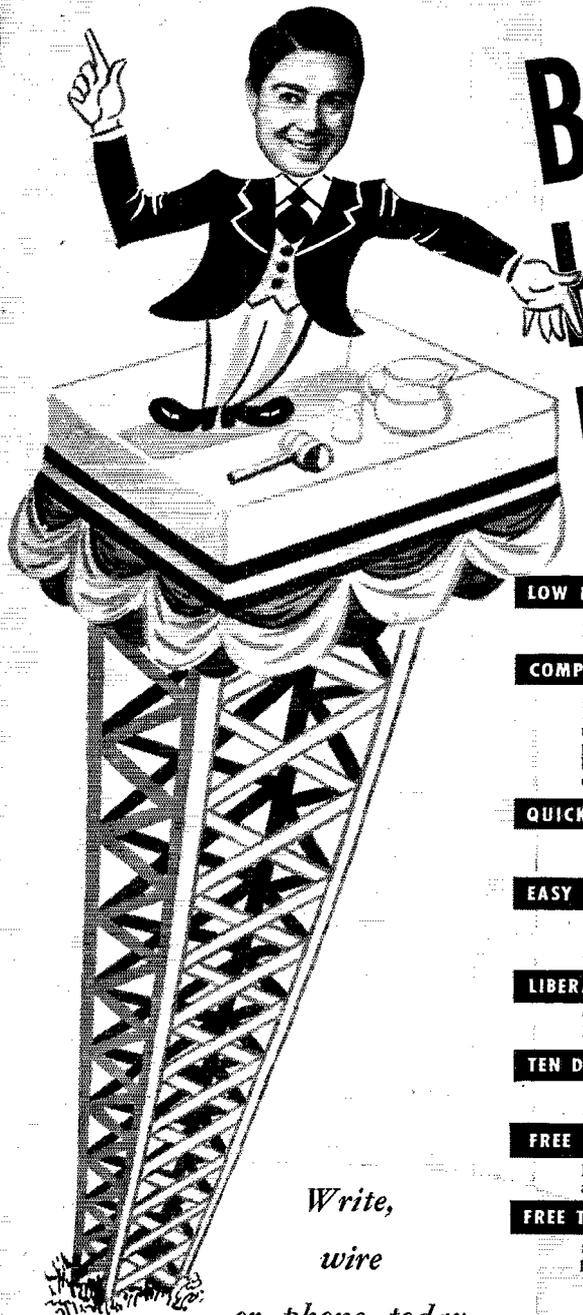
CANADA

Maritime VEIEA VEIEP VEIAO VEIBV VEIEK VEIPE VEIRP VEIRR VEIHG VEICU VEICM*	18,240- 60-103- B-45 13,520- 52-124- B-33 2388- 35- 47- B-45 4200- 28- 52- A— 2592- 24- 36- A-30 2175- 25- 29- B-16 1729- 19- 35- B-13 1577- 19- 27- B-22 924- 14- 23- A-25 351- 9- 14- B-6 189- 7- 9- A-4	VE3XY* VE2BV VE2SU* VE2XR VE6GD VE6AO VE6ZM VE6FZ*	60- 4- 5- B— Quebec 8610- 41- 74- B-53 72- 4- 7- A— 3- 1- 1- A— Alberta 4278- 31- 46- B-20 3150- 25- 45- B-19 220- 4- 10- A-6 75- 5- 5- —
Ontario VE3KE VE3QD VE3BDX VE3BCO VE3AFY VE3IJ VE3BR VE3BCU VE3JT* VE3AMK VE3TD VE3APE* VE3ACR VE3OU VE3TI* VE3VD VE3ADV* VE3AT*	54,384-103-176- B-64 39,759- 87-153- C-76 14,440- 30- 54- C-17 10,428- 44- 79- — 7040- 40- 60- B-59 3078- 27- 39- B-13 1820- 20- 36- B-27 1326- 17- 26- B-16 1080- 15- 23- B-11 570- 10- 19- B— 539- 11- 17- C-8 378- 9- 14- B-6 230- 7- 11- A-13 126- 6- 7- B-6 126- 6- 7- — 100- 5- 8- A-7 84- 14- 20- A-15 75- 5- 5- A—	VE3YI VE3YJ VE3YK VE3YV VE3YU VE3YW VE3YX VE3YV VE3YU VE3YW VE3YX VE3YV VE3YU VE3YW VE3YX	British Columbia 35,760- 80-151- B-48 2679- 19- 47- C— 2331- 21- 45- C-42 1860- 20- 31- B-31 243- 9- 9- A-10 120- 5- 8- A-4 Vanalla 1428- 17- 28- B-56 Manitoba 52,089- 97-179- C-70 5134- 34- 51- C-17 780- 13- 19- B-18 Saskatchewan 528- 11- 16- A-15 45- 3- 5- A-1

AFRICA

Algeria — FA FARH FARBG FA3JY	64,942- 38-576- A— 30,096- 33-304- A— 11,508- 21-183- A-29	6GUSA	Eritrea — J8 1215- 9- 45- C—
Egypt — SU SUIUS	632- 8- 27- C-8	ZD4AB	Gold Coast — ZD4 7344-18- 140- A-13

(Continued on page 188)



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<i>Mauritius</i> — VQ	VQAD	1080- 9- 40- A--	<i>U. of So. Africa</i> — ZS	
<i>Nw. Rhodesia</i> . VQ2	VQ2GW	6954-19- 122- A-19	ZS2AL	213,456-48-1483- A--
<i>So. Rhodesia</i> — ZE	ZE1J	850-10- 29- A-47	ZS6DW	167,850-50-1124- A--
ZE1JS	129- 3- 15- ----	ZE1JO	ZS6CT7	39,825-25- 531- A--
	30- 2- 5- A--		ZS2Y	25,312-28- 311- A-51
			ZS1M	18,792-29- 232- A-41
			ZS6BV	10,080-15- 224- ----
			ZS1BF	1918-14- 49- ----
			ZS5BW	395- 5- 27- A- 7
			ZS2AQ	306- 6- 17- ----
			ZS6HM	144- 4- 14- A-35
			ZS5DS	3- 1- 1- ----

ASIA

<i>China</i> — XU	XU6GRL	104,640-40- 880- C-61	W3EKK/J2	21,627-27- 267- ----	
<i>Hejaz</i> — HZ	HZIAB	1260- 7- 60- ----	J3AAD	13,566-21- 220- B-34	
<i>Iran Persia</i> — EP	EP3D	156- 4- 13- A--	W2CDJ/J2*	8385-13- 215- --14	
<i>Iraq</i> — YI	YIZAM	38- 3- 4- B- 1	J3AAE	5364-12- 149- B-20	
<i>Japan</i> — J	J2AHI	27,642-34- 271- C-30	<i>Macao</i> — CR9	CR9AG	25,955-29- 301- B-29
			CR9AN*	7239-19- 127- ----	
			<i>Malaya</i> — VS1	VS1BX	2640-10- 89- A-14
			VS1AF	174- 2- 29- A- 4	

EUROPE

<i>Azores</i> — CT2	CT2AB	1104- 8- 46- ----	G3VA	4200-14- 100- A-11
<i>Belgium</i> — ON	ON4BC	38,665-27- 433- A-76	G2XY	2720-10- 94- B--
ON4AZ	38,805-35- 277- A--	ON4AU	G2VY	2250-15- 50- A-20
	11,535-35- 169- A--		G6BB	1818-18- 34- A-29
<i>Czechoslovakia</i> — OK	OK1FF	44,469-27- 549- A-43	G2HPF	1440-12- 40- A--
OK1LM	18,479-29- 225- A-30	OK2MV	G3UA	1326- 8- 34- ----
OK2ZM	11,760-35- 122- A-28	OK1CX	G3SS	1300-10- 40- A-13
OK2LO	5529-19- 101- A-12	OK3DG	CSFA	1276-11- 40- A-11
OK1CW	5338-17- 108- A-27	OK1AW	G3TE*	744- 8- 31- ----
OK2MM	5200-13- 135- A-20	OK1XW	G8TK	672- 8- 29- A- 4
OK1XU	2700-20- 135- A-15	OK2DD	G6XK*	196- 7- 24- A--
OK1KB	1438- 6- 62- A--	OK1KX	G2AAU	126- 6- 7- A-10
	1463-11- 49- A-13	OK1XU	G2AJB	60- 4- 5- A- 9
	983-13- 26- --13	OK1KB	G3RQ*	3- 1- 1- ----
	245- 5- 19- A--			
	196- 7- 12- A--			
	51- 3- 6- A--			

Greece — SV

SV1RX 4690-13- 122- A--

Italy — I

I1AY 36,256-32- 384- A-60
I1US 24,030-27- 31- A-49
I1BU 11,814-22- 179- A--
I1PL 4066-19- 74- A-25
I1RO 18- 1- 1- A--
I1ER 3- 1- 1- A--

Denmark — OZ

OZ9Q 62,700-38- 564- A--
OZ3FL 24,423-21- 395- A--
OZ7G 5371-21- 120- A-34
OZ5HQ 4740-15- 114- B--
OZ7CC 4228-14- 104- ----
OZ7EU 2196-10- 65- A--

Eire — EI

EI9J 37,774-34- 374- A-33
EI9P 6903-13- 179- A- 9
EI4Q 6480-24- 92- A- 5
192-11- 24- A- 5

France — F

F8BS 44,104-37- 402- A-42
F8QD 38,736-36- 360- A-38
F8FO 26,028-27- 321- A-25
F8NB 17,640-29- 210- A--
F8ZF 13,632-32- 142- A-27
F8XK 5719-19- 105- A-18
F8TM 4769-19- 93- A-21
F8ZW 4476-17- 103- A--
F8OL 3346-14- 82- ----
F8EJ 1639-11- 50- B--
F8II 639- 9- 24- A-10
F8GQ 630-10- 21- A- 7
F8NV* 456- 8- 19- ----
F9B0* 12- 2- 2- ----

Germany — G

D2GQ 8100-20- 135- A-23
D4AON 7776-12- 146- B-14
D4AAN 2508-11- 80- B- 9
D4ALN 1841-13- 48- ----

Great Britain — G

G6ZO 50,248-44- 384- A-62
G2MI 22,575-35- 215- B--
GE1J 18,752-32- 204- AB-50
G6MP 18,224-34- 186- B-38
G5VB 15,840-31- 142- B-29
G81C 15,300-30- 171- B-44
G60B 10,846-29- 127- B-14
G6RB 10,764-28- 138- B-36
G3PZ 10,530-26- 139- A--
G43Z 9925-21- 147- AB-18
G8CY 9773-29- 117- B-26
G6RO 9646-26- 127- B-32
G6CL 8472-24- 125- B-36
G6GN 6762-23- 98- ----
G5GK 6744-12- 202- B-30
G8OZ 6300-21- 100- B-14
G3BK 6069-21- 93- A-21
G5RT 5244-23- 75- B-16
G3SU 4577-23- 75- B-18

Netherlands — PA6

PA0UN 59,007-39- 506- A-85
PA0GN 30,591-33- 309- A-80
PA0DD 24,000-32- 262- A-47
PA000 17,875-25- 240- A-50
PA0EP 15,745-29- 181- A-86
PA0FEX 9125-25- 126- A-39
PA0EA 6650-25- 90- A-12
PA0OK 5310-18- 101- A-22
PA0XW 4237-19- 75- A-60
PA0NC 3312-22- 48- A--
PA0TX 837- 9- 31- A- 9
PA0CB 264- 7- 15- A- 7
PA0VO 42- 2- 7- A- 3

No. Ireland — GI

G16TK 69,254-52- 449- B-31
G16YM* 258- 6- 15- ----
G16YW 156- 4- 13- A--

Norway — LA

LA3GA 10,738-26- 138- A-21
LA4P 10,582-26- 141- A-45
LA4K 8372-23- 122- A-38
LA2B 5925-25- 79- A--
LA4J 4335-15- 103- A-16
LA4R 3072-16- 66- A--
LA3PA 693- 7- 34- A-17
LA3B 190- 5- 16- ----
LA1C 22- 2- 4- AB- 4

Rumania — YR

YR5R 651- 7- 33- A--

Scotland — GM

GM8MN 36,975-29- 425- A--
GM3ANV 912- 8- 38- ----
GM3UM 567- 9- 21- ----
GM2BMJ 375- 5- 25- ----

Soviet Union — UA

UA3DA 6720-14- 160- ----
UA3AM 3081-13- 81- ----

Sweden — SM

SM5PA 3866- 9- 71- B-11
SM5UN 2788-17- 58- A-11
SM7XV 522- 8- 23- B--
SM2VP 432- 8- 18- A- 7
SM3UT 343- 7- 16- A- 2
SM5PL 168- 4- 14- A- 3
SM3V 50- 3- 6- A--
SM7YP 3- 1- 1- A- 1

(Continued on page 140)

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Want a new Receiver?

