

March 1963

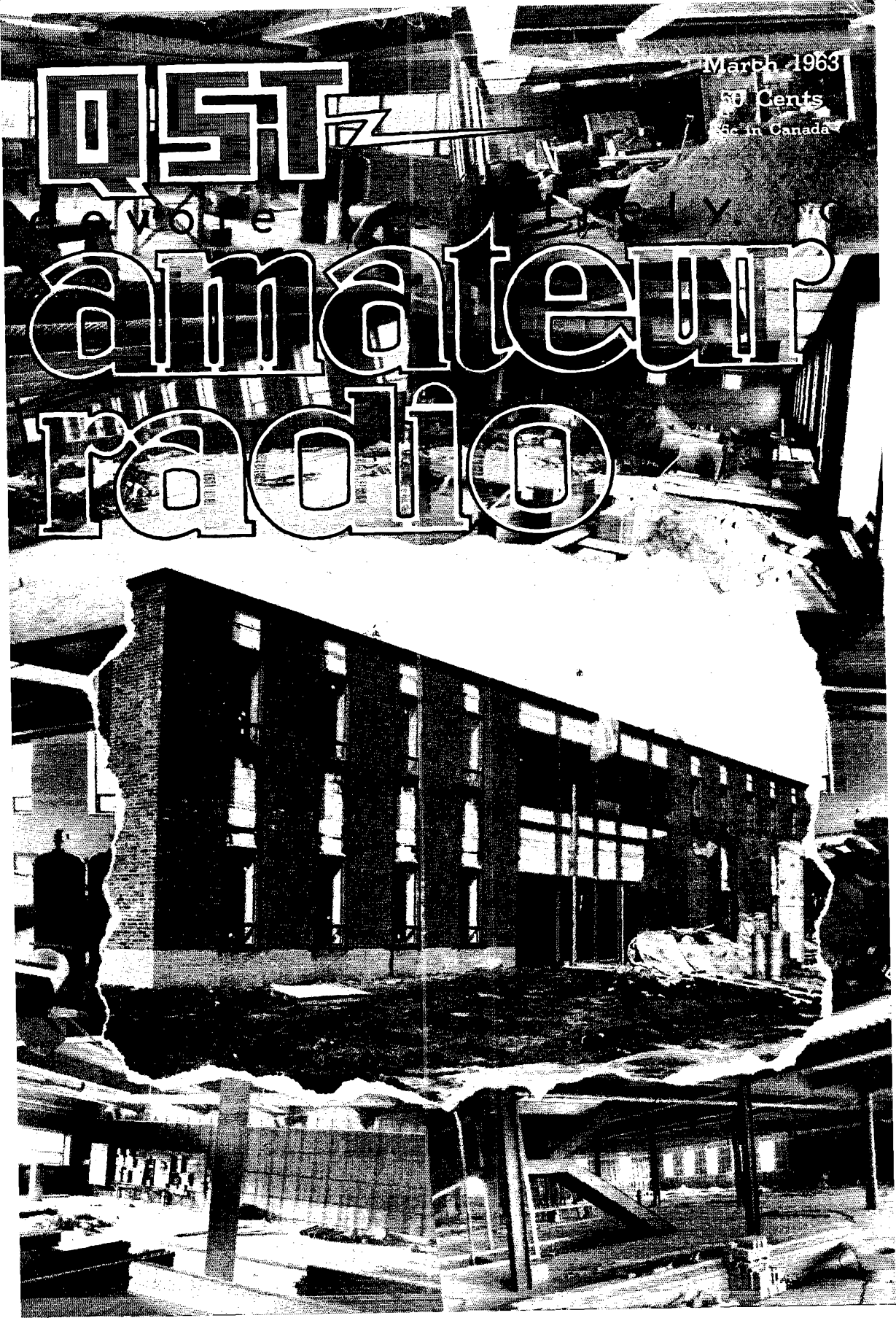
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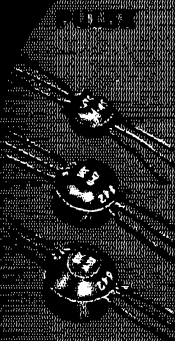
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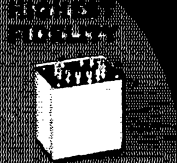
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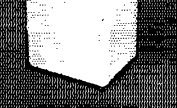
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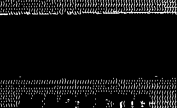
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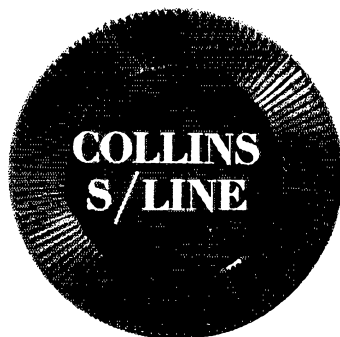
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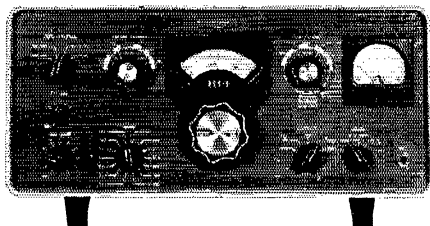
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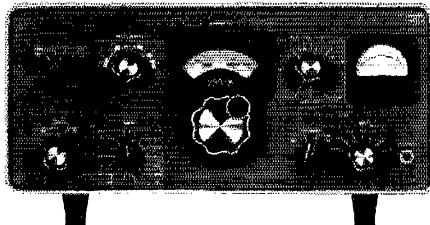
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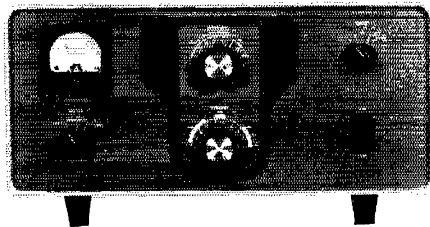
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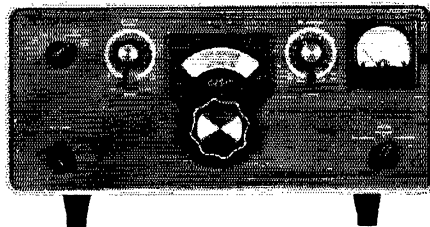
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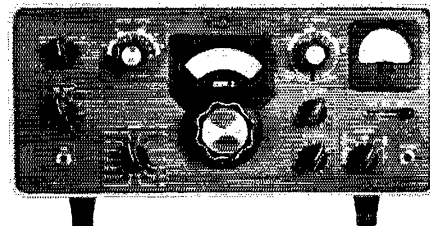
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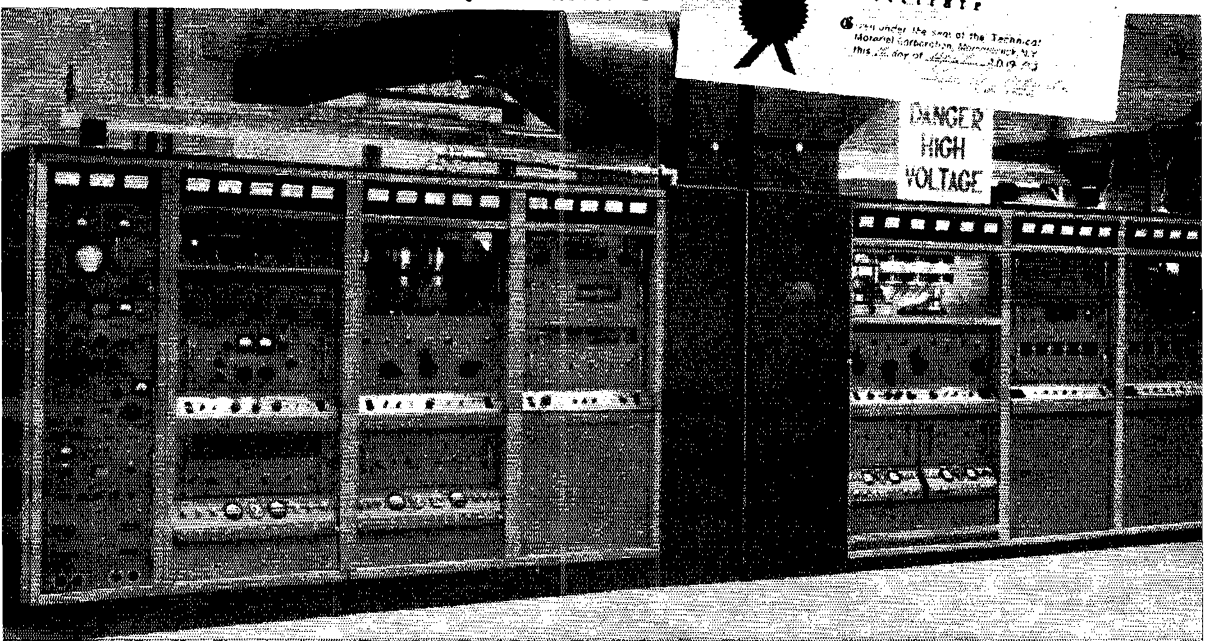
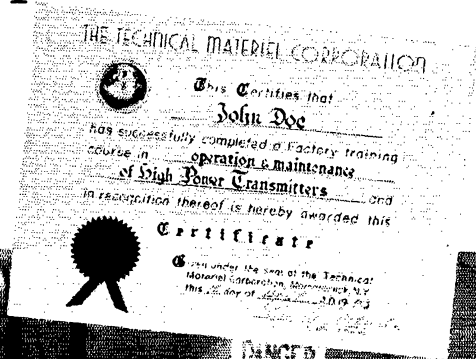
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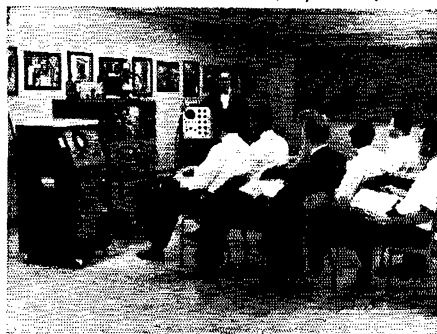
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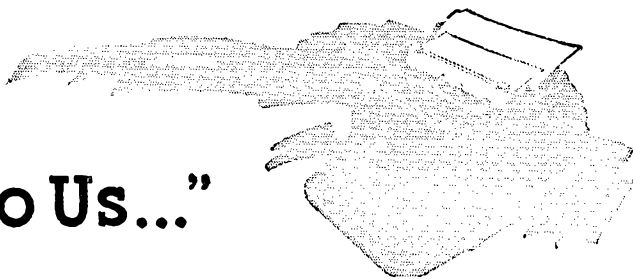
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# “It Seems to Us...”



## Understanding Amateur Radio

In recent years this page, as well as our “Correspondence” section, has carried critical comments on the present technical level of amateurs. Thousands of hams are in the very highest echelons of advanced electronics—yet we have to admit that the *average* leaves something to be desired.

One problem is that there is so much to know about modern techniques. Another is that today’s influx of new licensees is so rapid, and is much more interested in operating rather than technical aspects—a trend accentuated by the convenient availability of manufactured gear.

The ARRL Board of Directors has found this situation of increasing concern and, jointly with the Hq. staff, in recent months has initiated a series of steps in a program which might be called the “clean signals crusade.” *QST* editorials have preached the need. *QST* articles are providing the tools (e.g., pages 20 and 34 this issue). The affiliated-club Training Aids program has been expanded in its coverage of technical subjects. The ARRL Executive Committee has adopted a code of operating and technical recommendations (see page 65) to help solve the problem.

We are pleased to announce completion of another project in the form of a new League publication, *Understanding Amateur Radio*. It was conceived and written to fill the gap between the beginner-level *How to Become a Radio Amateur* and the complete, more-advanced *Radio Amateur’s Handbook*. Although sometimes affectionately known around the office as the “junior handbook,” it is not primarily an all-inclusive reference work but rather is a discussion of the basic, everyday, practical aspects of amateur communication. It contains an assortment of construction

projects, but highlights the principles of equipment operation and adjustment, for the purpose of being as useful to the owner of manufactured gear as to the home builder. Its treatment of fundamentals is as sugar-coated as we know how to make it. In the familiar League format, it fits our basic concept, as a non-profit society, of the widest possible distribution of technical information to members—and, indeed, to all amateurs—at the lowest practical price. To prove the point, stack the new ARRL book alongside any other radio technical publication of 320 pages!

In a further assault on the over-all problem, we commence in this issue of *QST* a series of “refresher” articles on basic radio theory and practice. Except in approach, none of the material is really new. In fact, most of it will be excerpted from other League publications, principally “UAR.” But this series is in response to an increasing number of requests which suggest that, to many of us, acquisition of technical knowledge is more palatable in monthly doses than in tackling a more formidable-looking complete text. If you can wait long enough, therefore, you’ll eventually get most of the theory and practical discussions in *Understanding Amateur Radio* as a bonus in *QST*.

Just the same, take a look at “UAR” next time you visit your favorite distributor. We think you’ll agree that it is an ideal book, particularly for the Novice who is struggling with practical, everyday operating and adjusting problems, and who is seriously intent on getting his General ticket. We won’t be at all surprised if you take a copy home yourself, for some needed brushing up.

We did!

**QST**

## Restricted Voice Bands

Our February editorial on the above subject has stirred up quite a lively discussion. We intended and expected that it would.

It was written to bring a long-smouldering question out into the open, to give it thorough exposure and analysis through discussions by the body of amateurs, and thus to provide the basis for a decision as to whether our licensing system should have practical incentives to progress technically beyond the Conditional-General level.

That decision will be made only by the Board of Directors. Accordingly, all comment received at Hq. will be forwarded to the appropriate division director for his information.

At press time, such membership comment is beginning to arrive in large batches. As the volume makes individual response impractical, please accept this as our acknowledgment and sincere thanks for voicing your opinion. We shall excerpt substantive points for next month's "correspondence" department. Although even a greatly expanded section will permit use of only a small percentage of individual comment, we shall attempt to present in the forthcoming issue — as always — an accurate cross section of membership opinion.

Quite frankly, we expected initial comment to be largely opposed; the displeased are the ones most likely the first to take pen in hand. It was therefore somewhat of a surprise to find the early trend supporting the editorial view, however barely. Nevertheless, weight should be given to the substance of arguments presented — rather than "counting noses," as would occur in any ballot or poll which some of you suggested. A simple post-card "yes" is less helpful than a "no" with detailed supporting arguments.

It is occasionally evident that the present class of license held is what determines the individual's viewpoint. E.g., "This won't do anything for me, so I'm opposed and am dropping my membership." Happily, there are few of this type who have only self-centered interests and none really in the stature of amateur radio itself. We are greatly heartened at the many serious, intent letters — both pros and cons — expressing carefully thought-out views with personal detachment and concerned only with what is best for amateur radio. Even some of the letters which, with considerable emotion, roast us for publishing the editorial, disclose careful thought and meritorious argument.

The correspondence also discloses some misunderstandings which should be clarified. First, the matter is purely in the discussion stage. No proposal to FCC has been made nor will one be unless so authorized by the Board of Directors.

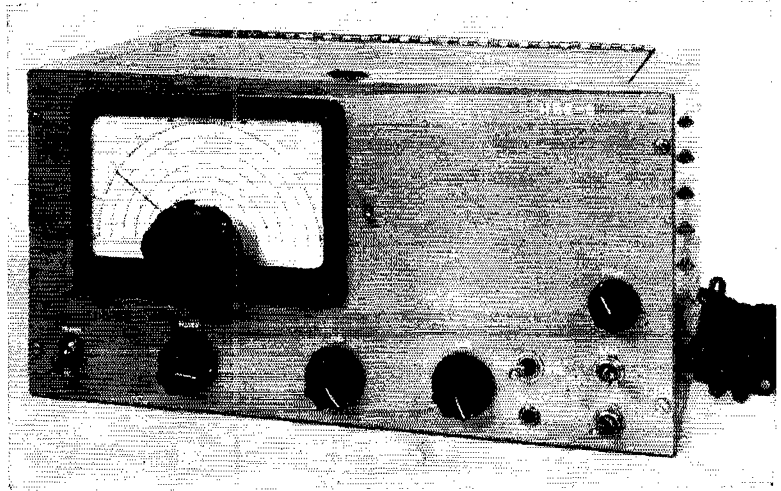
Another misconception is that a principal objective is to reduce the number of amateurs using certain voice bands and thus the QRM. This is not so; it is aimed at continuing growth, but in quality as well as quantity. Neither is it proposed exclusively as a remedy for poor signals and bad manners on the air; a higher grade of license will not automatically make a gentleman of a licensee. These are all problems, but they have other solutions which have been previously aired in *QST*.

Nor is it an attempt to force increased c.w. proficiency as a condition to restricted voice band use. Many readers have erroneously assumed we had in mind the Amateur Extra Class license with its 20-w.p.m. requirement. The editorial pointedly ignored that class and said instead that the most common proposal in amateur discussions has been a modernized version of the old Class A license. No additional c.w. was required for that ticket.

It is the duty of the League to push for improvement in all the various phases and interests of amateur radio — public-service potential, operating ability, courtesy, technical proficiency and just plain enjoyment of our hobby, to name a few. The restricted voice band proposal is primarily aimed at just one of those — technical proficiency. Its purpose is to spur the amateur body with a challenge to improve personal ability in the technical radio field, which is certainly in the national interest, and to do so by providing an incentive, which does not now exist, in the form of special privileges. Its purpose is to bring the amateur service more closely into line with our international regulatory definition: (*italics ours*) "*self-training, intercommunication and technical investigations. . .*" As to whether this is a desirable procedure, form and express your opinion as you will — but please don't let the issue be clouded with unrelated arguments such as code speed and bad manners.

Amateur radio will be what we amateurs make of it. The serious, thoughtful tone of the bulk of our correspondence gives us reassurance once again that, whatever decision is eventually forthcoming from membership guidance, it will be the right one. QST

Fig. 1—The panel of the HBR-8 has some unused areas to be filled later when the receiver is expanded into the HBR-11. The cabinet size, 14 by 8 by 7 inches, is roomier than needed for the 'minimum-requirements' receiver. The dial is an Eddystone 598.



## The HBR-8 Communications Receiver

An 8-tube Expandable Design Based on the HBR-16

BY TED CROSBY,\* W6TC

THE response to the series of HBR communications receiver articles<sup>1</sup> has been most gratifying, exceeding by far my fondest hopes and expectations. Countless numbers of these receivers have been built and are in daily use. "Ask the man who owns one."

Undoubtedly the number would be larger if the construction could be simplified even further. One way to do it is to leave out a few of the "extra" features of the HBR-16, in other words, to incorporate only those things absolutely essential to any receiver worthy of being called a "communications" receiver. This has been done in the HBR-8 described in this article. Not over-simplified to the point where it is inadequate for present-day band conditions, almost any amateur could successfully cut his eyeteeth on this particular project.

\* 10126 Colwell Drive, Sun Valley, California.

<sup>1</sup> Crosby, "Ham-Band 14-Tube Double-Conversion Receiver," *QST*, July, 1957.

Crosby, "The HBR-16 Communications Receiver," *QST*, October, 1959.

"Concerning the Type 1461 Tuning Capacitor in the HBR-16," *QST*, November, 1959.

Stewart, "The HBR-16 with an Eddystone Dial," *QST*, June, 1961.

(Of the above issues, the following are no longer available, but photocopies of the pages can be obtained at a cost of 25 cents per page: July, 1957, 9 pages; October, 1959, 8; November, 1959, 1 — *Editor*.)

Second, the design is such that, having been built and operated, it can easily be modified to provide those additional features needed for all-around optimum performance. These modifications, which turn the HBR-8 into the fully-expanded version, the HBR-11, will be described in a subsequent article.

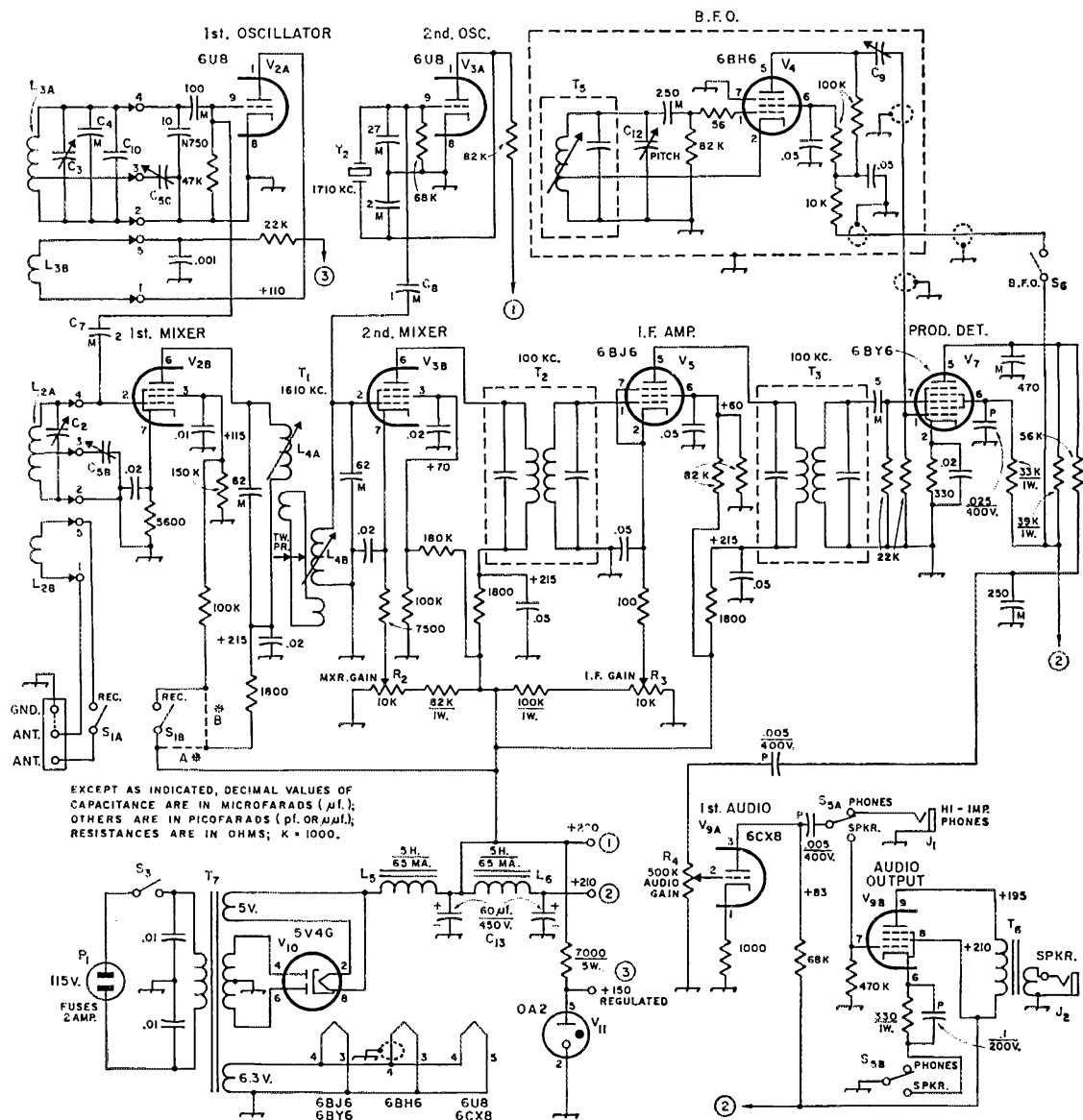
### The HBR-8

The "minimum-requirements" receiver, shown schematically in Fig. 2, uses only the "heart" of the HBR-16 circuit. Except for the revisions required for this particular application, and the simplified method of approach, this portion of the original circuit remains unchanged.

That is, the HBR-8 is a full-fledged double-conversion amateur-band superhet; surprisingly stable, sensitive and selective, and with adequate gain on all bands, 10 through 80 meters. It has a first mixer-oscillator stage, coupled to the antenna, which converts the incoming signal to 1610 kc. This frequency is converted a second time, to 100 kc., and amplified in a single stage. The 100-kc. signal goes into a product detector which is followed by a single-tube two-stage audio amplifier.

On c.w. and s.s.b. the receiver is a much better performer than usually is the case with a like

*Ted Crosby sums it up in the opening paragraphs of this article — more receiver construction would be attempted if it didn't look so formidable. The HBR-8 is not formidable. An excellent performer itself, it can be expanded into an 11-tube receiver which is the equivalent of the highly-popular HBR-16.*



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS ( $\mu$ f.); OTHERS ARE IN PICOFARADS (p.f. OR  $\mu$ mf.); RESISTANCES ARE IN OHMS; K = 1000.

Fig. 2—Circuit diagram of the HBR-8. Except as indicated, fixed resistors are  $\frac{1}{2}$ -watt composition. Fixed capacitors are ceramic except those marked M (mica) and P (paper tubular); see list below. D.c. voltages shown measured with 20,000-ohms-per-volt meter.

\* Connect as shown at either A or B, but not both. A permits using the receiver as a monitor when  $S_{1B}$  is in the transmit position (switch open); B kills receiver when  $S_{1B}$  is open.

$C_2$ - $C_4$ , inc.—See coil chart.

$C_5$ —3-section variable, 5.5-23 pf. per section (Miller 1461-BS).

$C_7$ —2-pf. dipped silver mica.

$C_8$ —1-pf. dipped silver mica.

$C_{10}$ —10-pf. variable, screwdriver adjustment, (Hammarlund MACP-15, cut down to 2 rotor and 2 stator plates).

$C_{10}$ —See coil chart.

$C_{12}$ —50-pf. variable (Hammarlund MACP-50B).

$C_{13}$ —Dual electrolytic, 60  $\mu$ f. per section, 450 volts (Sprague TVL-2772 or equivalent).

$J_1, J_2$ —Open-circuit jack.

$L_2, L_3$ —See coil chart.

$L_4$ —1610-kc. i.f. coil, with link winding (Miller 1731); two required for  $T_1$ .

$L_5, L_6$ —5 henrys, 65 ma. (Triad C-6X).

$P_1$ —Fused line plug.

$R_2, R_3$ —10,000-ohm wire-wound control, not over  $1\frac{1}{4}$  inches in diameter (Centralab WW or equivalent).

$R_4$ —0.5-megohm control, audio taper.

$S_1$ —D.p.s.t. toggle.

$S_3, S_6$ —S.p.s.t. toggle.

$S_5$ —D.p.d.t. toggle.

$T_1$ —See  $L_4$  and text.

$T_2, T_3$ —100-kc. i.f. transformer, slug-tuned (Miller 1710).

$T_5$ —100-kc. b.f.o. coil, slug-tuned (Miller 1711).

number of tubes. Admittedly, it is susceptible to some image-frequency response, a fault common to all communications receivers not incorporating a tuned r.f. stage. However, this is negligible on 40 and 80 meters, where the front-end selectivity is sufficient to overcome it, and only begins to show up on 20 meters where high-power commercial stations are more likely to be present at the 200-ke. image frequency of the second i.f.

The HBR-8 is simple to fabricate, with more than ample room for parts placement and wiring. Although it is laid out with future expansion in mind, the basic requirements are met in every respect. Possibly a few will consider the elimination of an a.m. detector a mistake, but a simple modification, easily accomplished at any time, will rectify it. (The addition of a germanium-diode a.g.c. circuit and infinite-impedance a.m. detector will be described in a subsequent issue of *QST*.) This is not to imply that it is impossible to hear an a.m. phone signal with the 6BY6 product detector; such is not the case. It can be accomplished by treating the a.m. signal exactly as though it were an s.s.b. signal. Either a.m. sideband will serve equally well. With the b.f.o. injection either slightly above or below the center passband frequency of the receiver and the tuning dial set to carrier zero beat, the results will be passably good if the transmitter is stable both as to drift and frequency modulation of the carrier. Unfortunately, many a.m. transmitters fail to qualify.

### The Pros and Cons of This Design

Multiple-element tubes are used wherever practicable, as well as miniature 1st and 2nd i.f. components designed especially for this receiver. There are several plus factors over the HBR-16.

Immediately obvious is the relatively small physical size. It is exceptionally compact for a receiver which in its fully completed state (HBR-11) includes all of the features of the parent receiver. Not so readily apparent are a number of other things.

No longer must the 2nd i.f. transformers and b.f.o. coil be padded in order to bring them down to 100 kc. Instead, these units are tunable from approximately 95 to 105 kc. as they come from the factory.

The slug-tuned coils used in the 1st i.f. are



T<sub>6</sub>—Audio output; 7000 to 4 ohms, 40-ma. primary (Triad S-7X).

T<sub>7</sub>—Power; 525 volts c.t., 90 ma.; 5 volts, 2 amp.; 6.3 volts, 5 amp. (Triad R-10A). Fig. 3 shows a Triad R-8A, which is inadequate for the HBR-11.

Y<sub>2</sub>—1710-ke. crystal; see text.

#### Mechanical items:

Cabinet: 14 × 8 × 7 inches, steel, complete with panel (Wyco CR-7723, gray hammer-tone).

Dial—Eddystone 598, 4 1/8 × 6 inches.

B.F.O. Enclosure—3 1/4 × 2 1/8 × 1 7/8-inch aluminum, channel-lock (LMB 000).

V3 Enclosure: 2 1/8 × 2 1/8 × 1 3/4-inch aluminum, channel-lock (LMB 00Z).

available commercially. The 1610-ke. operating frequency eliminates occasional background QRAM from a local broadcast station operating on 1600 kc., the previously specified 1st i.f. This simplified arrangement works perfectly, at a very reasonable cost.

The smaller cabinet and chassis, lesser power-supply requirements, and rather unique one-tube audio system result in further savings. This audio system has high over-all gain, despite degenerative feedback due to the unbypassed cathode resistor in the triode stage, and has more than adequate power output for speaker operation.

Mechanically, this project is a "cinch." I completed both phases of this receiver, including considerable cut-and-try experimentation, over a 15-day period of my vacation, using only the hand tools available to all of us. Undoubtedly, some of you can do even better. After all, I soon will celebrate my 65th birthday!

Not that everything turned out completely to my liking. The miniature i.f. transformers do not have as good an *L/C* ratio and *Q* as do the 612s used in the HBR-16. The selectivity suffers slightly as a result: approximately 5.5 kc. at 60 db. down for the HBR-11, as compared with 4 kc. for the HBR-16. Even so, this gives much better than "average" results, and it is my honest opinion that the many plus factors inherent in this design more than compensate for the single minus factor.

### Mechanical Notes

All that follows will apply equally well to both the HBR-8 and HBR-11. Much of it will be in the nature of a duplication of things mentioned in previous HBR receiver articles.

I have found it best practice first to drill the holes in the panel and then use the drilled panel as the template for the chassis front.<sup>2</sup> Matching sets of holes are more apt to result when this procedure is followed. A rattail file can be used to clean up any small discrepancies which may show up.

The panel holes for the tuning dial and b.f.o. pitch-control shaft cannot be located and centered correctly until the associated parts are permanently mounted to the chassis.

The lower row of panel controls and the phone juck are mounted directly to the chassis front. The hex nuts used to hold them in position also serve as spacers, separating the chassis front and the panel by about one-eighth inch. A second set of hex nuts then holds the panel securely.

The space between chassis front and panel accommodates the half-inch flange which extends across the lower front edge of the cabinet. When

<sup>2</sup> Full-scale templates for both panel and chassis of the HBR-11 will be available. These templates will serve for the HBR-8 as well. The templates are not actually required for the latter receiver, since the available panel and chassis space is ample. However, in the fully completed state, both panel and chassis parts placement becomes a matter of partial inches. If subsequent expansion is planned, it is strongly recommended that the templates be secured before construction is attempted. A stamped, self-addressed envelope with all inquiries, please.

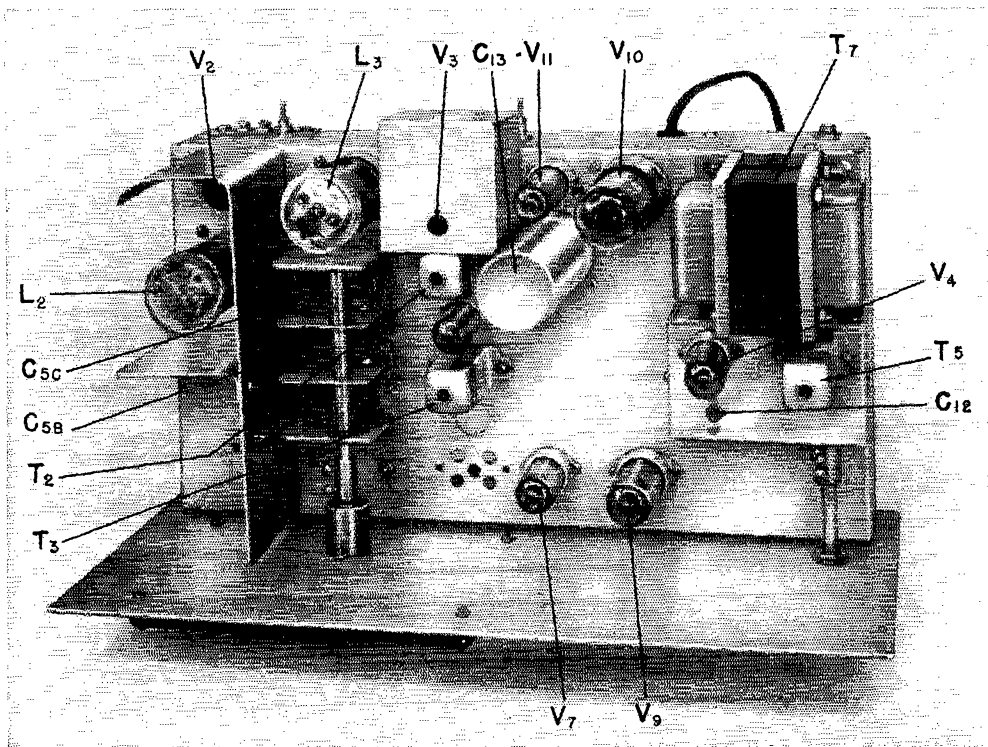


Fig. 3—Plan view of the chassis, which measures 13 by 7 by 2 inches. The principal components are identified.

inserting the receiver in the cabinet, tilting the top of the panel slightly forward will clear the upper panel assembly as the lower front flange of the cabinet slips into its slot. As a precaution against binding between the chassis and the two upright side flanges of the cabinet, file about  $\frac{3}{32}$  inch off both side flanges for a distance of three inches from the bottom. Rather deep notches in the lower front flange will clear the mounting hardware of the phone jack and a.c. toggle switch.