(Or transmitter, test equipment, parts, tubes, etc.?)

It will pay you to get it from me!

I guarantee you—lowest prices—top quality—higher trade-in allowances—easiest time payment plan—quickest delivery—all models and makes—and, **above all, a sincere desire to be of friendly, helpful service!**

Visit, write, wire, or phone me — now.

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New! Hallicrafters SX-43



All the new, good features you've wanted, at a price you will want to pay! **\$169.50**

Matching R-44 Speaker \$19.50

JONES MM-2 MICRO—MATCH for coaxial cables

Accurately measures Standing Wave Ratio and RF Power over 3 to 162 Mc range. Coupler unit has coaxial cable connectors and may be inserted in the line at any point. Indicator unit may be in any convenient location.

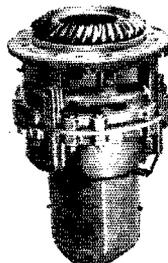
Coupler Unit (specify 52 or 72 ohm), with complete instructions for using any 1 ma meter as indicator \$19.95

Jones Indicator Unit \$17.50

Jones Model MM-1 for 75 to 300 ohm line. Complete \$29.50

Here's a ROTATOR for your BEAM!

- ★ Runs on 24 to 33 volts AC or DC
- ★ Reversible—only three wires required
- ★ Approximately 3/4 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 F B 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)

COMPLETELY CONVERTED—Ready to mount on your pole or tower. Machined steel supports firmly attached to mounting plate. Extension on thrust bearing provides clearance for slip or inductostub rings. Top plate ample to secure boom for dual 10/20 beam. Well designed, rugged construction means years of dependable trouble-free operation! **\$29.96**

(Mail orders add \$1.25 for packing)

THE NEW NATIONAL NC 571—Performance value that can't be beat: Features that you wouldn't expect at the sensationally low price. Complete with tubes and built-in speaker **\$89.50**

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Since 1925!



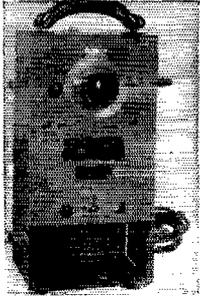
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110 volt AC operated, range 195 to 215 megacycles; complete with tubes, crystal, calibration curves and schematic; only..... **\$9.95**

BC-1066A—UHF 2 Band Receiver, battery powered. Tubes 2-957, 1-1D8GT. Very easily adjusted to 2 meters. In wooden case, with schematic..... **\$3.95**

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Aerovox, type 1590-H-229 low loss, bakelite case; capacity 0.4 Mfd 600v EFF. 18 amps at 3000 KC; 25 amps at 1000 KC. Special..... **95c**
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VARIABLE CONDENSERS

100 Mfd double bearing, silver plated, Isolantite insulation; can be ganged either end..... **29c**

10 for **\$2.50**

25 Mfd balanced stator one hole mfg. Isolantite insulation, polished plates; swell for UHF..... **29c**

10 for **\$2.50**

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ARC-5 Banana plugs silver plated; doz..... **10c**

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Special..... **\$14.95**

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8 AG 1/100 amp Inst. type; doz..... **50c**

3 AG 2 amp doz..... **25c**

3 AG 3 amp doz..... **25c**

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550-0-550 V at 100 Ma..... **\$1.95**

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Tunes 410/420 megacycles; light weight airborne Radar. 17 tubes, including 5/6J6; 9/6AG5; 2/ZDZ1; 1/VR105 and 30 megacycle I.F. strip. All for..... **\$11.95**



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2 x 0.1 Mfd, 600v DC.....	25c	7.5 Mfd, 330v AC.....	\$1.25
1 Mfd, 600v DC.....	25c	1.78 Mfd, 200v AC WE.....	25c
2 Mfd, 600v DC.....	49c	1 Mfd, 5000v DC.....	\$2.95
10 Mfd, 600v DC.....	98c	0.1 Mfd, 7500v DC.....	\$1.50
1 Mfd, 1000v DC.....	39c	2 x 0.1 Mfd, 7500v DC.....	\$2.00
2 Mfd, 1000v DC.....	79c	.02 Mfd, 8000v DC.....	98c
0.5 Mfd, 1500v DC.....	25c	2 Mfd, 10000v DC.....	\$17.50

General Radio Co., VARIACS

200-B 170KVA 0-135v output, 1 amp..... **\$12.50**

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V-10MT 1.725KVA 0-135v output, 10 amp..... **\$40.00**

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ACN Vernier dial 5 x 7/4..... **\$2.98**

AR-16 air spaced exciter coils, for 5-10-20-40-80 meters; end, center or swinging link..... **\$1.15**

XB-16 Socket for above..... **33c**

Complete stock of NATIONAL CO., Receivers
 Condensers, dials and other parts ON HAND.

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Octal socket, Isolantite molded in metal ring, 1 1/8" diameter..... **8c**

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100,000 ohm, precision made. G.R. type; 25 watt, 6" diameter.

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Mobile Mike**

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Unaffected by temperature or humidity. Output impedance 200 ohms at about -35db.

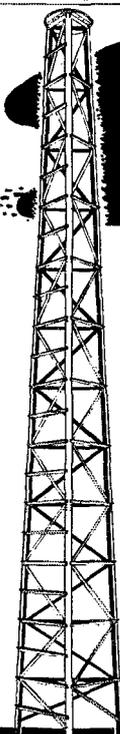
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Transmitting Tubes - - - Only - 69¢ Each**
On orders of from 1 to 4, add 20¢ to cover
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**TRIG: trim, trusty, sound,
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Iowa	W0SQO 37,083-39-86- B-70	W0HX 10,185-35-98- B-29
	W0YFP 5394-31-58- C-11	W0QJP 3384-24-47- B-16
	W0HQH 75-5-5- A-12	W0OTB 2964-26-38- B-33
Kansas	W0VAV 1728-24-24- B-1	W0JWJ 243-9-9- B-4
	W0VAT 31,680-64-165- C-9	W0QDQ* 114-3-4- B-1
	W0OZA* 36-3-4- ---	
	W0JAS 3-1-1- A-1	Nebraska
Missouri	W0GDB 1615-19-29- B-15	
	W0AIW 60,556-88-230- C-86	W0FLF 297-9-11- B-8

NEW ENGLAND DIVISION

Connecticut	WIMTG 1332-12-37- B-13
	WIFOX 1311-19-23- B-1
	WIPOY 588-12-17- B-10
	WIAJA* 468-12-13- B-15
	WIPST 330-10-11- A-1
	WIKMY 27-3-3- B-4
	WIMRQ 12-2-2- ---
Maine	W. Massachusetts
	WIZD 9594-39-82- C-21
	WICLX 405-9-15- B-9
E. Massachusetts	New Hampshire
	WICRW 18,000-50-120- C-33
	WIBFT 15,300-50-102- B-1
	WIKKT 1532-19-27- A-30
	Rhode Island
	WIBFB 40,425-77-175- B-63
	WICJH 24,186-58-139- C-5

NORTHWESTERN DIVISION

Idaho	W7KK* 3-1-1- ---	Washington
	W7ESK 33,760-80-141- C-29	
	W7DL 14,352-52-92- C-60	
Oregon	W7GUI 3024-24-43- C-6	
	W7EYS 1292-19-34- C-10	
	W7FS* 36-4-4- ---	

PACIFIC DIVISION

Nevada	W6AED 8325-37-75- C-29
	W6UZX 4557-31-51- B-21
	W6VFX 320-8-14- A-4
Santa Clara Valley	San Francisco
	W6BIP 12,138-42-97- B-56
	W6MWK 12,126-43-96- C-1
East Bay	Sacramento Valley
	W6EJC 40,110-70-191 C-1
	W6GHG 27-3-3- C-4
	San Joaquin Valley
	W6VPV 3741-29-43- B-19
	W6WXZ 12-2-2- ---

ROANOKE DIVISION

North Carolina	W4IYB 396-11-12- B-8
	W4IYI 12-2-2- B-1
	W4CB* 9-3-4- ---
South Carolina	West Virginia
	W8VAN 2860-22-44- B-14
	W8CWY 990-15-22- C-7
	W8OHG 756-14-18- B-16
	W8LIN* 3-1-1- ---

ROCKY MOUNTAIN DIVISION

Colorado	W0CDP 12-2-2- B-2	Utah-Wyoming
		W7UOM 5148-29-54- A-42

SOUTHEASTERN DIVISION

Alabama	W4GVP 5460-28-65- B-1	W4CWW* 27-3-3- A-1
E. Florida	W4EQR W. Florida	
	17,710-46-131- C-1	
	Georgia	
	W4EYW 13,156-46-96- C-1	
	W4FLJ 9844-35-68- B-29	
	W4IPX 4 986-17-21- C-10	

SOUTHWESTERN DIVISION

Los Angeles	W7PUM 2205-22-35- B-16
	W7HW* 240-8-10- ---
	W7JVN 162-6-9- C-2
	Arizona
	W6RCD 35,675-75-163- C-63
	W6BBR 29,295-55-123- ---
	W6CHV 18,810-55-114- B-47
	W6QMJ 4009-39-77- C-53
	W6CTP 1596-19-28- B-21
	W6WLQ 612-12-17- B-19
	W6LRU 396-11-12- A-2
	W6M1 168-7-8- A-6

(Continued on page 148)

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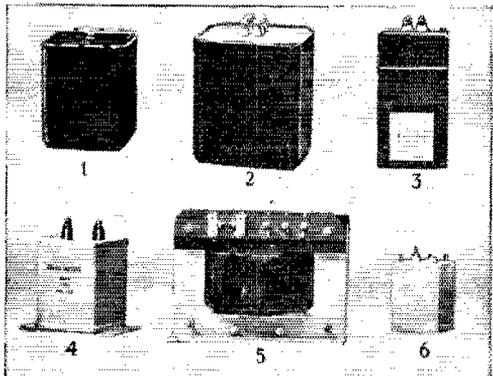
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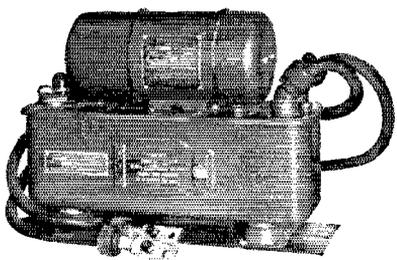
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6 or 12 VDC input, 500 VDC @ 160 M.A. output. Complete with heavy duty rubber covered battery cable, complete filtering and overload circuits. Brand new in original over-seas shipping crate. **Shipping Weight 81 lbs. Only... \$9.95**

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No. 1 of a Series

The comment most often expressed in the letters I receive is: "Thanks for the quick service but more important for shipping the order complete."
Believe me, such comments are doubly welcome because they indicate your appreciation of our long established 3 point policy:
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A 75 watt output transmitter for the 2, 6, and 10 meter band. Xtal controlled and uses an 829B final amp. As advertised in October 1947 QST. Shipping Weight 25 lbs.
Complete with 10 meter coils but less tubes and xtal. **\$69.75**
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PRIVATE Telephone System

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- No external power is required - installation is simple, requiring only two wires or one wire and ground - and you can use as many units as you need on one pair of wires.
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WEST GULF DIVISION

<i>Northern Texas</i>			<i>Southern Texas</i>		
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WSFRD	27,899-74-126-	B-53	WGEFZ/5	9030-43-70-	C-24
WSRGP	2774-29-50-	B-21	WSDAA	7768-32-32-	B-56
WSAPW	273-12-14-	B-13	WZYM	209-20-36-	---
WSBXM	126-6-7-	B-4	WSLBC*	324-9-12-	---
WSMCF	75-5-5-	A-5	WSEDX	80-5-6-	B-3
WSALA	45-3-5-	B-4	WSLPX*	48-4-4-	---
			WSLTY	12-2-2-	---
<i>Oklahoma</i>			<i>New Mexico</i>		
WSITF*9	3-1-1-	---	WSLGS	2262-25-29-	B-12
			WSMLX ¹⁰	3993-16-41-	B-95