The power transformer shown in Fig. 3 is too small to handle the expanded receiver. A larger transformer was substituted in the HBR-11, and is recommended for both receivers. This transformer should be mounted on the chassis as illustrated in Fig. 5.

#### 2nd-Mixer Enclosure

As a matter of necessity, the 1st-oscillator coil,  $L_3$ , is mounted rather close to the 2nd-oscillator/mixer tube and crystal. The under-chassis aluminum shield between the two 1610-ke. coils, plus the Minibox enclosure for the 2nd oscillator/mixer tube and crystal, precludes any trouble with undesired coupling between these circuits.

A hole just large enough to clear the contours of the tube and crystal sockets was made in the bottom half of the enclosure before bolting it to the chassis. The hole should not be overly large or the shielding will not be complete. A  $\frac{3}{8}$ -inch

hole to clear the glass tip of the tube is drilled in the cover of the enclosure. Five or six  $\frac{1}{8}$ -inch ventilating holes, with a matching set of holes in the overhanging underside of the box, were added as an afterthought, and do not appear in the photographs.

Be certain that this enclosure is mechanically solid once it is mounted. Any movement or vibration will affect the frequency stability of the 1st oscillator because of its proximity to the  $L_3$  coil. Eventually, I found it necessary to add an off-center sheet-metal screw in the front-cover flange of my enclosure for this reason.

#### Chassis and Cabinet

For reasons best known to themselves, most manufacturers have seen fit to eliminate the all-important corner bracing on metal chassis. Fortunately, this is quite easily rectified. Small triangles of sheet aluminum are bolted to the inner sides of the flanges in each corner, as shown in Fig. 4. Flat-head 6-32 screws, with lockwashers and nuts, are used to hold these corner braces in position. The bolt holes should be countersunk for a flush finish. The chassis will be mechanically flimsy if these braces are not used.

For ventilation, about seventy-five  $\frac{1}{4}$ -inch holes were drilled in the bottom of the cabinet, about 60 per cent of them toward the power-supply end. A series of  $\frac{1}{2}$ -inch holes, centered 1 inch apart, runs across the rear top edge of the



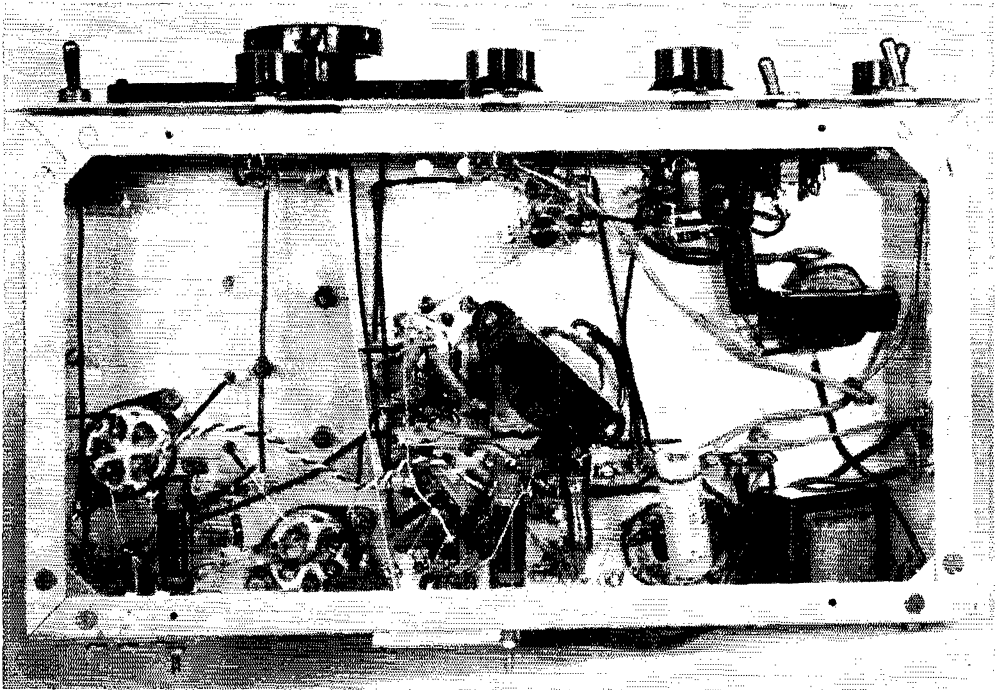


Fig. 4—The r.f. section is at the left in this bottom view. The coil near the lower left corner is  $L_{4A}$  and its associated link; the one near bottom center is  $L_{4B}$  and link. Both are part of the 1610-kc. i.f. transformer,  $T_1$ . One power-supply choke is near the center of the chassis and the other is in the lower right-hand corner. The audio output transformer,  $T_2$ , is above center near the right-hand edge of the chassis. Unused holes are for mounting components to be used in the expanded version, the HBR-11.

cabinet. Around the upper edges of the side and back walls of the chassis there is a line of  $\frac{1}{4}$ -inch holes, centered  $\frac{3}{4}$  of an inch apart. Finally, rubber feet at the four bottom corners of the cabinet assure maximum possible air circulation from bottom to top inside the cabinet. Make certain that these rubber feet are positioned so the mounting bolts do not strike the panel or chassis-mounted components.

Relatively large cutouts along the bottom rear edge of the cabinet provide access to the antenna-input terminals, slug-tuned 1st-i.f. coil-adjustment screws, and speaker jack.

#### Tuning Capacitor

The Miller 1461-BS tuning gang,  $C_5$ , is secured to the chassis with three 6-32 studs approximately  $\frac{3}{4}$ -inch long. There are threaded holes for these studs in the capacitor frame. A 6-32 nut tightened up against the frame locks each stud in position. Two additional 6-32 nuts on each stud, one above the chassis and the other below, not only provide for subsequent raising or lowering of the capacitor assembly, but in addition will lock it firmly in position when finally tightened.

The three outer trimmer plates and companion adjustment screws should be removed from the 1461-BS prior to installation. These trimmers have no place in the normal scheme of things, the front-end coils being designed to do

without them.

Oftentimes the rotor shaft of the 1461-BS is fitted so snugly into the capacitor's U-shaped frame that the load on the driving head of the 598 dial is overly heavy and backlash is likely to result. As the 1461-BS is not equipped with an adjustable rear thrust bearing, the only alternative is to spring the rear upright portion of the frame outward until a thumb-and-finger freeness of rotation results. This should be done before installation, of course. A set-screw equipped metal collar, such as a  $\frac{1}{4}$ -inch shaft coupling, should be slipped on the 1461-BS shaft and placed snugly against the front upright portion of the frame before the bending operation is attempted. This will ensure that the small steel balls used in the front bearing will stay in place. Push the stator plates back to a normal mid-rotor plate position if the normal spacing has been disturbed by the above operation.

Because of the extremely short connecting shaft and resultant lack of flexibility between the 1461-BS capacitor and the driving head of the dial, a solid shaft coupling proved to be unsatisfactory. A certain amount of drag, binding and backlash was prone to persist, even though the shaft alignment was perfectly linear, as it must be under any and all circumstances. The substitution of a Millen 39006 slide-section flexible coupling cured the trouble, and is a "must."

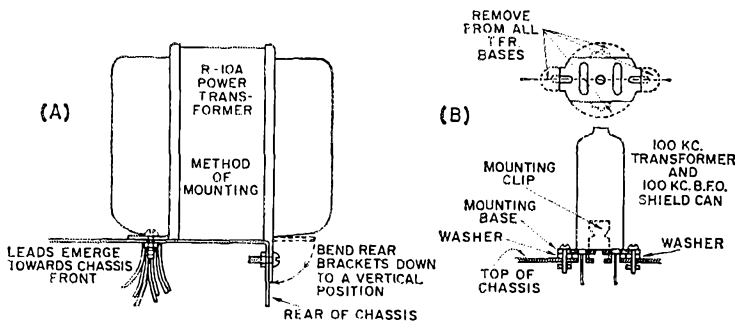


Fig. 5—A—Method of mounting the larger power transformer (also recommended for the HBR-8) needed for the HBR-11. B—Modification of 100-kc. i.f. transformer mounting base.

### Other Items

The i.f. transformer and h.f.o. coil mounting plates must be cut down as shown in Fig. 5. Metal washers between the mounting plate and chassis provide the necessary clearance for the spring clip that joins the plate to the shield can.

The shield between the plug-in coils and 1461-BS capacitor should clear the coils by about  $\frac{1}{8}$ -inch and the capacitor frame by not less than  $\frac{1}{4}$ -inch. Closer placement tends to lower the  $Q_s$  of the coils and increase the minimum capacitance of the tuning gang. This shield, as well as the shield between the two 1610-ke. coils, must be solidly anchored and free from vibration. The use of 6-32 spade bolts and nuts as the mounting hardware is recommended.

A low-loss ceramic or steatite tube socket should be used for the 1st-oscillator/mixer tube. Bakelite or mica-filled tube sockets are perfectly satisfactory for the balance of the receiver.

Low-loss sockets are preferred for the plug-in coils. The available space is not overly large. The Millen 33005 steatite socket is recommended on both counts.

The toggle switches all must be the relatively small-sized units, rated at 3 amperes. Larger switches cannot be fitted into the available panel space. At a couple of spots I found it necessary to wrap and solder 1-inch lengths of No. 18 bare wire to the switch lugs prior to installation, it being impossible to get to the lugs with a soldering iron after the switches were in place.

In my opinion, the relatively new 508 Eddy-stone dial is quite an improvement over any similar dial heretofore available to us. Properly linked to a free-running load, it will provide velvety-smooth and effortless tuning. The 10:1 ratio makes the tuning of these receivers a real pleasure rather than a provocation—even on s.s.b.

### Front-End Tuned Circuits

The plug-in-coil type of front end used in the HBR-16 has been retained. It is not only relatively easy to build and align, but those "in the know" will tell you there is no acceptable substitute for the low-loss high- $Q$  coils, extremely short leads, and sensitive and quiet pentode

mixers.<sup>3</sup> At the frequencies covered by this receiver, this combination provides exceptional gain and signal/noise ratio.

The oscillator coils ( $L_3$ ), as well as the  $L_1$  and  $L_2$  coils, have been redesigned in some instances for better efficiency and easier band-coverage adjustment. These new coils can be used in the HBR-16, and are in fact recommended, provided that the suggested primary-secondary spacings of the  $L_3$  coils be made slightly more than specified here. Otherwise, the feedback with the 6BH6 tube used in the HBR-16 will be excessively high, and 1st-oscillator instability will result. By "slightly more" I mean  $\frac{1}{32}$ - to  $\frac{1}{16}$ -inch.

The high- $C$  temperature-compensated type of 1st-oscillator again is employed in these receivers. On both 40 and 80 meters, this oscillator operates on its fundamental frequency. It is tunable from 5390 to 5690 kc. to provide the 1610-ke. beat frequency for the 7000-7300-ke. band, and from 5110 to 5610 kc. for the 3500-4000-ke. band. The  $C/L$  ratio of both these  $L_3$  coils is such that a high degree of 1st-oscillator stability is achieved at these relatively low frequencies.

Optimum 1st-oscillator stability on the 10-, 15- and 20-meter bands isn't quite so easy of accomplishment. For the three higher-frequency bands the  $L_3$  coils are designed so the 1st oscillator not only operates on the low side of the actual signal frequency, but in addition, the oscillator fundamental frequency is one-half of the required mixing frequency. That is, the mixing frequency that produces the 1610-ke. beat is the second harmonic of the oscillator. For example, on 20 meters the 1610-ke. beat with a signal on 14,000 kc. is obtained by mixing with the 12,390-ke. second harmonic of the 1st oscillator, which actually is operating on a fundamental frequency of 6195 kc. This second-harmonic type of operation makes it possible to use a relatively large 1st-oscillator tank capacitance on 10, 15 and 20 meters, and is of considerable help insofar as 1st-oscillator stability is concerned. As many will testify, the over-all frequency stability of the

<sup>3</sup> The author is, of course, thinking of the pentode in the frequency range up to 30 Mc. At v.h.f., where among other factors the noise coming in on the antenna is not always dominant, the lower receiver noise figures attainable with triodes favor the use of that type of tube. — Editor.

HBR-16 has become one of its established trademarks. That very important characteristic continues to be evidenced in the new receiver.

For satisfactory frequency stability the APC padders must be made of brass, rather than aluminum. Hammarlund APCs are so constructed, and are recommended. Even so, an occasional case of capacitance change due to temperature effects in a faulty rotor bearing will show up, rendering this particular APC unfit for use in an  $L_3$  coil. The only satisfactory solution is to replace it and use it in one of the  $L_1$  or  $L_2$  coils instead; minor capacitance variations are relatively unimportant in that portion of the front-end circuitry.

The N750 capacitances specified for  $C_{10}$  are those used in my own receiver, and the values should prove substantially correct for the average receiver as well. Larger or smaller values can be substituted should some particular receiver show a need for closer compensation. Long-term drift in the positive direction — indicated by the tuning dial's having to be moved toward a lower-capacitance setting to maintain frequency — is rectified by increasing the amount of N750 capacitance used. Negative drift is indicated and corrected by the reverse procedure.

In the HBR-16 the N750 capacitors were mounted inside the  $L_3$  coil form, and any subsequent substitution was a major operation. To avoid this, solder the APC rotor spring-tension spider to one of the insulated mounting studs located either side of the rotor adjustment screw. This provides an external connection to the rotor. An external connection to the stator is already available at the mounting studs on the opposite end of the ceramic base plate. When soldered across these two external terminals, the N750 capacitor will be shunted across the  $L_3$  secondary coil, as called for in the receiver schematic. The silver-mica padder,  $C_4$ , is mounted inside the coil form.

The over-all turns spacing, or physical length of the tuned windings of  $L_1$  (HBR-11 only),  $L_2$  and  $L_3$ , must closely duplicate the figures called for in the coil data if the inductance is to be approximately correct for proper frequency coverage. A final vernier adjustment of the turns spacing, once the coils are operational, usually is necessary. To spread the band over more of the dial, decrease the inductance of  $L_{3A}$  by increasing the upper turn (and/or turns) spacing of the secondary coil. Conversely, to increase the total

frequency coverage, decrease the spacing between turns.

Once the inductance of any particular  $L_{3A}$  coil has been adjusted for proper coverage of the band, the companion  $L_{2A}$  coil must be similarly adjusted. If, with  $C_2$  set for resonance at the low-frequency end of the band, it is found that its capacitance must be increased to bring the circuit into resonance at the high-frequency end, the inductance between the tap and cold end of the coil is too large; these turns should be pulled apart slightly and the alignment procedure repeated, starting at the low-frequency end of the band. Conversely, if the capacitance of  $C_2$  must be decreased at the high-frequency end of the band, the inductance is too small; the turns between tap and cold end of the coil should be moved closer together and the alignment procedure repeated, starting at the low-frequency end of the band. The tracking will be correct only when the setting of  $C_2$  remains unchanged at the ends of the band. No special equipment is needed for this alignment; it is necessary only to listen to the response of the receiver to external noise.

The same procedure must be followed in adjusting the frequency coverage of the  $L_{1A}$ - $C_1$  r.f. amplifier circuit in the HBR-11. It is vitally important that the r.f. and mixer circuits be adjusted for on-the-nose tracking, or the performance of the receiver will be seriously degraded.

The above plug-in-coil adjustments can be made before installing the chassis in the cabinet, but do not cement the windings permanently until double-checking with the set inside the cabinet. And speaking of cement, don't overdo it. Completely immersing the coil forms in the coil dope accomplishes nothing except a reduction of the  $Q$  of the coils. Six or seven narrow lines of Duco cement, top to bottom of the windings proper, is sufficient.

A rather generous amount of Duco cement serves to join the APC base plate to the coil form. Jamming a flat-sided toothpick into the space between the base plate and coil form, before cementing, will seat the band-set capacitor tightly and permanently. Insert the toothpick at that end of the base plate which does not in turn shove the rotor plates so close to the inner wall of the form that the rotor plates cannot be turned.

The rotor of every APC band-set capacitor is connected to the cold end of its associated coil and the stator to the topmost turn, or hot end,

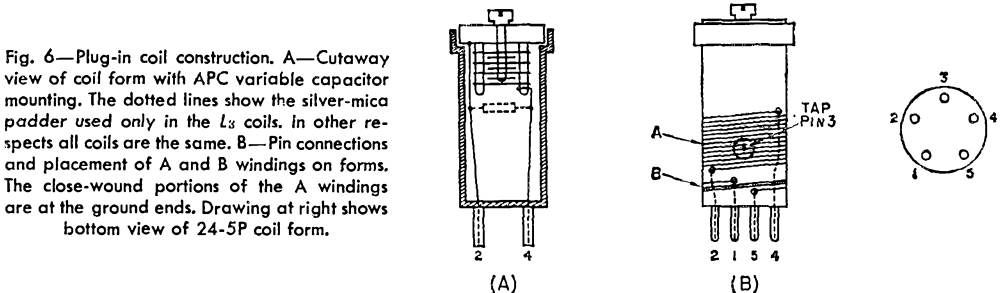


Fig. 6—Plug-in coil construction. A—Cutaway view of coil form with APC variable capacitor mounting. The dotted lines show the silver-mica padder used only in the  $L_3$  coils. In other respects all coils are the same. B—Pin connections and placement of A and B windings on forms. The close-wound portions of the A windings are at the ground ends. Drawing at right shows bottom view of 24-5P coil form.

**Table I**  
**Tuned Circuit Data**

All coils wound with enameled wire on 1 $\frac{1}{4}$ -inch diameter polystyrene 5-pin plug-in forms (Amphenol 24-5P). Taps are counted from "cold" end of coil.  
On "A" coils, turns should be evenly spaced to length specified; "B" coils are close-wound. "A" and "B" coils wound in same direction. See Fig. 6 for method of mounting capacitors.

3.5 Mc.	<p><math>L_{1A}</math>, <math>L_{2A}</math>: 29 turns No. 26, close-wound, then 3<math>\frac{1}{2}</math> turns spaced <math>\frac{1}{4}</math> inch, then 4 turns close-wound, tapped at 31<math>\frac{1}{4}</math> turns; (total 36<math>\frac{1}{2}</math> turns).</p> <p><math>L_{3A}</math>: 15 turns No. 22, close-wound, then 3<math>\frac{1}{2}</math> turns space-wound over <math>\frac{1}{16}</math> inch; tapped at 18<math>\frac{1}{4}</math> turns (total 18<math>\frac{1}{2}</math> turns).</p> <p><math>C_1</math>, <math>C_2</math>—50-pf. air padder. <math>C_3</math>—75-pf. air padder. <math>C_4</math>—None. <math>C_{10}</math>—5-pf. N750 ceramic.</p>	<p><math>L_{1B}</math>: 57<math>\frac{1}{2}</math> turns No. 26, spaced <math>\frac{3}{8}</math> inch from <math>L_{1A}</math>.</p> <p><math>L_{2B}</math>: 9<math>\frac{3}{4}</math> turns No. 26, spaced <math>\frac{5}{16}</math> inch from <math>L_{2A}</math>.</p> <p><math>L_{3B}</math>: 117<math>\frac{1}{4}</math> turns No. 26, spaced <math>\frac{3}{16}</math> inch from <math>L_{3A}</math>.</p>	14 Mc.	<p><math>L_{1A}</math>, <math>L_{2A}</math>: 11<math>\frac{3}{4}</math> turns No. 22, length <math>\frac{15}{16}</math> inch; tapped at 4<math>\frac{1}{4}</math> turns.</p> <p><math>L_{3A}</math>: 8<math>\frac{1}{2}</math> turns No. 22, length <math>\frac{1}{2}</math> inch; tapped at 8<math>\frac{1}{4}</math> turns.</p> <p><math>C_1</math>, <math>C_2</math>—25-pf. air padder. <math>C_3</math>—50-pf. air padder. <math>C_4</math>—180-pf. silver mica. <math>C_{10}</math>—15-pf. N750 ceramic.</p>	<p><math>L_{1B}</math>: 3<math>\frac{1}{2}</math> turns No. 26, spaced <math>\frac{3}{16}</math> inch from <math>L_{1A}</math>.</p> <p><math>L_{2B}</math>: 3<math>\frac{1}{2}</math> turns No. 26, spaced <math>\frac{1}{16}</math> inch from <math>L_{2A}</math>.</p> <p><math>L_{3B}</math>: 117<math>\frac{1}{4}</math> turns No. 26, spaced <math>\frac{1}{8}</math> inch from <math>L_{3A}</math>.</p>
	<p><math>L_{1A}</math>, <math>L_{2A}</math>: 6<math>\frac{1}{2}</math> turns No. 22, close-wound, then 16 turns space-wound to an over-all length of 1 inch; tapped at 9<math>\frac{3}{4}</math> turns (total 22<math>\frac{1}{2}</math> turns).</p> <p><math>L_{3A}</math>: 6<math>\frac{1}{2}</math> turns No. 22, close-wound, then 7 turns space-wound to an over-all length of <math>\frac{3}{16}</math> inch; tapped at 13<math>\frac{1}{4}</math> turns (total 13<math>\frac{1}{2}</math> turns).</p> <p><math>C_1</math>, <math>C_2</math>—50-pf. air padder. <math>C_3</math>—50-pf. air padder. <math>C_4</math>—68-pf. silver mica. <math>C_{10}</math>—10-pf. N750 ceramic.</p>	<p><math>L_{1B}</math>: 2 <math>\frac{1}{4}</math> turns No. 26, spaced <math>\frac{7}{16}</math> inch from <math>L_{1A}</math>.</p> <p><math>L_{2B}</math>: 3<math>\frac{3}{4}</math> turns No. 26, spaced <math>\frac{3}{8}</math> inch from <math>L_{2A}</math>.</p> <p><math>L_{3B}</math>: 107<math>\frac{1}{4}</math> turns No. 26, spaced <math>\frac{3}{8}</math> inch from <math>L_{3A}</math>.</p>		<p><math>L_{1A}</math>, <math>L_{2A}</math>: 8<math>\frac{1}{2}</math> turns No. 22, length <math>\frac{1}{2}</math> inch; tapped at 2<math>\frac{1}{4}</math> turns.</p> <p><math>L_{3A}</math>: 5<math>\frac{1}{4}</math> turns No. 22, length <math>\frac{3}{8}</math> inch; tapped at 4<math>\frac{1}{4}</math> turns.</p> <p><math>C_1</math>, <math>C_2</math>—25-pf. air padder. <math>C_3</math>—50-pf. air padder. <math>C_4</math>—130-pf. silver mica. <math>C_{10}</math>—10-pf. N750 ceramic.</p>	<p><math>L_{1B}</math>: 37<math>\frac{1}{2}</math> turns No. 26, spaced <math>\frac{3}{16}</math> inch from <math>L_{1A}</math>.</p> <p><math>L_{2B}</math>: 37<math>\frac{1}{2}</math> turns No. 26, spaced <math>\frac{3}{16}</math> inch from <math>L_{2A}</math>.</p> <p><math>L_{3B}</math>: 87<math>\frac{1}{4}</math> turns No. 26, spaced <math>\frac{3}{8}</math> inch from <math>L_{3A}</math>.</p>
7 Mc.	<p><math>L_{1A}</math>, <math>L_{2A}</math>: 6<math>\frac{1}{2}</math> turns No. 22, close-wound, then 16 turns space-wound to an over-all length of <math>\frac{3}{16}</math> inch; tapped at 13<math>\frac{1}{4}</math> turns (total 13<math>\frac{1}{2}</math> turns).</p> <p><math>C_1</math>, <math>C_2</math>—50-pf. air padder. <math>C_3</math>—50-pf. air padder. <math>C_4</math>—68-pf. silver mica. <math>C_{10}</math>—10-pf. N750 ceramic.</p>	<p><math>L_{1B}</math>: 2 <math>\frac{1}{4}</math> turns No. 26, spaced <math>\frac{7}{16}</math> inch from <math>L_{1A}</math>.</p> <p><math>L_{2B}</math>: 3<math>\frac{3}{4}</math> turns No. 26, spaced <math>\frac{3}{8}</math> inch from <math>L_{2A}</math>.</p> <p><math>L_{3B}</math>: 107<math>\frac{1}{4}</math> turns No. 26, spaced <math>\frac{3}{8}</math> inch from <math>L_{3A}</math>.</p>	28 Mc.	<p><math>L_{1A}</math>, <math>L_{2A}</math>: 5<math>\frac{1}{4}</math> turns No. 22, length <math>\frac{15}{16}</math> inch; tapped at 2<math>\frac{3}{4}</math> turns.</p> <p><math>L_{3A}</math>: 5<math>\frac{1}{2}</math> turns No. 22, length <math>\frac{1}{4}</math> inch; tapped at 5<math>\frac{1}{4}</math> turns.</p> <p><math>C_1</math>, <math>C_2</math>—25-pf. air padder. <math>C_3</math>—50 pf. air padder. <math>C_4</math>—47-pf. silver mica. <math>C_{10}</math>—10-pf. N750 ceramic.</p>	<p><math>L_{1B}</math>: 37<math>\frac{1}{2}</math> turns No. 26, spaced <math>\frac{3}{16}</math> inch from <math>L_{1A}</math>.</p> <p><math>L_{2B}</math>: 37<math>\frac{1}{2}</math> turns No. 26, spaced <math>\frac{3}{16}</math> inch from <math>L_{2A}</math>.</p> <p><math>L_{3B}</math>: 87<math>\frac{1}{4}</math> turns No. 26, spaced <math>\frac{3}{8}</math> inch from <math>L_{3A}</math>.</p>

Note:  $L_1$  coils are for the r.f. stage in the expanded version of the receiver and do not appear in the circuit of Fig. 2. See text for discussion.

of the coil. Reverse this and it will be practically impossible to adjust the capacitors, especially  $C_3$ , because of hand capacitance.

#### Miscellaneous Circuit Pointers

The 1710-kc. 2nd-oscillator crystal,  $Y_2$ , must be a good one. A sluggish crystal at this point will seriously impair the 2nd-mixer conversion gain. It should be mounted in a standard FT-243 (pin spacing, 0.486 inch; pin diameter, 0.093 inch) or smaller holder; some of the older-type crystals are too large to fit in the metal enclosure.

The oscillator-injection capacitances,  $C_7$  and  $C_8$ , were a problem in the HBR-16, but several manufacturers now are marketing dipped silver-mica capacitors in 1-, 2- and 3-pf. values. The values shown were optimum in the prototype model, and undoubtedly will work well in any duplicate receiver. Cut-and-try experimentation at these points is suggested, nevertheless. It is very important that these capacitors be mounted directly between the designated tube-socket pins, or the grid leads connected to them, using the two bare-wire leads of the capacitor as the sole mounting support. These supporting leads should be kept as short as possible.

The capacitance value of these dipped silver-micas is printed on the case, rather than being color-coded. For this reason it might be well to use this type of silver-mica throughout. The padders used in the  $L_3$  coil assemblies must be of the

correct size if the coil is to be resonant at the correct frequency. The mysteries of the color-code system being what they are for some of us, I suspect the "percentages" strongly favor the plainly-labeled type of capacitor. Do not attempt to substitute so-called "zero-temp." ceramic fixed capacitors for the specified silver-micas in the  $L_3$  assemblies. My experience has been that such capacitors actually are so "negative" in characteristics, in this application at least, that they simply cannot be used.

Prior to installation, check the various resistors for proper ohmage, the fixed capacitors for shorts or leakage, the toggle switches for make-break, and the transformers for continuity. It might save some subsequent unpleasant trouble-shooting.

A pair of solid insulated wires, *tightly* twisted together to the required length, serves as the low-impedance line between the two links of the 1st-i.f. coils ( $T_1$ ). Any size from Nos. 22 to 26, with either plastic or cambrie insulation, will be perfectly satisfactory. Once operational, reverse the connections at one end of the line for a comparative check. Slightly more gain results from the correct line terminations.

Note the shaft of the pitch control capacitor,  $C_{12}$ , before installation, so you can tell when it is at the half-capacitance position after the b.f.o. enclosure is sealed up. With  $C_{12}$  so positioned, use the slug in the b.f.o. coil,  $T_3$ , to put the b.f.o. frequency at the exact center of the passband. Only

then will it be possible to use  $C_{12}$  to move the b.f.o. slightly above or below center for upper or lower s.s.b. Optimum b.f.o. injection is obtained at the setting of  $C_9$  which results in maximum undistorted audio output from the 6BY6 product detector.

The 6BY6 used in these receivers corrects the faults of the 6BE6 originally used in the HBR-16, yet retains the simplicity of the original circuit. It is not overdriven, even though the s.s.b. signal is of the "40 over" variety. And there is no b.f.o. leakage problem, even when used with the relatively simple a.g.c. circuit to be employed in the HBR-11 receiver.

The  $L_1$  and  $L_2$  coils for the various bands are identical except for a smaller number of turns on some of the  $L_{1B}$  coils. Better front-end selectivity will result if these particular  $L_{1B}$  coils are used in the 1st-mixer coil socket of the HBR-8, rather than the  $L_{2B}$  coils. If and when an r.f. stage is added, the  $L_1$  coils should be transferred to the r.f. position, and the specified  $L_2$  coils used in the 1st-mixer coil socket.

### HBR-8 Alignment

I doubt if there is any single word in the English language that has done more to frighten the living daylights out of amateurs than the word "alignment," especially as it applies to a double-conversion superhet. The consensus seems to be that here is something far beyond the capabilities of any mortal not possessing a sheepskin in electronics, plus a fully equipped lab. What a "bill of goods," especially in this particular instance. Dealing with duplicated inductances and pre-determined values of tuning capacitance as we are here, the over-all alignment of this receiver is not at all the complicated job you may always have considered it to be. Instead, it can be accomplished in a few minutes' time.

The signal generator need not be an elaborate multifrequency affair. Instead, it need be capable only of generating those ham-band frequencies covered by this receiver, and stable over a reasonable period of time. The exciter stages of the station transmitter provide such a signal generator. Or, in the case of the HBR-11, so does the 3500-kc. crystal-controlled calibration oscillator. The fundamental and harmonic r.f. outputs of the latter device fill the bill admirably.

Additionally, a visual indicator of resonance in the tuned circuits of the receiver is required. The S meter of the HBR-11 is precisely such a device.

The relatively simple lash-up diagrammed in Fig. 7 works equally well for the HBR-8. Assuming that a majority will decide to tackle the latter receiver initially, the over-all alignment procedure for that receiver will be described here.

The initial alignment could be accomplished with any set of coils in the front end, but for several reasons it is easier to do at one of the lower frequencies — the 7-Mc. band in this case.

Place the receiver in close proximity to the station transmitter, and connect a 3- or 4-foot piece of flexible insulated wire to the receiver antenna-input terminal. Place the free end of the wire near the output stage of the exciter. Set the two slugs of the 1st-i.f. coils,  $T_1$ , so that the threaded studs project approximately one-half inch. This tunes these coils sufficiently close to 1610 kc. so that a strong r.f. signal of that frequency can be forced through them. If an accurate grid-dip meter is available, a more precise adjustment can be predetermined.

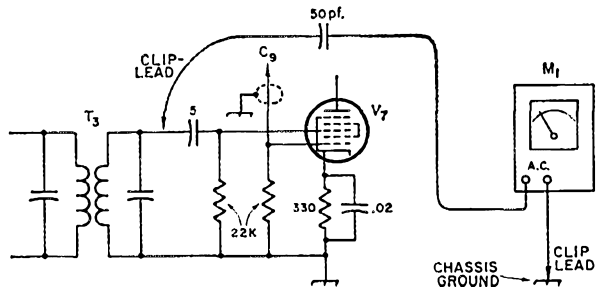
Initially, the two upper slugs of the 100-kc. transformers should be screwed all the way up and the two lower slugs all the way down. Next, move the two lower slugs back in  $1\frac{1}{2}$  turns, and the two upper slugs  $2\frac{1}{2}$  turns in. When so adjusted, the two i.f. transformers will be tuned sufficiently close to 100 kc. so an r.f. signal of that frequency can be forced through them, provided it is sufficiently strong. Caution: A second point of apparent resonance shows up with the slugs screwed several turns in (near the center of the can proper). As this adjustment results in over-coupling, with a broad passband, it should be avoided by following the procedure above.

Next, set the mixer gain control to maximum and the i.f. gain control about 90 per cent advanced. The gain increases as the arm approaches the grounded end of the control. Set  $C_2$  to slightly less than half capacitance, and turn the receiver dial to "2" on the dial scale — near maximum capacitance of the 1461-BS.

Tune up the exciter for 7-Mc. output — the extreme low-frequency end of the band — and let it run. Vary the capacitance of  $C_3$  from minimum to maximum. Two or three upward excursions of the meter probably will result. The 7-Mc. signal you are seeking can be easily identified; it is the setting of  $C_3$  which results in the highest meter deflection. Turn the exciter off and on a couple of times to be certain you do have the correct signal.

(Continued on page 148)

Fig. 7—Test setup for r.f. and i.f. alignment.  $M_1$  should be a high-resistance a.c. voltmeter such as is found in the better-type volt-ohm-milliammeters using a 50-microamp. movement (20,000 ohms per volt). Use the 2.5-volt a.c. scale initially, increasing as needed if the pointer goes off scale. A v.t.v.m. having an input resistance of 1 megohm or more on the a.c. range also can be used. Leads from the meter to the receiver circuit should be kept short.



## A. C. in Radio Circuits

### Part I -- Energy Storage and Reactance

BY GEORGE GRAMMER,\* WIDF

Too many of us, alternating current is simply one of those taken-for-granted facts of everyday life, like radio, TV, plumbing, and whatnot. It comes out of a couple of little slits in the wall, and with a minimum of effort on our part will go to work doing most of the jobs, light or heavy, that have to be done to keep a household running. It puts the life into our ham stations.

But this is only one of the many forms that "a.c." takes. Other varieties of it are generated, amplified, modified, and processed in numerous ways in our receivers and transmitters. Alternating currents and voltages are the materials from which radio communication is fabricated. We can't begin to comprehend the operation of radio circuits without first digesting some of the facts of behavior of the currents that flow through them.

The technical problems of alternating current stem from the fact that the current (or voltage) is changing throughout the cycle. In a "steady" alternating current each cycle is like the one before it and also like the one that will follow. But within the cycle there is no such peaceful repose as we find in the behavior of direct current. This continual restlessness leads to all sorts of effects that are absent with d.c. (That is, absent except during those times when the direct current is being started or stopped, or is otherwise subjected to change. These periods can be, and are, ignored in many situations, although not in all.)

First, there is the question of how to assign a value to an alternating current. If we follow the current throughout a cycle, we may find that at

\* Technical Director, ARRL.

successive instants it is increasing until it reaches, say, one ampere. At that instant it starts to decrease, eventually dying away to nothing. Then it reverses itself to do the same thing while flowing in the opposite direction. Next, it starts the whole business over again. At no point does it stay still long enough for us to say, "that's the value of the current."

#### A. C. Amperes and Volts

The clue to settling on a number to use for the current is found in this statement: Power makes no distinction between a.c. and d.c. A resistor gets just as hot when current flows from top to bottom as when it flows from bottom to top. Thus the power will be the same regardless of the direction of current flow; and since this is so, it doesn't matter how rapidly the current may reverse direction. It follows that we can say we have one ampere of alternating current when that current heats a given resistor exactly as one ampere of direct current would heat it. If the alternating current has the form of a sine wave when plotted on a graph, as in Fig. 1, it will have an **effective value** of one ampere when its maximum value during the cycle is equal to 1.41 ampere (the exact figure is  $\sqrt{2}$ ). The same relationship holds for the effective value of voltage. An alternate term for effective is **r.m.s. (root-mean-square)**, this name being derived from the method by which such a wave is analyzed mathematically.

The effects associated with alternating current are intimately related to the **frequency** of the current, or the number of cycles per second. The

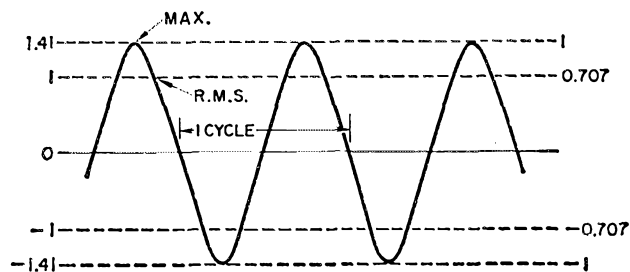
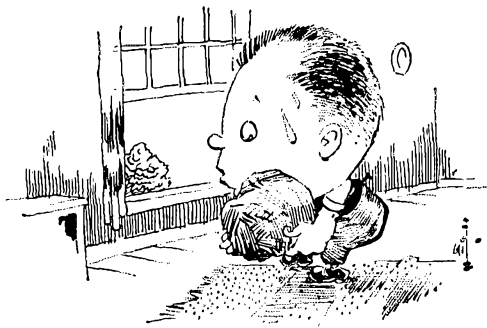


Fig. 1—If an alternating current or voltage has the sine form shown above, an effective current of 1 ampere exists when the maximum value is 1.41 amp., as shown by the scale at the left. Figures at the right are in terms of 1 ampere maximum current, in which case the r.m.s. current is 0.707 ampere. The ratio is the same for all sine waves. Other waveforms will have different ratios, in general.

principal one is **reactance**. To appreciate reactance you need first to know a little about energy storage in electric circuits.

### Stored Energy

Suppose you carry a stone to an upper floor of your house and place it on a window sill. You probably didn't think of it in these terms, but



the fact is that in carrying it up above the ground you have been storing gravitational energy in the stone. The energy stored is equal to the work you did in carrying it up. If you now push the stone off the sill its stored energy is released, carrying it rapidly back to the ground. This sequence is said to be the result of a gravitational **field**, an invisible something that has been invented to account for an observed effect.

Electrical energy can be stored, too. If you send a direct current through an inductance, a **magnetic field** comes into being around it. (Fig. 2). This field represents stored energy. If you now open the circuit, all the stored energy comes back. It comes back a lot faster than it went into the field, because it has to get back at the very instant you open the switch. After that it would be too late, since there would be no circuit. If the returning energy is large, it will make itself visible by a fat spark at the switch contacts.

### Magnetic Energy

Putting energy into a magnetic field also takes work. One definition of work is that it consists in overcoming an opposing force — gravity, inertia, friction, or what-have-you, in the case of mechanical work. In storing energy in a magnetic field the work done consists in overcoming a force generated in the inductance by the very fact that energy is being stored. This opposition takes the form of an **induced voltage** which bucks the applied voltage. Its value depends not on the actual value of current but on the rate at which the current *changes*. The current changes in value most rapidly at the instant that voltage is applied to an inductance, so at this moment the induced voltage is almost equal to the applied voltage. Then the rate of current change becomes slower and slower, and eventually there is no change that can be measured. At this time the work is complete; the maximum energy is stored in the field, there is no induced voltage,

and from then on the resistance of the circuit governs the current flow. Ohm's Law finally prevails.

### Electric-Field Storage

You can store energy in a capacitor, too. In this case the storehouse is an **electric field**, not a magnetic field (Fig. 3). If you apply a d.c. voltage to a capacitor there will be an instantaneous rush of current into the capacitor to charge it. The only thing that limits the current at the instant of closing the switch is whatever resistance there may be in the circuit. The capacitor itself acts like a short-circuit, at that instant, and all the voltage appears across the resistance. Then as the capacitor "fills up" with electricity — meaning that one set of plates is acquiring an excess of electrons while the other set is being robbed of the same number — the voltage across it rises. Eventually the voltage at the capacitor terminals is equal to the source voltage, and current flow stops. If the source of voltage is then disconnected the capacitor will remain charged to that voltage. The charge will stay there just as long as there is no path by which electrons can travel from one set of plates to the other. A capacitor with very low **leakage** will hold a charge for days on end.

If you connect a resistance to the charged capacitor the energy will dissipate itself in heating the resistor. If the capacitance and resistance are both large it may take a long time for voltage to disappear entirely from the capacitor terminals. However, the capacitor can be discharged rapidly into a low resistance or a short circuit. If you touch a wire to the terminals of a capacitor of several microfarads charged to a few hundred volts you'll get quite a spark. (If you touch the terminals yourself you'll get quite a jolt! To avoid danger of this, power supply capacitors have **bleeder resistors** connected across them to drain off the charge.)

### Reactance

Just what does all this have to do with reactance? It goes about like this: From the preceding discussion you've seen that energy is stored in the magnetic field when current through an in-

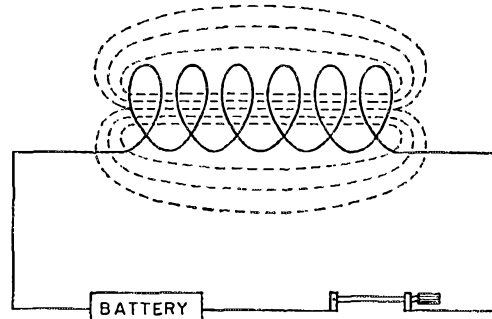


Fig. 2—Current sent through an inductance sets up a magnetic field around it. The dashed lines represent the paths along which the field exerts magnetic force.

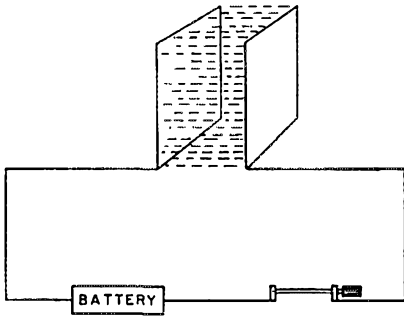


Fig. 3—An electric field exists between the plates of a capacitor when a voltage is applied. Dashed lines represent paths of the "lines of force."

ductance is increasing, and in the electric field when the voltage across a capacitor is increasing. If the current through the inductance is made to decrease, energy will come back into the circuit. The induced voltage will tend to keep current flowing in the same direction as the original current. By the same token, if the voltage applied to a capacitor is made to decrease, the capacitor will discharge into the circuit, giving back stored energy.

Now an alternating voltage or current is one which not only reverses its direction periodically, but also is one in which the *value* of the voltage or current is continually changing. Because of this continual change, energy will at times be stored in the magnetic field and shortly thereafter returned to the circuit, if the circuit contains inductance. Similarly with the electric field and capacitance. *All of the energy stored during one part of a cycle is returned by the time the cycle is over.*

### Apparent Power

In other words, inductance and capacitance take energy (or power) from the power source only to hand all of it back again. A "pure" inductance or capacitance (i.e., without associated resistance) uses no power. Nevertheless, current does flow in the circuit when voltage is applied. If we multiply the voltage by the current, the same as we do to find power in d.c. circuits, we get a number which seems to represent power. It only *seems* to do so, because no real work is done unless there is resistance. This power is called **apparent power** or **wattless power**. To distinguish it from real power a different unit is used — a **volt-ampere**. One volt-ampere is the same as one watt — except that it doesn't do any work, while a real watt does.<sup>1</sup>

You are undoubtedly curious as to how it is

<sup>1</sup> — This is an oversimplified statement, although true when considering only "pure" inductance and capacitance. A volt-ampere is the product of volts times amperes in any circuit, whether or not part of the power is used up in resistance. The modern term for the stored-energy — i.e., reactive — part of the volt-ampere product is the "var." Thus volt-amperes contain both watts and vars in the general case. However, watts and vars cannot be added arithmetically to obtain volt-amperes; the relationship is complicated by phase.

that there can be voltage and current but no power. A detailed examination of what goes on in the circuit is beyond our scope here. Briefly, however, it is a matter of timing (for which the technical term is **phase**). The voltage and current don't pull together, as they do in a simple resistance. When one is big the other is likely to be small; or, even, when the polarity of the voltage is positive the current may be negative — that is, flowing in the "wrong" direction. It's something like a tug-of-war in which two teams expend a lot of effort in pulling each other back and forth without making any net progress one way or the other.

### Inductive Reactance

We said earlier that the more rapidly the current changes, the larger the opposing voltage generated in an inductance. A high-frequency alternating current changes more rapidly than a low-frequency one, since there are more cycles per second. Thus the higher the frequency and the larger the inductance, the harder it is for current to flow through the inductance; it meets more opposition. The measure of this opposition is called **inductive reactance**. It is something like the opposition that resistance offers to current flow, and so the unit of reactance is also named the ohm.

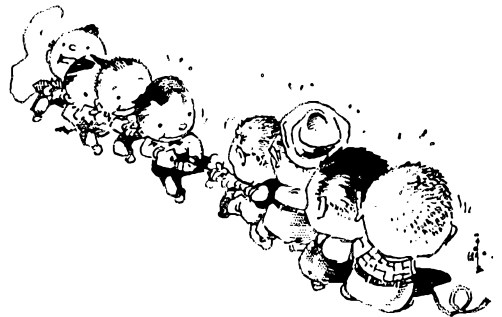
Like the wattless watt, though, it is an ohm without resistance. It does act like a real ohm to this extent: Given a fixed frequency, the current through it will be directly proportional to the voltage applied. In other words, we can write for reactance the equivalent of Ohm's Law for resistance:

$$I = \frac{E}{X}$$

where  $X$ , which stands for reactance, replaces  $R$  in the familiar Ohm's Law formula. But for a given value of inductance, reactance increases with the frequency, so it is not a **constant** like resistance is — unless we specify that the frequency stays constant.

### Capacitive Reactance

A capacitor acts in just the opposite way. The more rapidly the applied voltage changes in value, the faster the capacitor stores energy.





This means that a high-frequency alternating voltage will put more current into a given capacitor than a low-frequency voltage could. Thus the reactance of a capacitor goes *down* as the frequency increases. Nevertheless, the same formula applies if the frequency stays constant. All we have to remember is that  $X$  gets smaller as the capacitance is made larger, and that it also gets smaller as the frequency is made larger.

To distinguish inductive from capacitive reactance the former is usually designated  $X_L$  and the latter  $X_C$ . Just plain  $X$  can mean either one or a combination of both. In the form of equations, the ideas expressed above in words result in

$$X_L = 2\pi fL$$

and 
$$X_C = \frac{1}{2\pi fC}$$

In these formulas,  $f$  is the frequency,  $L$  the inductance, and  $C$  the capacitance. The proper units have to be used.<sup>2</sup> We won't attempt to explain the factor  $2\pi$  here because that's a whole topic in itself, and is chiefly of mathematical interest.

<sup>2</sup> The most convenient units in amateur work are megacycles for frequency, microhenrys for inductance, and picofarads (micromicrofarads) for capacitance. With these units the formulas are

$$X_L = 6.28fL$$

and

$$X_C = \frac{1,000,000}{6.28fC} = \frac{159,000}{fC}$$

in which 6.28 is the approximate value of  $2\pi$ . The reactance as given by these formulas is in ohms in both cases.

## Reactances Combined

The "oppositeness" of inductive and capacitive reactance has another important effect. When a coil and capacitor are connected in series in a circuit, one tends to undo what the other is trying to do. This is quite different from placing two resistances in series. The resistances both act the same way, and the total resistance is the sum of the two. But if we put inductive and capacitive reactance in series the total reactance is the *difference*. Conventionally, capacitive reactance is called "negative" and inductive reactance is called "positive". Thus a series circuit might have an inductive reactance of "plus" 15 ohms and a capacitive reactance of "minus" 10 ohms; the total reactance would be only 5 ohms (15 - 10) in that case.

However, reactances of the *same* kind add up just as resistors do. That is, an inductive reactance of 15 ohms placed in series with one of 8 ohms will result in a total of 23 ohms. The same would be true of two capacitive reactances of these same values, except that the sign would be negative.

Also, reactances of the same kind connected in parallel are combined by the same rules that we use for resistances. Not so with reactances of *opposite* kind in parallel! Things begin to get complicated in that case — too much so to be considered in an elementary discussion. QST

(The subject of resonance will be discussed in the next section, to be published in a succeeding issue. — *Editor.*)

## Strays NEWS

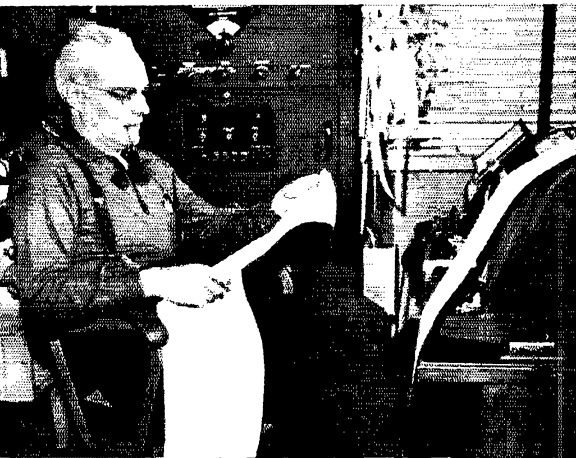
J. W. Miller Company's catalog No. 63 is now available (5917 South Main St., Los Angeles 3, Calif.). Its 48 pages describe the Miller line of r.f. chokes, i.f. transformers, adjustable coils, replacement coils, and related items.

A 10-page folder is available from Illumitronic Engineering (680 E. Taylor Ave., Sunnyvale,

Calif.) on their complete series of air-core inductors for ham rigs. Pi network and conventional LC output circuit design dope is included.

Almost an all-ham family, reports W4EJQ. Dad is W4DYW, son is WA4AAK, and three teen-age daughters are WN4LKC, WA4BSJ, and WA4BVF.

Here are two of the several stations that have been handling reams of traffic with the SS Hope, which is now operating in Peruvian waters. At the left is WØAJL, who often ends up with about eighteen feet of teletype messages, on a morning schedule, while at the right is WØJRQ, who also does yeoman service. The outstanding signals from these mile-high Denver stations have kept personnel on the Hope closely linked with home.



# • *Beginner and Novice*

## Have You Received An FCC QSL?

### *Keeping Your Harmonics At Home*

BY LEWIS G. McCOY,\* W1ICP

EACH year a new batch of Novices gets started in ham radio and each year some of these new hams get into trouble with the FCC for harmonic violations. If the hams are lucky, they get notices of harmonic violations from ARRL Official Observers *before* getting into hot water with the FCC. This article will show you a few simple methods for preventing harmonic radiation. However, before discussing the "how," let's take a look at the "why."

What we are looking for from our transmitters is a single signal to be fed to the antenna. Any other signal that reaches the antenna and is radiated is classed as a "spurious radiation." Unfortunately, unless certain precautions are taken, it is characteristic of almost any transmitter that spurious signals will be generated and fed to the antenna. For example, with a well-designed rig operating on 80 meters, the second harmonic from 80 (twice the desired frequency) can cause interference to other services. A Novice signal at 3750 kc. would have a second harmonic at 7500 kc., which is well outside the 40-meter band.

As we said, this can be expected even in a well-designed rig, but let's qualify this statement. The probable attenuation of the second harmonic in the tank circuit of such a transmitter, if the tank  $Q$  is 10 or more, is approximately 30 decibels down from the fundamental signal. Assuming a transmitter with 50 watts output, 30-db. attenuation amounts to about a 50-milliwatt second harmonic. This doesn't appear to be a very strong

signal but take our word for it, with good propagation conditions such a signal *can* cause interference to other services.

This 30-db. figure is assuming the transmitter is *properly* tuned and adjusted. Slight misadjustments can reduce the attenuation considerably. It might also be added that many Novices make the mistake of actually tuning up on the second harmonic instead of the fundamental. In this case the amplifier works as a doubler, resulting in an extremely strong signal being radiated on the wrong frequency. A Novice should always read his transmitter instruction book carefully (if it's a rig he bought) and if he has any doubts about the transmitter tuning, check the output with a wavemeter.<sup>1</sup>

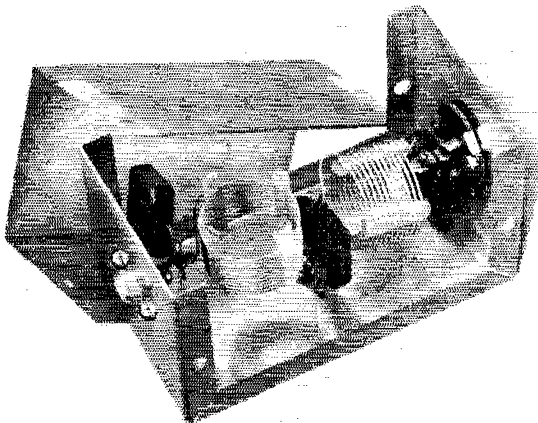
#### *Whose Fault*

Sometimes when a Novice gets a citation from the FCC or an Official Observer he is inclined to lay the blame on the manufacturer of the transmitter, or the designer if it is a homebuilt job. He is wrong in making the assumption that the manufacturer is at fault. The manufacturer has no way of knowing how the transmitter is to be used and, in addition, to take into account all the possible ways the rig could be used and still prevent harmonic radiation would increase the complexity and cost of the transmitter greatly.

Many Novices think that using a "single-band" antenna will prevent the radiation of unwanted signals. This is not true. It *is* true that

\*Technical Assistant, *QST*

<sup>1</sup> See p. 40, Dec. 1961, *QST*.



The unit shown here is for 80-meter operation. Listed in Fig. 1 are the component values for each band.

certain antennas work better on one band than others but it doesn't mean that these same antennas won't radiate spurious signals. In fact, not that we want to confuse the beginner, but *any* antenna can be used on more than one band — an ordinary hunk of wire can be called a "multi-band" antenna. We don't mean to say that such antennas will do a good job on all bands but the important point is that they will radiate. A good example is W1JMY, of the ARRL Hq. staff, who has a 20-meter folded dipole antenna which works quite well on that band. By tying the feeders together he tunes the antenna up on 160 meters (!) and he insists to us that he works everything he hears (or almost).

The important point to remember is that you shouldn't depend on your antenna to provide harmonic attenuation. The only way of being reasonably safe from harmonic radiation is to add additional selectivity between the transmitter and antenna. Additional selectivity can be obtained by using a tuned circuit that is tuned to the same frequency as the amplifier tank circuit. This additional circuit can be in the form of a filter or a transmatch as either unit will provide the necessary harmonic attenuation to reduce the spurious signals to a non-interfering level.

#### Do You Have A Harmonic Problem?

You may have read up to this point and decided that it didn't apply to you because you have never received any notices of harmonic violations. However, simply because you haven't been cited, don't be lulled into a sense of false security. Harmonic radiation is a problem that every ham is faced with and the safest thing to do is assume you have harmonics and take steps to prevent their radiation. You can have another ham listen for harmonics from your transmitter but because he doesn't hear any is no safe indication that you don't have any. To repeat, the safest thing to do is assume you have harmonics and act accordingly.

#### Filters for Coaxial Fed Antennas

There are two types of filters commonly used by amateurs on their transmitters. These are low-pass filters and half-wave filters. A low-pass filter is used when the harmonics from a transmitter could cause interference to television reception. Many Novices who receive second-harmonic notices believe that a low-pass filter is the answer to their problem, but a low-pass filter will not attenuate any harmonics below 30 Mc., at least none of the low-pass filters designed for TVI prevention.

A filter that will do the job is the half-wave type. A half-wave filter can be designed to have a cut-off frequency just above the band in use. For example, one for the 80-meter band can be designed to pass any signals in the band but attenuate any signals above its cut-off frequency. A desired feature of this type filter is that it can be used in a coaxial line that isn't "matched." For a low-pass filter to work properly the transmission line should be fairly well matched. The half-wave

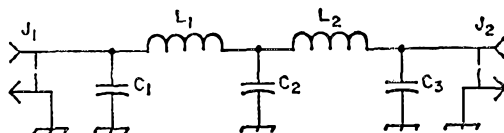


Fig. 1—Circuit diagram of the half-wave filter.

C<sub>1</sub>, C<sub>3</sub>—3.5 Mc.; 820-pf. mica, 500 volts.

7 Mc.; 470-pf. mica, 500 volts.

21 Mc.; 150-pf. mica, 500 volts.

C<sub>2</sub>—3.5 Mc.; 1500-pf. mica, 500 volts.

7 Mc.; 1000-pf. mica, 500 volts.

21 Mc.; 300-pf. mica, 500 volts.

J<sub>1</sub>, J<sub>2</sub>—Phono jacks.

L<sub>1</sub>, L<sub>2</sub>—3.5 Mc.: 11 turns No. 20, 16 turns per inch, 1-inch diam. (B&W Miniductor 3015).

7 Mc.: 8 turns No. 18, 8 turns per inch, 1-inch diam. (B&W Miniductor 3014).

21 Mc.: 10 turns No. 18, 8 turns per inch, ½-inch diam. (B&W Miniductor 3002).

filter is not that critical and will tolerate mismatches of 3 to 1 with either 50- or 70-ohm cable. One disadvantage, and not a serious one, is that a different filter must be used for each band. However, the filters are very inexpensive and simple to make. Changing filters when changing bands only takes a few seconds if the units are constructed with phono jacks.

#### Making the Filters

Fig. 1 is the circuit of the half-wave filter. The unit consists of two coils and three mica capacitors. A 4 × 2½ × 2¼-inch Minibox is used for the filter enclosure. If you don't mind the appearance, a coffee can also can be used to house the filter, reducing the cost of the unit.

The filter shown in the photograph is for 80-meter operation. J<sub>1</sub> and J<sub>2</sub> are phono jacks and are mounted on each end of the box. A single length of B&W Miniductor coil stock will provide both L<sub>1</sub> and L<sub>2</sub> for any of the filters. Note how the coils are mounted in relation to each other. This is to reduce any coupling between the coils. C<sub>1</sub> and C<sub>3</sub> are mounted between the ground lug and inner conductor terminals of J<sub>1</sub> and J<sub>2</sub>. Keep the capacitor leads as short as possible. A soldering lug is mounted near the bottom center of the box and the lug is used for one terminal point of C<sub>2</sub>. The other lead is the junction of L<sub>1</sub> and L<sub>2</sub>.

The attenuation of the second harmonic with this type of filter is about 30 db., which should be adequate. The higher-order harmonics are attenuated even more. If you should happen to have a low-pass filter in your setup it can be left in the line in addition to the half-wave filter. However, it is *very* important that you change the half-wave filter when you change bands otherwise you'll burn out the capacitors in the filter. Incidentally, if you are using a low-pass filter for TVI then there is no need to build the 15-meter half-wave job. The low-pass filter will take care of any harmonics for this band. However, 80- and 40-meter filters or a transmatch should be used by every Novice to prevent the radiation of undesired signals.

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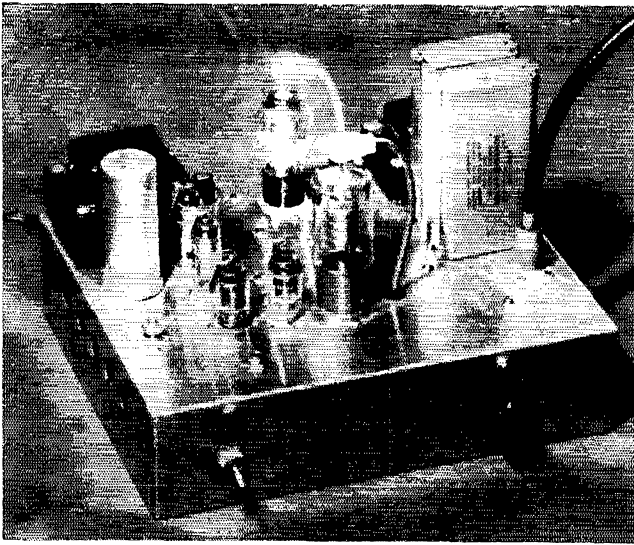


Fig. 1—Pulse modulator and power supply. The 3C45 hydrogen thyatron is the large tube near the center of the chassis. The pulse-forming network is located beneath the blank area of the chassis between the thyatron and the output cable. The latter runs to the remote oscillator assembly to be described in a subsequent article.

# Pulse: A Practical Technique for Amateur Microwave Work

## Part II—The Pulse Modulator

BY ROBERT F. GUBA,\* W1QMN AND JOHN T. ZIMMER,\*\* W2BVU

THE unique advantages of pulse emission for the amateur bands above 2300 Mc. were described last month. To summarize briefly, pulse permits the amateur to use relatively simple and inexpensive equipment in the microwave bands to communicate over distances comparable to those presently spanned on 144, 220 or 420 Mc.

The gear to be described in this and later articles is not intended to be the last word in pulse equipment, but rather to show an easy way for the amateur to get started in the microwave bands. Although the equipment is designed for the 2300-Mc. band, much of it can be used equally well for the microwave bands at 3300 and 5650 Mc. One big advantage of pulse is that it is hardly more difficult to construct pulse equipment for 5650 Mc. than it is for 2300. Though the use of such new components as varactors may make the use of stable, narrow-band equipment on 2300 Mc. more practical for the average amateur as time goes on, the pulse equipment described here serves as an introduction to a technique which should make it possible for large numbers of amateurs to use the fascinating, space-age microwave bands for interesting work.

### Pulse Generation

The transmitter is divided into two main parts: the pulsed oscillator and the modulator. A general description of its operation is given in Part I, but it is worth pointing out certain features in more detail. Much of the modulator, Figs. 1, 2, and 3, is conventional power-supply circuitry. Any supply capable of providing 10 ma. at 1500 volts and 20 ma. at 300 volts could be substituted for that shown in Fig. 3. The actual pulse-generating circuitry uses three tubes: two 12AU7s and a 3C45. The latter is a hydrogen thyatron which is available on the surplus market for about four dollars. They have been sold at some radio club auctions for 25 cents.

The p.r.f. is generated in the modulator, Fig. 2, by  $V_1$ , in a multivibrator circuit. This is a type of square-wave oscillator which has reasonably good frequency stability. It can be adjusted over a small frequency range by means of  $L_3$ . Thousand-cycle square waves appearing at the plate of  $V_{1B}$  are differentiated by a short-time-constant coupling network,  $C_3R_6$ , to produce impulses at the grid of  $V_{2A}$ . Positive and negative impulses are produced when the voltage of the square wave is rising and falling, respectively. Since the voltage at Pin 1 of  $V_{1B}$  falls faster than it rises during the square wave, a larger negative impulse is generated. This negative impulse

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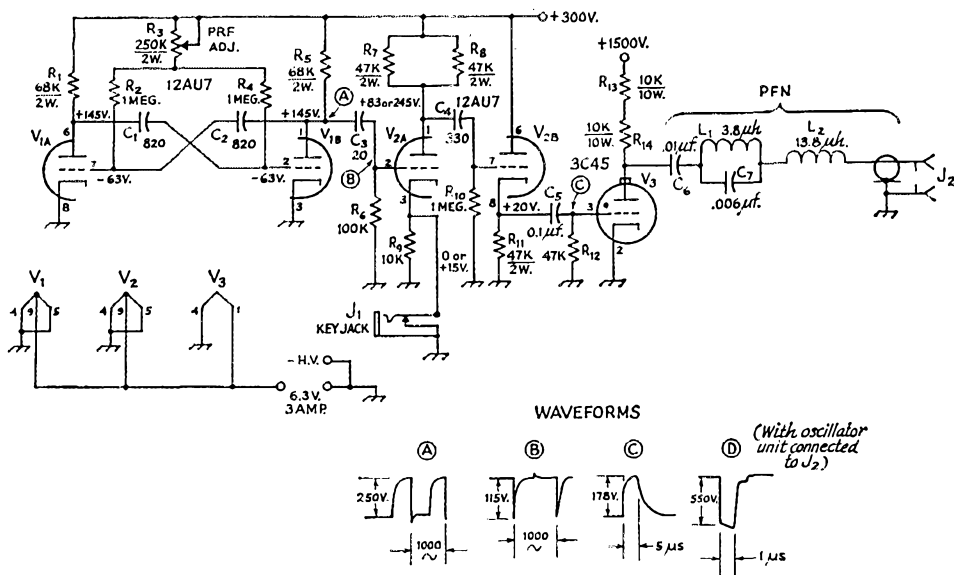


Fig. 2—Schematic diagram and parts information for the modulator. Values of parts are plus-or-minus 20 per cent, unless specified. Output from  $J_2$  goes to pulse transformer (mounted in r.f. unit to be described in subsequent article) shown in Fig. 4.

$C_1, C_3$ —820-pf., 600-volt, 5 per cent, silver mica.  
 $C_2$ —20-pf., 600-volt, 10 per cent ceramic.  
 $C_4$ —330-pf., 600-volt, 10 per cent mica.  
 $C_5$ —0.1- $\mu$ f., 400-volt paper.  
 $C_6$ —0.01- $\mu$ f., 2000-volt mica.  
 $C_7$ —0.006- $\mu$ f., 1500-volt mica.  
 $J_1$ —Closed-circuit jack.  
 $J_2$ —Coaxial receptacle, SO-239.  
 $L_1$ —3.8- $\mu$ h., 28 turns No. 24 enamel, close-wound on  $\frac{3}{8}$ -inch diam. form about 1 inch long.

$L_2$ —13.8- $\mu$ h., 54 turns No. 30 enamel, close-wound on form similar to  $L_1$ .  
 $R_1, R_6$ —68,000 ohms, 5 per cent, 2 watts.  
 $R_2, R_4, R_{10}$ —1 megohm, 5 per cent,  $\frac{1}{2}$  watt.  
 $R_3$ —250,000-ohm, 2-watt potentiometer.  
 $R_5$ —100,000 ohms,  $\frac{1}{2}$  watt.  
 $R_7, R_8, R_{11}$ —47,000 ohms, 2 watts.  
 $R_9$ —10,000 ohms,  $\frac{1}{2}$  watt.  
 $R_{12}$ —47,000 ohms,  $\frac{1}{2}$  watt.  
 $R_{13}, R_{14}$ —10,000 ohms, 10 watts.

becomes the positive trigger for firing the thyatron,  $V_3$ , after having been amplified by  $V_2$ . The operating conditions for  $V_2$  are arranged to suppress the undesired positive impulses appearing at the first grid.  $V_{2A}$  can be keyed in its cathode circuit. When the key is closed, the stage is a conventional pulse amplifier, and the negative impulses on the grid (point B) produce positive pulses at the plate. These are applied to the grid of the thyatron by  $V_{2B}$ , a cathode follower. When the key is open, sufficient self-bias is developed across  $R_9$  to prevent the pulses from triggering the thyatron.

The thyatron is the most important part of the pulse generator. It acts as a high-speed switch, closed by the trigger pulses whenever an output pulse is to be produced. The one-microsecond length of the actual output pulses of the modulator is determined by the pulse-forming network (p.f.n.) in the plate circuit of the thyatron. To create each output pulse,  $C_6$  is first charged to almost 1500 volts by the power supply, acting through resistors  $R_{13}$  and  $R_{14}$ ,  $L_1$ ,  $L_2$ , and the transmitter load resistance of 50 ohms (connected to  $J_2$ ). When the thyatron is fired, it becomes almost a short circuit from its plate to ground so that the energy stored in  $C_6$  of the p.f.n. begins to discharge through the load,

which is then effectively in series. The p.f.n. acts as a delay line in such a way that, one microsecond after the thyatron fires, it causes the voltage across the thyatron to be reduced to zero. When this happens, the thyatron becomes an open circuit again, and  $C_6$  begins recharging in preparation for the next pulse. The charging resistors  $R_{13}$  and  $R_{14}$  are large enough in value so as not to affect the action of the circuit when pulses are actually produced.

The pulse-forming network has a characteristic impedance of 50 ohms which, when working into a 50-ohm load, causes the output pulses to have an amplitude equal to approximately one half the power-supply voltage. This low impedance permits a coaxial cable, such as RG-8/U, to be used to conduct the pulses to a remotely-located oscillator. Since the energy of the pulses is concentrated in the frequency range below a few megacycles, a relatively-long cable can be used without introducing appreciable loss.