CANADA

<i>Maritime</i>			<i>Alberta</i>		
VEIET	15,050-50-101-	B-34	VE6FK	1173-17-23-	B----
VEIPE	14,550-50-97-	B-65	VE6ZM	126-6-7-	---
VEICM	4752-27-59-	A-27	<i>British Columbia</i>		
VEIEA	351-9-14-	A-11	VE7AJN	30,976-64-162-	C-47
VEIQF*	45-3-5-	---	VE7VP	7644-39-68-	C-53
<i>Ontario</i>			VE7EB	3916-24-53-	A-17
VE3HC	63,256-84-212-	C-42	VE7AM	1168-16-26-	A-16
VE3QL	17,925-61-101-	C-64	VE7IM	720-12-21-	B-12
VE3UJ	13,536-48-107-	B-27	VE7WL	120-5-8-	B-7
VE3XG	3828-29-44-	A-7	<i>Manitoba</i>		
VE300	2112-22-32-	---	VE4IF	6171-33-65-	B----
VE3QB*	1881-19-33-	A-7	VE4MJ	3645-27-46-	B----
VE3HG*	1634-14-21-	B-20	VE4RP	2079-21-33-	A-58
VE3AMK	858-13-22-	B-7	VE4KF	2016-24-28-	B-36
VE3PE	168-7-8-	B-4	VE4QV	2000-20-34-	B-17
VE3YY*	60-4-5-	A-7	VE4RO	1260-18-24-	B-12
VE3CD	48-4-4-	---	VE4LF	684-12-19-	B-7
VE3BJD	36-4-4-	---	VE4AC	200-8-9-	B-5
<i>Quebec</i>			VE4P	126-6-7-	B-5
VE2DX	5365-29-63-	B-22	VE4YW	108-6-6-	A-7
VE2JI	2247-20-36-	A-22	VE4WB	48-4-4-	---
VE2SE	726-11-23-	B-7	VE4QM	27-3-3-	---
VE2KQ	126-6-7-	---	<i>Saskatchewan</i>		
			VE5OM	240-8-10-	A-7

AFRICA

<i>Gold Coast ZD4</i>			<i>ZS6V</i>		
ZD4AB	1243-11-39-	A-5	ZS6CT ¹¹	19,320-23-280-	A-7
			ZS6BV	2832-16-51-	A-9
			ZSIDM	871-13-23-	---
<i>U. of So. Africa ZS</i>					
ZS6DW	79,648-32-833-	---			

ASIA

<i>China CI</i>			<i>HZ1AB</i>		
CICH	2310-10-77-	---	HZ1AB	56-4-5-	---
CICYC	75-3-9-	---	<i>Japan J</i>		
			J9AAI	13,800-25-185-	B-22

EUROPE

<i>Belgium ON</i>			<i>Netherlands PA0</i>		
ON4MS	4992-24-70-	A-17	PA0GN	29,000-32-303-	A-74
			PA0UM	26,442-26-341-	A-45
<i>Denmark OZ</i>			PA0BU	16,016-28-193-	A-51
OZ9Q	31,096-26-414-	A-7	PA0HS	3456-12-96-	---
OZ7G	16,750-28-229-	A-58	PA7EA	72-4-7-	A-2
OZ1W	5280-20-88-	A-1	<i>Norway - LA</i>		
OZ6PX	1950-10-65-	A-16	LA3B	144-6-8-	---
OZ7EU	1683-10-63-	---	LA4R	6-1-2-	---
			LA1F	3-1-1-	---
<i>France F</i>			<i>Scotland - GM</i>		
F80D	25,375-29-295-	A-38	GM2UU	23,340-30-264-	B-34
F8BO	680-8-30-	A-9	GM8RJ	4368-14-106-	A-7
F8MY	103-4-9-	---	<i>Sweden - SM</i>		
F80A*	24-2-4-	---	SM5UM	3534-19-62-	A-7
			SM5WJ	600-12-18-	A-7
<i>Great Britain G</i>			SM5RF	96-4-8-	A-6
G6LK	39,616-32-416-	B-56	<i>Switzerland - HB</i>		
G6AY	21,141-29-243-	A-37	HB9DB	2096-16-47-	A-7
G4JZ	20,590-29-262-	AB-35	NORTH AMERICA		
G8MX	8532-23-128-	B-14	<i>Barbados - VP8</i>		
G6CB	729-9-27-	A-25	VP2MY*8	816-8-34-	---
<i>Italy I</i>			<i>Leeward Islands - VP2</i>		
I1BU	4768-16-100-	A-7	VP2MY*8	816-8-34-	---
			<i>Mexico - XE</i>		
<i>Canada</i>			XE1A	306,504-66-1548-	-46
VP6YB	70,496-32-747-	B-39	XE1KE	67,956-42-540-	B-39
			XE1FB	3630-15-84-	B-7
KZ5AZ	7922-18-148-	A-22	XE1CE*	2444-26-32-	A-7
			<i>Cuba - CM-CO</i>		
CM2JK	770-10-26-	A-3			

OCEANIA

<i>Australia - VK</i>			<i>Fiji Islands</i>		
VK2ADT	47,520-44-360-	---	VK2BW	730-10-18-	A-9
VK2TI	29,988-32-303-	A-33	VK5LC	450-6-25-	A-1
VK3ZL	26,940-30-302-	A-35	VK3MX	150-5-10-	A-1
VK2YL	9180-30-102-	---	VK2KL	126-3-14-	---
VK6RU	9126-18-169-	---	VK7NC	38-3-4-	---
VK5KG	3630-10-121-	---	<i>Hawaii - KH6</i>		
VK2VA	3195-15-71-	---	KH6J	48,300-35-460-	-34
VK7LZ	2265-15-51-	---			
VK4GJ*	2010-10-67-	---			
VK3BE	1290-10-43-	A-7			

(Continued on page 148)

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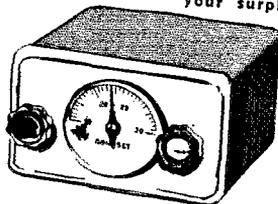
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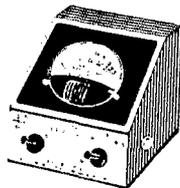
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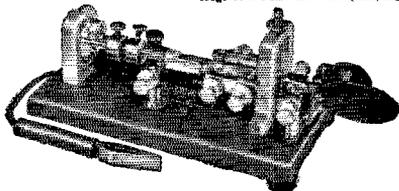
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LU9AX	Argentina — LU	OA4AK	12,012-14-286-B-19
LUIDH	864E-23-124-16	OA4BI	4587-11-139-A-13
	6578-13-170-B-12		
OA4M	Peru — OA	CX2CO	Uruguay — CX
	59,653-29-700-C	CX1FB	57,752-32-612-B-58
			3356-12-94-A

¹ Two ops. W6CHE, W6HB. ² Three ops. ³ Eight ops. W1MJH, W2RCX, W4INJ, W4IYR, W4JNC, W4JDS, W4KXW, W8VTN. ⁴ Six ops. W1KCD, W1IBM, W1MLO, W2IDN, W4DSV, W4KYF. ⁵ Two ops. W6LHN, W6LDJ. ⁶ Nine ops. W5MLX, W5MKF, W5MLJ, W5MSG, W5LFT, W6DRU, W2PGR, W6RUX, W5MLC. ⁷ Two ops. ⁸ City of Belfast YMCA Radio Club. ⁹ No award. ¹⁰ Eight ops. W5MLC, W5MKF, W5MSG, W5LFT, W5MLJ, W6DRU, W2PGR, W6RUX. ¹¹ Two ops.

¹² Special note to 'phone participants outside W/VE: Through circumstances beyond our control, a file of 'phone logs which is believed to include several high scores has become lost, strayed or stolen. No 'phone awards, therefore, will be made to entrants outside the W/VE area until amateurs who may be affected have had an opportunity to resubmit copies of their 1947 DX Contest log. If your call is not listed in the above tabulation, please send a copy of your log to ARRL headquarters. It is requested that amateurs in the above category endeavor to send the necessary copies before February 1, 1948. We are sorry it becomes necessary to postpone making the foreign 'phone awards until this date, but under the circumstances it is the only arrangement possible.

How's DX?

(Continued from page 63)

this date, do not try to get a confirmation from W4JMQ. Check your log before sending that card along. . . . HK3CK is ex-HK1CK/HK1AB and confirmations for contacts with these stations can be had by sending a card to L.C.R.A., Box 584, Bogota, Colombia. . . . Via W9RIA comes word from LX1AB, QSL manager for Luxembourg, that LX1AX is definitely a pirate. If an LX is not listed in the latest *Call Book* he is N.G. . . . The legit XZ2AA suspended operations as of September 1, 1947, so any contacts with XZ2AA after this date are also in the N.G. class. . . . Jim Peaden, W5HHR, is going overseas and expects to be a nice hunk of DX in the near future. . . . G8UA suggests the 80-meter gang look for DX between 3635 and 3685, this being a gap in the band assigned to Europe. . . . Anyone got any legit info on TALAD, AC4BR or AC4EA? . . . J9SIR (W8SIR) writes to say that he is 1000 cards behind schedule, but asks the gang to be a little patient. He also wants the gang to QSL to his home QTH, which is David C. Fugman, Aurora, Ohio. . . . The New Zealand gang are running a DX contest on December 6th-7th and December 13th-14th, from 6:00 P.M. to 12:00 P.M. (0600 GCT to 0000 GCT). 'Phone or c.w. may be used; a serial number with six figures will be swapped. . . . Via W4FPK we get word that HA4EA is definitely the only authentic licensed ham in Hungary at present, but more are expected on soon. QTH of the new QSL bureau for Hungary is: Hungary QSL Bureau/HQB, A. Sass, Dohany Utea, 1/c, Budapest VII, Hungary. . . .

(Continued on page 160)

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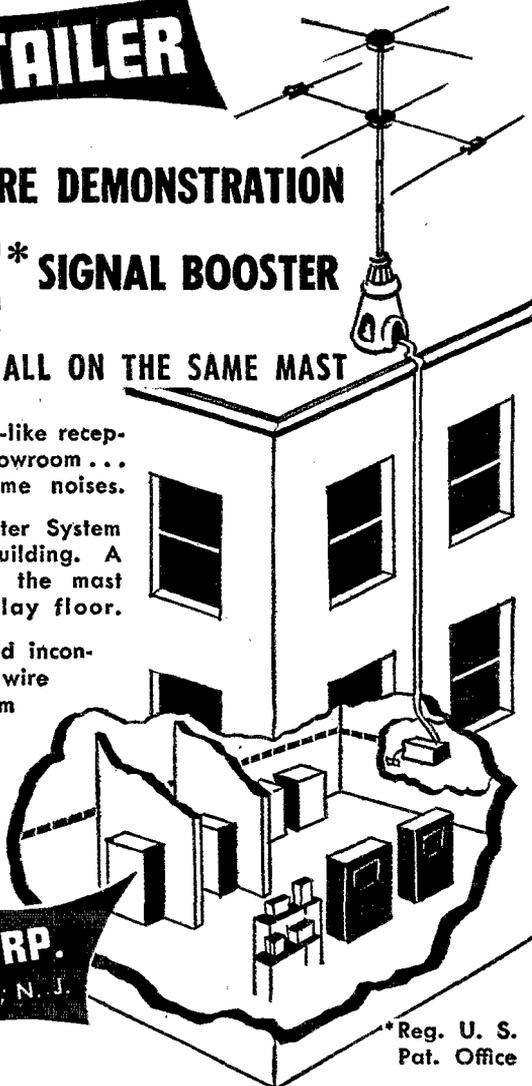
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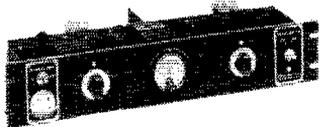
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73, JULE BURNETT, W8WHE

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W4KRT (ex-J9ACS) will confirm all contacts if cards are sent to Paul McCleary, 4534 Blount Ave., Jacksonville, Florida. A letter from ZM6AC, via WIKKS, tells of some of the hardships he had in getting on the air so we could grab off a nice juicy country. His voltage regulation runs from 80 to 140 and he keeps a Samoan boy swinging the rheostat, to prevent the hydroelectric plant from going west. Secondly, import restrictions are very tough and he wants us to know that he was held up until W1AH came to the rescue with some equipment. Thanks, Art, from ZM6AC and the gang the world over. W6EAY, who likes DX as well as any of us, often takes time out to handle traffic, even to the extent of telephoning it to the East Coast, while the boys in the outlying islands stand by for the answers. That's putting our hobby to one of the uses for which it was primarily intended. W5ALA says if you call OQ5AE, stand by on his frequency for about a minute before calling again or giving up. He has to run outside and start up a gasoline-driven generator (and we gripe because our voltage might vary a volt or two under load!)