#### Modulator and Power Supply Layout

The modulator and its associated power supplies are constructed on a 10 × 12 × 3-inch aluminum chassis as illustrated in Fig. 1. The power-supply section requires no special layout or critical wiring technique, other than observing

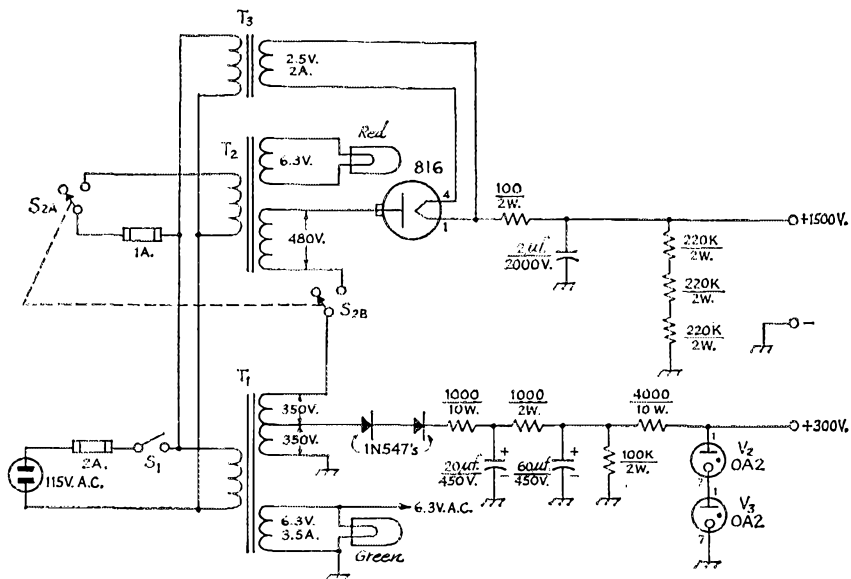


Fig. 3—Schematic diagram and parts information for the power-supply portion of the modulator. Components are not critical, and any supply capable of delivering 1500 volts at 10 ma. and 300 volts at 20 ma., and 6.3 volts at 3.5 amp., may be substituted. Capacitors with polarity shown are electrolytic.

S<sub>1</sub>—S.p.s.t. toggle switch.

S<sub>2</sub>—D.p.d.t. wafer switch.

T<sub>1</sub>—Thordarson 24R04-U or equiv.

T<sub>2</sub>—Thordarson 24R00-U or equiv. Do not use high-voltage center tap.

T<sub>3</sub>—Stancor P4082 or equiv.

insulation requirements in the high-voltage section. Transformers  $T_1$  and  $T_2$  are interconnected as a means of generating high voltage with readily obtainable components. Before wiring the transformer secondary high-voltage leads permanently into the circuit, check the phasing of the high-voltage windings to make sure they are aiding, not bucking. The modulator section is also not critical and the wiring technique one would use in a 160-meter transmitter is appropriate.

#### Winding the Pulse Transformer

The winding of the pulse transformer is similar to winding a heater transformer for 60-cycle operation. The differences are the type of core used and the amount of insulation needed between the windings. The core, specially fabricated for use in pulse circuits to minimize the high-frequency eddy-current losses, can be purchased from Arnold Engineering Co., Marengo, Illinois, or through one of their many sales offices. The full description of the core is Arnold 2-mil. Sillectron ("C" core, part No. AL-12, and it is listed for \$3.32. Data for winding the transformer and a cross-sectional view are shown in Fig. 4.

Since winding wire directly on the core initially is very impractical, a wooden mandrel should be made having the same cross-section dimensions as the core. After clamping the mandrel in a vise, cut a strip of cardboard approximately 0.025 inch thick (such as used in a tube carton), 1½ inches wide, and wrap it tightly around the mandrel. Overlap the ends ¼-inch and cement

the ends together. The cardboard form prevents the windings from collapsing when removing the coil from the mandrel. This permits easy insertion of the core. Before winding, precut 1½-inch wide strips of Teflon from 2-mil sheet stock. Wrap two layers of Teflon around the form, securing the ends with short strips of masking tape. Next, center a 2-inch long strip of masking tape, sticky side up, across the form and wind

(Continued on page 158)

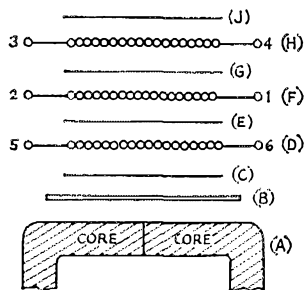


Fig. 4—Pulse transformer construction.

A—Core; Arnold Eng. Co. No. AL-12.

B—Cardboard form.

C—2 layers 2-mil Teflon sheet.

D—50 turns No. 26 enam.

E—4 layers 2-mil Teflon sheet.

F—20 turns No. 22 enam.

G—4 layers 2-mil Teflon sheet.

H—50 turns No. 26 enam.

J—4 layers 2-mil Teflon sheet, followed by 3 layers masking tape.

# • Technical Correspondence

## FILAMENT CHOKE

Eitel-McCullough, Inc.  
301 Industrial Way  
San Carlos, Calif.

Technical Editor, *QST*:

Correspondence has indicated that confusion exists concerning the filament choke, *RFC*'s, in Fig. 1, page 42, December 1962 *QST*, in the 3-1000Z article.

The choke has four coils, wound in two pairs, each pair bifilar wound. The complete assembly has two layers, each layer being a bifilar winding. Each coil is 25 turns of No. 12 enameled wire, and each bifilar winding therefore has a total of 50 turns, as it has two coils. Thus, you have a bifilar winding on the bottom layer, and a second bifilar winding on top of it.

The caption under Fig. 1 states (in error) that the wire is No. 10 enameled. It calls for 50 turns per winding (which is OK), but really doesn't clarify that each winding is two 25-turn coils.

— William J. Orr, W6SAI

## PICKARD'S OSCILLATING CRYSTAL DETECTOR

Research Laboratories  
General Motors Corp.  
Warren, Michigan

Technical Editor, *QST*:

In *QST* for November 1960, page 49, H. R. Hyder brings attention to G. W. Pickard's heterodyne reception using an oscillating crystal detector.<sup>1</sup> Mr. Hyder infers a mode of operation similar to that produced by tunnel diodes.

At the time of Mr. Hyder's letter, the much-publicized tunnel diode was known to be a two-terminal semiconductor device which exhibited the negative resistance characteristic needed for oscillations. However, a recent publication by M. Kikuchi<sup>2</sup> reports the discovery of oscillations from forward-biased point-contact silicon crystals. These oscillations have also been observed in the compound semiconductors CdSe and GaP. In addition, Cardona<sup>3</sup> has reported oscillations using forward-biased germanium. In light of these recent developments, a brief examination of solid-state oscillators is in order.

The average radio amateur has at least a rudimentary grasp of the concept that practical tuned circuits have a finite resistance. Energy put into the circuit is dissipated in this resistance. In order to overcome this loss it is necessary to supply energy to the circuit. When the energy supplied is equal to or greater than the energy consumed, continuous oscillation takes place. This energy is usually supplied by a device external to the tuned circuit. Since the external device supplies rather than consumes energy, it is said to have a negative resistance. This negative resistance is fundamental to oscillatory circuits.

In a negative resistance device the current decreases as the voltage increases. Most radio ama-

teurs have at least seen a graph of  $I$  vs.  $E$  for tunnel diodes. The fact that the tunnel diode has a region of negative resistance is obvious. Less obvious and undoubtedly not as well known is the negative resistance characteristic of the point-contact germanium diode. At some critical reverse-bias in the region of avalanche breakdown an ordinary diode, such as a 1N34, shows negative resistance. The current flow in breakdown is catastrophic, and unless the current is limited this negative resistance cannot be utilized. However, if there is some protection in the circuit to prevent destruction of the diode, oscillations can be produced.

Both of the aforementioned devices are used to overcome the loss in a tuned circuit. Kikuchi states that the  $I$ - $E$  characteristic of his higher-resistivity crystals apparently did not exhibit negative resistance. In addition, the oscillations take place without an external tuned circuit. The frequency is a function of the forward bias and crystal resistivity. The disparity between the need for negative resistance and the positive resistance of Kikuchi diodes is fictional rather than real. Since the lossy "tuned circuit" is integral with the diode junction, the d.c. current-voltage measurements may not be related to the process under consideration. At the frequency of oscillation the gain is at least equal to the loss, and negative resistance is implicit. Similar oscillations have been observed in gaseous plasmas excited by direct current.

On the basis of the original report, it is difficult to explain Pickard's oscillating crystal. There are at least these three possible mechanisms:

- 1) Negative resistance of a tunnel diode or diode in avalanche breakdown.
- 2)  $R$ - $C$  relaxation oscillations, or
- 3) Kikuchi diode oscillations.

It is an unfortunate accident of history that Pickard could not, or did not, carry his investigations further. The state of the art might have been advanced considerably.

No doubt it will be a long time before Kikuchi's point-contact oscillator becomes part of the radio amateur's equipment. Yet it will pay foresighted experimenters to consider this new realm of solid-state electronics. The elimination of the physical bulk of conventional  $L$ - $C$  elements in oscillators and amplifiers would produce the ultimate solid-state receiver or transmitter.

— Bernard W. Joseph, K8LIX

## GROUNDING POWER OUTLETS

P.O. Box 118  
Lewistown, Montana

Technical Editor, *QST*:

I note in the new 1962 *National Electrical Code* under par. 210-21(b) that receptacles installed on 15-ampere and 20-ampere branch circuits shall be of the grounding type (and grounded).

This is a step toward safety, and use of 3-wire cordage on all ham gear should be encouraged.

Perhaps we can get the TV manufacturers to use 3-wire cords, too, and so reduce a lot of ITV. Grounding the TV chassis does help in a lot of cases.

I presume that the installation of such receptacles is mandatory only in new construction.

— Wesley M. Bell, W7QB

<sup>1</sup> "Strays," *QST*, March, 1920.

<sup>2</sup> *Journal of Phys. Soc., Japan*, 17, 240, 1962.

<sup>3</sup> *Journal of Applied Physics*, 31, 1826, 1960.

# Grinding Surplus Hermetically-Sealed Crystals

## Simple Method of Altering Frequency

BY ROBERT C. WILSON,\* WSEIM

Hams have long been taking advantage of the low prices of off-frequency surplus crystals in removable-screw type holders by regrinding them to desired frequencies. Now, you can make use of those even cheaper hermetically-sealed types — without etching or messy "sludge" grinding.

THIS article concerns the changing or modification of frequency of type CR-1S/U hermetically-sealed crystals. Probably almost every amateur has come in contact with crystals of this type and has passed them up as worthless if they were not on frequencies he would like to use. Because of this fact, one often finds bins full of the CR-1S/U-type crystal in the surplus stores. They commonly have frequencies which, when multiplied or heterodyned, come out to some very reasonable value, but a ham owning a 13.3333-Mc. unit may be hard put to find a use for it.

In reality, there are very many uses to which these crystals can be put, particularly with modern circuitry. In my ham shack they have been used for direct frequency control of transmitters, heterodyne exciters, converters, crystal

\* 1212 South Sandusky, Tulsa 12, Oklahoma.

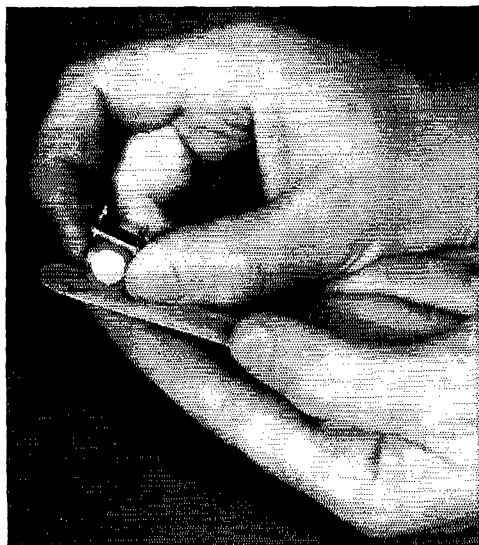


Fig. 1—To raise the frequency, grind a "flat" on the edge of the crystal with an emery board.

discriminators and lattice filters. The filter is a simple, rather than difficult, project using the following techniques. By moving the crystals a few kilocycles it might be possible to make use of that batch of off-frequency CR-1S/U crystals found in the dealer's bins.

### Removing the Cover

The first job one must always do before anything else is to remove the top part of the crystal can. This is accomplished quite easily by those of us who have gas stoves. One must grasp both pins of the crystal with either a pair of long-nose pliers, or better, an old set of gas pliers. Try to make sure that both leads are protected reasonably well by the pliers and that when heating the unit they will not get so hot as to melt the internal solder connections. Turn on the gas flame, or small propane torch, and hold the crystal downward at an angle of about 45 degrees from horizontal. Rotate the unit back and forth so that both sides get heated evenly. In a few seconds you will probably hear a slight putt — this is the seal blowing out. Because of the possibility of solder flying from the seal, it is best to wear glasses during this operation. However, in my experience the quantity of solder ejected is so small, and the range so short, that the danger is almost negligible.

Now that you are committed to opening the crystal, it will take only a few seconds more to complete the operation. Still turning the pliers back and forth, the top of the can will fall off. Immediately remove the opened crystal from the flame. There should be no damage to it unless you have been too timid in applying the flame. Naturally, you don't want to overdo it either. The best spot is directly at the top of the visible flame.

You are now holding a bare crystal which is both hot and fragile, so be careful. The quartz itself is quite different from most "plate-and-spring"-type crystals in that it is round rather than square. Now and then a square crystal turns up, or one with wire leads soldered in the center of the crystal plate. Both of these should be avoided like the plague because they very seldom make good conversions. If all goes well and you find yourself with a good type of crystal, not obviously broken, it is well to hold it up to the light and look for hairline cracks in the quartz. If you find any, discard the crystal. It wouldn't work anyway. But 99 times out of 100, you will find a good round crystal plate, quite smoothly finished, with a dot of silver or aluminum on either side. On opposite edges of the crystal



will be a small wire clip which holds the plate and, at the same time, makes contact with one of the metal dots.

### Raising the Frequency

Changing frequency is remarkably easy. To move the frequency up, it is necessary only to hold both sides of the crystal where the wires are attached and rub the edge of the crystal over a clean emery board, as shown in Fig. 1, grinding a "flat" on the edge of the crystal. It is best to take this process very slowly. Kilocycles can be removed with only one pass of the emery board on some crystals. After you get the feel, you can take it faster, but remember that all crystals don't change frequency at the same rate—even crystals of the same frequency and brand. (If you have a small transistor oscillator available, it may be possible to put the crystal in operation, then set the receiver, with b.f.o. on, for the required frequency and adjust the crystal while it is actually oscillating.) A 10- or 15-ke. change at 20 meters, with a 100-cycle final-calibration accuracy, is easily obtainable in this manner. Of course, one must be careful to take good care of the fragile crystal and not to hold it too tightly. Make sure that your hands are clean, and touch only the edges of the crystal.

### Lowering the Frequency

Suppose that you want to go the other way and shift down in frequency (perhaps you went too fast with grinding). Decreasing frequency is also easy, but it is not possible to shift so rapidly or so far. A change of only about 5 ke. seems to be possible without causing the crystal to stop oscillating. First, grasp the crystal as before, across the wire-attachment points, and rub on a small dot of pencil lead in the very center of the crystal over the top of the metallic coating, as shown in Fig. 2. Check the frequency to see how you are doing. If more change is required, put some pencil lead on the opposite side of the crystal. Keep changing sides so that you build up a more or less balanced amount on either side. If you go too far, simply turn the pencil around and use the eraser. The frequency will go back up. Try not to make your dot larger than  $\frac{1}{8}$ - to  $\frac{3}{16}$ -inch in diameter. When you gain confidence in your ability, you might want to try using a dot of solder, rather than graphite. You can do this by making a hairpin out of cold wire solder and rubbing with the loop end thus formed in the same way you did with the pencil. The results seem to be slightly more stable but, on the other hand, it is much harder to erase.

### Replacing the Cover

The final step, if you have been successful in the grinding, is replacing the cover. This is the most difficult part of the operation. First clean up the can cover by holding it in the flame and shaking off the surplus solder. If you want to be even neater, wipe the residue with a rag while the solder is still liquid. Now pick up the crystal assembly by its pins as before, using a second pair

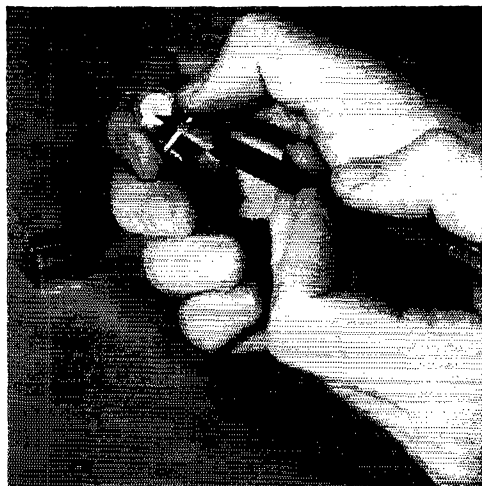


Fig. 2—Lowering frequency is accomplished by placing a small spot of pencil lead in the center of the plate.

of pliers. Hold the crystal and the cover together in the flame, turning them as much as possible to allow equal heating on both sides, and push the two together. There will be enough solder left on the base to seal the parts together. Take care not to expose the quartz to the direct flame at any time. Remove from the flame, and hold both units until the solder is hard. If the rough solder bothers you, the completed unit may be reheated to soften the solder and a rag may be used to wipe the joint to a smooth finish. This is difficult to do and adds only aesthetic appeal. The final step is to put a drop of solder over the seal hole and buff up the slightly tarnished case with fine steel wool.

A faster but more hazardous method of rejoining the case and crystal is possible. Both parts are held in pliers, as before, but only the crystal can be heated. This must be brought to a temperature somewhat past the melting point of the solder. Then the hot cover is quickly jammed onto the cool base. This calls for steady hands, an accurate eye, and controlled speed.

### A Case in Point

I received a number of surplus crystals through MARS which could not possibly be put on any amateur band. Moreover, they were all of the same frequency. With about two hours work, six of these were modified suitably for a crystal-lattice filter with 4-ke. bandwidth, and the accompanying sideband-selection crystals were made from the same lot. The whole filter compares very favorably with a \$35 commercial job.

QST

### Strays

W2SJD reminds us of a scheme for sending left-handed with a bug. Simply reverse the leads to an electronic key, and it becomes very natural to send with the left hand without any relearning being necessary.

# DX, Where is Thy Choice Location?

Or, Do the W6's Really Work All the DX?

BY NED CULLER,\* W3JW

IN the quiet of a long winter night, when DX is nil and conditions seem to be generally punk, you begin to wonder a bit about your location, especially when you can hear W1FH calling EP5X and W6AM working VU2XG — and you can't even hear those stations. So you say to yourself, "Boy, if I were only a W1, or, better yet, a W6 in sunny California, I'd sure make a name for myself in DXCC." And then you begin to wonder how you can sell this idea to the wife.

Then comes December *QST*, with its annual listing of all the active DXCC members, and in order to decide which way to move, you begin counting hams, stations, DXCC members, countries worked vs. call areas, etc., and pretty soon you come up with some interesting figures.

First of all, I found out from ARRL Hq., that as of the December, 1962, *QST* listing there had been a total of 8755 DXCC certificates issued. However, the December listing shows only about 3908 of these stations, these being the active ones who have reported additions to their country total during the previous 24 months. I decided that in order to avoid confusion and duplication, I would examine only the regular DXCC membership, not the phone-only figures, and it turns out that there are some 1818 of these.

I figured out the number of hams in the various call areas by making a rough count of a recent edition of the *Radio Amateur Call Book Magazine*. I did this by getting a typical figure for the number of calls per column of type, and then multiplying by the number of columns for the call area. This is probably sufficiently accurate for our survey, and it agrees quite closely with data published in the February issue of *QST*.<sup>1</sup>

\* 286 Wills Road, Connellsville, Pa.

<sup>1</sup> February, 1963, *QST*, p. 52, Griffin, "A Survey of Communications Practice on Our High-Frequency Bands."

Tabulating our various accumulated figures, we come up with the following Table I.

U. S. Call Area	No. of Amateurs	% of U. S. Total	No. of active DXCC members	% of amateurs in district who are DXCC members
1	18,015	7.4	199	1.099
2	34,575	13.8	278	.803
3	18,831	7.7	141	.750
4	31,980	13.0	251	.785
5	23,166	9.3	141	.609
6	32,856	13.4	228	.694
7	16,734	6.9	93	.556
8	24,120	9.8	168	.696
9	23,874	9.8	199	.833
0	22,161	8.9	120	.541
Totals	246,312		1,818	

As we examine this table, we come to the conclusion that in the United States the best place for DX work is New England, because a higher percentage of W1s make DXCC than in any other district. What is surprising is that of those W6s we hear so much about, only .694% of them make DXCC, which is not only substantially lower than W1 but also lower than five of the other call areas. Notice how tough it is in W7 and W0 — we've always heard that it is rough in the northwestern part of the country, and this proves it. You'll note that nearly twice as great a percentage of W1s make DXCC as do W0s.

But don't be discouraged, you W0s — Table II shows that despite the difficulties of making

Country Total	Call Areas									
	1	2	3	4	5	6	7	8	9	0
Honor Roll	5	8	4	3	3	4	3	11	5	4
250-311	36	66	29	47	30	66	17	23	34	21
200-249	43	49	23	60	24	34	15	26	36	22
150-199	35	47	25	48	19	41	19	40	48	27
100-149	80	108	60	93	65	83	39	68	76	46
	199	278	141	251	141	228	93	168	199	120

**TABLE III**

VE	No. of Amateurs	% of VE Total	No. of active DXCC members	% of amateurs in district who are DXCC members
1	911	9.1	10	1.09
2	1771	16.4	12	.677
3	3925	38.7	34	.866
4	515	5.2	5	.971
5	517	5.2	4	.773
6	867	8.6	4	.461
7	1462	14.4	10	.683
8	227	2.3	2	.881
Totals	10,195		81	

**TABLE IV**

Active VE DXCC Members By Call Area and Number of Countries Worked

Country Total	Call Areas							
	1	2	3	4	5	6	7	8
Honor Roll	—	—	—	—	—	—	—	—
250-311	1	3	5	1	—	—	—	—
200-149	1	4	6	1	2	1	2	—
150-199	2	2	8	—	2	1	2	—
100-149	6	3	15	3	—	2	4	2
	10	12	34	5	4	4	10	2

DXCC from 0-land, four W0s are on the Honor Roll, as contrasted to five W1s. Your top W0s are way ahead percentage-wise!

**In Canada**

We have heard a few wails from our Canadian friends about the difficulty of making DXCC, the competition from the Ws, etc. But take a look at Tables III and IV. These show that the percentage of VE hams making DXCC runs just about the same in the various VE call areas as it does for the W hams in their call areas, except that it appears a bit rough for the VE6s. However, we are dealing with such a small number of hams and DXCC members in this instance that

the percentage comparison is really not sound — one more VE6 DXCC member would make quite a change in the percentage.

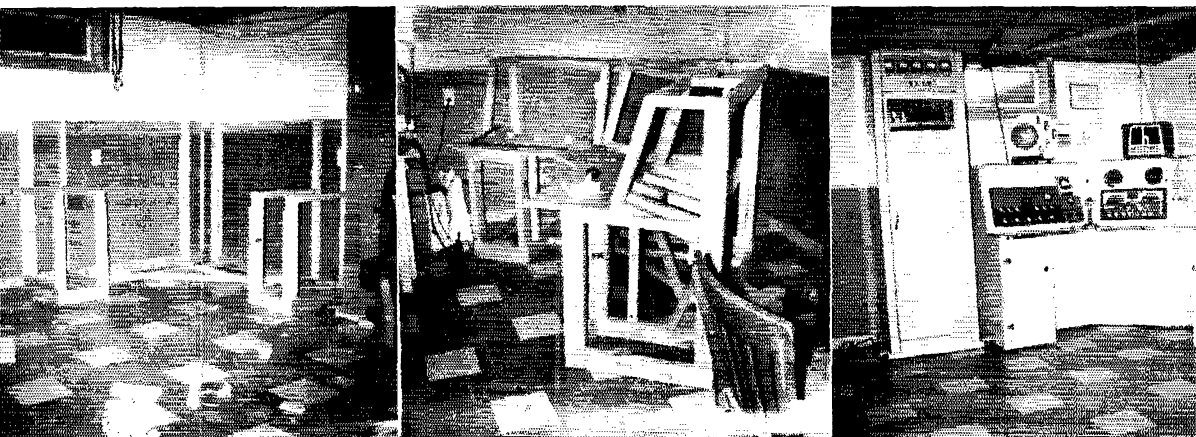
**Why?**

Now perhaps some other ambitious individual will sit down with the countries list and these figures and come up with some reasons why it is that so many more W1s make DXCC, for instance, than W7s. Is it because W1s have a better location? If so, then why is the percentage of W7s and W0s on the Honor Roll just as good as the W1s?

Anyway, now that I have discovered that the W6s do *not* work all the DX, I have decided to lower my s.w.r., polish my beam, and stay right here!

**QST**

**Strays**



KØDPD built himself a console for his operating position, and how he went at it is pretty well depicted in these three photos. He built a strong framework, carefully braced, to fit the available space. Sturdy shelves were incorporated, to hold the gear at a convenient angle. Plenty of storage space was included underneath the counter. Finally, plywood covered the framework, and a smooth writing surface was applied to the counter, together with decorative trim. And everything fits neatly. (But how do these fellows do it? Everytime we build something, there's sawdust and scraps all over the place!)

# Checking Signal Quality With the Receiver

BY GEORGE GRAMMER,\* W1DF

*No oscilloscope, audio generator, v.t.v.m., or whatnot? No handicap, either, and no excuse for having a poor signal. You can find out what you need to know about your transmitter's output without any of these things, useful as they are.*

AMATEUR c.w. and phone transmitters generate signals that are intended to be *listened* to at the receiving end. The quality of the signal is judged by what the receiving operator *hears*. (Discounting the S-meter reading, of course!) This being the case, there is no better "ultimate" instrument than a good receiver for checking a transmitter. Practically every amateur, therefore, has the means right at hand for finding out whether his transmissions will stand close inspection.

Lack of fancy test equipment is no excuse for putting out a poor signal. Oscilloscopes and meter-type indicators are invaluable while making adjustments and in routine monitoring, if what they present visually is properly interpreted. But the answers they give are, at best, indirect and somewhat inconclusive; they cannot show the actual frequency band occupied by a signal, for example.

What to listen for, in using a receiver for transmitter checking, has been covered in an earlier article.<sup>1</sup> How to go about doing it when the transmitter and receiver are in close proximity is another matter. The receiver, like any other device used for measurement, is quite capable of giving false results when not handled properly.

The problem can be stated in simple terms: The transmitter's signal must be reduced in strength to a level well within the receiver's normal signal-handling capability. But transmitter testing has meaning only when the transmitter can deliver its full output, while FCC regulations forbid the extensive one-way transmissions you have to make in finding out what, if anything, is wrong. So testing on the regular antenna is "out." The use of a dummy antenna is mandatory.

## Dummy Antennas

At one time a good dummy antenna that would handle some power was mostly something to dream about. However, in recent years several solutions have been offered. There are low-cost commercial dummies available, including kits, for practically any legal amateur power level.

\* Technical Editor, *QST*.

<sup>1</sup> Grammer, "Looking at Phone Signals," *QST*, December, 1962.

There are also rod-shaped ceramic resistors (Global type CX) in values equaling transmission-line impedances, essentially nonreactive, and capable of dissipating up to 100 watts.<sup>2</sup> Methods for using ordinary resistors also have been devised, at least for powers up to 100 watts or so.<sup>3</sup> Any ham who can afford a transmitter can afford a dummy antenna to go with it — and he should have one.

It is a mistake to assume that to be useful for transmitter testing a dummy antenna has to have some specified ideal characteristics, such as a pure resistance of 52 ohms over a wide frequency range. Such a dummy is convenient to use and will let you measure your actual power output, with the help of an r.f. ammeter. But this isn't at all necessary. The principal thing is that the dummy should be capable of dissipating whatever power the transmitter puts out, and should be reasonably stable in operation. That is, its resistance should not change to any significant extent with heating. It is for this reason that incandescent lamps are not suitable; the lamp resistance depends too much on the current in the filament. This is not a serious handicap in rough adjustment of a transmitter, but it is a distinct disadvantage when modulation, especially s.s.b., is being checked, and can lead to erroneous observations.

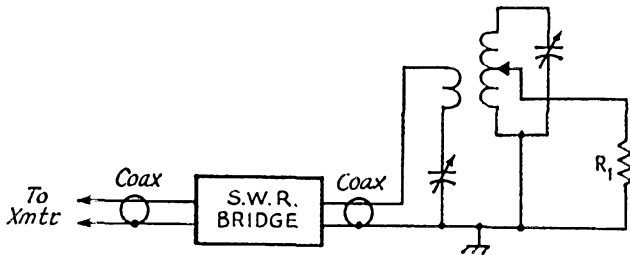
Noninductive wire-wound resistors are available in the 10-watt size (Sprague 457E) at reasonable cost, and although not completely free from reactance at amateur frequencies, this causes no difficulties when an exact value of "pure" resistance is not required. They can be wired in various combinations of parallel and series to come out in the neighborhood of 50 to 75 ohms, and need no special treatment — other than keeping connecting leads short — if your transmitter's final stage has adjustable loading. If it doesn't, any practicable combination of such resistors can be made to look like a pure resistance of the desired value by the method shown in Fig. 1. The s.w.r. indicator shows when the resistance is transformed to the right value to match a transmission line. The common parallel-tuned matching circuit is shown in Fig. 1, but if you already have a transmatch using a different circuit it can be used just as readily. Whatever the circuit, the adjustments are made in the same way as when an actual transmission line or antenna is used in place of the dummy antenna,  $R_1$ .

Putting a dummy antenna together in this way makes economic sense only when it can be done

<sup>2</sup> Available through Workman TV, Inc., 309 Queen Anne Road, Teaneck, N. J.

<sup>3</sup> Tilton, "V.H.F. Dummy Loads," *QST*, March, 1960, Geiser, "Wide-Band Moderate-Power Dummy Loads," *QST*, December, 1958.

Fig. 1—A transmatch and dummy-load resistor,  $R_1$ , can be used to simulate a 50- or 75-ohm line for testing, even though the actual value of  $R_1$  differs widely from these figures. The resistance should be reasonably non-reactive, but doesn't have to be "pure." See text for discussion of resistors. LC constants for various bands are given in the Handbook and Antenna Book.



at a considerable saving as compared with buying a complete unit. It is probably not very attractive for continuous power levels above 50 to 100 watts. But bear in mind that a resistor combination capable of dissipating, say, 50 watts continuously will take at least 100 watts with c.w. keying and probably as much as 200 watts p.e.p. on s.s.b., because of the intermittent nature of the transmitter's output.

The tuned dummy-antenna arrangement can be used successfully even if no s.w.r. bridge is handy. It simply takes a bit more cut-and-try. Put the transmitter's controls at the settings normally used when working into an antenna, and then try different coil-tap positions and tuning adjustments in the transmatch until the transmitter loads normally with a minimum of readjustment of the transmitter's controls.

For higher power there are some expedients (which are also useful for low power). Heating elements from household appliances such as irons and toasters will dissipate quite a lot of power. These elements usually have a flat-strip resistance wound on mica cards. While they are far from noninductive, the inductance is not so high as to make them unusable. It may even be possible to use the appliance as is; the writer has had good results on all bands from 80 to 10 simply by clipping onto the plug terminals of an old-fashioned "no-pop-up" toaster and connecting it directly to the transmitter. The amplifier tank circuit, a pi network having the garden-variety LC constants, handled it just as well as it handled a perfectly-matched transmission line. Any such appliance is worth a try. One having a detachable line cord would appear to have the best chance of working, although it may even be possible to feed the r.f. through the cord in some cases.

### Test Setup

The complete test setup is shown in Fig. 2. An essential part of it is the "actuator" — the substitute for *you* in your regular capacity as talker on phone or key manipulator on c.w.

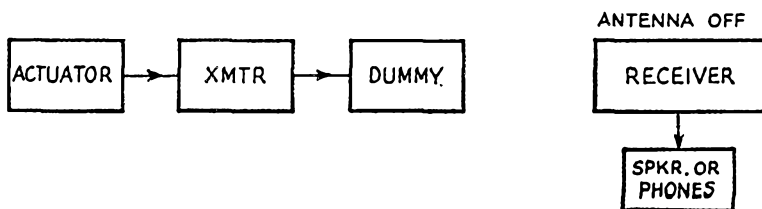


Fig. 2—Setup for using the station receiver for transmitting checking.

Actually, you don't need a substitute for c.w. testing since it isn't difficult to operate a key while tuning the receiver and listening. However, if you have an electronic keyer it can be set to make continuous dots, thus letting you have both hands free.

Phone is a different story. You can't talk and do a good job of listening to your signal at the same time. Neither can you hope to enlist someone else's voice for an extended period. What is needed is an untiring source of audio comparable with what you put into the microphone yourself. Also, if you want to use a speaker instead of headphones in your testing it must be a *silent* source. The ideal actuator is a tape recorder. If you have one, as many hams do, you obviously can record your own voice and do your testing under conditions as close as possible to actual operation on the air. Recorders usually have preamplifier or external speaker connections, or both, from which audio can be taken, and it requires no circuit diagram to feed one or the other of these outputs into the microphone jack on the transmitter.

There is one possible hitch—the output voltage level may be higher than is desirable for going into the microphone preamplifier. This can be handled, usually, by cutting down the gain in the recorder's amplifier so no stage ahead of the gain control in the transmitter's speech amplifier will be overloaded. If hum becomes bothersome when this is done, it can be overcome by using a simple external attenuator as shown in Fig. 3.  $R_1$  should be about 10 times  $R_2$ , and the sum of the two should equal whatever resistance the preamplifier output of the recorder is intended to work into, if the preamplifier output is used. As this resistance value is fairly high, shielded wire should be used for the connections, in order to avoid stray hum pickup. It may also be necessary to shield the resistors, which can easily be done by wrapping them with aluminum foil over a wrapping of paper for insulation, with the foil connected to the shields on the connecting wires.

If the audio is taken from the speaker output terminals, the total resistance may be of the

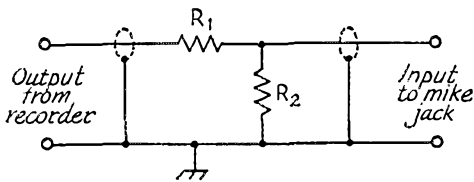


Fig. 3—Simple voltage divider for reducing audio voltage to a manageable level for the transmitter's speech amplifier. Ordinarily  $R_1$  will have about ten times the resistance of  $R_2$ . A variable control having the same over-all resistance can be substituted for the two resistors.

same order as the voice coil impedance, usually around 8 ohms. The value isn't critical, and as long as a low resistance is used, shielding shouldn't be necessary. Needless to say, the recorder's internal speaker should be shut off if you want to listen with a speaker on your receiver.

If you don't have a recorder there are still other possibilities. A phonograph is one; there are many 100-per-cent voice recordings that are suitable for the purpose. The output of a phono pickup is not generally usable directly, since a crystal or ceramic pickup ordinarily has too much to simulate a microphone and a magnetic has too little. Here again you can take the output from a preamplifier, using an attenuator as in Fig. 3 if necessary. The same type of attenuator can be used directly on a crystal pickup, with resistances totaling something of the order of 1 to 5 megohms. Shielding is a necessity with such high resistances.

Still another source of continuous talk, or very nearly so, is the a.m. broadcast band. Audio can be taken from the speaker voice-coil terminals in the b.c. receiver, but use caution with small power-line radios. Make sure that neither voice-coil terminal is tied to a "hot" a.c.-d.c. chassis before you try this method. The output-voltage problem is the same as with the recorder, and should be handled in the same way. One speaker lead will have to be disconnected from the speaker itself if you want "silent" audio. A transistor set is handy because of its portability and because it will have no hum. Even an old-fashioned crystal receiver can be used.

By one means or another, a suitable actuator can be rigged up at practically no cost. It would be hard to find a household without a radio, and not much less so to find one without a phonograph. Even the tape recorder is fast becoming a household item.

### The Receiver

A normally-shielded transmitter working into a dummy antenna, even if the dummy is not shielded, should not radiate more signal than can be handled by the receiver. No doubt it will be necessary to disconnect the receiving antenna; after all, the "spray" from the transmitter will still be rather strong within a few feet of the set. Here a great deal depends on the over-all shielding, both transmitter and receiver, so it is possible to talk only in general terms. Reread what was

said in the earlier article<sup>1</sup> about setting the receiver's controls. You should aim to get the signal pickup down to the point where you can use about the same gain settings on your own signal as you did on distant signals when the receiving antenna was connected. If the receiver, transmitter and dummy antenna are really well shielded, it may be necessary to use a few inches of wire as a receiving antenna in order to get the needed signal strength. If the signal is too strong, try running the antenna trimmer off tune, and if that doesn't do it, try pulling out the r.f. amplifier tube in the receiver — anything that will let you get a moderately-strong signal with the gain settings you found optimum for listening to incoming signals.

One further point needs consideration in using the receiver for monitoring. In c.w. and s.s.b. testing (and to a lesser extent with controlled-carrier a.m.) the load that the transmitter puts on the power line varies with the modulation. This may cause the line voltage to fluctuate, possibly with adverse effects on the receiver's stability. To settle this question, use the receiver normally — i.e., with the antenna connected and an incoming signal tuned in. Pick a frequency sufficiently far from your transmitting test frequency so there is no interference from it.<sup>4</sup> Let the transmitter operate into the dummy antenna and watch carefully for any change in beat note in the incoming carrier, or shift in naturalness on s.s.b., while your transmitter is being modulated. If the receiver stands this test, you're ready to go. If it doesn't, there is no simple alternative but to try to find an a.c. outlet for the receiver that won't show such large voltage changes. While instability of this sort won't have an appreciable effect on the bandwidth of the transmitter, as measured by the receiver, it can be misleading if you are listening for carrier frequency shift or keying chirps. If there is no way to avoid it you have to discount transmitter stability checks to some degree.

Once you're sure you've eliminated any possibility of receiver overloading and instability, examine your transmitter's signal carefully. Using the highest available selectivity, check the bandwidth as described in the earlier article, and listen particularly for spurious "burps" outside the channel that the signal should occupy legitimately. As you can readily vary the audio gain in the transmitter while listening, it is no problem at all to find the level at which spurious sidebands start to become noticeable. In turn, this level can be observed on the transmitter's meters. Their readings may surprise you in comparison with what you've been seeing in your ordinary operating. But after a test such as this they will take on some real significance, where before you had been working in the dark.

To have the most meaning, the actuating signal should be your own voice, which is why a

<sup>4</sup> If connecting the antenna to the receiver causes feedback troubles, the transmitter can temporarily be put on a different band, preferably higher in frequency, while the receiver is being checked in this way.

(Continued on page 142)

# The Chartreuse Panels

BY JOHN G. TROSTER,\* W6ISQ

W6FB from W6ISQ. OK, Fred. Thanks for the report and all that. You've got a nice signal in here. Good S9, nice quality.

"Well, Fred, the rig here is a Scandahoovian Pulverizer FD-7A driving the Potowatamee Paralyzer Model 3B. Just got the Paralyzer yesterday. Traded off an old Annihilator 17-K7Q for it. Of course, one big reason for the swap was that I finally got the entire layout here in matching cabinets — three-tone chartreuse, semi-crackle, super-gloss finish. Looks real keen with the red knobs.

"Aaaaaaand, the receiver's an old model Super Snooper 497-3C with the panadaptor. That's the one with the 8-inch scope. But Fred, I'll tell ya, with the sun spots doing tricks like they are, I suppose I oughta up-grade the receiver a bit. Trouble is, the panel color on this one is such a perfect match for the transmitter cabinets now that I got the new Paralyzer . . . well, quite a problem . . .

"Then, let's see. Oh yeah, the antenna's a new rotary Bangem-Slamem log periodic, stacked. Covers 1.8-144 megs . . . I guess. So what are ya using down there, Fred? W6FB-W6ISQ."

"W6ISQ this is W6FB. Fine. Very nice equipment. You must do OK. Well, the gear here is all homebrew. The exciter's an all-band 150-watt affair — it sits on the table. And the all-band final with its power supplies are in a cabinet off to one side. Both units homebrew, as I said. The receiver also is homebrew and I try to keep it pretty well up to date with the latest gadgets — kinda fun that way. Yes, I have a homebrew panadaptor, too. And the antenna is a full-size three-element affair — homebrew also. And how is the weather up there? W6ISQ-W6FB."

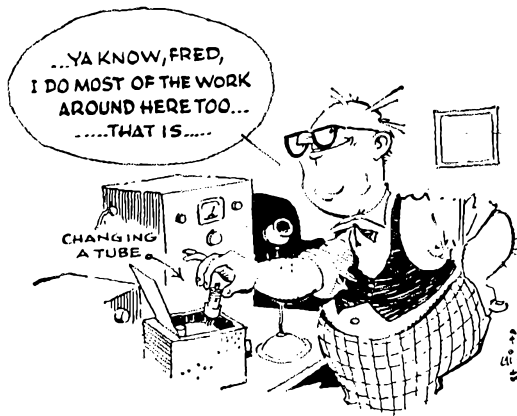
"W6FB from W6ISQ. Very fine, Fred. Well, I'd say that Homebrew outfit is pretty good from the sound of your signal up here. Funny, I've never seen their advertisements in *QST*. Boy, if all that Homebrew line is as good as yours sounds up here, I can't understand why those people at *QST* won't accept their advertisements. As a matter of fact, I don't think I ever even saw that Homebrew line of equipment advertised anywhere. Or, for that matter, I never saw it on display at any of the stores either. Usually takes a little longer for some of that new stuff to get clear out here to the west coast. I'll keep on the lookout for it though. Sure is unusual to find an outfit who makes receivers and transmitters and antennas. Where did you say you bought that Homebrew gear — back east somewhere? W6FB-W6ISQ."

"W6ISQ-W6FB. No, no. I mean homebrew is home made. I built all the equipment myself — didn't buy it — made it. ISQ-FB."

"You what?"

"I said I made the equipment I'm using."

"W6FB from W6ISQ. You mean you put to-



gether all them tubes and resistors and . . . ahhh . . . the other pieces inside the box all yourself . . .?"

"Sure, lots of fun. Always make my own stuff."

"Oh, you mean you make them kits like I read about?"

"W6ISQ this is W6FB. No, I didn't use kits. I just designed the various units, then bought the parts — or dug 'em out of the junk box — and then put 'em together. Lotsa fun. W6ISQ-W6FB."

"FB-ISQ. Ya mean to tell me ya figured out where to put all . . . I thought only the factory . . . well, I suppose after ya get that diagram there's nothin' much to it . . . condenser here . . . resistor there . . . little glue . . . coupla wires around and about . . . screw in the tubes, and, boooooommmmm . . . I mean, dar de dar de dar de dar . . . good little job for Sunday afternoon.

"Well ya know, Fred, I do most of the work around here too — that is, what I have time to do. Awful busy ya know, with, ahhhh . . . antenna tuner . . . coax fittings . . . lamps . . . antenna insulators . . .

"Ya know, Fred, it's just too bad these days that the new ops aren't getting any of the old experience like us — ahh — building our own — ahh — well, all that sort of thing, you know! Why, Fred, I'd go even so far as to say that everybody ought to have to build something! Fellas these days take the ham exam then stop off at the store on the way home and buy up everything in sight. Fred, I'd say the FCC

(Continued on page 142)

Those of you who have enjoyed W6ISQ's regular contributions to *QST* can send a bit of cheer his way by mailing some get-well cards to Jack Troster, W6ISQ, 45 Laurel St., Atherton, Calif. He suffered a coronary attack on January 3, but we hope that by the time you read this he will have left the hospital and will be recuperating at home.

\*45 Laurel Street, Atherton, Calif.

# Transistor High-Frequency Converters

## Crystal-Controlled Units for the 7- through 50-Mc. Bands

BY B. E. HARRIS,\* W6ANU/4

THE crystal-controlled converters to be discussed here were designed primarily to feed the 2- to 4-Mc. i.f. tuner described in a previous article.<sup>1</sup> However, one or more of them may be used to feed other tunable i.f. systems, such as a communications receiver covering the 80-meter band or, by suitable choice of crystal frequency and mixer-output tuning, a car broadcast receiver.

Separate converters for each band are much more practical as the front end of a multiband communications receiver when transistors are used than in the case of tube converters, since they require little space and there are no filaments to produce heat or require warm-up after switching. Except for those in v.h.f. converters the transistors used are less expensive than vacuum tubes. The converter units described here are assembled on bases of uniform dimensions with plug-in connections. This makes it relatively easy to change frequency coverage for reception outside the amateur bands should this become desirable at any time.

### Circuit

The basic circuit used in all converters is shown in Fig. 1. Except for component values, all of the converters can be about the same, and the discussion to follow should be understood to

\* Chief Engineer, Polaris Project Office, Patrick AFB, Fla.  
<sup>1</sup> Harris, "A Tunable I.F., Amplifier Using Transistors," *QST*, December, 1962.

Harris, "Selective Transistor I.F. Strip and Dual Detector System," *QST*, January, 1963.

Harris, "A Transistor Audio System with Squeal Control," *QST*, February, 1963.

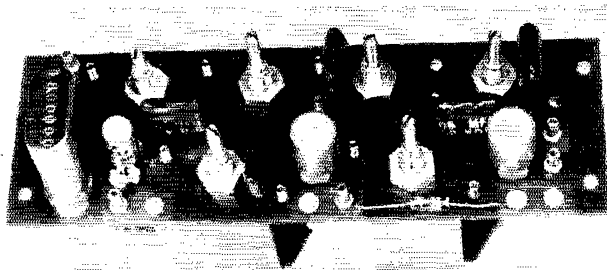
This is the last of a series of four articles<sup>1</sup> by the author describing units that may be combined to form a complete all-transistor communications receiver. However, the use of the high-frequency converters described here is not confined to this specific application.

apply to all unless specific mention is made otherwise.

The r.f. stage is operated in a common-emitter configuration. This is suitable up to 50 or 100 Mc., depending on the transistors used. Above 100 Mc., the common-base configuration has the advantage. In this series of converters, the highest frequency is 52 Mc., so the common-emitter configuration is used for all.

The input circuit of the r.f. stage is the most critical item in the converter. Transistors have a low input impedance, and power must be transferred in the input circuit. The loaded  $Q$  of the input circuit is therefore quite low compared to vacuum-tube amplifiers. This causes the input-circuit selectivity to be low, but this is not a particular disadvantage in a fixed-tuned converter. The  $L_1/L_2$  turns ratio determines the coupling to the base of  $Q_1$ , and this determines the loaded  $Q$  of the input circuit. The total number of turns on  $L_1$  should be from five to eight times the number of turns on  $L_2$ . Experimentation here is well worthwhile.  $L_2$  is interwound at the cold end of  $L_1$ . The antenna is tapped on  $L_1$  at about 10 to 15 per cent of the total number of turns up from the cold end. An alternate method for coupling to the base of  $Q_1$  would be to eliminate  $L_2$  and use another tapping point on  $L_1$ , selected to provide more than the required coupling. The coupling could then be adjusted to the proper value by a series capacitor between the tap and the base of  $Q_1$ .

A.g.c. to the r.f. amplifier is delayed by  $CR_1$ . Actually a.g.c. in this stage may not be required, depending upon the a.g.c. characteristics of the remainder of the system with which the converter



A typical h.f. converter subassembly (14 to 16 Mc.). Input jacks and r.f.-stage transistor are to the right, mixer transistor at the center, and the crystal and oscillator transistor to the left. The a.g.c. delay diode  $CR_1$  is below and to the left of the r.f.-stage transistor. The projecting screws are the 2-56s holding the coil shields in place on the under side.



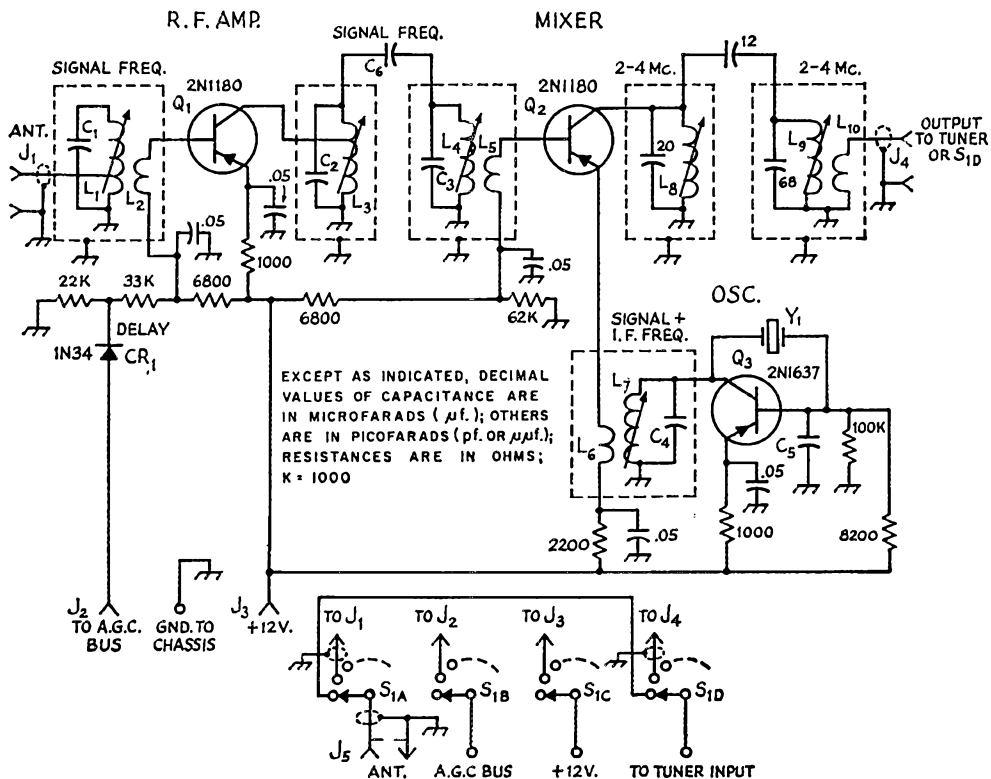


Fig. 1—High-frequency converter circuit. Resistances are in ohms and resistors are  $\frac{1}{4}$  watt. Fixed capacitors of decimal value are disk ceramic or mylar; others are mica or NPO ceramic. All jacks (and the plugs that mate with them) are single-circuit miniature, except  $J_5$  which is a phono jack. Other components not listed below are labeled for text-reference purposes.

- $C_1$ — $C_4$ , inc.—See table.
- $C_5$ —See text.
- $C_6$ —0.8 to 6.8 pf. (Select value to give best bandpass and sensitivity).
- $L_1$ — $L_7$ , inc.—See table.
- $L_8, L_9$ —Approx. 50- $\mu$ h. ceramic iron-slug coil (CTC 2060-7).

- $L_{10}$ —10 turns No. 32 enam. at low-potential end of  $L_9$ .
- $S_1$ —Four-section four-pole ceramic rotary, one position for each converter as desired (CRL PA-302 index assembly, four type PA-31 wafers). Other converters are similarly connected to  $S_1$ .
- $Y_1$ —See Table.

is used. The a.g.c. action of the system described in a previous article is very flat without applying a.g.c. to the r.f. stage. The control is switched from one converter to another to avoid overloading the a.g.c. bus. Converter a.g.c. does not provide protection against overloading of the converter stages by strong adjacent-channel signals. This is because adjacent-channel signals are not within the i.f. filter passband and hence do not activate the a.g.c. No difficulty has yet been experienced with this kind of overloading, but the nearest amateur station is about a half mile away. Difficulty would undoubtedly be encountered from a station in the same block, even though the stages involved will handle a fairly strong signal. This is a basic limitation inherent in this kind of receiver design. It is not easily overcome either in vacuum-tube or transistor circuits because of the difficulties associated with constructing very narrow-bandpass tunable circuits.<sup>2</sup>

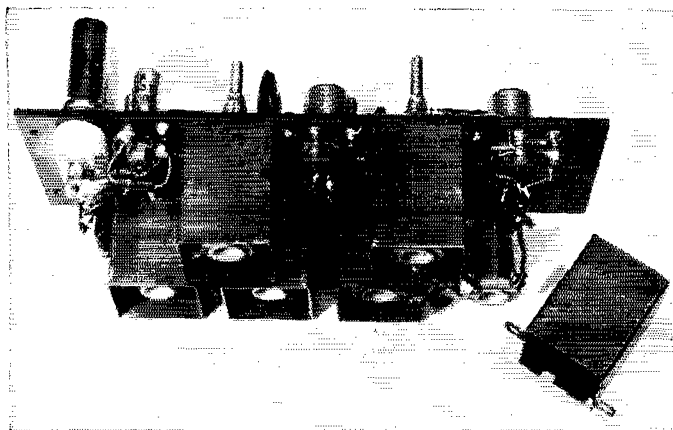
Coupling between the r.f. and mixer is by means of a capacitively-coupled bandpass filter. The collector of  $Q_1$  is shown tapped down on  $L_3$ , but this is not a necessity and is undesirable on

the higher-frequency ranges.  $L_5$  is interwound at the cold end of  $L_4$  in the same manner as described for  $L_1L_2$ . Considerations with regard to coupling are similar. The alternate method of coupling described for the r.f. stage can also be used for the mixer.

Bandpass coupling is used also in the output of the mixer. An alternate arrangement would be an emitter follower for impedance matching, and a low-pass filter to reduce image-frequency input to the tunable i.f. amplifier. This has not yet been tried, but it might prove easier to adjust than the arrangement shown in Fig. 1.

The oscillator circuit shown will work well with either fundamental or overtone crystals. The capacitor  $C_5$  serves to reduce the feedback by shunting part of the r.f. base current to ground. The value required depends primarily on the base-emitter capacitance and current gain of the particular transistor used, and secondarily on the activity of the crystal. A value of 180 pf. was found to be satisfactory in the 6- to 8-Mc. converter. Smaller values, or no capacitance at all, may be suitable at the higher frequencies where transistor gain falls off. Since the capacitor affects the shunt capacitance across the crystal, it can be used, within limits, to adjust the crystal fre-

<sup>2</sup> The subject of front-end overloading has recently been discussed in *QST*. See Andrade, "Recent Trends in Receiver Front-End Design," *QST*, June, 1962. — Editor.



Underside view of the 14- to 16-Mc. converter. The coil shields (one of which has been removed) are only  $\frac{3}{8}$ -inch square. The copper coating on the underside of the base plate is removed from the areas around ungrounded jacks and tie points.

quency to exact value. The oscillators of all the converters are operated on the high-frequency side of the signal. Integral megacycle values of crystal frequency are used to permit a single dial calibration to be used for all bands.

The transistor types shown in Fig. 1 for the typical converter are satisfactory for frequencies up to 20 or 25 Mc. The 2N384, 2N1177, and 2N1179 are good up to about 100 Mc. There are so many different transistors available that it is impractical to list all of the satisfactory types. The higher-frequency types also work well at the lower frequencies, but they cost somewhat more.

### Construction

For this application, the converters have all been assembled on identical bases of  $\frac{1}{8}$ -inch copper-coated phenolic board measuring  $4\frac{1}{4}$  by  $17\frac{1}{8}$  inches. Approximate coil dimensions and fixed-capacitor values are given in the table, and the photographs show the arrangement of components.

Preventing inductive coupling between the converter coils is important. The simple flat-plate shields often seen in converters are not very effective for this purpose unless the whole converter is enclosed in an over-all, fairly tight-fitting shield. In this construction each coil is shielded individually by a removable shield made of 0.020-inch copper sheet. These shields are homemade by bending a flat plate of copper around a  $\frac{5}{8}$ -inch square dural bar. The seam is filed to provide a tight joint and soldered. The resulting square cross-section tubing is cut to a length of  $1\frac{5}{8}$ -inch, leaving two small tabs which are bent outward and drilled for 2-56 round-head machine screws. The copper-coated phenolic board used for the converter subchassis is drilled and tapped in the appropriate places for mounting these shields around the coils. The shields are very effective since they act as shorted turns.

### H.F. CONVERTER TUNED-CIRCUIT VALUES

Component		Band (Mc.)				
		6-8	14-16	20-22	28-30	50-52
L <sub>1</sub>	(turns)	32 $\frac{1}{4}$	26 $\frac{1}{4}$	19 $\frac{1}{4}$	15 $\frac{1}{4}$	8 $\frac{1}{4}$
	(tap)	5 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	2 $\frac{3}{4}$	1 $\frac{3}{4}$
L <sub>2</sub>	(turns)	5 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	3 $\frac{3}{4}$	2 $\frac{3}{4}$
L <sub>3</sub>	(turns)	32 $\frac{1}{4}$	22 $\frac{1}{4}$	19 $\frac{1}{4}$	13 $\frac{1}{4}$	9 $\frac{1}{4}$
	(tap)	20	15	None	None	None
L <sub>4</sub>	(turns)	32 $\frac{1}{4}$	22 $\frac{1}{4}$	19 $\frac{1}{4}$	15 $\frac{1}{4}$	9 $\frac{1}{4}$
L <sub>5</sub>	(turns)	5 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{4}$	1 $\frac{1}{4}$
L <sub>6</sub>	(turns)	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{1}{4}$	$\frac{3}{4}$	$\frac{3}{4}$ **
L <sub>7</sub>	(turns)	32 $\frac{1}{4}$	22 $\frac{1}{4}$	19 $\frac{1}{4}$	12 $\frac{1}{4}$	8 $\frac{3}{4}$ *
C <sub>1</sub>	(pf.)	100	39	27	20	24
C <sub>2</sub>	(pf.)	120	56	39	30	15
C <sub>3</sub>	(pf.)	100	50	30	24	12
C <sub>4</sub>	(pf.)	62	39	24	27	10
f <sub>1</sub>	(Mc.)	10	18	24	32	54

All coils are wound to a length of  $\frac{1}{2}$ -inch on  $\frac{1}{4}$ -inch slug-tuned forms with No. 28 enameled wire except those in the first column (6-8 Mc.) which are wound with No. 32, and \* which is wound to a length of  $\frac{3}{8}$ -inch.

Coils in the first two columns (6-8 and 14-16 Mc.) are wound on CTC PLS6-2C4L/E forms, those in the third and fourth columns on PLS6-2C4L/O forms, and those in the last column (50-52 Mc.) on PLS6-2C4L/D forms.

L<sub>2</sub>, L<sub>5</sub>, and L<sub>6</sub> are interwound at the low-potential ends of L<sub>1</sub>, L<sub>4</sub>, and L<sub>7</sub>, respectively, except \*\* which is spaced  $\frac{1}{8}$ -inch. Taps are in respect to ground or low-potential end of winding.

### Adjustment

The r.f. stage should be biased to one or two milliamperes of collector current. The mixer should draw from 0.5 to 1 ma. The bias-network resistance values shown in Fig. 1 are typical, but they are not critical so long as the ratios result in the proper collector current. The values should not be much higher than those shown to avoid leakage difficulties with increasing temperature.

Oscillator injection to the mixer should be in the range of 150 to 300 millivolts as measured at the emitter of Q<sub>2</sub>. This level is controlled by the number of turns on L<sub>5</sub>. With crystals of average activity, the number of turns on L<sub>6</sub> should be about 5 per cent of the number of turns on L<sub>7</sub>. In the higher-frequency converters, single-turn coils are used for L<sub>6</sub> and the coupling is adjusted by varying the spacing between L<sub>6</sub> and L<sub>7</sub>.

While a sweep generator and oscilloscope are desirable, satisfactory alignment can be accomplished without them. The oscillator frequency should be checked, since the tuning affects the frequency to some extent. As mentioned earlier, small frequency corrections can be made by choice of values for  $C_5$ . The input r.f. circuit is best peaked near the middle of the tuning range. This is a very broad-tuning circuit. The two band-pass couplers are then adjusted, both in the degree of coupling (by adjustment of the coupling-capacitor values) and in tuning, for the most uniform atmospheric (or noise-generator) noise level across the tuning range consistent with reasonable sensitivity.

### Converter Switching

Fig. 1 includes a system for switching any one of several h.f. converters between the antenna and an i.f. tuner. In the first position, the antenna is connected directly to the tuner for 2- to 4-Mc. reception. In subsequent positions, h.f. converters are inserted and power and a.g.c. applied to the converter in use. In the author's receiver,  $S_1$  has 11 positions. In addition to the tuner position, 6 positions are reserved for internally-mounted converters. The remaining 4 positions are connected to jacks to which external converters for other ranges may be connected. In this case,  $S_{1C}$  may be used to actuate a 12-volt relay controlling power to an external converter if the 12-volt supply is not suitable for operating the converter directly.

Small-diameter shielded wire is used for the connections between the converters and the switch. All of the switched circuits are at low impedance, and there is very little tendency toward coupling 2- to 4-Mc. signals around the converters. Short jumper leads can be used to extend the switch leads so that the individual converter sections can be removed and tested outside the receiver chassis.

External u.h.f. converters may, of course, be fed into one of the internal converters, rather than directly into the tuner. Triple conversion is a necessity at frequencies of 200 Mc. and higher if satisfactory image rejection is to be obtained. A fifth section could be added to the band switch if it is desired to avoid manual connection of external converters so used.

### Receiver Performance

The receiver has not been tested extensively on other than the 2- to 4-Mc. range. On this range it compares most favorably with the best communications receivers. On the higher-frequency bands, limited comparative tests also indicate a favorable comparison. The stability is the same on all bands as it is on the 2- to 4-Mc. range. The noise figure has not been measured accurately, but comparative tests would indicate it to be about 6 db. on the higher-frequency bands. With the antenna disconnected, a few very weak "birdies" can be heard on the 6- to 8-Mc. and 14- to 16-Mc. ranges. These are difficult to spot because they are the result of beats between har-

monics of the tunable oscillator and the fundamental or harmonics of the crystal oscillators. They therefore go through the i.f. passband with a very small rotation of the dial. They cannot be heard above the average atmospheric noise when the antenna is connected.

### Errata

In an earlier article of this series the receiver panel height was given as 8 inches; the actual height is 7 inches, making the volume 560 inches, rather than 640 inches. The switch used by the author for control of the panel lamps in battery operation is a momentary-contact push-button unit. This was listed incorrectly as a toggle switch.

In response to several inquiries, the 2N641 transistor used in the 2-4-Mc. tuner has been removed from current listings. The 2N1180 is among several suitable substitutes. QST

In the discussion of the squelch system (page 39 of the February issue), it was stated that  $Q_5$  is reverse-biased when  $Q_4$  is off. This is incorrect.  $Q_5$  is reverse-biased when  $Q_4$  is on.



March, 1938

... For the receiver enthusiast there was dope on a feedback compensator for r.f. circuits, a double-regenerative superhet by Goodman, a new method of eliminating images in superhet receivers by Miles and McLaughlin, and a Hint & Kink on a t.r.f. stage for a 2-tube Handbook receiver.

... For the transmitter builder there was an exciter by Millen, a compact 500-watt transmitter by Ferrill, and dope by Frank Lester on a solution to the LC ratio problem in tank circuits.

... For the phone man there were constructional details on a home-built velocity microphone and a discussion of Class B modulator capabilities.

... In the antenna department was a continuously-rotatable 28-Mc. beam and a H & K on a universal antenna coupler.

... Alan Eurich described some of his experiences on the schooner *Yankee*.

... In "How's DX?" it was reported that W1FH would probably cease to be the perennial DX threat — he was about to be married! QST

### Strays

W3ETB has administered just two license tests — one fellow ended up as WA2UZT and the other as K3UZ1.

— — —

K4ZIQ, a bachelor, claims that children should be called "heterodynes," not "harmonics." If we're going to kid around, why not call them "images"?

# A Survey of Communications Practice on Our High-Frequency Bands

## Part II—Activity Patterns and Time Sharing

BY DANA A. GRIFFIN,\* W2AOE

This continues Dana Griffin's thought-provoking thesis on the current problems of congestion in the amateur bands. You, and we, may not agree completely with W2AOE's conclusions, but we can all agree that he has given us a new and interesting look at the perplexing problem of crowded bands.

CIVILIZED man is largely a creature of fixed habits. Except for a handful of night workers, man is geared to identical work, play, eating and sleeping habits the world over. In every one of earth's 24 time zones, the same activities at the same time of the day, as indicated by the clock on the wall, are indulged in by a vast majority of humanity.

These patterns are also tied to the calendar, which drastically changes the work-day activity pattern by eliminating the work period one or two days per week, thus making at least 8 hours extra

per day available for amateur radio station operation. This change in living and operating habits may take place on one day of the week and not necessarily on the same day, as in predominantly Mohammedan countries. In most countries possessing significant amateur populations, the "no work" pattern extends through Saturday and Sunday plus an occasional holiday.

A generalized curve of radio amateur activity under these two distinctly different behaviour patterns is shown in Fig. 2-A for week days and Fig. 2-B for Saturdays, Sundays and holidays. The 0 to 6 scale indicating the number of stations on the air every hour of the day is, of necessity, an arbitrary one. We have already seen the huge differences in time zone populations in Table I, Part I, February 1963 QST. See also Fig. 1, below.

In Fig. 2-A, the activity curve is confined to one time zone, and is applicable in many parts of the world. The week-end pattern of Fig. 2-B, for a single time zone, is extended by dotted line to include 4 time zones to illustrate the cumulative effects of operations in the four contiguous time zones in the United States in particular.

\* 139 Beekman Road, Summit, N. J.

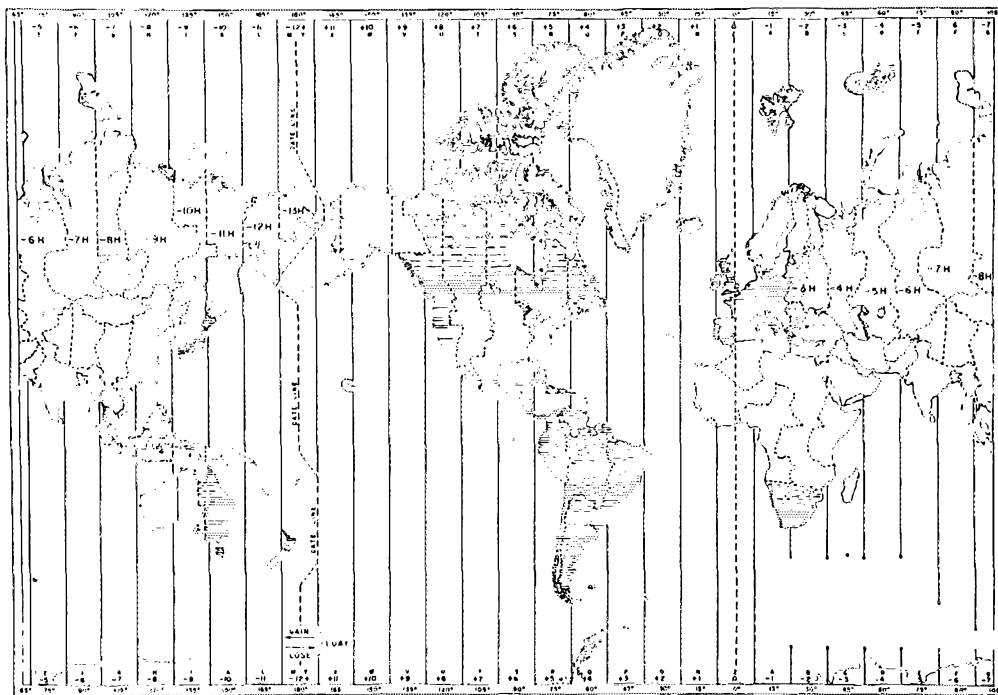
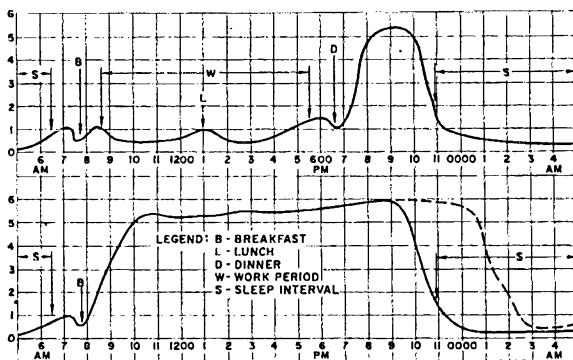


Fig. 1—This map shows in a general way the areas of maximum ham population throughout the world. See also Table I in Part I of this Survey, in last month's QST.

Fig. 2-A (Top)—Amateur activity in one time zone on typical work day covering 24 hours. The effects of eating, work, and sleep habits are shown. Fig. 2-B (Bottom)—Amateur activity in one time zone on typical non-work day. (Saturday, Sunday, national holiday). The dotted line extends the pattern over the 4 U.S. time zones.



Activity on a normal work day, during the evening hours, is shown in Fig. 3-A on the basis of the contribution by each of the four time zones. Fig. 3-B shows the integrated activity of the same four zones. From an examination of Fig. 3-B, it is quite apparent that the ocean barriers on both coasts reduce QRM levels well below those in the midwest.

The important point to consider is not the value of the algebraic sum of the transmitted energy developed by the amount of operating activity, since no one receives all of it. What is important is the fact that an intense eruption of electromagnetic radiation occurs every week day on our amateur bands in the United States starting at 7 P.M. Eastern Time and ending at 3 A.M., for a total period of eight hours.