Because of the lack of time and the uncertainty of my whereabouts in the future, this will be my last "How's DX?" I would like to thank one and all for the splendid cooperation I've had and hope you will do likewise with my successor. 73.

[EDITOR'S NOTE: Please mail all future contributions for "How's DX?" to ARRL Headquarters, 38 La Salle Road, West Hartford, Conn.]

Correspondence

(Continued from page 73)

tion in that position would get an increase, not a cut, in frequencies. Why do we not get the increase? It must be leadership; that would be the case in the commercial organization with a similar set-up. . . . Are all our investments to be made worthless because our duly-elected-and-appointed leaders are more interested in hobnobbing with certain alleged big-shots than in getting the good will, and incidentally, the support of the smaller countries?

This is only a sample of the tens of thousands of letters that you will receive when it becomes generally known that the hams have been "sold down the river" again. (Plenty will want to know for what price?) Of course they will probably be read, if at all, by some office girl who will not get a pension.

— Bill Case, W5FN-1

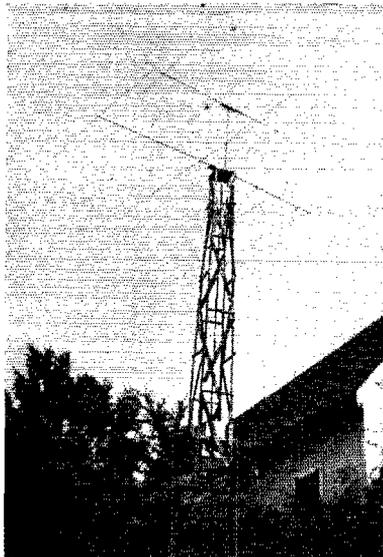
2 Congress St., Newburyport, Mass.

Editor, QST:

I just got through reading the very first article in the September issue, "It Seems To Us," which refers to changes that are going to take place. What are you trying to do — make us feel a little better after we lose all our frequencies? It seems as though ARRL is now turning with the stream. You tell us what we have done, etc., and all sorts of junk like that. You also give us the bull that we also must make changes like the rest of the world.

Well, that sort of junk isn't going to build up morale; it's about time that someone did something instead of telling what could be done. It seems as though the U. S. (and now the ARRL follows) has just parked its carcass in the back seat and is letting all the foreign countries do the steering. Who are they to tell us what to do?

(Continued on page 152)



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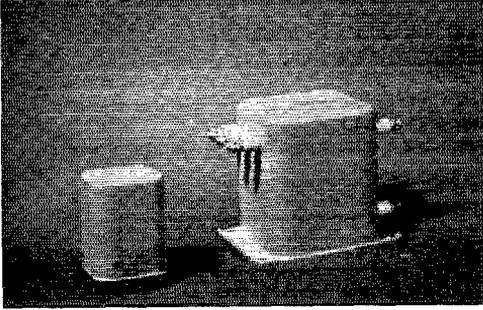
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Wake up; start some action before we are forced to use light transmission only. The U. S. is foolish enough to let a two-cent foreign country take a band away from us for some good-for-nothing reason, and now the ARRL lets 'em get away with it. A few years ago we were being told that amateurs perfected radio, the amateur greatly helped win the war — well, friends, this is how we are getting paid off.

Now is the time (if it isn't too late already) to make ourselves known; because when our frequencies are gone, gone also is the League, and gone is amateur radio. It is also about time that all hams woke up and did something instead of sitting back and thinking that the good old U. S. is going to give us our frequencies back. This is no picnic; if we lose now, then ham radio is lost.

Wake up; if a hundred thousand hams cannot beat a few punk countries, then it is about time that we gave up the U. S. and let the foreigners run it.

— Milton Kalashian, W1NXT

Glendive, Montana

Editor, QST:

Seems to me that you and your force have done just about everything humanly possible and wound up a FB job at Atlantic City. For myself, at least, I wish to congratulate you. There will no doubt be some squawks on the outcome but I am sure that there will be nothing that should cause much worry. I'm out here where I hear a lot of loose talk to the east of me on 75 'phone evenings. Most any outcome is wrong, hi! They sort of sound like the old W6 gang had moved into the North Central states.

— R. Rex Roberts, W7CPY

405 Sayles Street, Oneida, New York

Editor, QST:

In view of the recent happenings at Atlantic City and the apparently biased opinions being expressed on the bands, one seems to be of the opinion that the ARRL officials are taking it on the chin. Let it not be said that the members of the Oneida Amateur Radio Club are a party to these "woeful destroyers."

At our last meeting there was discussion of the Atlantic City conferences and the ARRL, and the discussion finished with a request that I write and inform you and the ARRL officials of our thanks for the way they have been aiding amateur radio in these trying times. The Oneida Amateur Radio Club is solidly behind the ARRL and sincerely and fraternally congratulates the ARRL on the manner in which they have handled their part (and the part of amateur radio) during and preceding the Atlantic City conferences.

— Walter L. Babcock, W2RXW
 Pres., Oneida Amateur Radio Club

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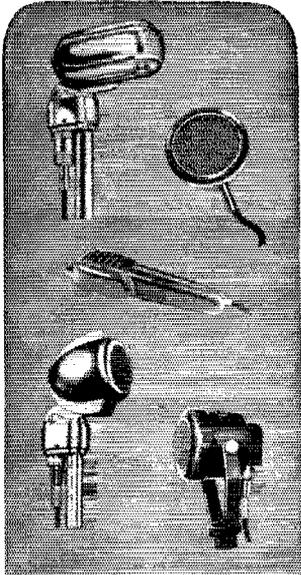
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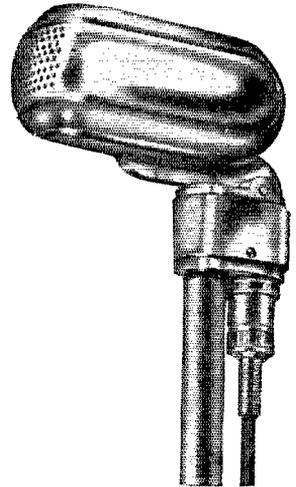


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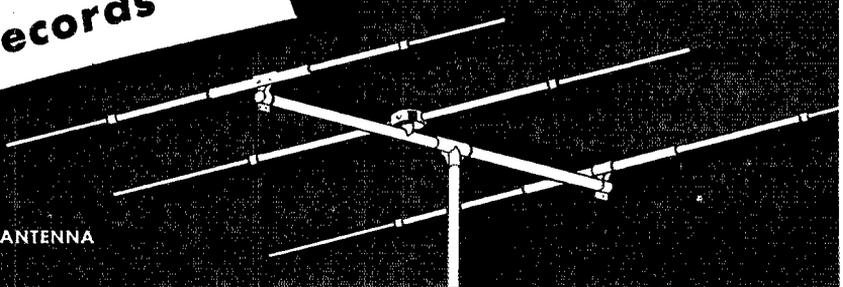
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These enthusiastic comments from owners of Workshop 10-meter beams are the result of many months of painstaking research and testing to obtain constant gain, impedance match, and "front-to-back" ratio over the entire band. For structural strength, clean-cut design, and maximum performance, you cannot equal the Workshop 10-meter beam antenna. Model #29, price \$39.50

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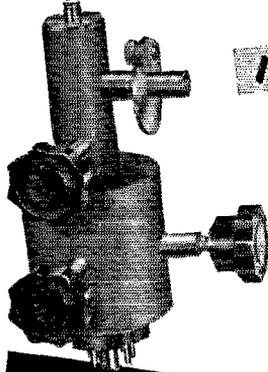
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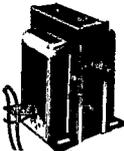
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METER repair. Braden Engineering, 3317 Kenmore, Dayton, O.

COMMERCIAL radio operators examination, question-and-answers. One dollar per element. G. C. Waller, WSATV, 6540 E. Washington Blvd., Tulsa 15, Okla.

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. Hallcrafters, National, Hammarlund, Collins, RME, Gonset, Millen, Meissner, others. Send deposit for new gear or list of used or surplus. Van Sickle Radio Supply, Indianapolis 6, Ind.

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TOWERS for your rotary beam. Full lattice-work, spruce construction. Priced for the amateur. Write for Bulletin T-101. Sky Lane Products, Ironwood, Mich.

TRANSMITTER kits, 40 watts, \$69.95. Exciter kit, \$17.95. 175-watt xmt'r soon. All makes and models new and recond'g revrs. Trade-ins accepted low payment plan; terms financed by Leo, W6GFQ. Write for specials. World Radio Labs., Council Bluffs, Iowa.

DON'S QSLs. "Leader in the field." Samples, 2138 So. 16th Ave., Maywood, Ill.

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CUSTOM building of ham equipment, your specifications. Medium pwr xmt'rs, VFOs, etc. Inquire Chatel, W2RSC, ex-WIDIF, 235 Duffield St., Brooklyn, N. Y.

QSLs in plastic — record cards, Ham Xmas cards. Stamp for samples. Reber Print, R.D. 1, Sewell, N. J.

SELL: Hallcrafters S-36A rcvr like new, good cond'g. \$150. Carl M. Carrow, R.R. #1, Box 105A, Hemetite, Mo.

SELLING: New HRO-W in original carton. Complete with power supply and coils from 1.7 to 30 megacycles — \$165. HQ129X used about two months and in perfect condition — \$130. New Navy LM17 frequency meter, calibrated with original crystal and ac power supply — \$65. B. Yeager, 423 Sheridan Road, Chicago, Ill.

SELL: Recently overhauled Collins 301-3 1/4 kw input — \$410.00 — Dr. C. R. Crosby, RFL #1, Chatham, Mass.

QSLs for 3¢ Harrison, 8001 Piney Branch Road, Silver Spring, Md. **BEAM** Control Cable 2 #16; 6 #20 conductors, weatherproof, shielded. 10¢ ft. Associated Industries, 6639 S. Aberdeen St., Chicago, Ill.

SELL: Arc-5 Xmitter 100-156 Mc. New with tubes, less crystals, \$15. Mack, 98 Bodin, Staten Island, N. Y.

FOR SALE: BC348R, converted to 110v AC, \$55. W6AAO/Ø, 1238 No. Waco, Wichita 5, Kans.

SELL: Transmitter receiver test equipment 1E36 for SCR522 \$35.00. Henry Griffiths, 3982 65 Place, Woodside, L. I., N. Y.

ABBOTT DK-2 transceiver, 2 meters, \$15 or best offer. Dalton Harrow, Westwood, Mass.

WANTED: Best transmitter \$1000 will buy. Prefer commercial built but good custom built might do. No BC 610. W7ALO — Route 4, Box 336, Salem, Ore.

THORDARSON T19F58 new Dual Secondary 2400 volt/200ma 1800 volt/150 ma, \$12.50. W6TFV, 17th N.E., Seattle, Wash. Richard Wall

SALE: Sonar XE-10 FM exciter—350 watt cw transmitter—Hexmax rotary beam kit, adjustable 6-10-11 Meters, SX28A receiver — Best offer on any or all. Herb Halbig, W3MZP, 130 Old Dorwart St., Lancaster, Pa.

MILLEN 616-807 Exciter: First \$30.00 money order takes it. W2QU, David Bulky, 405 Weaver St., Larchmont, N. Y.

WILL trade for boat with inboard motor, Hammarlund HQ129X — 500 watt N.B.F.M. (10-meter xmt'r.) Julius Lewis, W2ORW, 1244 Putnam Ave., Brooklyn 21.