If we consider our operating habits on a Saturday or Sunday, when the week day "work period" is available for operating, the situation changes drastically for the worse. The pattern of Fig. 2-B, extended over four time zones, shows intense activity for 13 hours out of 24 on Saturdays, Sundays and holidays. Small wonder it is almost impossible to work DX on week ends from the United States! When long skip conditions prevail on 20 meters, signals from the United States also seriously impair intercommunication between foreign countries during this 13-hour period. Every amateur overseas can attest to the truth of this statement.

Fig. 4 is the most interesting of all, particularly to the DX fanatic. Here, we see the activity pattern of the four time zones in the United States on week days, in relation to a single relatively-isolated time zone under two different

operational situations. The great majority of Australia's 4200 amateurs are in the Sydney time zone, which is otherwise uninhabited from pole to pole. The relative scale of activity in both our countries, at any time, is a percentage of the ratio of 250,000 United States operators to approximately 3000 Australians, so the amplitude of the curves is far out of line.

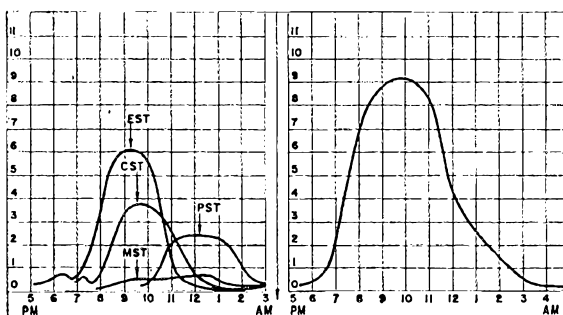
However, the curves clearly indicate that east coast and west coast amateurs have a far better chance of working Australia than the amateurs in the central and mountain time zones. They also clearly indicate that Friday in the United States is the best day in the week to try to work Australia, while Sunday in the United States is the worst day of all. Aussies are on their work-week schedule (Fig. 2-A) while we in the United States are on the extended version of Fig. 2-B on Sunday.

Quite obviously, by shifting the two types of patterns in phase (by time zone) we can use them to determine the best times to try to communicate between any two time zones on earth. Get busy, Jeeves — these dry statistics have a practical use in the hunt for rare DX after all!

— . . . —

This completes the survey. We have had a look at population and growth statistics which should give every amateur pause. We have found out where we live in reasonably important numbers. We have knowledge of our distribution by hemisphere and, far more important, our distribution by time zones. We have seen that the number of stations on the air in one time zone is determined largely by two fixed patterns of living habits. Lastly, due to the instantaneous

Fig. 3-A—Work day pattern of amateur activity in four U.S. time zones showing relative amount by zone and disposition in time. Fig. 3-B—Integrated pattern of Fig. 1-C illustrating comparative intensity over the 8-hour period of maximum activity (Monday through Friday.)



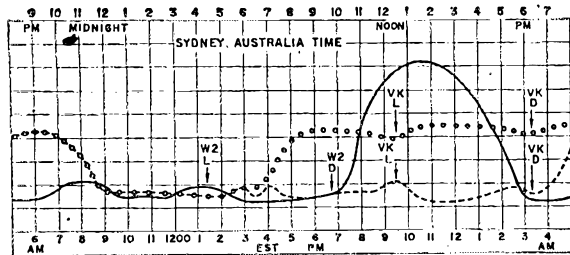


Fig. 4—A comparison of activity patterns of two areas widely separated geographically and phase/timewise.

Solid Line—Four U.S. time zones Monday through Friday.  
Dashed Line—Sydney, Australia, time zone on work day schedule.

Circles—Sydney, Saturday and Sunday activity patterns.

Note: The calendar must be taken into account in comparing activity distributions over such distances. When it is Friday in the U.S., it is Saturday in Sydney; Saturday in U.S./Sunday in Sydney; Sunday in U.S./Monday in Sydney. Fig. 2-B pattern must be superimposed on Fig. 2-E to show all four possible comparisons. Friday, U.S., provides best chance for VK contacts.

nature of radio communication, dozens of combinations occur when local QRM is at a minimum, and activity in far off places is at a maximum (best DX). These "best chances" to work DX are available to every amateur on earth, propagation conditions permitting.

What can we do to improve our lot, as we steadily increase in numbers, is the basic question. A reduction in our rate of growth and improvement of our operating habits will help. The elimination of a.m./d.s.b. transmission, as discussed in Part I, will vastly improve our phone-band communication capability.

If we refer to Fig. 2-A through 4 and also consider  $N/C = Q$ , it becomes quite apparent that the value of  $Q$  rises and falls in 24 discrete steps in two radically different work-day/week-end patterns around the world. It is also apparent that the value of  $Q$  in the United States far exceeds any value of  $Q$  that could be put on the air by stations in the two other major time zone groupings listed in Table I. The total amateur population of the Tokyo time zone plus two to the east is less than 25,000; in the European zone, it is 50,000. Therefore, the value of  $Q$  in the four United States time zones will exceed that of the Tokyo-based zones by a factor of 10, without considering the populations of Canada and the countries to the south of us. In the European grouping, the ratio drops to approximately 5 to 1.

The enormous disparity between the amateur population of the United States, which is twice that of the rest of the world, puts the onus on us to do something about the reduction of the value of  $Q$  on the bands most useful in international communication. At this point in the sun-spot cycle, the 20-meter band is by far the most useful, with 15 meters very spotty and 10 meters practically useless. The result is quite obvious to any

amateur anywhere in the world: the twenty-meter band is overloaded many times over.

If this situation merely annoyed our fellow amateurs overseas and we were willing to live with a declining capability to work DX on 20 meters as we grow in numbers, we should put up with the status quo. However, amateurs in the United States live in a large country spanning four time zones. Twenty meters, without question, is the most reliable band for medium- and long-distance communication within the confines of the continental United States. But if we are to enhance our capability to communicate amongst ourselves on twenty meters, we must reduce the value of  $Q$  in this country in our own self-interest.

The  $N/C = Q$  formula is as inexorable as Ohm's law, if the value of  $C$  is held constant. It follows, therefore, that we must resort to a time-sharing plan thus reducing the value of  $N$ , if we are to reduce the value of  $Q$  by any appreciable amount. Amateurs in the United States are literally faced with a situation popularly called a "trade off" in military and business circles. We can reject the concept of time-sharing and maintain our so-called "right" to operate any time of the day or night. If we do so the value of  $Q$  will rise steadily as we grow in numbers. Increasing numbers of us will observe "quiet hours" during our periods of maximum domestic activity, as thousands of us are doing already.

The alternate choice is to establish a *part-time*, time-sharing plan designed to reduce  $Q$  by a factor of 2, insofar as the United States QRM level is concerned. There is an added "bonus" on the 20-meter band which will effectively reduce  $Q$  beyond the level calculated for a specific value of  $N$ . This bonus will give every United States amateur a new type of opportunity to work DX on week ends. Father Time and the good old ionosphere are responsible for it.

To reduce  $Q$  by a factor of 2 or better, we must divide our population into two groups. Fortunately, this can be accomplished quite neatly. In Region #1 we put all 1st, 2nd, 3rd and 8th district amateurs, plus all 4th district stations in the eastern time zone; the total population is approximately 130,000. In Region #2, we put the W4s residing in the central time zone, plus all amateurs residing in the 5th, 6th, 7th, 9th and 0 districts, except those living in Hawaii, Alaska and other overseas locations; the population of Region #2 is approximately 120,000.

The part-time, time-sharing plan shown in Table III was set up for use on Saturdays, Sundays and national holidays only, with 20 meters specifically in mind. On these days, the value of  $Q$  is extremely large and it persists for 18 hours out of the 24.

As the legend in Table III indicates, alternate half-hour periods of silence would be imposed on both regions, followed by a half hour of "free-for-all" communication by both regions. The pattern then repeats itself, until  $Q$  falls to a reasonable level. Let us see how it will work in practice on 20 meters. Those in Region #1 should have worked their fill of available DX coming in

**TABLE III**

**TIME-SHARING PLAN FOR 20-METER PHONE IN THE CONTINENTAL U. S. A. ONLY  
FOR USE ON SATURDAYS, SUNDAYS AND NATIONAL HOLIDAYS  
(AUTOMATIC SHIFT TO DAYLIGHT TIME IN SEASON)**

	Region #1		Region #2				Legend: S — Silent Periods  T — Transmit Periods	Region #1		Region #2			
	EST	CST	MST	PST	EST	CST		MST	PST				
NOON EST	8:30 S	7:30 T	6:30 T	5:30 T	3:00 T	2:00 S	1:00 S	12:00 S	3:30	2:30	1:30	12:30	
	9:00	8:00	7:00	6:00	3:30 T	2:30 T	1:30 T	12:30 T	4:00	3:00	2:00	1:00	
	9:00 T	8:00 S	7:00 S	6:00 S	4:00 S	3:00 T	2:00 T	1:00 T	4:30	3:30	2:30	1:30	
	9:30	8:30	7:30	6:30	4:30 T	3:30 S	2:30 S	1:30 S	5:00	4:00	3:00	2:00	
	9:30 T	8:30 T	7:30 T	6:30 T	5:00 T	4:00 T	3:00 T	2:00 T	5:30	4:30	3:30	2:30	
	10:00	9:00	8:00	7:00	5:30 S	4:30 T	3:30 T	2:30 T	6:00	5:00	4:00	3:00	
	10:00 S	9:00 T	8:00 T	7:00 T	6:00 T	5:00 S	4:00 S	3:00 S	6:30	5:30	4:30	3:30	
	10:30	9:30	8:30	7:30	6:30 T	5:30 T	4:30 T	3:30 T	7:00	6:00	5:00	4:00	
	10:30 T	9:30 S	8:30 S	7:30 S	7:00 S	6:00 T	5:00 T	4:00 T	7:30	6:30	5:30	4:30	
	11:00	10:00	9:00	8:00	7:30 T	6:30 S	5:30 S	4:30 S	8:00	7:00	6:00	5:00	
	11:00 T	10:00 T	9:00 T	8:00 T	8:00 T	7:00 T	6:00 T	5:00 T	8:30	7:30	6:30	5:30	
	11:30	10:30	9:30	8:30	8:30 T	7:30 T	6:30 T	5:30 T	8:30	7:30	6:30	5:30	
NOON CST	12:00	11:00	10:00	9:00	8:30 S	7:30 T	6:30 T	5:30 T	9:00	8:00	7:00	6:00	
	12:00 T	11:00 S	10:00 S	9:00 S	9:00 T	8:00 T	7:00 T	6:00 T	9:30	8:30	7:30	6:30	
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	2:30 S	1:30 T	12:30 T	11:30 T	12:30	11:30	10:30	9:30	9:30 T	8:30 S	7:30 S	6:30 S	
	3:00	2:00	1:00	12:00	12:00	11:00	10:00	9:00	9:30 T	8:30 S	7:30 S	6:30 S	
	NOON MST												
	NOON PST												

from the east by 8:30 A.M. eastern time. The number of Region #2 inhabitants on the air prior to this time is negligible. Therefore, we start Region #1 on the first half-hour period of silence at 8:30 A.M. E.T. Won't this open brand new opportunities for DX contacts to the east, you long suffering residents of Region 2? Imagine -- no W1, W2, W3, W4 (EST) or W8 QRM to contend with for a whole half hour, when the band is best for QSOs eastward!

Next, Region #2 amateurs observe a half hour of silence giving Region #1 residents a crack at DX without interference from Region #2. By this time, an appreciable number of W6s and W7s are up and about, so we have a half hour "free-for-all" for long-distance intra-country QSOs.

The pattern then repeats until the last half hour of silence for Region #2, which will give the Region #1 gang a brand-new opportunity to work DX in a westerly direction without midwest or west coast interference. Each region will observe 9 quiet half hours throughout the day and have nine equally-long opportunities to work DX, the like of which we have not seen since the early 1930s when 20 meters was sparsely populated.

The time-sharing plan proposed above could be employed on 15 meters when activity on this band increases after we pass the dip in the current sunspot cycle, as skip-distance conditions are generally quite similar on both bands.

There is more bandwidth available on ten meters than there is on the five lower-frequency bands combined. Here, our main problem for

some time to come appears to be underpopulation rather than overpopulation. It is an ideal band for interference-free local QSOs at present. It is important to us all that it be kept intact as suggested in the August, 1962, QST editorial.

The characteristics of propagation on the 40- and 80-meter bands are such that communication in the daylight hours is confined to the continent on which the signals are generated, with a small percentage of intercontinental communication taking place over reflection paths in darkness, during the night. It follows, that any time-sharing plans for these bands should be confined to the evening hours and that the best plan may not be patterned after the plan proposed in Table III for 20 meters. Such plans should be investigated in the immediate future. As any U. S. phone operator using 75- or 40-meter phone can readily attest, the value of *N* is enormous on these bands at night.

The figures on world-wide population distributions listed in Table I indicate quite clearly that changes in the status quo are not needed in any foreign country. We, in the United States, are the only ones with an amateur overpopulation problem.

It is believed that this survey provides the first major compilation of data on amateur radio operating practice, together with the factors which enhance or degrade our ability to communicate with each other. It is hoped that the information will give every amateur a new

(Continued on page 160)

## COMING A.R.R.L. CONVENTIONS

- March 15-17 — Michigan State, Saginaw  
April 27-28 — New England Division, Swampscott, Mass.  
May 18 — Pacific Division, Fresno, California  
June 7-9 — West Gulf Division, McAllen, Texas  
June 30 and July 1 — Saskatchewan Province, Moose Jaw  
July 5-7 — \*  
July 6-7 — West Virginia State, Jackson's Mill  
Aug. 31-Sept. 1 — Atlantic Division, Washington, D. C.  
October 4-6 — ARRL National, Cleveland, Ohio  
October 11-13 — Southwestern Division, San Diego, Calif.  
October 26-27 — Midwest Division, Wichita, Kansas

\*The Amateur Radio Caravan Club has found it necessary to cancel plans for a Rocky Mountain Division Convention formerly scheduled for July 5-7 in Albuquerque, N. Mex.

## MICHIGAN STATE CONVENTION March 15-17, 1963

The Michigan State Convention will be held on Friday, Saturday and Sunday, March 15, 16 and 17, in Saginaw. Activities will center at the Baneroff Hotel, beginning with a "State Radio Amateur Queen" contest on Friday night.

Saturday's program will feature a "swap and shop," manufacturers' displays and various meetings. There will be gatherings of both Army and Air Force MARS; v.h.f.: Wolverine, Buzzards Roost and Michigan Emergency, Postal, General Motors, Teen Age and Interstate Sideband Nets; Quarter Century Wireless Association; Novice Corner; and RTTY. FCC Exams will be administered. Speakers will include Lew McCoy, WIICP, of the ARRL Technical Department,

who will present a slide-illustrated discussion of the present sunspot conditions, entitled "Where Did My Signal Go?" Stuart Seeley, W2ZE, administrator of RCA microwave communications project coordination, will give a talk on the "Good Old Daze."

Convention activities will wind up Sunday with informal gatherings. Registration is \$1.75 in advance or \$2 at the door. For tickets and hotel reservations, write to Michigan Amateur Radio Convention, Box 686, Saginaw, Michigan.



**New York** — The annual RTTY Dinner will be held on March 25, the first day of the IRE Convention, at 7 p.m. at the White Turkey Town House, 260 Madison Avenue, New York City. The price will be \$6. Attendance will be limited to 150, so send in your check now to Elston Swanson, W2PEE, c/o Instruments for Industry, 101 New South Road, Hicksville, L. I., New York.

**New York** — The Southern Tier Radio Clubs of Broome County are holding their 4th annual dinner on March 30, at 7 p.m., at St. John's Ukrainian Hall, Virginia Avenue, Johnson City, N. Y. Tickets are \$3.50 per person, and reservations must be made before March 25. Plenty of entertainment is planned, so bring the YL or XYL and prepare for a very enjoyable evening. For reservations contact Ralph Hendrickson, WA2RTN, 16 Duke Street, Binghamton, N. Y.

**New York** — The SSB Amateur Radio Association will sponsor the 12th annual SSB Dinner and Hamfest on March 26, at the Hotel Statler-Hilton, 33rd St. and 7th Ave., New York City. All amateurs and their friends are invited. Held during the week of the IRE Convention, this dinner attracts many outstanding radio amateurs and communications men from all parts of the world. Good food, fellowship and professional entertainment are featured. Equipment displays open at 10 a.m. and dinner starts at 7:30 p.m. The price of the steak dinner is \$12.50 in advance, and \$13.50 at the door. Send checks for reservations to SSBARA, c/o Buddy Robins, W2JKN, 4665 Iselin Ave., New York 71, N. Y.

**Pennsylvania** — The 8th Annual Banquet of the Reading Radio Club Inc. will be held on March 30, at the Crystal Restaurant, 545 Penn St., Reading, Penna. Tickets are \$5.00 each (limit of 150), including dinner, dancing, and entertainment. FCC-administered General and Extra Class exams are scheduled prior to the banquet. For further info and reservations, contact Herb Cohen, K3KHY, 5113 Casa Grande Road, Temple, Penna.

## Strays

In response to numerous requests, W7QBR has made up scale templates of the chassis and panel of his modified HBR-16 (January, 1963, QST, page 36). These, along with a 17 by 22 inch complete schematic, can be obtained for \$1.50, which covers the cost of reproduction and mailing. Note the new address: William E. McKay, P. O. Box 27, Cedar Rapids, Iowa.

On Jan. 17 or 18 a Cheyenne and Comanche mobile receiver and transmitter were stolen from K9YLG. The receiver has "K9YLG" etched in the lower right-hand corner; the transmitter has an extra black knob at the front of the chassis, lower left-hand side, accessible through an en-

larged hole in the case. K9YLG offers a \$25 reward for information leading to the recovery of this gear. Contact Charles W. Duncan, 2854 North Marmora, Chicago 34, Ill.

The second edition of *Ham Phone Directory*, containing complete listings, including phone numbers, of 1500 amateurs in Ft. Lauderdale, Hollywood, Miami, Homestead and Key West is now available. Send your check for \$1.50, payable to Variety Children's Hospital, to Ham Phone Directory, 1136 S. W. 74th Court, Miami 44, Fla., for your postpaid copy. This directory is compiled by Morris Stabin, K4DJW, as a fund-raising project for the hospital.



# The Paul Bunyan Whip

**This unguyed mast will support a full-size triband beam antenna and rotator. The cost is held down by using second-hand steel well casing obtained at scrap-metal prices.**

A FUNNY thing happened to me after a visit by an old friend. I became a ham.

It all happened when Colonel Carl Wyman, USMCR, stopped by on his way to Boulder, Colorado, to brush up on ionosphere research in connection with the International Geophysical Year in the "Deep Freeze" expedition to Antarctica. The Colonel came through Minneapolis from Philadelphia late in the fall. There was nothing he wanted from me *except* that I get busy and get a radio amateur license and station. With this, I could keep him in contact, while he was down under, with our mutual friend and his current boss, Lawrence Gould, president of Carleton College, Northfield, Minnesota, and director of IGY. Practically before you could say "QRX" he had me hooked.

At 52 years of age, getting the license was a challenge, but in a month and a half I was ready to pass the tests. Getting the station equipment was a big strain on the pocketbook, because it had to be able to put out a big, consistent signal and pick up the weak ones.

## The Diplomatic Assault

The antenna system was an entirely different matter. It presented problems. Living in a so-called "picture-window" area along the north bluffs of the Minnesota River in Bloomington meant neighbors who wouldn't relish the idea of an assortment of poles, wires and guy lines cluttering up the skyline. I realized that if they really put their hearts into it, they could probably find some remote zoning ordinance that would stop the project entirely. But the investment in the Collins KWS-1 and 75A-4 wasn't going to accomplish much without a good antenna system. The situation called for a combination of engineering and psychological strategy.

The least objectionable structure seemed to be a neat, slim mast of steel, topped by a beam antenna, and with no unsightly guy wires to trip over in the dark. It had to be capable of withstanding wind loadings of 90 m.p.h. and be of "tilt-over" design, so that all work on the beam could be done from the ground. At my age, I wasn't going to climb any higher than a 24-foot ladder would take me.

The equipment had mortally strained the budget, so the cost of the mast was an important factor. A cruise up and down the salvage-metal

\*7303 Auto Club Road, Bloomington, Minn

## A Practical 60-Foot Unguyed Tilt-Over Mast

BY ALFRED W. HUBBARD,\* K8ONM

or junk yards on Washington Avenue revealed the fact that used steel well casing was available in various diameters and lengths at scrap-metal prices. It was also learned that such places are usually equipped to do any cutting, welding or bending that may be required.

With the design of the mast shaping up, a few visits with the neighbors was the next order of business. After pointing out to them the potential dangers of the natural elements, the promise of a super lightning rod on top of the highest point along the bluffs, to protect everyone from the hazards of electrical storms, proved to be the psychological measure that not only gained the approval of the nearby neighbors but actually enlisted their help in an antenna-raising party. Furthermore, when I continued my story by going into the romance and public-service angles of the project, they were intrigued by the idea of listening in on the discussions between Colonel

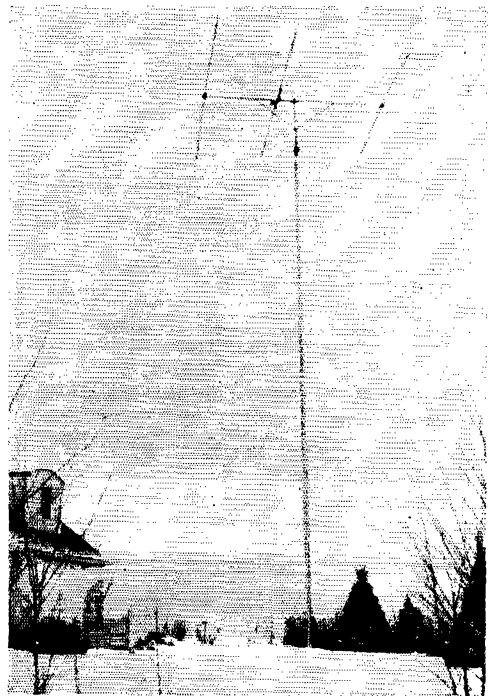


Fig. 1—"The least objectionable structure seemed to be a neat slim unguyed mast of steel."

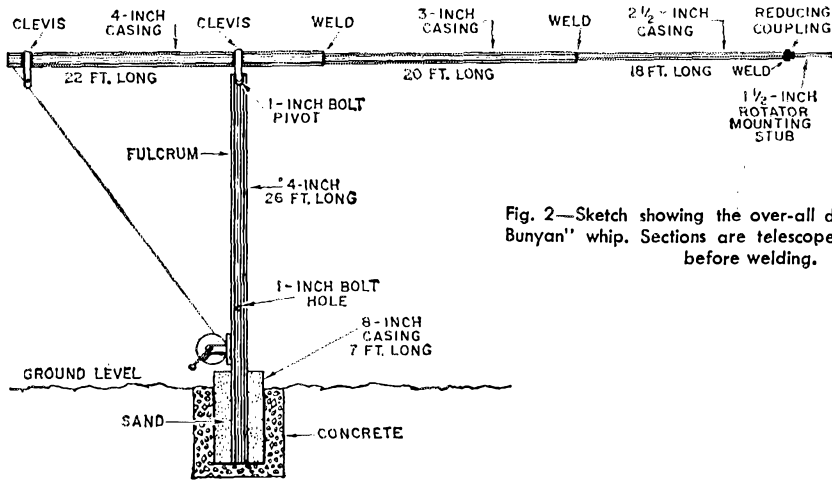


Fig. 2—Sketch showing the over-all design of the "Paul Bunyan" whip. Sections are telescoped about 4 inches before welding.

Carl Wyman in Antarctica and Doctor Gould here in Minnesota.

### Mast Design

Now we could go ahead with the details of the design. The base or foundation consists of a 7-foot length of 8-inch well casing, with the bottom end set in concrete to a depth of 6 feet below ground level, as shown in Fig. 2. The fulcrum is a 26-foot length of 4-inch casing centered in the base section while the space between the two is filled with sand. The sand acts as a buffer against wind thrust. This brings the top of the fulcrum 20 feet above ground level.

The mast proper consists of a 22-foot length of 4-inch casing, a 20-foot length of 3-inch casing, and an 18-foot length of 2 1/2-inch casing. The top end of the 2 1/2-inch section terminates in a

short length of 1 1/2-inch pipe on which the rotator is mounted. The antenna is supported on a 6-foot stub of 1 1/2-inch pipe mounted in the rotator socket, making the total height 60 feet.

At a point 15 1/2 feet from the bottom end of the bottom mast section, a clevis made of 1/2 x 2-inch strap steel (fabricated at the junk yard) is centered and welded. Holes to clear a 1-inch bolt are drilled in the clevis and at a point 2 inches down from the top end of the fulcrum, as shown in Fig. 4. A similar clevis is welded a few inches from the lower end of the bottom section of the mast, and matching holes are drilled in the clevis and fulcrum. The original design called for the mast sections to be joined with reducer pipe couplings, but events which took place later proved this concept to be faulty. The complete assembly was given a coat of aluminum paint which is still intact after five years of weathering.

### Raising the Mast

The planning, designing, engineering, and fabrication started in December and extended into January while awaiting the results of the General amateur license test. The winter of 1956-57 was a cold one with very little snow. The frost line was down below 2 1/2 feet—certainly no condition for hand digging. A call to a friend associated with a well-known utility company brought a crew with a truck-mounted power auger on the site. About 15 minutes after starting, the hole was completed, and the crew came in out of the 5-below-zero weather for hot coffee. A cement contractor set the 8-inch casing in the hole, and poured freeze-proof cement around it.

At the appointed time on a Saturday morning, the neighbors and other friends appeared for the mast raising. The fulcrum was set into the 8-inch base, and the sand poured and packed around it. Getting the lower portion of the 60-footer up so that the bolt holes of the upper clevis lined up with the holes at the top of the fulcrum turned out to be a much bigger task than an-

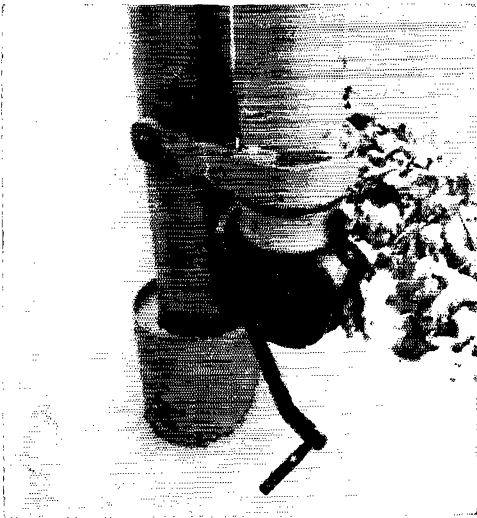


Fig. 3—Close-up view of the base, showing the sand packing between the base mounting and the fulcrum, the hoisting winch, and the bottom clevis which secures the lower end of the mast to the bottom of the fulcrum.

anticipated. At 6 below zero, it was a cold job to say the least. We finally managed to haul and push it up along a couple of planks and, with a supreme last effort, the holes were aligned and the bolt slid home. (I have since learned that no dyed-in-the-wool amateur would think of doing any extensive outside antenna work except in the middle of a cold winter, so I take it that my experience was not unique in this respect!)

### Unforeseen Problems

A rope fastened to the butt end of the mast was used to pull the mast to its vertical position. We didn't get an even pull, so when the top of the mast cleared the ground, it started to oscillate. The next thing we heard was a series of loud cracks or explosions and every section of the mast had broken apart at the reducer couplings. The whole mess was lying in pieces on the frozen ground. Evidently the weight and the oscillation were too much for the cast-steel reducer couplings, which were probably more than normally brittle because of the low temperature. Fortunately no one was under the mast when it came down, so there were no casualties. After condolences and post-mortems had been offered over some hot toddies, it was concluded that the joints would have to be welded. This experience should serve as a warning to others who might mistakenly think, as we did, that cast-steel pipe couplings are adequate.

Nearby is a missionary training institute, Bethany Fellowship, where there is a welding shop. The welder there not only welded the mast firmly together but also brought over a tractor fork lift, and the installation was made with little strain. The mast tilted very easily from horizontal to vertical and back again. Just the way the calculations said it should. *But*, this was *before* putting on the rotator and triband antenna. We had forgotten to include this additional weight at the extreme outboard end in our calculations! With the added load, it took a tremendous pull to get it up from the horizontal. It was thought that if we filled the lower part of the 4-inch bottom mast section with sand, this would help to counterbalance the load. So a hole was bored at the 20-foot level, the bottom sealed, and gravel laboriously poured in. However, when this job was completed, it still took a 350- to 400-pound pull to swing the mast up. Lead shot might have done better than sand, or some sort of counterweight attached to the butt end of the mast after the mast was partially raised might make subsequent raisings and lowerings easier. However, my eventual solution was a boat winch, mounted near the bottom of the fulcrum. This did the trick nicely. One person can let the mast down and raise it quite easily. As alternatives, utility farm winches are available reasonably from Sears and others. A husky pulley attached to the butt end of the mast, with the winch line reeved through the pulley back to a secure anchorage at the base of the fulcrum, would double the mechanical advantage.

As to the cost, \$42.59 was invested in the pipe

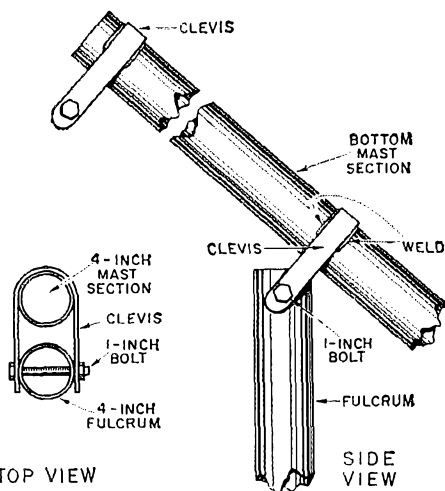


Fig. 4—Detail sketch showing how the top clevis is used to provide tilting action.

and \$12.00 for original fabrication, and delivery. The second fabrication, or welding, was done by Bethany, and the digging was accomplished through connections. However, even without these bonuses, and allowing for commercial welding, the cost can still be expected to total less than \$75.00 in areas where used well casing is available.

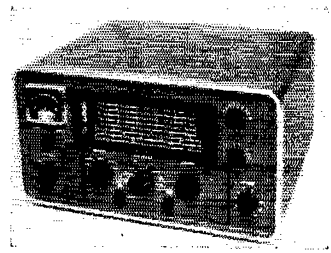
The unguyed mast carrying the Hy-Gain Tri-bander has now been in use since January 1957. It has stood up to storms with wind gusts of over 90 m.p.h. Colonel Carl Wyman did get his connections through to his IGY boss Larry Gould, and we have been able to provide communication for Bethany with their missionaries. KØONM has compiled a record of handling traffic to people in every one of the 50 states of the Union. All of this traffic has been originated by military and government-service personnel scattered from the Arctic to the Antarctic, all outside the continental boundaries of the United States. An average of 60 units of person-to-person traffic per month has been maintained for the past five years. Traffic has been handled from the western Pacific area when other local hams were commenting, "How can you be carrying on successful traffic contacts when we can't even hear them?"

The location on the bluffs of the Minnesota River, and the equipment (which now includes a 32S-2 and Thunderbolt, and 75S-2 receiver, plus a solid-state broad-band r.f. stage having a 20-db. gain, built for me by Minneapolis Scientific) deserve a lot of the credit. Also the ground screen, consisting of a continuous 420-foot length of No. 8 copperweld in the form of flower-petal loops radiating from the base of the mast, with one end connected to the base and the other to the transmitter ground terminal, may help. But the 60-foot unguyed tilt-over neighborhood lightning rod is a winner. It's a real Paul Bunyan whip which sways in the wind, but stands up and takes it.

QST

# • Recent Equipment —

## Hammarlund HX-50 Transmitter



The Hammarlund HX-50 is an s.s.b., c.w., and a.m. transmitter/exciter which operates on the 80- through 10-meter amateur bands as supplied, but which can be adapted for operation on 160 meters. Coils and crystals are available from the manufacturer for operation on 160 meters.

Rated at 130-watt p.e.p. input and 90-watt d.c. input, the transmitter can be v.f.o. or crystal controlled. A five-position panel switch allows a choice of either the built-in v.f.o., an external v.f.o., or three crystal-controlled frequencies. Crystals must be supplied by the owner.

Through the use of bandpass couplers in the low-level r.f. stages, Hammarlund has limited the number of tune-up controls to a minimum. When changing frequency or bands, it is only necessary to touch up the final amplifier tuning and loading controls. Other controls are provided, of course, and seldom-used ones are hidden behind access doors on the front panel where they can be adjusted conveniently when necessary.

Weighing only 40 pounds, the equipment has its own built-in power supply. Although all of the operating features expected in an s.s.b./c.w. transmitter are included, the appearance of the HX-50 is pleasingly clean and uncluttered. The use of several multipurpose tubes, along with the filter system for generating s.s.b., probably is

responsible for this impression, at least in part.

The block diagram of the HX-50 is shown in Fig. 1. A triode section of a Compactor is used as a crystal-controlled carrier oscillator. Upper or lower sideband is selected by the use of either a 3.038- or a 3.035-Mc. crystal, which places the carrier frequency on the proper side of the sideband filter. Output from the carrier oscillator goes to the balanced modulator, which uses semiconductor diodes. The audio signal from the microphone is amplified in two triode stages, the remaining sections of the 6C10 Compactor.

On s.s.b. the balanced modulator feeds into the crystal sideband filter, where the desired sideband is passed through. Rated unwanted sideband suppression is 40 db. below the p.e.p. output.

For c.w. the modulator is automatically unbalanced and the carrier is shunted around the crystal filter. The same thing happens on a.m., except modulation is applied in the balanced modulator. This results in a double sideband with carrier signal.