FOR SALE: Receiver's BC-348's New \$42.50; 522's New \$29.75; International Aero Activities, 2322 W. 18, Oklahoma City, Okla.

COLORTONE QSL's are new! Different! Reasonable! Hams everywhere regard them as examples reflecting smartness and practicability. See for yourself! Samples? The Colortone Press, Tupelo, Miss.

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BC1068 — \$38.00 — BC348Q converted to Ac, \$55. BC342N, like new \$60 — W1BY.

BC-348 FOR 110 V. with broadcast converter, \$80. BC-375, \$25. John C. Harvey, 2324 Broadway, Lubbock, Texas.

TRANSMITTING keys: new, beautifully built, hi quality Mac type 200 keys. Black crackle finish, heavy cast oval shape base, the type that doesn't require fastening down. Won't tilt. Switch lever for closing circuit. All parts chromium plated. Adjustable bearings, heavy 3/16" silver contacts. A real buy, \$1. Shipping wt. 1 lb. Please inc. postage. Ed Doherr, W3CIR/1, 96 Highland St., Hyde Park, Boston, Mass.

SELL: BC-342 N AC rcvr. Complete accessories. M. E. Hughes, 4819 Euphrosine, New Orleans, La.

FOR SALE: Hickok 305 'scope used 5 hours, \$110. Rider manuals 1-V, VI thru XIV, \$115. All f.o.p. Visalia, H. E. Stratton, jr., W6VTH, 427 So. Garden, Visalia, Calif.

COMPLETE mobile 10-11 meter rig. Month old. Gon-set and limiter, Sonar MB-611, mike, meter, antenna, \$100x takes all. W2JWB, 31-85 Utopia Hwy, Jamaica, N. Y.

SELL or trade: 2 BC211 rcvr. meters, one with modulation, also SWR pwr supply for BC-1221. Earle Davis, W6VW1, 4506 W. 60th St., Los Angeles, Calif.

BEAM rotators, heavy duty. Priced to sell. Descriptive sheet free. A. G. Ferris, W9UUL, R. 3, Box 260, Indianapolis, Ind.

SELLING out: all kinds of transmitter parts. Standard makes. Excellent condition. Price reasonable. Write for list. Al Haagenson, WØEFP, 721 1/2 Union Ave., So., Ferguson Falls, Minn.

WANTED: SCR-505. State details. Letters answered. Filderblum, 49 Cliff Ave., Yonkers, N. Y.

SELL: Millen ECO, like new, \$28. Bedell, W2HFM, Merrick, N. Y.

SELL: Meissner 150-B exciter unit, practically new, prepaid, \$50. Robert J. Sudbury, 1414 Third Road, Baltimore 20, Md.

SUPER-PRO Army version, 100-400 Kc., 2500-20,000 Kc. Complete with pwr supply, \$100. Also used SX-24, \$60. WIADB, 12 Warren Road, Framingham, Mass.

FOR Sale: one NC-46 rcvr with spkr, used about 10 hrs. Won at a hamfest. Will sell for \$65. W2KSY, Earl Foster, Russell, N. Y. Box 24.

SELL: BC-342-N AC receiver, complete accessories, M. E. Hughes, 4819 Euphrosine, New Orleans, La.

WILL purchase for cash or trade desirable equipment for Boonton 100A Q meter in good condition. Gordon-12 Sunnyside Ave., Wellesley 81, Mass.

TEMCO 75 G. A. like new — 12 OW phone and C. W. Xmitter complete with 2000 Hz. All bands 3, 7, 14, 21, and 28 megs — just factory checked with last words in refinements added. Fine D. X. Record. Priced for quick sale, reason want the Temco 500 G. A. First \$350 gives it. O. B. W2FHE — 201 Forest Avenue, Glen Ridge, N. J.

J9AAK now stateside has QSL'd 100% direct or through bureaus. Will gladly send duplicate when requested. W0KDA Box 987 Wink, Texas.

WANTED: HQ-120X or HQ-129X. WSITY, Tulsa, Oklahoma.

SELL complete HQ Fone/cw rig consisting of meck gck XMT'R with coils 10M to ØØM and tubes, Turner V1-7.5 mike and vibroplex bug. Send letter for details. All replies answered. WØOZA, 305 W. 5th, Pittsburgh, Kansas.

HAVE latest model Meissner Signal Shifter with six meter coils and rack conversion kit, twenty meter three element Bassett beam, "Proceedings of Ire" communications receiver, Thordarson speech amplifier, etc. WSHGL, Jim Reid, Huston, Miss.

MUST sell new BC-610 converted with coils 10-20-40-80 speech amplifier and tubes. For details write John G. Johnson, 501 North New Street, Champaign, Illinois.

MOTOROLA Police Cruiser Receiver, P-69-17A. Ten tubes six volts DC Converted for 10 meters by Motorola. Complete with new speaker, tubes, dash mounting control, necessary cables. Ready for use. Cost \$150.00. Best offer over \$40 takes it. WØCVU Po Box 224 Cedar Rapids, Iowa.

MODULATOR 75-watt Class B National transformers on 77 x 197" leatherette. Crystal or carbon to 6CS-45-108. Vissing recorder and tapes. Lampkin Micrometer Freq. Meter type 101, capable excellent OO-FMT work. FOB best offer. Handy, c/o ARRL.

HAVE a kw cw and phone Xmitter will trade for BC 610 Xmitter. Write Box 516, Stryker, Ohio.

SELL — brand new unused Electrovoice Cardax 950 mike with desk stand \$20.00. W3LEL Box 274 Elkland, Pa.

HAMS — 500 watt amplifier, 4-850's. Use selenium rectifiers. Makes good modulator for KW, \$49.50. Write for dope. SOS, 449 W. 42nd, New York.

POWER relays, Dunco DPST, 117VAC coil, contacts 30 AMP 117VAC, \$.395 C.O.D., postpaid if remittance accompanies order. Arrow Radio, Duluth, Minn.

SUPER-PRO, New, 540kc-20mc, speaker, spare tubes, rack mounting, best offer, 69-26 175 Street, Flushing, New York.

QSL's, Variety, Quick service. Stamp for samples, Griffith, W3FSW, 1042 Pine Heights Avenue, Baltimore 29, Md.

QSL's, good service, Central Printing Company Box 345, Huntington, Ind.

QSL's, Maps of all States, all Provinces of Canada, All Countries. QSL Printers, Box 947, Ft. Wayne, Ind.

SELLING out — send for complete list — WICPI Wakefield, R. 1. BEAM elements — Dural $\frac{1}{8}$ " & $\frac{3}{8}$ " dia. 15 meter adjustable, 3 for \$12.00, 10-11 meter adjustable, 3 for \$9.00, 10-11 2 piece elements cut to frequency, set of three \$6.00, 6-12" lengths $\frac{3}{8}$ " dia. \$5.00, W2SVG, 375 Oak Place, Mineola, N. Y.

SELL: Complete station, HRO5T, 9 coils, 2 power supplies, \$225.00. 450 watt cw transmitter, power supplies, \$125.00. Both \$300.00. W8QMN.

FOR Sale: HRO, pre-war model, glass tubes, without limiter. Perfect condition. Price \$150.00 complete. W8ZQC, Olmstead Falls, Ohio.

SELL: SX25 W/spkr, \$85.00, Al HQ129X — 3 mo's old 1.50. Sell or trade: RCA XFMR-110-60n 15 volts ct., @ .020 and 2.50 @ 5 amps w/8013A \$15.00, pyronol .1 mid 25000 \$10.00, 4-813's \$7 need 2 Amertron 200 ct., @ .00, 2-4-250's or 304th's, 2-2KVA VARIAC's, Pyronol 4000 volt cond., P.O.B. Mobile, Hank Bailey W41KM 106 Bradford, Mobile, Ala.

FOR Sale: BC-610F, Complete, coils, Speech amplifier, Modified for 10 meters, used 75 hours, Good condition, Cash \$575, Lloyd D. Berent W9VLG 154 Gould Street, Beaver Dam, Wisc.

SCR 522A's 2-meter 25.00, BC459A's 7-9mc., 7.50 complete, ready for conversion. Order now, limited supply. Electronic Engineering 1210 Dryades St., New Orleans, La.

24-28 volt transformer, 115V, 2000 watts, fully shielded, Porcelain terminals, J. Reidal, W2CRB, 1523 41 St., Brooklyn 18, N. Y.

SACRIFICE: 10-20 meter fone-cw Xmitter, 35T's modulated by 811a-200 watts. A-1 parts and construction — not junk. Details and pics on request. W4CJT, Box 86, Coral Gables 34, Fla.

W8VHY Washington Court House, Ohio is now WLLB, 2480 Marion St., North Bend, Ore.

SELL: BC-610 modified for ten, 813 driving 250th mike, spare tubes, Xtal, Bi-Push Transmitters, ten twenty and forty cw and phone 45 watts, coils, LRO5TAL, complete, DB-20 Preselector; So-44 Panoramic; BC-221 freq. mtr., internal modulator. All in new or good operating condition. Best offer all or part takes. Or will trade for real good used Farmall A or similar tractor on rubber with attachments Adma Mayer W4ILU P. O. Box 425 Morehead City, N. C.

SURPLUS Sale — Test equipment, Transformers, meters, transmitters, etc. Special — BC 614 D Speech amplifier (similar to Hallcrafters HF-5) \$12.50 low Washington. Write for list. W3ZW 1305 46th St., E. Washington 19, D. C.

FIRST forty dollars takes one Brush Wire Recorder magazine, level wind, time elapse indicator one spool wire, record and erase head, no motor. W. Lee Beckley, Grundy Center, Iowa.

SELL: SX28A complete with matching speaker, \$175. W2MKT, 243 Carlton, E. Rutherford, N. J.

HALLCRAFTERS Sky Ranger, S-39, 55 to 30 mc, ac/dc/portable. Purchased new in late 1945. Used only slightly. Without batteries. \$75.00 or trade equivalent in test equipment (Scope, Signal Generator) . . . W. M. Lynch 417 Laurel Ave., Palo Alto, California.

SELL: Abbott TR4 with extra set tubes \$35.00; SCR 522-2 Meter XMTR and Revr. \$15.00. W. Kunde, W9 YR 214 S. Kildare Ave., Chicago 24.

SELL: Two BC 611F 3885KC handle-talkies complete with crystals, tubes batteries and manual. New, perfect. \$95 for both. W6JTY, 4432 Hazelbrook Ave., Long Beach 8, Calif.

SUPER-PRO, Model BC 779 Perfect condition, without speaker, best offer. Send for bargain list of rest. Equipment, parts, meters, and other parts; W2OXR 71 Crosshill St., Staten Island, New York.

METERS: New surplus O-1 MA De General Electric 2" round, white 0-200 Scale; in control box with two toggle switches and other parts. \$2.65 each postpaid. W. Strasser, W8BLR, 15384 Birwood Ave., Detroit 21.

QSL'S-Kromekote Cards, WK1MP, Box 219, Cambridge A, Mass. QSL'S, SW1'S. Latest designs, finest stock. Free samples. Write Dossett, W9BHV, 587 Burlington, Frankfort, Ind.

FOR Sale: DB 20 Preselector, \$35.00 W2CBS-866 E. 48 St., Brooklyn 3, N. Y.

BC610F Transmitter with BC614 E. speech amplifier, like new, converted for 10 meters and completely checked at factory. Also extra 250th, 2 100th 2-866's never used. Complete \$780, RCA model 158 crystal screen 5" screen \$110. Meissner Deluxe Signal Shifter minus coils \$45. Frequency standard with multivibrator and 200 kc. Cysalco Model 100-7A, \$15. RME45 receiver \$120, W6VCA, 3821 Chestnut St., Del Paso Heights, Calif. Sacramento 9-1830.

THE Narragansett Association of Amateur Radio Operators wish to announce their address as Box 73 East Greenwich, R. I.

QSL'S, Samples, Albertson, W4HUD, P.O. Box 322, High Point, N. C.

SELL: SX-28 and 6" Jensen speaker — \$135, J. F. Coleman, 234 Clark Charlestown, Ind.

JACKSON 615 V-O-ma meter \$25, 2 tube a.c. audio oscillator \$5.00. Wireless phono-oscillator \$6.00. Instructograph and ten tapes \$20.00. A. C. Ham set with five plug-in coils \$20.00. Send for list of bargains. C. G. Fisher Box 126 Keene, Texas.

WEATHERPROOF your twin line by covering with clear flexible plastic tubing, 4¢ per foot. Postpaid. Clear-Flo, 243 West Lake, Rayway, N. C.

MEISSNER 150-B transmitter complete with signal shifter and all spares. Condition like new. Price \$250.00. Charles Devereux, 21 Edgemoor Ave. Wellesley, Mass.

IMPEDANCE Calculator, solves vector triangle of unit circle in five seconds. \$3.50. C.O.D. Triculator, 643 W. 109 Place, Los Angeles 14, CAL.

FOR SALE: Meissner 150-B transmitter 300 watts 80-40-20-phone cw, with spare parts \$285.00. F. O. B. W2KWM 179-10-134 Ave., Springfield Gardens 13 L. I. N. Y.

SELL: National receiver NC-2-401 complete with National speaker in case. Perfect condition. All queries answered immediately. Best offer over \$200. f.o.b. R. C. Littler, 1400 St. Paris Pike, Springfield, Ohio.

FOR Sale: BC-348, converted for 110V., with broadcast converter, like new, \$75. T. Gardiner W5MXY P.O. Box 1336, Santa Fe, N. M.

CRYSTAL Kit: — Includes 4 low drift, highly active crystals, 2 holders, abrasive, instructions, treatise. State band preferences from 3500 to 8500 kilocycles. \$1.00 complete. Mounted crystals — your specified frequency \$1.00 each. Breon Laboratories, Williamsport, Penna.

SELL: Millen Exciter like new, complete with tubes, two sets of coils, \$38, N. Rehbein, 821 Tayco St., Menasha, Wisc.

BC348R — converted for a.c.-Brand new. RT-19 Arc 4 xmitter-recvr-13 or 26 volts d.c. Brand new, complete with dynamotor, remote control switch and rack plus two sets tubes guaranteed, never used (40 tubes in all), boxed ready for shipment. Best offer takes all or part. C. Mowat 1223 O'Farrell St., San Francisco, Calif.

QSL "by hams for hams" quality at a surprising price, quick service, stamps or samples. W7JPX, Firman, 3739 S. W. 98th St., Seattle, Wash.

RCA 100kc xtals, new, plated electrodes, shock mounted, plug-in factory sealed bakelite case, \$4.95 each postpaid. Sosebe, W2LJD, New Brunswick, N. J.

SAVE \$50 on new RME-45 receiver. Latest model with Cal-O-Matic dial including speaker, \$149, Triplet Modulation Monitor Model 1696-A, \$25. National transmitting condenser, TMA-40DC, dual 40 Mmf, 12000 volts, \$5. Wise, 424 Twentieth N. E., Cedar Rapids, Iowa.

BC348R, good condition but used, gen-e-motor, heaters wired for a.c. \$45 or best offer. FB7 with 40, 80, 160 coils best offer. W2MOL, 71 Gould Place, Caldwell, N. J.

GASOLINE driven generator for sale 110-220 Volts 60 cycles. Write John P. Young, Box 14 Station A, Atlanta, Georgia.

SALE: 500W CW 300W phone all band transmitter, enclosed rack, 11 meters built by professional radio engineer. Will sacrifice \$350. Photo and details on request. Also have complete parts for KW phone rig, 2 meter transceiver, 30 watt bi-fidelity sound system, test equipment and tubes. Write for details and prices. W9HXT/2, 1921 Narberth Ave., Haddon Heights, N. J.

TRADE: transmitting equipment or transmitter built to specifications for HO-129X or equivalent receiver. W8OPG 3656 Rawsdale Rd. Shaker Heights, Ohio.

FOR Sale: National 1-10A complete with power supply. Best offer over \$55. Jules P. Bernd, W3BEJ, 208 W. Chesapeake Ave., Towson 4, Md.

FOR Sale: Meissner 150-B transmitter, Robert Williams, Chadron, Neb.

SELL: RME 45 receiver and speaker, Cal-O-Matic dial. New condition used very little. \$150.00. W9ZLM, c/o Airport, Rockford, Illinois.

FOR Sale: Meissner 150B and signal shifter, never been on air, already converted to 10 meters — \$280.00. Prefer local buyer. W. D. Ross, 307 Adams St., Decatur, Ga.

MOBILE Rig, 10 meter NFM, 6 tubes, 30 watts output, RCA, complete with tubes, remote control, cabling, dynamotor and instructions. Brand new, never used. \$75.00. Jose Alvarez, W3KRO, 2602 Germantown Ave. Philadelphia, Pa.

NC-156 (Navy revision of NC-100) 0.3/1.2 — 1.7/16.0 Mes., 2 r-f stages \$87.50. W1PDP.

SALE: Echophone Nol Communications receiver. .55-30 m.c., B. F. O. etc., good condition. \$22.95 postpaid — George Lund, 34 Chalten Road, Havertown, Pa.

SELL: ARR-5 receiver. Military version Hallcrafters S-36, 27-145 mc., AM-FM, with 110 v AC power supply. \$75.00. J. L. Kelley, Radio KWVB, Walla Walla, Wash.

SELL: SX-28A with speaker \$200, VHF-152, \$70, DB-20, \$55, Pan-adaptor \$80, 92101 with 10 and 20 coils \$25. J. J. Reilly, 45 Claremont Ave., Orinda, Calif.

PLATE Transformers, 1 kilowatt commercial duty, New Kenyon's, Primary 110 volts 60 cycles, 1450 V. A.; Secondary 4520 v. Cento tapped. Weight 78 lbs. \$35.00 each — Art Wearth, W9QGC, 6006 El Monte, Mission Kansas.

FOR Sale: Hallcrafters SX-42 for \$225 and matched speaker R-42 for \$25. Both for \$240. In new condition and in factory cartons. E. E. Tate Somerset, Ky.

TUBE-tester vacuum tubes, meters, power and radio transformers, sockets and other experimental material for rapid sale or trade for good camera. Phone evenings Havemeyer 4-0556 or write to E. A. B. 132 Franklin St., New York City.

BEAM rotating motors, powerful, small, new, limited or unlimited rotations both directions \$7.75 four for \$24.00. Other surplus items. Hieronymus Radio, 100-35 201st St., Hollis 7, N. Y.

TELEVISION rcvrs. (5-15") — proj. rcvrs. — tvly. cameras — xmtrs — serv. eqpt. — R. F. power units (2-10kv) — FM-Am rcvrs. — cmplt. diag. — 50¢ each. Kits upon request. Progressive Electronics P. O. Box 6382 Philadelphia 39, Pa.

FOR Sale: HRO SRA1 complete closed rack, coil compartment, speaker, power supply and 2 extra broadcast coils with the regular 4 band spread coils, condition new used less than 10 hours. Best offer over \$250. Irv. Fieselberg, 223 Pacific Ave., Atlantic City, N. J.

IN Stock: New and used Hallcrafters, National, Hammerlund, Collins, Millen, RME, Pierson, Meck, Temco, Meissner, Sonar, other receivers, transmitters, parts, etc. Lowest prices. World's best terms. Reconditioned: \$41, \$19.00, \$20R, \$19.00, \$40, \$59.40, SX23, \$139, SX42, \$199, HQ120X, \$99, RME 45, \$99, RME84, \$69, \$38, \$29, SX16, SX25, SX32, HQ120X, NCI73, NC240D, HQ129X, SPC400X, etc. Shipped on approval. Send \$5.00, rest COD. Write, Henry Radio, Butler, Mo.

FOR Sale Best Offer. Phordaron Laboratory Engineered Transmitter All bands 10 to 80, 300 watts phone 400 watts cw, beautiful, compact in deluxe cabinet. Victor Beale, C. A. A., Airport, Willmar, Minn.

SELL: Final-8005a, plate sup.-1250/1500 at 500 ma; 600 watts 350 phones with mod. Ant. tuner. All coils 80-40-20. Best components, less than cost, but used only 35 hrs. Rack mount. \$150. W6VAJ, 215 E22nd St., Merced, Calif.

SPECIAL offer: New TBM transmitter & modulator 1 kw. 860 Master oscillator. 2-860 buffers 861 final, 803 modulators, 2,000 to 18,000 kc. frequency as expected. Never used. May be used for commercial service. Best offer over \$500.00 takes it. With instruction book less tubes and power supply. Additional information furnished upon request. SVARC c/o W3QJP, 734 Market Street, Sunbury, Pa. Reason for selling: no club room available.

FOR Sale: One HQ 129X with Millen R-Niner, coils for ten and twenty. One Millen Exciter with 40 meter Xtal and ten meter plate coil with 500 watt 200 ml power supply. First \$225, will ship express collect. Less than ten hours on Millen es less than 50 hours on HQ. Dr. George S. Acton, W5BEM, Plain Dealing, La.

SHIP-shore radios \$85. BC375 \$35. RCA 500kc Receiver \$35. BC348 \$65. Mark Tank Transceiver \$40. Portable D. F. Receiver \$45. TRV Power units and instruction books, Mobile FM Receiver \$25. BC659A Transceiver, \$20. Handie-Talkies \$10. New Weston Precision Analyzer #665, \$35, 250 Watt Phone/CW Transmitter, \$125. Press-talk microphones 75¢. LS3 speakers \$6.50. BC312 and B-42 receivers. Hallicrafters HT6 Transmitter, \$90. W2OEA 712 Bergen, Linderoth, N. J.

SELL: Meissner 150-B transmitter, signal shifter, spare parts \$270. L. J. Denning 104 Sayles Ave., Pascoab, R. I.

FOR Sale: 120 watt, cw-80 phone, 10 and 20 meter, deluxe desk transmitter. Wagsdorf model, 807a final, 3 power supplies, \$100.00. B. Kavanagh 3311 Broadway, New York 31, N. Y. W2M0Z.

VARIAC, Amertron, 0-115v, 60 amp, or 0-230v, 50 amp. New, \$50. ARR-5 FM-AM receiver, \$75. SCR-274 Transmitter, 7-9.1 mhz, \$10. Supreme Model 561 Signal Generator and Audio Oscillator, new, \$100. Weston Wattmeter Model 310, \$30. Japanese Precision Ammeter, 0-5, 0-10 amps, Dynamometer movement, \$25. WRACE, 920 Wyoming St., Dayton 10, Ohio.

SELL: HRO-M receiver, power supply, speaker, coils 80-40-20-10. Recently factory serviced. All new tubes. Fine condition. \$125.00 fob. Wayman 48 Sagamore Rd., Bronxville, N. Y.

SELL: HRO-W power supply, speaker, 4 GC coils, 4 BS coils. Perfect condition. Wagsdorf limiter. Recently aligned at factory. \$225. K. L. Kihopel, W8CQO, 653 South Dodge St., Iowa City, Iowa.

COLLINS T-47 Art/18 in first class condition, all tubes, less dynamotor \$95. Handie-Talkie Super Pro. Army model 100 kc to 400 kc and 2.5 to 20 megs. rack mounting with heavy duty power supply. less speaker. A-1 condition \$145.00. SRC-522, good condition, not battered up, all tubes less crystals and power supply \$18.00. Several well known Shure T-17B hand mikes, brand new in original box \$1.00, enclose a dime for postage. W. M. Mead, W5APW, Chico, 1744.

Hallicrafters S-36 AM-FM receiver 27-145 Mc for sale. Used only a few hours. With extra postcard \$195. W1KKS, Marvin Handleman, 390 Main St., Worcester, Mass.

QSL'S? QSL'S SWL'S? No cheap trash! Samples 10¢. Biley Crystals? DB-22A? VHF-152A? Sakers. W8DEB, Holland, Mich. (Veteran).

LEARN Railway Telegraphy at home. Instrument furnished. Operators needed. Jobs waiting. Bell Telegraph Railway Institute, 10 Parker Ave., San Francisco 18, Calif.

WANTED: 80-40-20 meter coils for National FB-7 or FBXA and Preselector. J. P. Welsh, W29ZR, 544 Lisbon Avenue, Buffalo 15, N. Y.

Crystals - Acid etched. BT cut. Frequencies 4100 to 9000 K.C., minimum activity .4 milliamperes. Mounted in ocal (FT243) or 5 pin holders (3/4" pins spaced). Your frequency within 10 K. C. \$1.00, 5 K.C. \$1.25. Calibrated within 1 K.C. of marked frequency. Free frequency list. W75. Holders \$2.00. James McCarty, 7301 Ibsen, Chicago 31, Illinois.