In all types of transmission the signal is amplified in the 3-Mc. bandpass amplifier,  $V_2$ , and then is heterodyned to a first i.f., which is changed for different output frequencies, in the first mixer,  $V_{3A}$ . Injection voltage is furnished by a crystal oscillator,  $V_{3B}$ . In the example shown in

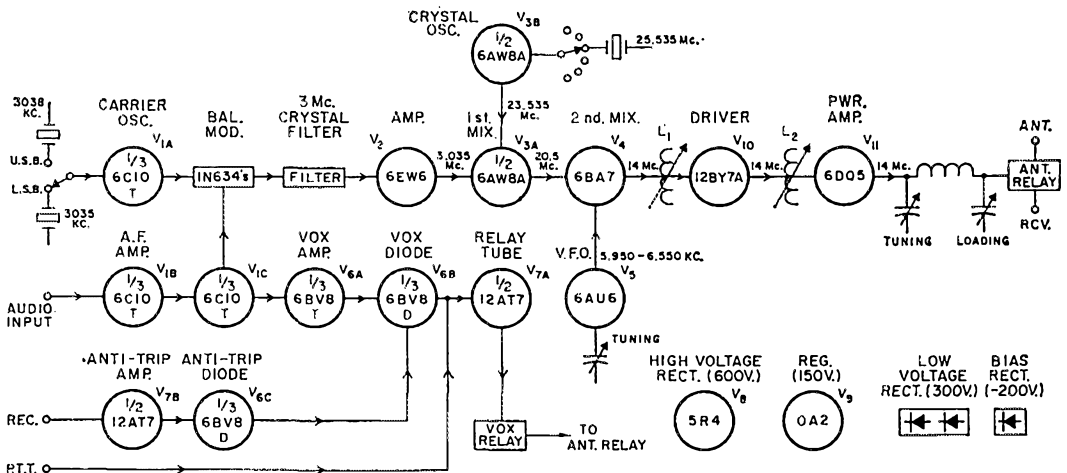


Fig. 1—Block diagram of the HX-50 transmitter. Frequencies beyond  $V_3$  are shown for 14-Mc. output.

Fig. 1, the oscillator is operating at 23.535 Mc. to give a first-mixer output of 20.5 Mc. This signal goes immediately into the second mixer,  $V_4$ , where it is heterodyned by the v.f.o. to the desired amateur frequency. The v.f.o. frequency range is 5.9 to 6.55 Mc. Our example in Fig. 1 puts the 20.5-Mc. signal into the 20-meter band. To maintain the proper relationship between upper and lower sideband and the dial calibrations, a small bias is applied to a capacitor diode across part of the v.f.o. tuned circuit when the FUNCTION switch is moved from LSB to USB. This automatically shifts the v.f.o. frequency the proper amount.

A jack at the rear of the HX-50 allows for connection of an external v.f.o. for transceiver use. The external v.f.o. should have a 6- to 6.5-Mc. range for amateur-band operation, and the injection voltage required is 3 volts across 50 ohms. The three crystal sockets for the crystal-controlled operation mentioned earlier are behind the right-hand panel door. Crystals must be the CR-18U type and in the 6- to 6.5-Mc. frequency range.

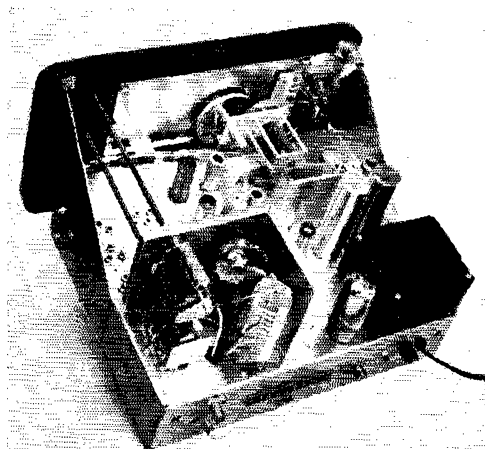
Mention should be made here of the tuning dial and band-indicator feature of the transmitter. The eight-position band switch (160, 80, 40, 20, 15, and three 10 positions) also controls five band-indicator lamps mounted beside the slide-rule dial. When the band switch is moved to a particular band, the appropriate band-indicator lamp lights up. One lamp is used for all three 10-meter-band segments. The transmitting frequency is read from the dial scale indicated by the light. Each scale is marked in 10-ke. divisions. The actual scale ranges are 1.8 to 2.3 Mc., 3.5 to 4.0 Mc., 7.0 to 7.5 Mc., 14.0 to 14.5 Mc., 21.0 to 21.5 Mc., 28.0 to 28.55 Mc., 28.55 to 29.1 Mc., and 29.1 to 29.65 Mc.

Output from the second mixer,  $V_4$ , which is at the desired amateur-band frequency, is coupled through a broad-band circuit ( $L_1$  in Fig. 1) to the 12BY7 driver tube, then through another broad-band coupler,  $L_2$ , to the 6DQ5 r.f. amplifier. The bandpass couplers are overcoupled tuned circuits with resistive loading. Their use greatly simplifies tuning, since only the final-amplifier plate and loading controls need be adjusted after changing bands or frequency.

The final amplifier uses a 6DQ5 TV sweep tube with a pi-network output circuit designed for nonreactive loads of from 40 to 80 ohms. Power output is rated at 50 to 60 watts on s.s.b. and c.w. and 12 to 14 watts on a.m.

A front panel meter and meter selector switch allow monitoring either the 6DQ5 cathode current or relative power output. The meter scale is divided into two sections: 0 to 250 ma., and 50 to 0 db. The latter is for making an approximate carrier-suppression check, which is done by first tuning up on c.w. and setting the meter to full scale (with the METER sensitivity control), then switching to s.s.b. With no audio input the meter will read carrier suppression in db.

The HX-50 has the usual VOX and anti-trip features, including a built-in antenna relay.

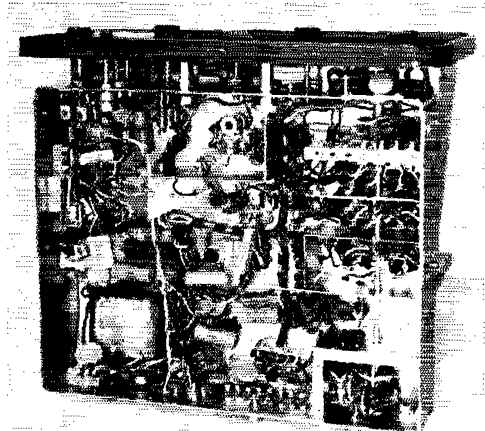


Top view of the HX-50 transmitter. The final-amplifier compartment is in the foreground and is shown with its cover cage removed. Rear apron connections are from left to right: antenna connector (SO-239) top, receiver connector (phono connector) bottom, terminal board (push-to-talk, speaker, receiver blocking bias, VOX relay contacts for external control of station functions), external v.f.o. connector below terminal board (phono connector), key jack, microphone connector, bias adjust control, fuse and line cord.

The VOX delay can be adjusted separately for c.w. work so the relays can be made to hold in between words. The first and second mixer driver and r.f. power amplifier are grid-block keyed when operating c.w. Receiver blocking bias, operated by the VOX circuits, is available at terminals at the rear of the transmitter.

In recent production models of the HX-50, the VOX circuitry has been modified in order to reduce the interaction between the audio level control and the VOX sensitivity. A VOX modification kit is available from the manufacturer for owners of earlier sets.

(Continued on page 140)



Bottom view of the HX-50 transmitter. Cover plates have been removed for the photograph.



# Hints and Kinks

For the Experimenters



## CAR-RADIO DUMMY ANTENNA

WHEN bench-testing a car radio, a suitable dummy antenna to simulate the fender or cowl-mounted antenna can be constructed from a couple of 39-pf. mica capacitors and a small aluminum box. The circuit for the dummy antenna is shown in Fig. 1, and is placed in series

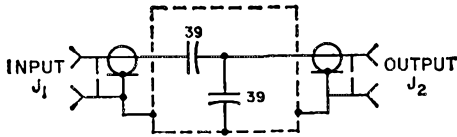


Fig. 1 — Dummy antenna to simulate a car antenna. J<sub>1</sub>, J<sub>2</sub>—Automobile antenna connectors (Motorola 1741).

with the signal generator, etc., and the receiver. Motorola-type connectors are mounted on the aluminum box. A variation on the circuit uses adjustable trimmer capacitors which can be adjusted after the unit is assembled, in which case small access holes must be placed over the trimmer adjustment screws.

— Sol Davis, W3WPN

## BALL INTERLOCK SWITCH

THE sketch in Fig. 2 shows a safety device for shorting the high-voltage circuit of a power supply when the access door is opened. This system is used quite often in commercial broadcast transmitters and has appeared from time to time in ham publications.

When the door is opened, the wooden block is withdrawn, allowing the string to straighten out. The metal ball, which is attached to the string, drops down on three standoff insulators. Metal contacts at the top of the insulators are connected to ground and to the high-voltage circuits. When the ball drops down, the high-voltage circuits are grounded.

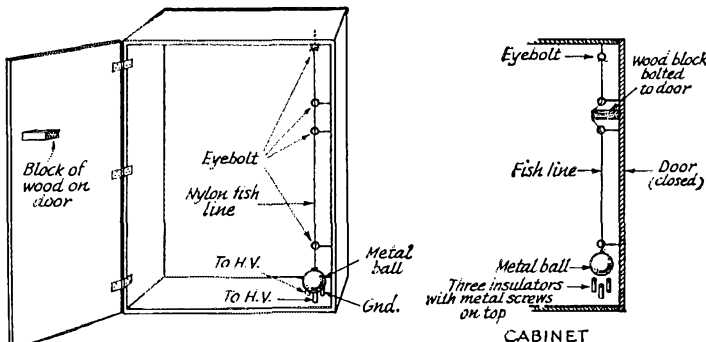


Fig. 2—W8MTI's safety switch.

This system has a back-up safety feature: If the string breaks, the ball will fall into place and short the high voltage. If this happens, it will be up to the power-supply fuses to turn off the supply.

— Harold E. Davis, W8MTI

## WEATHERPROOF SEALER

GENERAL Electric has come out with a new silicone rubber adhesive sealant labeled RTV 102. This material is impervious to the weather and temperature extremes encountered in ham use. It is excellent for sealing antenna connections and connectors that are used outdoors and can be used for potting connections or components. The sealant, which cures without heat, comes in a "toothpaste" tube ready to apply. RTV 102 can be obtained from any G.E. silicone sales office or authorized dealer.

— Bill Hurni, K1SDR

## HINTS ON WINDING COILS ON SMALL POLYSTYRENE FORMS

IN winding a coil of large wire on a small-diameter polystyrene or bakelite form, the process can be simplified by first winding the coil on a smaller-diameter form with a few more turns than is necessary. The coil is then removed from the small-diameter form and worked onto the larger form. Once it is properly in place it can be doped on the form, and the result is a form coil which will not be as subject to change as one that is wound only for the finished diameter. This method also has the advantage that no holes in the coil form are necessary for fastening ends of wire.

— Jack Hill, W0ZWW

## BEAM ROTATOR

THE photograph in Fig. 3 shows my antenna rotator; it is extremely rugged and can be built quite inexpensively. The heart of the unit is a transmission out of an old coal stoker. There are plenty of these available at junk yards and furnace dealers, especially where the trend has been to shift from coal to gas or oil heating.

The relative size of the transmission can be visualized by comparing it to the one-tenth-horsepower motor at the right. The assembly is mounted at ground level and is designed so that the entire mast revolves.

As a direction indicator I use 20 No. 47 pilot lamps mounted on a board in a circle. Outside, at the base of the mast and just above the stoker transmission, is a Plexiglas disk with brass machine screws mounted around its periphery. A commutator turns with the mast and wipes across the screw heads, lighting up the corresponding lamps in the shack. A 20-conductor cable, salvaged from the telephone company, connects the indicator lamps to the brass screws.

— James L. Peterson, K7NUP

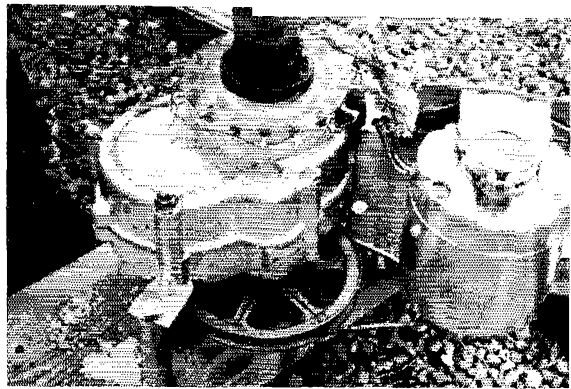


Fig. 3 — K7NUP's beam rotator.

## REPUNCHING SOCKET HOLES WITH ACCURACY

I OFTEN find it necessary, after having selected a punch and knocked out a hole in a chassis, to make this hole larger so as to accommodate an electrolytic capacitor or tube socket of larger dimensions. An easy, quick and accurate way of accomplishing this feat is to keep on hand a knockout from each of your various punches. Then, say, you punch a three-quarter-inch hole and find a larger hole necessary. All you need to do is re-fit the three-quarter-inch knockout, place the larger punch in the starting hole and punch away.

This method is particularly successful with screw-type punches, such as the Greenlee. Try it on a piece of scrap and see for yourself how simple it is.

— Thomas B. Moseley

## REMOVING GLASS FROM METER CASES

OFTENTIMES it becomes necessary to remove the glass face of a meter, either for repairs or for recalibrating the scale. A convenient way to do this is to bake the meter with an infrared heat lamp. This expands the bakelite or metal case but not the glass, allowing the latter to drop out "easy like."

— Ed. A. Kirchhuber, W2KJY

## DESOLDERING AID

TO keep lug holes from filling up with solder while unsoldering a wire/lug connection, insert a round wooden toothpick in the lug hole while the solder is still molten. The solder will not stick to the toothpick and the hole filled by the toothpick will be left clean.

— George Simon, W4KRP

## SAVE BLOWN FUSES

THE life of small glass cartridge-type fuses does not need to end when the fuse elements blow. They make excellent forms for small v.h.f. chokes, and when pigtail leads are soldered to the ends, they can be mounted firmly the same as a resistor or capacitor.

— J. C. Nelson, W2FW

## STILL ANOTHER NAA RECEIVER

THE diagram in Fig. 4 shows the circuit of my transistorized NAA receiver which was inspired by the converters described by W9BNW/8 ("Hints & Kinks," *QST*, July, 1959) and W6OMN ("Hints & Kinks," *QST*, February, 1961). I use a 2N414 transistor, although almost any kind of transistor will work. A 2370-kc. marine-band crystal,  $Y_1$ , was used for the oscillator simply because I'm feeding the converter into a 1937 vintage receiver with stability best around this frequency.

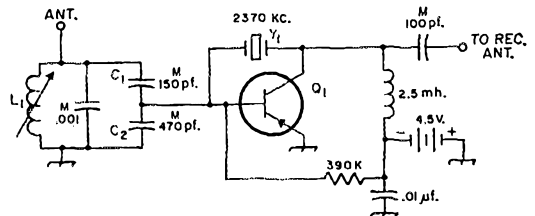


Fig. 4—K1PNK's transistor NAA receiver.

$L_1$ —60-130 mh. (Thordarson HS-6).

$Q_1$ —2N414 or equivalent.

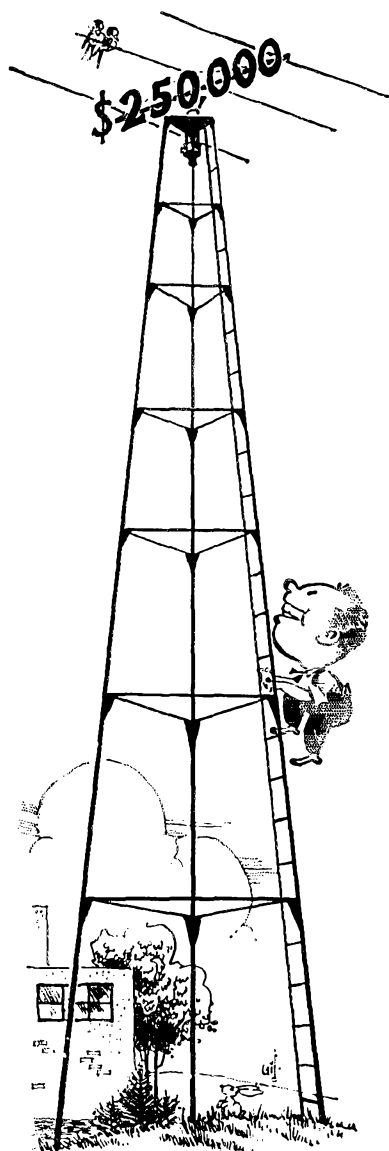
The 15-ke. input circuit is a 0.001- $\mu$ f. fixed capacitor and a 60- to 130-mh. horizontal oscillator inductor,  $L_1$ . A capacitive divider,  $C_1$  and  $C_2$ , is shunted across the input circuit to tap down the transistor input. All of the capacitors marked "M" in Fig. 4 are mica.

I used an audio signal generator to resonate the input circuit and, after the antenna was connected, only a slight readjustment was necessary. My antenna is approximately 50 feet of wire running around the edge of the basement. Although NAA roars in at my location, a more sophisticated antenna will probably be necessary for those farther removed from Maine!

— Ben Warriner, K1PNK

# Building Fund Progress

THE month of January produced a continuing flow of contributions to finance the new ARRL Hq. administration building, though not quite at the level of the two preceding months. (We can understand; we get Christmas bills, too!) Our man on the tower widens his grin as the top steadily comes closer. At copy time nearly 7,000 participants had pushed the drive almost to the \$100,000 mark, and thus 40% of the over-all goal. With continuing cooperation of individual



amateurs and clubs, we should soon be past the half-way point.

A comment from several members concerning the decision to inaugurate a Building Fund deserves clarification here. Some amateurs are pointing out that the League has a surplus sufficient to handle financing of the new building and arguing, therefore, that the fund drive is not needed.

It is perfectly true that ARRL has a healthy financial reserve. This was quite plainly stated in the March, 1962, *QST* editorial. The question asked of members in that editorial was whether the League should deplete its accumulated reserves, built up slowly and carefully over our almost-50 years of existence, or whether the membership would prefer and support a building fund program. The response was overwhelmingly (98%) in favor of the fund, and accordingly the Board of Directors chose that course. Letters and notes attached to individual and club contributions, some excerpts from which appear regularly in "Members Are Saying," attest to the soundness of the Board's decision.

— . . . —

The breakdown by divisions, with percentage of quota achieved, is as follows as of January 25:

Hudson	58.5%	Midwest	36.4%
Southwestern	52.4	West Gulf	29.8
Northwestern	43.2	Atlantic	29.5
Central	41.7	Delta	28.3
Pacific	41.1	Rocky Mountain	26.4
New England	39.2	Canadian	26.2
Dakota	38.1	Great Lakes	23.5
Roanoke	37.5	Southeastern	19.9

## OUR COVER

With the outer shell of the new Hq. building practically complete, activity at the rear of 225 Main Street, Newington, Conn., has shifted almost entirely to interior construction (besides — it's *cold* outside!). Plasterers, plumbers, electricians and utilities crews are hard at work. Tanks contain compressed fuel for the temporary heat of "salamanders." A visitor finds, in apparent disarray, piles of sand and bags of plaster, steel girder studs, pieces of ductwork and fire dampers, armored cable and conduit, bales of insulation, crates of fluorescent light fixtures — all in process of installation. In fact, normal activity is so hectic that we took these photos when we'd be out of the tradesmen's way. There have as yet been no serious delays and, give or take a couple of weeks, we should be "in business" in early June.



This photo was taken on January 23. Outside the building all is quiet, but inside is a bustle of activity as electricians, plumbers, plasterers, and carpenters ply their trades. Our cover this month shows some of the inside work in progress.



## Members Are Saying . . .

I couldn't think of a better place for the first check of the New Year to go than the ARRL Building Fund. — *K3AZK*.

The enclosed is in appreciation for all the help the League rendered me in the past, particularly from your late and departed staff member, Walter Bradley W1FWH, who never tired of answering my most foolish questions, and whom I shall always remember. — *W2GIE*.

I am only a shortwave listener but I have a brother who is a ham; and while I am not a member, I am and always have been a solid 100% friend and booster of ham radio expecting eventually to get my ticket. — *Francis Kamernick, Green Bay, Wis.*

Enclosed you will find two checks. At our January meeting we held an auction for the purpose of raising money for the building fund. The second check is a donation directly from the club treasury. — *Mid-South Amateur Radio Assn. (Tenn.)*

It should be a matter of conscience for each ARRL member to make some kind of contribution no matter how small. And in looking at the situation in the light of service rendered, we, as members, certainly are getting the bargains. — *K6TWE*.

At the January meeting we voted a donation to the Building Fund. Our club is small in membership but large in appreciation for the efforts of ARRL in amateur radio. — *Ohio Valley Amateur Radio Association*.

My funds are limited so the offering is meager, but every little bit helps. Maybe I'll take my children up to the new headquarters and say "See those 20 bricks up there? — I paid for those!" They'll all stand in awe and ask how come I was so generous. Lots of luck with the new Hq. and continued success as the lifeline of amateur radio. — *W5CJE*.

Attached is my second donation. ARRL has meant a way of life to me since 1930 when I first started getting *QST*. Ham radio has been responsible for many good things in my life — many friends of long standing, a wonderful hobby, and the earning of a living. My vocation is not radio today but it got me started on the way to whatever success I may enjoy now. I cannot understand why you were not overwhelmed with donations when they were first

called for. Four packs of cigarettes given up or one highball by all members would do the trick. — *W1AQW*.

Your representation of the nation's radio amateurs has, in my ten years as a licensed amateur, enabled us to retain privileges despite mounting pressures to encroach on frequencies long reserved for our use. Without your help we would, I am sure, have been decimated. — *W3WVZ*.

We are one of the very new clubs with a very small membership at this time. We became one of the ARRL family of clubs a short time ago. We are pleased to send a check for the building fund and with it our wish for continued success of the League in its dedicated service to all amateurs, no matter where they may be. — *The Martin Amateur Radio Club (Colo.)*.

Though we are far from home ground, we feel a close tie with ARRL. We are aware of the fine job that ARRL has done for amateur radio in the past and we, along with countless thousands, rest assured of ARRL's work for all amateurs in the future. That is why we here at FEARL (M) want to participate, through the enclosed check, in the construction of a building that will not only house the League's many offices, but a building that will be a symbol for all radio amateurs throughout the world. — *Far East Auxiliary Radio League (M)*.

Contribution enclosed. If every radio amateur in the United States and Canada realized that with every advantage to one of our freedoms such as ARRL, there is an equal obligation of all those who profit by that freedom to uphold and support that advantage, I am sure that already you would have the funds necessary for the new building. — *K7KOV*.

We voted ten dollars of the total fifteen dollars in our treasury. As a four-month-old club, we will try to be somewhat like you, as far as leadership goes, and our club looks up to you for a goal. We felt since we could turn to the ARRL to help us out in the event that we should come up with a problem that we can not solve dealing with amateur radio, then we could help in your building fund as much as we could. — *Upper Darby High School Amateur Radio Club (Pa.)*.



## TYPHOON KAREN

### *A Symposium and Condensation of Reports on Amateur Operation*

BY GEORGE HART,\* WINJM

**T**HE storm that all but destroyed the island of Guam and its neighbors on Nov. 11, 1962, was called a typhoon. If it had occurred in the Atlantic, it would have been called a hurricane. In both places, tropical storms are given women's names, whether or not they develop into monsters the like of Typhoon Karen.

We have little information on the typhoon itself. All we know is that it hit Guam on Nov. 11 and it must have been a real dilly, because it completely isolated the island for several days, during which amateur radio became a prime communications medium. Where it came from and where it went afterwards are undoubtedly matters of meteorological record, but they do not concern us here. We are interested in what the amateurs did.

Most of the material collected herewith was sent in by Mike Fern, KH6ARL, Acting SCM of Hawaii, and we wish to acknowledge freely that without his substantial contributions this symposium would be thin indeed. We also received information from W6CBE, from W6BE and from W6MLZ.

The amateurs did plenty. The reports listed over 100 as having had a hand in the procedure, and all reports admit that there were many left out. Our purpose here, then, is partly to give due credit to those we know about, but mainly to give readers some idea just what amateur radio operators accomplished and how they did it during a time when they were first the only means of communications, then the only way of informing friends and relatives elsewhere in the Pacific and in the states what had become of their loved ones. This went on for a week or more after the

typhoon and amounted to an estimated fifteen to eighteen thousand written messages, not to mention informal relays via telephone.

#### *The Big Five*

According to KH6KS (who should know), the five "big guns" on Guam were K2QGC/KG6, KH6AKZ, K4PNM/KG6, W6CBE/KG6 and WA6ROP/KG6. These were the first five to come up after the emergency and they had the signals to push out the long-haul traffic on 15- and 20-meter s.s.b. Other KG6s reported active during the emergency period were KG6s AOI NAC AAY GX AOJ BO FAE NAA AHF, and K4ERA W7YBY K6SZO K6CQV K6SZV and W7PQP, all /KG6. Most of these were operated by more than one person at different times, and some of them were club or military-amateur stations. We do not have complete information on all five, but KH6ARL sends us the dope on two of them and another comes from the licensee himself.

Joe Price, KG6AKZ, is generally credited as being the first "big signal" to reappear from Guam after the typhoon. As the big storm approached, Joe had carefully packed away all his ham gear in waterproof plastic sheeting, and transported his beam and a mast to a newly-completed FAA receiver control center which had its own emergency power plant. Although his home was so badly damaged that his family had to be evacuated, this foresight enabled him to be on the air with full power and a beam almost before Karen made her last swipe at the island and passed on. Besides taking care of his regular duties with FAA, Joe handled a tremendous amount of FAA traffic to Hawaii requesting supplies and equipment, along with large quantities

\* National Emergency Coordinator, ARRL.



One of the "big five" stations who got on the air from Guam after Karen was W6CBE/KG6, owned by Ron Panton, W6CBE (left photo), and operated by him assisted by Sgt. Mel Fenrich, KG6ALS and Marge Beardsley, KG6AOE (right photo). This trio handled over 1700 messages in the seven days following the typhoon.

of semi-official and third party traffic. In contact with KH6s CJ and CV, he coordinated arrangements to fly FAA dependents to Wake after the storm and return them when conditions permitted. Joe's own family was among those evacuated to Wake because his house was wrecked; but the demand for his services was so great that for many days he could not get home to clean up the house or salvage any of his property.

Alvin Knickerbocker, K4PNM/KG6, was a Seabee on Guam when Karen came along. He handled about 1200 messages before he secured to pack his gear and return to the states on another assignment. Many of the messages were informal relays via landline. Nick lost his beam and tower during the typhoon, but afterward he made a two-element beam out of what was left and scrounged an emergency generator. The latter accomplishment, being somewhat harder than it sounds, delayed him quite a few hours. K4PNM/KG6 and KH6EKO ran a relay system from Guam to the mainland via Hawaii to move some health and welfare traffic. Nick transmitted to KH6EKO, who relayed through landline to W5FLO/KH6, who transmitted to W6BE. KH6EKO said that after the first two transmissions everyone got the hang of it and it worked fine. On Nov. 13, KH6EFH shipped Nick a new beam and K4PNM/KG6 was restored to the "big signal" category.

W6CBE/KG6 set up at Andersen Air Force Base on Nov. 12, we are informed by a terse and factual statement of operation sent in by Ron himself. (We had asked him to rush some details of the emergency operation. — *Ed.*) Besides the owner, operators were KG6ALS and KG6AOE. Traffic was handled for the Red Cross,

newspapers, IBM, the local radio station and the "typhoon chasers" weather squadron, over 1700 messages in the seven days following the typhoon. At first lightweight dipoles were used, later a beam was erected. Ron lists the following as among those who relayed his traffic: KH6s BGS EGO EKR DUV UI, EKO BYG DYG CYS AJF, W6AOF/KH6, KR6QW, K6UEF and W6s BMN SH and WX.

No specific reports are available on the others among the "big five" mentioned above, but their calls will be cropping up frequently in the write-up.

#### *Wake, Samoa, and Midway*

KH6COY/KW6 on Wake was active during the first five days of the emergency, handling eastbound traffic from Guam on 20-meter s.s.b. He also handled much of the emergency weather traffic from KC6BD in the Carolines, inasmuch as the military RTTY circuits which normally handled it were knocked out. KH6COY/KW6 operated for about 35 hours and handled around 22 messages.

Other Wake Island stations mentioned as having been in operation are KH6s CJ CV and DK.

K6CQV/KS6, Paul, played a big role in the emergency by relaying quite a lot of formal traffic to the mainland via KH6COY/KW6 and KH6CYS, in addition to his regular activity as principal outlet for American Samoa. Paul's

Dudley Mason, KW6CJ, is governor of Wake Island and FAA Island Manager. He was very active in the FAA Emergency Net on 20-meter s.s.b., coordinating the evacuation to Wake from Guam after much of the housing on Guam was destroyed, and arranging for emergency housing on Wake.





Concentrating to dig out a weak one is KH6KS, Jim Keefer, whose FAA Pacific Islands Emergency Net took much of the initial tremendous load of traffic in the wake of Karen. Jim is a former Hawaii SCM.

work was unspectacular but steady and efficient. For many days he helped out with eastbound traffic from KG6AKZ and also took a lot of traffic from Honolulu stations who did not know how to route it to the mainland. No other reports of activity from Samoa.

Jack, W6ZDF/KM6 provides a nice report from Midway, where he relayed quite a bit of Guam traffic in both directions; for the most part, however, he relayed traffic received from Guam by other Midway stations who were unable to take care of it. Most of his relays were made on 80- and 40-meter e.w. Other Midway stations were KN6CY and KM6CE, the latter a club station. Traffic was relayed to the mainland via W6CKU, KH6EWS, W7HMA, W6LYF and VE7AOI.

### Hawaii

Although the storm never came near the state of Hawaii, which is over 3000 miles from Guam (Gad, that Pacific is a *big* ocean!), it was the KH6 amateurs who did most of the traffic handling with Guam, both for Hawaii itself, which you might consider the base for the mighty U.S. military installation on Guam, and for the mainland as a logical relay point. Because most of the operation on Guam is of military or government nature, many officials in Hawaii were greatly concerned with the effects of the devastating typhoon, and personal traffic was quite heavy as well.

The first organized net to take up the tremendous load of emergency communications in the wake of Karen was the FAA Pacific Islands Emergency Net, organized a couple of years ago by Jim Keefer, KH6KS, a former Hawaii SCM and an FAA engineer. Jim says K2QGC/KG6 was the first station on the air from Guam; this station had lost its beam and was on emergency power from Andersen Air Force Base using a long wire secured with coke-bottle insulators. However, the storm had not yet completely abated when KG6AKC came on, and most of Jim's work henceforth was done with this station. K2QGC/KG6 went off the air when his equipment was commandeered for military purposes. Jim operated a total of 34 hours up to Nov. 14, when the load began to slack off. A daily schedule with KG6AKZ was maintained until Nov. 27.

Two communications were arranged for the aerospace editor of the *Honolulu Advertiser*, who was one of the first newsmen to fly into Guam after the typhoon. One outstanding communication was handled for the president of the Hawaiian Telephone Company, who said the quality was as good as the commercial service, and later another telephone executive called to use the same facilities. The telephone at KH6KS started ringing at 0430 local and kept ringing until 2330 during the height of the emergency.

KH6EGO, Del, an Air Force maintenance supervisor at the receiver site at Wheeler AFB, was possibly the first station in Hawaii on the air on an emergency basis after the typhoon. He was on from the 11th through the 17th and handled about 1200 messages "of all types" on 20-meter s.s.b., working with five different stations on Guam, the biggest load from KG6AOJ. He also relayed weather advisories from Truk and the Marianas into government circuits at Wheeler. First contact was with K2QGC/KH6; later he worked KG6AKZ. Other stations with whom he handled traffic were KC6BK, KC6BD and KH6COY/KW6. He also handled a lot of traffic from WA6ROP/KG6, including the first press release by the Guam Governor's press secretary, which was dispatched to UPI and AP. He says "I wore out five operators at W6CBE/KG6, the first multi-operator station to show up after the typhoon." A total of 104 ARL-text messages were handled, and later another 95 from KG6AOJ. One message from WA6ROP/KG6 involved a million dollars. The message was from the Bank of America manager on Guam to San Francisco; Del called the mainland by telephone and got a reply within 20 minutes authorizing the advance. A good receiving location and facilities plus a careful book-keeping system enhanced the efficiency at KH6EGO.

Besides maintaining good contact with Guam, KH6EGO beamed a wicked signal into the mainland and was able to handle much of his Guam traffic directly into the state of destination. He tells of one instance when he gave K5OGP in Albuquerque a message for Oklahoma City to be put on Western Union; but K5YLS came on the frequency and said he had a direct circuit to Okla. City and took the message. Then K5BZV broke in with a message for Guam; it turned out to be from the addressee of the first message. One message for Puerto Rico was handed to KP4-BBM, who knew the address and delivered it within 20 minutes. Del recalls that KH6GF and W4AUF/KH6 guarded the frequency for him quite a bit of the time. Altogether he logged 125 stations, delivered about 40 messages in Honolulu, and handled communications for the 1502 Air Transport Wing and SAC at Wheeler with

their opposite number in Guam, as well as two communications for Wake Island. He recalls that W6CBE/KG6 was running message numbers in the 1200 bracket before he secured. Other stations with whom he remembers handling traffic are KG6BO, KR6OH *KH6s* EFH EKR EKO, K6PRT, W7PA, K7AM and W6BSE.

KH6EKO at Pearl City was an old friend of K4PNM and was waiting for him to appear on the band after the typhoon. He took quite a bit of mainland traffic which he routed through KH6AJF who radioteletyped it to W6IAB. Besides K4PNM/KG6, traffic was handled with W6CBE/KG6, KG6AAY and KG6AHF. The high point was taking 280 messages from KG6AAY in four and a half hours on s.s.b. Almost all operation was on s.s.b., except for 35 messages he relayed to W6BE on 20 meter c.w. He handled 505 messages in all.

KH6EFH was the Honolulu link for K4PNM/KG6. He handled daily communications from the Seabee Commander at Pearl Harbor to the c.o. of the Navy Public Works Center in Guam, and acted as "backstop" for Nick's other traffic, most of which went through KH6BGS and KH6AJF. EFH says the biggest load came the day after the typhoon hit and for eight days thereafter. "The first two or three days," he says, "were frantic. Then the pressure dropped off and the next two days were merely at the panic level. Not until near the end of the week did things finally become a matter of normal routine." It was EFH who bought and shipped a beam to K4PNM/KG6. He mentions especially "the exemplary way the other fellows gave us a break and let us get the traffic through. QRM on the channel was nonexistent."