SELL: Three new Amertron shell transformers 50/60 cv. Primary 128/220/242 Volt; 370 VA. Secondary 2270 Vols. 1100 VA tapped. 925 volts 640 VA; suitable three-phase rectifier 2500 and 1000 VDC 600 MA each simultaneously or single-phase 2000, and 825 VDC 600 MA each third transformer as choke; 80 Lbs. each; \$80 lot FOB. Also 200 feet 3/4 inch new Andrews heat supported coax, 205 Lbs. gross, \$60 FOB. 91 Marion Ave., Staten Island 4, N. Y.

SELL: RME 69 receiver \$60. Another with 6AK5 RF \$70. RME Noise Silencer \$10. Manuals included. Brower, RFD 1, Box 125, Zion, Ill.

FOR Sale: Cash SX28A with speaker, used three months, like new. \$185. Receiver in storage Buffalo, New York. Contact Lt. Henry F. Clezak, 1st Signal Troop, APO 201 5/2, P. M. San Francisco.

SELL: one kw tube enclosed rack, pr HK-354's final pr 250th's mod. Not surplus. Best offer over \$675 fob. W4BIN, 616-C Pinecrest Cr., Marietta, Ga.

BRAND new, perfect Hickok model 203 test meter in factory packing. High impedance input vacuum tube voltmeter on both A, C and D. C. volts. Also measures current, ohms, capacity and inductance. \$59.00. Used FB7X receiver with National pre-selector and power supply, 40 bandspread and 80 general coils, \$23.00. Used 12" P. M. loudspeaker in walnut wall baffle, \$7.50. F. O. B. Kansas City Mo., Chas. Schoene, 3518 Central.

BC 610 Modulation transformer \$22.00; factory reconditioned RME-60 with speaker \$50.00; pair new, prewar 803's \$11.00; RCA 622GL dynamic mike with the matching transformer \$22.00. James H. Buck 1224 Orchard Dr. Ames, Iowa.

SWAP: Jackson model 652 audio oscillator for Mobile 10 or what have you? W3RBJ.

SELL: one DK-3 transceiver with batteries and one Knight 115VAC transceiver for 2 meters. Either: \$25. W2JVF, Owego, N. Y.

NEW: 800 watt cased Superior Variac original carton. Best offer. Need triplet 430-0-10 volt, two Stancor P-6323. Send for parts list. W8UCG, Kearney, Nebraska.

SELL: Practically new Supreme AF-100 Transmitter \$500 express paid. Retail price \$550. Also HC-299 with PS-135-C freq. meter excellent cond. \$150 express paid. W2KGD, 24 Concord, Larchmont, N. Y.

FOR Sale: 40 ft. steel mast including rotating bearing and 4 element 10M and 3 element 20M nested copper beams. Mast is all welded 12 foot 18 in. square sections. Best offer over \$150. F.O.B. S. Swigart, W3NLF, Alexandria, Va.

IRE Proceedings, 1925 to date, less 7 copies. QST's 1928 to 1933 and 1939 to date. Electronics, 1941 to date less 3 copies. Bureau of Standards Journal of Research July 1928 to May 1931. Will sell or swap for ham, hunting, fishing, or camera gear. E. B. Blett 14409 Linhurst Detroit 5.

FOR Sale: BC-610E complete with coils for 80-40-20-10-meters. Also National 240-D receiver. Both in excellent condition. Local buyer preferred. Joe Ross, W4E1T, Badin, N. C.

BEAM Rotators, propeller pitch motors, geared one rpm, reversible 25 volts AC, described p. 54 July QST. \$12.50 COD. W5FJE, 214 North Pine Albuquerque, N. Mex.

SELL: NC 240D receiver, matched speaker \$175.00 C. Horn #325 E. 163 St., New York 56, N. Y.

SELL: 1 KW fone final as per July '46 QST. RC-342-D in A-1 condition and 10-20 homemade converter. Also all kinds of parts, meters, etc. W1ERX, Darien, Conn.

WILL sell or swap my ham gear for RME-69 receiver. Send for list. W7CNA, Prineville, Oregon.

FOR Sale: Four stage P4812 Final Xmtr. coils for ten and twenty. Four power supplies, high level modulator, all in par metal cabinet. \$250. Also S-20K sky champion RCUR \$50. Reason marriage. W6SIB 5924 1/2 S. San Pedro St. Los Angeles 3, Calif.

FOR Sale: Hammerlund Super-Pro SPR-210-LX with power supply, newly reconditioned \$175. Six new 3mf 4000V Sprague oil condensers all for \$27.50 or \$1.90 each. Four dual section (2mf 1000V, 6mf 800V) condensers @ \$1.90. New CML broad band ten meter converter, perfect, \$2.50. Four DC easily converted to \$2.00. Why? XYL I send check or money, order W5M0T, 4010 Maryland, Shreveport, La.

SUPER-Pro Bc-779 receiver for sale with power supply. 2.5-20Mc. In fine shape \$105. W2KVF, 145 East 49th St. New York City.

WANTED: DM36 or VHF 152-W2JTL.

SURPLUS bargains. Pair modulation transformers, twenty watts. \$1.95. Ten meter beam rotator, 24 VAC, one kRPM, \$5.75. Lots more. H & H Electronic Supply, 510 Kishwaukee, Rockford, Illinois.

SELL: Hallicrafters HT-9 XMTR complete with 10 and 20 meter coils. In perfect condition. \$300. W0AVF, 5312 Murdoch. St. Louis, Mo. Fone FT. 0524.

COMPLETE ham station. FBX revr., with RF stage, compact 100 watt CW xmtr; \$100. W0GUL, 1127 Broadway. Boulder, Colo.

INFORMATION needed model TCK transmitter. Maker, availability, price? W2JCT/6 928-D Bougainville St. Oceanside, Cal.

FOR Sale HQ-120-X good condition, S-40. Like new. Best offer. W7JUT 2225 N. 24th St. Phoenix, Arizona.

SELL: Motorola 50 watt xtal controlled FM Xmtr revr. 30-40 Mega-cycles. easily 10 VAC or four DC easily converted to six or ten meters. Best offer. W6WNI 411 North Fairway South, San Francisco, Calif.

CHANGING frequency? Fine commercial crystals for Police, Aircraft, 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, Texas.

LELAND 2500-watt 115 volt 0v cycle self excited alternating current generator for sale or trade. Ideal unit for emergency power, summer camp, etc. W0BOH-Box 931 - Lincoln, Nebraska.

QSL'S-SWL'S. Meade, W0KXL, 1507 Central Kansas City, Kansas.

MEISSNER signal shifter model 9-1090 - 1947 model \$90. Super Pro S-400 X. Complete with speaker and power supply \$295. C. H. Buechman, W8RWZ, Vale Rd., R.F.D. #1, Springfield, Ohio.

AN/APR-4 receiver, including 3 tuning units, 38-10000 mc; \$70; Rme 45 (calomitic dial) with speaker, \$130; NC-24 3 with speaker \$165; HQ-129X with speaker, \$145; McElroy xtr 442B automatic keyer, \$45. Selling out. W8MGO, 1745 W. Boston Blvd. Detroit 6, Michigan.

SELL: Standard Instructograph, spring wound. Randall C. Goff Brooklyn, Iowa.

SELL: Howard 430 receiver, Weston 770 tube tester, Meissner 9-1047 FM adapter, Biley 80 meter LDZ. Want SW3 coils, 1-10 complete. W1JUL.

500 Watts, all-band fone-cw xmtr, beautiful compact 36" cabinet special blue-grey baked enamel to match built-in VFX 680, p. 813's final, Stancor broadcast type plate supply, separate regulated bias and screen supplies, new Simpson illuminated meters, best parts throughout, no surplus, equals commercial construction; sacrifice - \$450. W80LJ, 138 Huron, Mount Clemens, Mich.

HIGH EST bidder gets QST bound 1934, 1935, 1936, 1937, Complete issues 1940, 1942, 1945. Incomplete: 1938, missing June; 1939 missing Jan., Aug., Sept., 1941 and 1944 missing April and 1943 missing July. Write for list of other radio magazines available. C. L. Johnson, 1815 Venice Blvd., Los Angeles, Calif.

QST'S - SWL'S Samples. Cushing, W1HJI, P. O. Box 32, Manchester, N. H.

BEST offer takes fb KW fone-cw rig, dp 304TL-813 - pp 810 mod. B & W coils throughout, separate power supplies (750 ml fnl supply), relay controlled. More done on request. W4JJS, Box 87, Asbury College, Wilmore, Ky.

FOR Sale: WRL Globe Trotter, with coils for 40, 20, and 10 meters. All tubes included, 40 watts fone, 25 watts CW. \$65. John Oates, W3NMV, 2436 Perry, Munnhall, Penna.

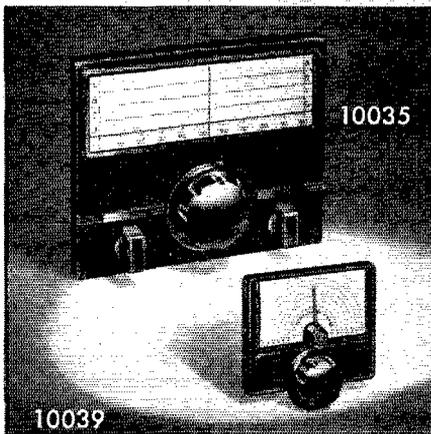
SELL: and will deliver in NYC area Navy TCS-14 xmtr and revr complete with dynamotor, tubes, ECO or xtal bandswitching 1.5-12 mcs. fone-cw, \$55. Bill Leonard CBS, 485 Madison Ave., N.Y.C. Also RME 45D, \$135.

WANTED: QST Dec. 1915-Dec. 1921 inc.; Electronics Apr., May, June, July, 1930; Elec. Engng, Sept., Nov. '42. IRE Pro., 1915-1916 inc.; Dec. 1917, Sept. '42. State price, James, W4KS, 851 N. Kensington, Arlington, Va.

Designed for



Application



**Nos. 10035 and 10039
Multi-Scale Dials**

A pair of truly "Designed for Application" controls. Large panel style dial has 12 to 1 ratio; size, 8½" x 6½". Small No. 10039 has 8 to 1 ratio; size, 4" x 3¼". Both are of compact mechanical design, easy to mount and have totally self-contained mechanism, thus eliminating back of panel interference. Provision for mounting and marking auxiliary controls, such as switches, potentiometers, etc., provided on the No. 10035. Standard finish, either size, flat black art metal.

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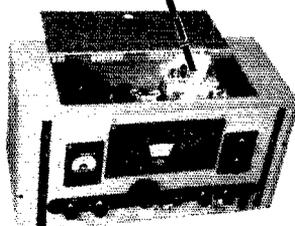
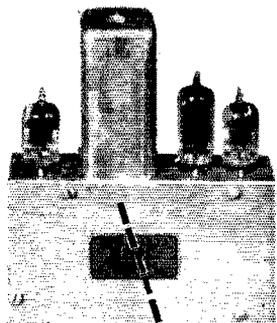
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RME

Announces...

THREE NEW PRODUCTS!



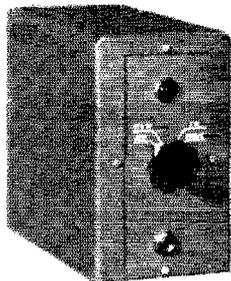
THE NEW RATIO DETECTOR (NBF4)

For Optimum Narrow Band FM Performance

The new RME NFM Ratio Detector is the solution to high sensitivity and noiseless reception of NFM (narrow band FM). With this plug-in unit and an RME 45 receiver, the noise-reducing advantages of NFM are fully realized. NFM Signals that can't be heard with good AM communications receivers come in loud and clear against a noiseless background.

The new RME NFM RATIO-DETECTOR PLUG-IN UNIT is designed for optimum results with amateur systems where the deviation is only ± 2.5 KC. With the unit, equal sensitivity can be enjoyed on AM or NFM. It employs a highly efficient ratio-type detector and a limiter for noise-free reception of NFM signals. The unit is switchable—from AM to NFM at will. For the owners of RME 45's, B Series, there are no soldered connections—simply plug the unit into the detector tube socket. In other model 45's, slight circuit changes can be made at the factory or at official RME service centers. Only RME 45 receivers can employ the unit. RME owners can once again be happy with their choice—for RME equipment stays modern!

Amateur Net. \$19.50

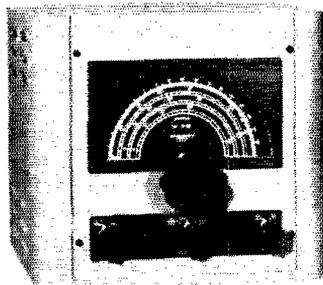


THE BOOMERANG (MB-3)

A Break-In And Monitoring Device For CW & Fone

Signals come right back to you because of the monitoring features of the "Boomerang." While monitoring your own keying or speech, you'll also enjoy instant break-in operation for c. w. or fone, even on your own frequency. The moment your key is depressed, or the transmitter turned on for fone operation, receiver output is silenced. You'll also hear incoming signals during the keying intervals. The "Boomerang" can be used with any receiver that has a phone jack. Simply plug the "Boomerang" into your fone jack and an AC line. The "Boomerang" makes possible efficient and enjoyable QSO's.

Amateur Net. \$22.50



THE HF 10-20 CONVERTER

For 10-11-15 and 20 Meters

Because of the double conversion system, the HF 10-20 provides outstanding and imageless reception on the above frequencies. And it's an especially vital adjunct to those receivers that tune only to 18 mc. or possess inadequate bandspread. The HF 10-20 provides an average of 7.8 linear inches of calibrated bandspread on each of the three bands. An all-gear planetary mechanism is used. Images are non-existent. The output (i. f. frequency) of the HF 10-20 is 7 mc. It can be used with any all-wave or amateur receiver. Features include provision for separate antennae, self-contained power supply, antenna selector switch, band selector and high gain.

Amateur Net. \$77.00



RME

FINE COMMUNICATIONS EQUIPMENT

RADIO MFG. ENGINEERS, INC.

Peoria 6, Illinois U. S. A.

COLLINS REINSTATES DIRECT SELLING

Prior to the appearance of this announcement, sales of Collins amateur equipment have been made solely through designated dealers. However, continued sharply increasing costs of materials, components and manufacturing have rendered this method of distribution impracticable.

The function and value of the amateur radio dealer are universally understood and appreciated. He invests in ham equipment, displays it, lists it in his catalogs, and puts time into selling and servicing it. But if his well-earned, normal profit is added to the present necessary factory price of Collins equipment, the resulting price to the amateur becomes prohibitive.

Therefore, since the Collins Radio Company has pledged itself to offer the amateur the best equipment that can be built, incorporating innovations which give superior performance, we now announce a return to our pre-war policy under which you may purchase any of our amateur equipment direct from the factory. The following prices will prevail, net F.O.B. Cedar Rapids, Iowa:

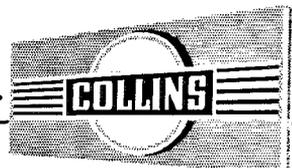
- 30K-1—500 watt Transmitter**, complete with 310A Exciter, Tubes, Microphone Cord, R. F. Cable, Power Cable and Instruction Book.....**\$1450.00**
- 32V-1—150 watt Transmitter**, complete with Tubes and Instruction Book.....**\$475.00**
- 75A-1 Receiver**, complete with Tubes, Speaker and Cabinet assembly, and Instruction Book (including excise tax).....**\$375.00**

- 70E-8 Variable Frequency Oscillator**, complete with Tube, 305H-1 Dial Assembly and Instruction Book.....**\$40.00**
- 310B-1 Bandswitching Exciter**, complete with Power Supply, Tubes and Instruction Book.....**\$190.00**
- 310C-1—80 meter Exciter**, complete with Tubes and Instruction Book, less Power Supply.....**\$85.00**
- 310C-2—80 meter Exciter**, complete with Power Supply, Tubes and Instruction Book.....**\$100.00**

You may purchase any of our amateur equipment with the exception of the 70E-8 Oscillator for 20% down. The unpaid balance, plus 5% interest is to be paid in twelve equal monthly installments. The procedure is simple: Remit 20% with your order; we will send you a credit application which will be subject to prompt action when you mail it in.

All orders will be shipped in the sequence received, and usually within two weeks of receipt of order, except the 32V-1 (December 15, 1947) and 310B-1 (February 1, 1948). You can now have the benefits of superior Collins performance at a competitive price, and pay out of income on favorable terms. Early action is suggested.

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



COLLINS RADIO COMPANY, Cedar Rapids, Iowa

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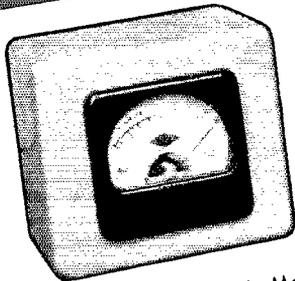
458 South Spring Street, Los Angeles 13, California

OUTSTANDING FEATURES

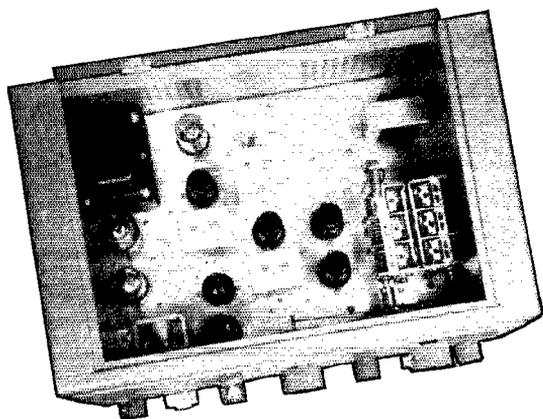
- Continuous frequency coverage from 550 kc. to 55 mc.
 - Bandswitching in 5 ranges. Bandspread tuning at any frequency.
 - Seven tube superheterodyne (plus rectifier and voltage regulator).
 - Automatic Noise Limiter.
 - Built-in loudspeaker and A.C. power supply.
 - R. F. stage with panel controlled antenna trimmer.
 - Operates from 105-130 volts, 50-60 cycles A.C. (Provision for battery operation.)
 - Housed in a streamlined gray cabinet.
- AMATEUR NET\$89.50



HERE IT IS—THE NEW NC-57



The SM-57 Signal Strength Meter has been designed as an accessory to be used in conjunction with the NC-57.



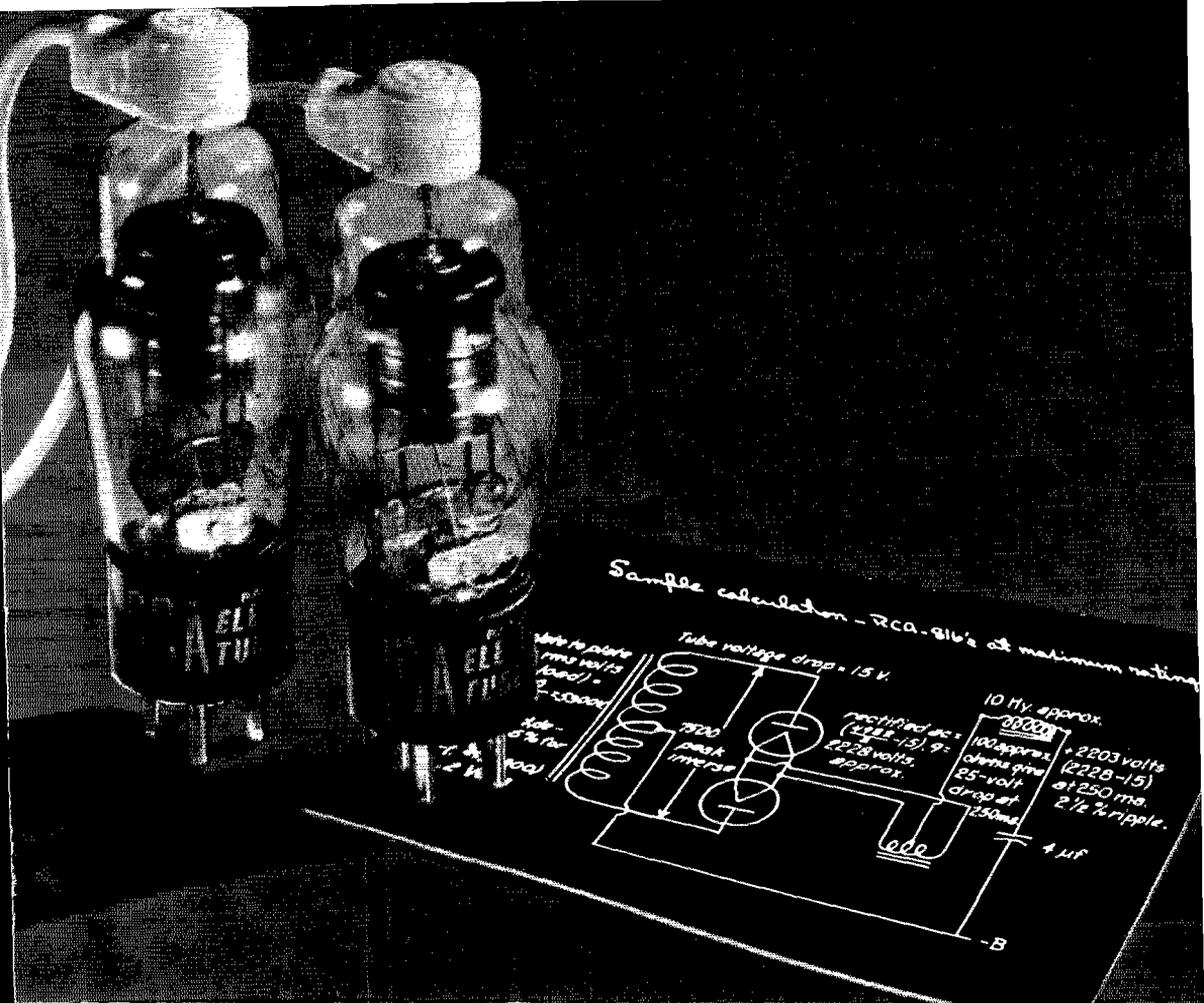
INTERIOR OF NC-57

To meet the needs of the many hams who have asked for a sensitive, first-rate bandswitching receiver in the lower price bracket, complete with speaker and power supply in one cabinet, the National Company has developed the brand-new NC-57.

The CW operator will enjoy the stable operation and excellent signal-to-noise ratio of the NC-57. The phone operator will be pleased with the tone quality and selectivity.

The SWL will log DX stations with ease and clarity. In fact, any operator now operating a communications receiver will find the NC-57 essential as a standby. In this price class, the new National NC-57 is an outstanding value. See and hear one at your local distributor's ham shack this week.

**National
Company, Inc.**
Dept. No. 8
Malden, Mass.



Now . . . 2200 volts dc at 250 ma. from a pair of RCA-816's

● 550 watts of dc, from two tubes full wave . . . the most power for the least money of any half-wave rectifier in its class.

Unlike most small-size mercury-vapor rectifiers, RCA-816's are *double-ended*; therefore their internal high-voltage qualities are not limited by glass-electrolysis or by base and socket insulation.

Truly professional tubes, 816's are practically identical to the 866-A. Smaller in size, but with the same type edgewise-wound, coated-alloy filament and internally shielded construction, RCA-816's will handle high peak voltages and emission currents . . . *safely* . . . over long periods of time.

Now, a pair of RCA-816's will operate well within their ratings when used with standard center-tapped

4800 to 5000-volt power transformers. In such service, 250 ma. dc at approximately 2000 volts can be taken from the output of a single-section filter using average quality components. Buy the *No. 1* mercury-vapor rectifiers . . . RCA-816's. Available at your RCA Tube Distributor. *Amateur net price only \$1.25.*

RATINGS FOR RCA-816		
Filament voltage, ac	2.5	volts
Filament current	2.0	amp.
Peak inverse volts ^o	7500 max.	volts
Peak plate current	500 max.	ma.
Average plate current	125 max.	ma.
Tube voltage drop (approx.)	15	volts

^oFor a supply frequency up to 150 cycles and a condensed-mercury temperature of 20 to 60 degrees C.



TUBE DEPARTMENT

RADIO CORPORATION of AMERICA

HARRISON, N. J.

The Fountainhead of Modern Tube Development is RCA