KH6AJF is the Marine club station at Camp Smith, near Pearl Harbor. They report a November traffic count of 4,292, most of which was Guam typhoon traffic that came via KR6GF and KR6MD on 21-Mc. RTTY. K4BLA and K3RPA are the operators at AJF. Traffic for the mainland was sent from AJF to W6IAB at Camp Pendleton on 14 Mc. For two weeks after the typhoon the working day at KH6AJF began at 0730 and finished at about 2200 local time. The biggest day was Nov. 23 when they handled 725 messages. KH6AJF also handled s.s.b. communications with K4PNM/KG6, W6CBE/KG6 and K2QGC/KG6; these were coordinated through KH6BGS.

K9VEA/KH6 was actually on the air Nov. 10 because of concern about possible damage to equipment serving Air Force circuits on Guam. The advance coordination for the first group of 35th Air Force installers sent to Guam from

Hawaii was handled through this station and three of the operators and off-duty personnel of KG6AKZ. VEA says he was short of sleep the first three days, handling 100 to 150 third-party messages; most of it came from K4PNM/KG6 and W6CBE/KG6. However, he gives most credit to KH6EKO and KH6EGO as the real traffic handlers in Hawaii, and to K6CQV/KS6 for valued help with eastbound traffic.

KH6BGS, the MARS/amateur station at Kaneohe Marine Corps Air Station near Honolulu, was fired up Nov. 11 by KH6DUY, assistant operator. Traffic built up after Nov. 12 and tapered off toward the end of the week. Their main sources of traffic were W6CBE/KG6, KG6NAC, K2QGC/KG6 ("who sent so much traffic he finally stopped putting numbers on it"), K6SZV/KG6, K4PNM/KG6 and KG6FAE. KH6BGS concentrated on informal communications for the most part, but reported a traffic count of nearly 1600 for November. Chief Operator KH6ECJ says it seemed that about half the people on Guam were sending messages to relatives on the mainland by ham radio and as official traffic died down "there were many KG6 stations on the air that nobody had ever heard of before," with traffic. Operation was mostly on 14 and 21-Mc. s.s.b. They also ran command communications through KG6NAA for men of the 4th Marine Battalion who had been sent to Guam to help with the monstrous clean-up job. W6IAB and W6YDK were principal outlets for eastbound traffic.

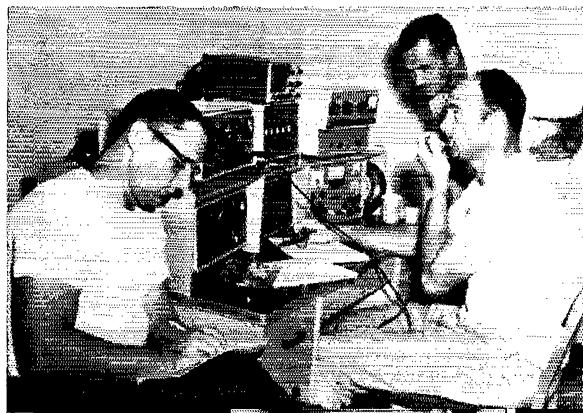
### Conclusion

Guam is a long way from West Hartford (and from just about everywhere else, for that matter) and we fully realize that there is much that has been unsaid in the story of Typhoon Karen and amateur radio, and many calls omitted of amateurs who were involved but not mentioned in any of the dispatches received. Our first task in compiling this composite report was to list the call letters of every amateur mentioned as having participated. Many have already been mentioned. Here are the rest: *KH6s* EU AFC EEU EFO EVT DKD AHQ EGL, W5FMO/KH6, W6BZV/KH6, *W6s* MLZ PFF UZO GTQ MFS/7 RH NAZ BYS CKU, *K6s* TWJ, PRU, *W1As* UGG MCI YCO, KC6BO (with KH6DVD operating), KR6MB, KM6CI, WB2CPP, K5VXA, W7AWN, W4TBX, W9GPI, W7BSW — and (all reporters have cautioned us to add) *many others.*

EST

One of the most active amateurs on Guam after the typhoon was KG6AKZ. That's Joe in the center operating, with two FAA employees. This station was back in business with a full kilowatt and a beam within hours after the typhoon struck, and was the first "big signal" to reappear.

March 1963





CONDUCTED BY SAM HARRIS,\* W1FZJ

## 420-Mc. Moonbounce

The first amateur 420-Mc. effort at moonbouncing has paid off with an echo. Bob Track, K5KDN, and Ed Bailey, W5SDA, on January 6 and 7 of this year received their first echoes from the moon. Frequency of operation, 432 Mc. Power input, 800 watts. Antenna, 30-foot dish. Receiver, parametric amplifier into a 100-cycle filter to a magnetic tape. The recorded signal was approximately 3 db. over the noise. That first little echo was the culmination of more than a year's work for Bob and Ed and associates. (See photograph of antenna in September, 1962, *QST*!)

The transmitter quite naturally took advantage of the new power limit on the 420-Mc. band. An RCA 7650 was used in the final amplifier. A parametric amplifier feeding a crystal-controlled converter is fed into a 75A-4 receiver and thence into a 100-cycle filter. A 50-foot length of RG-17/U feedline was employed. Needless to say, the attendant ground trip loss of in excess of 6 db. is not to be desired but, as I pointed out last month, it's not so easy to get rid of.

The fact remains that a first amateur 420-Mc. signal has been heard coming back from the moon and congratulations are in order for both Ed and Bob. Their hard work has paved the way for the first 420-Mc. moonbounce contact. Obviously, the cooperation of some other group is required before a two-way contact can be established. The Rhododendron Swamp VHF Society will be

operational on 420 Mc. by the end of May. Surely there must be someone, somewhere, who is willing to try to beat us out on this first two-way contact. Rumor has it that the Texas boys are not particular — they'll be happy to work anyone. Just call "CQ Texas via the moon". I am informed that W5SDA can be contacted on the low end of 75 meters for discussion of possible schedules.

Last month we mentioned antenna temperature as a tool in evaluating your system capabilities. Fig. 1 entitled "Antenna temperature vs. frequency for various antenna elevations" is an attempt on my part to expand the readily available antenna charts to fit the u.h.f. and v.h.f. bands where most of the present work is concentrated. In the expansion of the chart some liberties have been taken with exact amounts of temperature but in the main the chart is reasonably accurate.

Note that the usual antenna position (aimed at the horizon) leaves little choice between 420 Mc. and 1215 Mc. As a matter of fact, if anything, the antenna temperature is slightly less at 420 Mc. As we elevate our antennas for satellite or moonbounce work the 1215 Mc. band shows a considerable improvement. All this chart purports to tell you is how much noise is present at your antenna terminals in the absence of any manmade signals. It assumes that you are not pointing at the downtown Los Angeles area or directly at the galactic plain (Milky Way). It points out the

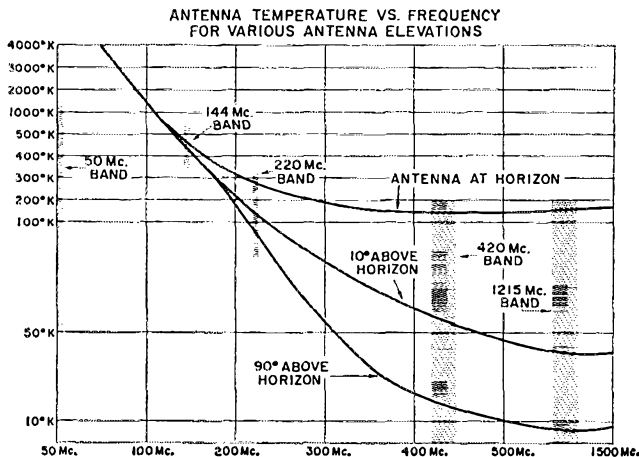
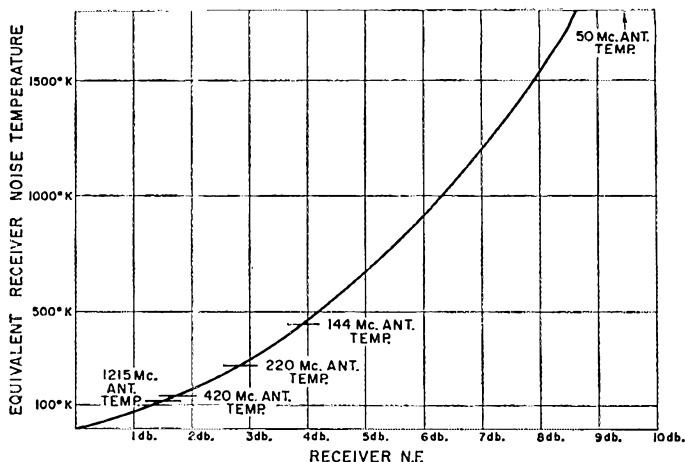


Fig. 1—Antenna temperature vs. frequency for various antenna elevations.

Fig. 2.



desirability of improving your receiving noise figure as you go higher in frequency. As you can see the antenna temperatures available at 420 and 1215 Mc. when aiming at the horizon are in the vicinity of 150 degrees Kelvin.

Now referring to Fig. 2 one can see that this temperature is equivalent to approximately a one and a half db. noise-figure receiver. Please don't let me lead you into believing that it is desirable to match your antenna temperature with your converter temperature. Obviously the ideal situation is to have the converter add no more noise to the system. This, of course, is not an achievable goal, at least by amateurs, and as a result we must shoot for some reasonable and achievable noise figure for the receivers. If the converter contributes an equal amount of noise to the antenna the signal-to-noise degradation will be approximately 3 db. This may sound pretty horrible, but consider the result of the average 420-Mc. converter which has a 7-db. noise figure.

The antenna temperatures plotted in Fig. 1 assume many things and disregard many other things which all contribute to some extent to the actual antenna temperature obtained. Other sources of noise in an antenna for instance may be attributed to physical  $I^2R$  losses and noise picked up by minor lobes. Most antennas are relatively efficient. When an antenna's physical dimension is of the same order as their effective aperture (parabolic reflectors, broad-side arrays and so forth) the efficiency may be nearly 100%. On the other hand, antennas whose physical dimensions are small compared to their effective apertures (so-called super gain antennas, such as long yagis, etc.) the resultant high  $Q$  and large  $I^2R$  losses may result in efficiencies of 50% or less and the consequent contribution to antenna temperature may be considerably larger than the main lobe temperature.

The problem of minor lobes is not a simple one. High-gain antennas inherently have minor lobes and any attempt to reduce them will compromise the main-lobe gain. Fortunately, a horizon-aimed antenna will have an appreciable part of its main lobe coupled to the earth and a residual 150-

degree temperature will be picked up regardless of the size of the minor lobes. However, when aiming above the horizon for satellite and moon-bounce work, the expected or predicted improvement in antenna temperature may not be gained if the minor lobes are not held down. At 420 Mc., for instance, a drop in antenna temperature of almost 100 degrees is obtained when elevating the antenna 10 or 15 degrees above the horizon. This, however, assumes that the side lobes are not an appreciable part of the main lobe. It also assumes that the front-to-back ratio of the antenna is 20 db. or better.

#### 144 Mc. DX — Australia

The following letter from David Tanner, VK3AUU is of sufficient interest, we believe, to be printed in its entirety.

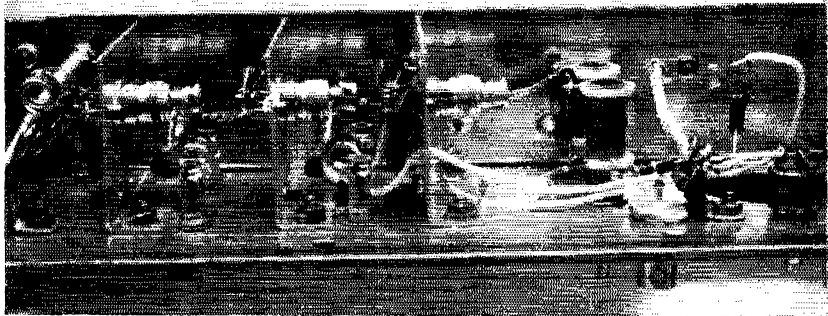
"Today has been a magnificent day on v.h.f. in VK. Two meters opened for distances of about 900 miles around our eastern states at about 7:30 A.M.

"At about 10:30 A.M. Dane, VK4ZAX in Brisbane was hearing signals on two meters from Adelaide at a distance of just under 1000 miles and he worked VK5ZMK, VK5ZDR, VK5BC, VK3ZCW at distances ranging down to 820 miles. The shortest contact to take place was about 760 miles between VK4ZWG and VK3ZCW. VK1VP/4 in Brisbane using a halo and running 30 watts to a QEQ03/20 final also worked VK5ZK and VK5ZDR in Adelaide. Signals were relayed onto six meters by Dane, VK4ZAX, to alert the gang. The two-meter signals appeared to be anywhere between the noise level and S9+.

"Stations were being heard or worked on two meters for about three hours. No particularly short skip was observed on six — only down to about 400 miles. I have worked down as short as 260 miles on sporadic E a couple of years ago.

"The gear at VK4ZAX on two meters is very good by our standards. 150 watts input to a QB3/300 (4/125) with 4 x 12 element yagis and 6CW4 converter. Most others concerned run the equivalent of 80-watt transmitters with 12- or 24-foot yagis with 6ES8 or 6CW4 converters. Most of the contacts were on phone as the limited license stations with Z calls are not permitted to use c.w.

"There is quite a bit of activity on s.s.b. on six and two meters here now with five fairly active stations on six meters around Melbourne. Power



Two-stage Nuvistor preamp with 7587 mixer for 420-Mc. band in use at the Rhododendron Swamp V.H.F. Society.

ranges from 15 watts to 150 watts. All of the gear is completely homebrew here. The rig at this QTH is as follows: 5-Mc. s.s.b. generator using h.f. crystal filter with 9 Mc. v.f.o. giving output on 14-15 Mc. Six-meter transverter with 12AT7 mixer followed by 6360-6252 driving a QB3/300 in AB<sub>1</sub>. The converter section has 6CW4 in grounded-grid r.f. stage - 6BC4 - 12AT7 mixer/cascode follower to BC-342 receiver.

"The QQEO6/40 (5894) is quite a popular final over here as well as the QB3/300 (4/125), are often available ex-B/C and TV transmitters. (Slightly down for commercial service but better than nothing for ham use.)"

Good to hear from you, David, and to receive the v.h.f. news from VK-land. Sounds like you are once again having sporadic # on 144 Mc.

#### 144 Mc. and Up

A number of the two-meter boys have added to their "states worked" total during recent weeks via meteor scatter and aurora. W0MOX in Colorado gained a state when he worked K9UIF in Indiana for state number 23 on November 15, and W9CUX made it with K4IXC on December 14 making state number 24 for Al. Out in Ohio K1CRQ/8 worked W1QAK on December 17 to bring his total states worked on 144 Mc. up to 25. Stew is now running a gallon with a 15-element yagi at 40 feet. During the Geminids in December Walt, K9UIF worked K4SJF in Georgia for #29 and on December 17 during an aurora Walt worked W1MEH in Connecticut for #30.

Shelby, W4WNH added two more states via meteor scatter now has a total of 33 states in 9 call areas. K4IXC in Melbourne, Florida seems to have been a mighty busy fellow during the Geminids; one of the many to whom he gave a contact for a new state was to W2LWI in New York who now totals 23 states on 144 Mc.

Bob (W2LWI) sez that during the evening of December 17 he heard VE3DSU, VE3ELA, VE2NI, K9UIF, W9EGH, K8HEG, K1CRQ/8, W4HJQ, W3SDZ, W1AEP, W1HUD, W2WZR and WA2GSX all on aurora. In Benton Harbor, Michigan W8PT also noted that same aurora hearing WA2GSX, W2ZKF, W3SDZ, W3SUJ, W4HJQ and numerous 8's and 9's. Jack sez that while repairing a broken phasing section on 432 Mc. quad yagis the gin pole rope broke and the beam was smashed. He now has only 15 over 15 up and thinks this may be a good excuse for building a big colinear. We're glad to know that Jack "has joined the ranks" that always put up a bigger one the next time.

K8PBA in Michigan tells us that K8HNW and K8BJO are both on 144-Mc. s.s.b. at the present

time and both of the boys have good signals. K8HNW has a kw., pair of 4X250B's. We're happy to hear from Joe, K3OBU that although two-meter activity in the Wilmington, Delaware, area has been low, it is now beginning to pick up. He says that a number of RTTY stations are beginning to pop up around the band again. Activity is also picking up in Memphis, Tennessee according to W4ZNV. "Two-meter activity seems to be on the increase here in Memphis, with W4YEL firing up his rig which has been in mothballs and with W8DBU/4 moving into town. Two-meter f.m. still seems to be the favorite mode for quite a number of local rag-chewers. W4HHK has a real fine s.s.b. signal on 144.200 now." Jack has changed his schedule frequency to 144.276 and is looking for anyone who needs Tennessee on two meters.

Down Florida way Allen, W4RMU has constructed two ten-element 144-Mc. yagis using 1 x 2-inch cypress 12 feet long for booms. All elements were made from aluminum clothesline wire. Al sez the antenna is durable in heavy weather, not too unwieldy to handle, and costs less than \$1.50 per antenna. All elements should be shortened by approximately the diameter of metal boom if dimensions are taken from one using metal boom. Out in Cheyenne, Wyoming W7YJG is now on 144 Mc. and has three states to his credit, Wyoming, Nebraska and Colorado. Hal's contact with W0MOX in Boulder, Colorado is his longest to date, about 80 miles, worked with a "twoer." He'll soon have more power on 144 Mc. From Pittsburg, Pennsylvania K3MIW tells us that on December 1 he put a new transmitter on the air on 144 Mc, using a 6360 in the final. Next project is a 432-Mc. rig which Neal has already started building. KN3SHP is also building the same line-up for 432 Mc., and between them the boys hope to come up with some new and different antennas for 432 Mc.

From Dick, W1QWJ we hear that the list of active stations in his area on 432 Mc. is growing. W1VNH, W1RVW, W1HDF all call in on sked nights which are Wednesday and Saturday at 8:00 p.m. local time. No set sked for other nights but if anyone is about they look on the half hour from 8:00 to 9:30 p.m. Dick has a 4CX250B working as an amplifier, driving it with a 2C39 and he gets 225 watts output. He recently worked the state of Maine for #10 on 432 Mc. W1HDQ is also on 432.07 Mc. now, both phone and c.w. Ed is running 75 watts to a 16-element colinear, but hopes to have a larger antenna come spring. He is on Wednesdays and Fridays after 8 p.m.

W9JIY and W9MHP have 432-Mc. QSO's three times a week and are constantly watching for new signals but have had no luck as yet. The boys





# Happenings of the Month

## ARRL OPPOSES "HOBBY-CLASS" LICENSE

A proposal filed with FCC by the International Crystal Manufacturing Co., to create a new "hobby-class" license, was unanimously opposed by the ARRL Executive Committee at its meeting January 19-20. International Crystal has asked that an exam-free "amateur" license with a five-year renewable term be created, permitting the use of 10 watts input, crystal-controlled type-approved transmitters on 6 c.w. and 17 voice channels in the ten-meter band. The Committee's first objection was that an amateur license granted without examination would be in derogation of the international radio regulations (Geneva, 1959) and this on a band open to international communication for large parts of the sun-spot cycle. But primarily, the Committee thought it wholly undesirable to permit an influx of unskilled operators into the amateur ranks, even on a limited basis. (The text of the Executive Committee minutes may be found at the end of this department.)

## ARRL TO OPPOSE 1-Mc. TV PROPOSAL

The ARRL Executive Committee has decided to oppose a petition (RM-399) filed with FCC by Wayne Green, W2NSD, in the name of the Institute of Amateur Radio, requesting that the amateur rules be amended to provide for amateur TV in the sub-bands 52-54 and 145.9-147.9 Mc. The Committee expressed its concern for interference with f.m. nets and RACES operations already established in portions of these sub-bands and for the 6-meter area, the increased potential for adjacent-channel interference with Channel-2 TV.

These considerations aside, the Committee felt that little would be gained by permitting 1-Mc. bandwidth TV in 6 and 2 meters. Techniques to be used would be crude copies of commercial practices, and experiments therewith

would be much less likely to produce worthwhile technical gains than experiments with slow-scan techniques, already permissible in frequencies above 50.1 Mc. The Committee felt that if the Commission were inclined to encourage amateur experimentation with picture transmission, it would be better advised to act on the League's petition of June 8, 1961, which asked for narrow-band slow-scan picture transmission in the 10- and 15-meter bands, where truly long-range work could be done, and where an amateur's geographical isolation would not restrict his opportunity for fruitful work.

## FCC EXAMS — CORRECTION

The Federal Communications Commission will conduct examinations for amateur licenses in Salt Lake City, Utah, on March 8, rather than on March 9 as shown in January *QST*. The amateur exams at Rapid City, S. D., scheduled for May 11 will begin at 11 A.M., rather than at 8 A.M.

## NATIONAL AMATEUR RADIO WEEK

Senator Kenneth B. Keating of New York has again introduced a resolution calling for the third week in June to be designated as "National Amateur Radio Week." Credit for the measure goes to Joseph R. Lebo, W2OEU, who has been interested in the passage of such a bill for a number of years. Interested amateurs should write their Senators to support passage; in addition, amateurs seeking declaration of Amateur Radio Week in the various states and cities might well consider choosing the same week, which of course culminates in ARRL's Field Day.

## ALFRED CLYDE HECK, W3GEG

We regret to report the death in January of former Atlantic Division Director Clyde Heck, W3GEG, of Greenville, Pennsylvania at the age of 52, following a long illness. OM Heck served

*(Continued on page 66)*



The Executive Committee held its January meeting during the Southeastern Division Convention the weekend of the 19th. Left to right: Midwest Director W0NWX; President W6ZH, holding the key to the city; host Director W4ZD; President Emeritus W0TSN; First Vice President W5NW; Canadian Director VE3CJ and General Manager W1LVQ.

## Effective Spectrum Use

The ARRL Executive Committee, in a resolution adopted at its January meeting, has laid down a set of band-usage principles that can mean more effective communication for all of us. They should be put into practice by every amateur — not tomorrow, not next year, but right *now*.

Too many of us indulge in operating practices that clutter up our bands unnecessarily. Example: the thoughtless use of DX frequencies for short-distance contacts. How many times have local ground-wave rag-chews on 14 Mc. pushed some poor soul to the verge of apoplexy because he couldn't maintain a long-distance QSO through the QRM? Especially now, when the sunspots aren't working for us, it makes no sense at all to misuse those bands that still offer a chance for long-haul work.

Our objective should be to get *all* local communication out of bands that have long-distance capabilities. By simple logic, we should aim at getting work of that nature — local ragchews, city-wide nets and the like — onto v.h.f. (or ten meters, when it is useful only for ground-wave communication). If you still have the antiquated notion that v.h.f. isn't good for anything but line-of-sight, don't let a v.h.f. man hear you say it out loud!

All this points to the need for greater equipment flexibility. Use that handswitch! A one- or two-band transceiver is fine if (1) there is other equipment in the station for other bands or (2) the operator is only interested in distances suitable to that available band or bands. But a ham with a one-band 14-Mc. job should realize that he is restricting himself primarily to longer-range communication, and any use for local ragchews when the band is open is strictly a violation of good frequency-engineering principles.

Use common sense, of course, in applying these principles. For example, in a 3.5-Mc. section net, stations in the same city are not precluded from participation because some of their contacts may be only a few blocks away; they don't have to move to v.h.f. for this purpose! Here the band is chosen on the basis of an area to be covered by a group of stations.

The use of minimum power for desired communications can also make more room in our bands. Every amateur station should be equipped to reduce power at times when it is appropriate. A report of "40 over 9" inflates the ego, but at the same time proves that the transmitting station is running much more input than he needs. If it is a brief contact, such as in a contest — OK.

But if it commences a ragchew, it should be the cue for an immediate power reduction. Give some consideration to others, those nearby trying to work on adjacent channels, or those at a distance trying to employ the same channel.

Actually, the Committee's recommendations are a plea for closer compliance with broad aspects of law. Various portions of regulations, international and domestic, point to use of minimum power, minimum bandwidth and an appropriate choice of frequency. So none of these principles is really new. Like truth and justice, they are known desirable objectives. But they are ones we often lose sight of in our enthusiastic pursuit of ham activities. So let's take a good look at our personal operating habits and see how well they comply. In this restatement of principles, the Executive Committee has provided us a concise code of cooperative techniques in these days of overcrowded bands.

### ARRL Recommends . . .

In view of increasing congestion in our limited frequency assignments, caused by the steady growth of the amateur body, The American Radio Relay League urges upon all amateurs a more strict observance of the following principles:

1) To make a proper choice of bands below 30 Mc. appropriate to the distance to be covered.

2) To achieve equipment flexibility so that an adequate choice of frequency bands and powers for desired communications distances may be available.

3) To use minimum bandwidth, consistent with good engineering practice and compatible with the mode of transmission being employed.

4) To expand the use of v.h.f. for local contacts wherever possible, with the ultimate aim of conducting all short-distance communication in this portion of the spectrum.

5) To use the minimum power necessary for each communication.



During a vacation trip to Europe over the Christmas holidays, ARRL and IARU President Herbert Hoover, jr. took some time from family reunions to visit with the officers of several European amateur societies. A highlight of his visit to Ireland was an invitation to the residence of the President of Ireland. In the photo above, left to right: El2W, president, Irish Radio Transmitters Society (IRTS); E16W, immediate past president, IRTS; His Excellency Eamon de Valera, President of Ireland; and our own W6ZH. (Photo courtesy of Irish Times, Ltd., Dublin)

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as director from January 1, 1952 to January 1, 1954. W3GEG was also a past president of the Mercer County Radio Association, past vice-chairman of the Pittsburgh Area Radio Club Council, and a former manager of the ARRL Third Regional Net. The son of a ham, ex-8EF SCHO, and brother of W3KNR and W3NCD, Clyde was employed for years as a broadcast engineer.

### Minutes of Executive Committee Meeting No. 291

January 19-20, 1963

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Biscayne Terrace Hotel, Miami, Florida, at 2 p.m. January 19, 1963. Present: President Herbert Hoover, jr., in the chair; First Vice President W. M. Groves; Directors Robert W. Denniston, John G.



President Hoover also met with the officers and council of the Radio Society of Great Britain (RSGB). Here he poses in front of RSGB headquarters with G6CL, long-time General Secretary of the British group.

Doyle, Noel B. Eaton and Morton B. Kahn and General Manager John Huntoon. Also present were President Emeritus Goodwin L. Dosland, Director James P. Born, jr., and General Counsel Robert M. Booth, jr.

The President read a letter from John G. Doyle, resigning as a member of the Executive Committee and Director of the Central Division because of serious illness in his family. On motion of Mr. Eaton, unanimously VOTED that the Committee extends its sincere regret to Mr. Doyle and expresses its deepest appreciation for the contributions he has made to the advancement of the welfare of amateur radio and the League through many years' service on the Board, its various standing and special committees and the Executive Committee.

On motion of Mr. Denniston, after discussion, unanimously VOTED that, in view of increasing congestion in our limited frequency assignments, caused by the steady growth of the amateur body, The American Radio Relay League urges upon all amateurs a more strict observance of the following principles:

- 1) To make a proper choice of bands below 30 Mc. appropriate to the distance to be covered.
- 2) To achieve equipment flexibility so that an adequate choice of frequency bands and powers for desired communications distances may be available.
- 3) To use minimum bandwidth, consistent with good engineering practice and compatible with the mode of transmission being employed.
- 4) To expand the use of v.h.f. for local contacts wherever possible, with the ultimate aim of conducting all short-distance communication in this portion of the spectrum.
- 5) To use the minimum power necessary for each communication.

On the matter of reciprocal licensing, the General Counsel reported on difficulties encountered by the previous bill to amend the Communications Act and outlined a modified approach based on reciprocal operating agreements between individual countries. On motion of Mr. Kahn, after discussion, unanimously VOTED to endorse this concept and urge continued efforts to obtain reciprocal privileges for amateurs.

The Committee examined a proposed pamphlet intended to carry the story of amateur radio to the general public. After discussion, on motion of Mr. Kahn, unanimously VOTED to approve publication and to commend the Public Relations Committee, under the chairmanship of Mr. Doyle, for its achievement.

The Committee next engaged in extended discussion concerning various petitions for changes in the amateur rules pending before the Federal Communications Commission. On motion of Mr. Denniston, unanimously VOTED that the Hq. staff is directed to study and report on the problem of mobile repeaters. On further motion of Mr. Denniston, unanimously VOTED that the League file in opposition to the proposal of the International Crystal Company for a no-examination "Hobby Class" amateur license carrying certain spot-frequency privileges in the 10-meter band, not only because it is contrary to international regulations which require examination, but also because the admission of unskilled operators to amateur bands is not within the League's concept of the best interests of amateur radio. On motion of Mr. Groves, unanimously VOTED that the League file in opposition to the proposal of the "Institute of Amateur Radio"

(Continued on page 150)



# How's DX?



CONDUCTED BY ROD NEWKIRK,\* W9BRD

## How?

DX men world wide get itchy for the switch in February and March. This is traditionally ARRL DX Contest time. We mentioned last month that short-wave propagation conditions generally repeat themselves every ten years or so. Let's look back to WIJMY's write-up of 1953 ARRL DX Test results to check this out. Joe opened his lively resumé (October '53 QST) like so:

"Never experienced worse conditions during a contest." — W4CYA. . . . "Apparently the bands are at rock bottom." — ZLIMQ. . . . "Things went badly, but I've got some FB excuses." — W3DUS. . . . Other adjectival remonstrations re band conditions: "Spotty" — KL7AON. . . . "Poor" — W0BBS. . . . "Very poor" — PA0SPR. . . . "Bad" — HB9AT. . . . "Terrible" — K6AAF.

Mur-der, eh? But what's this? WIJMY continues the tale:

DX men are hardy souls and, whatever the status of the ionosphere, rest assured they'll turn in some fancy scores. And *that* they did! There were 40 c.w. W VE scores over 100,000 in 1953 compared with only 27 in 1952. The story is the same in the phone portions: eight scores over 90,000 compared with just two last year. Honest, fellows, were conditions really so bad?

So the moral here, if any, seems to be: Let old QSB do its worst. The rest of the Test may well be the best. (It could hardly be worse than the first.)

And then there are those pessimists who feel that only to the kilowatts go the spoils. W7RGL ably disputes this contention poetically with his

### Crepe-hanger's Lament

Somebody said that you can't work DX  
Without power and skywires to burn.  
Regardless of "noxie" and other effects,  
It's brute force DX will discern.

But he buckled right in, with a trace of a grin  
On his face and his heart. With elation  
He started to smile as he tackled the dial  
And he tuned in an overseas station.

Somebody scoffed: "Oh, you'll never work *that* —  
None with your gear has yet done it."  
But he settled his ears as he stepped up to bat \*  
And adjusted his rig and bezon it.

With a lift of his chin, and a bit of a grin,  
Without any doubt, this apprised one  
Slid up ten kc., as calm as could be,  
Signed his call and quietly raised one.

There are hundreds to tell you it cannot be done —  
"Low power? You'll never succeed!"  
There are hundreds to point out to you, one by one,  
The gear you don't have that you'll need.

But just buckle right in, with a hint of a grin,  
As you sit yourself down and go to it.  
Keep your heart up skyhigh as you tackle the guy  
That "cannot be worked!" — and you'll do it!

\*7862-B West Lawrence Ave., Chicago 31, Ill.

## What?

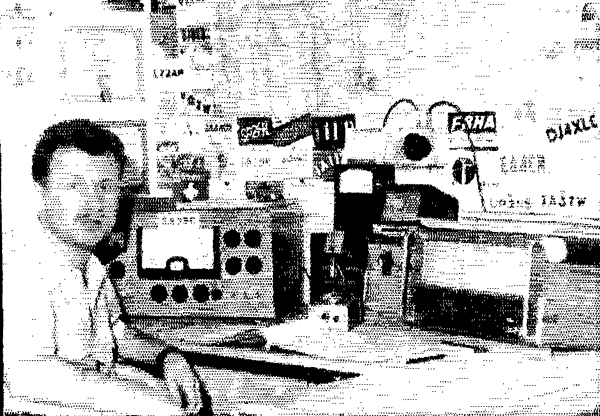
Apropos W7RGL's premise, the final week ends of ARRL DX Contests have always been hospitable to chaps with modest signals. Many of the big boys will have filled their quotas on some pretty good countries as the final hours approach. QRP men will always have to battle for ACs, ZAs and the like, but it's great fun to collect a batch of Gs and VKs with an 807 and dipole while the kilowatters murder each other in pile-ups over rare ones. . . . W8YGR colorfully documents current radio conditions with remarks re 20 meters: "Every evening I blow taps, fire off a few rounds, and gently lay the old hand down into the mud. Amazing the way she expires daily. During her last gasps each night you can detect giant beams swishing back and forth in utter futility, receivers screaming with internal pain as their gains are advanced to intolerable levels — then off we 14-Mc. men go to our newspapers, TVs or thumb-twiddling." (C'mon, Jack — we've heard you sneaking down to 40!) . . . Twenty is such a well-worn subject at the moment, what with the Test in full swing, that we'll concentrate our Bandwagon route on less trodden DX paths this month. Take

**75** phone, for example. K0s AXU JPL and KP4AXU find plenty of DX just off the low edge of the Yank phone subband, including DJs 11M 7ET ØGT, DLs 11N 1UX 2BW 3BJ 31R 7FT, Gs 2PL 3JCQ 3KPV 3MZV 3RDW 3RAF 6LX 6ZY, GIs 3CDF 4RY 6TK, GW3s AX EHN, HB9MQ, HI1s CL PRA, HI8s MHV WPC XAG, HK4EB, a dozen KP4s, KV4BZ, LA6U, ON4UN, PZ1AX, SM6VR, VPs 2ML 9L, W4VCA/KH6, YVs in four Venezuelan call areas, ZL4MD and 4X4DK, KP4AXU, with a strategic location, interesting prefix, 200 watts and a tuned dipole bagged the lion's share of this batch.

**80** c.w. is reluctantly coming to life, prodded by contest pressure. Ws 1SWX/1 3GQF 3WZL 7DJU, Ks 3VWH 8NMG ØJPL and KP4AXU, who works considerable stuff crossband, 80 to 160, specify 3.5-Mc. specimens DJS 1FN 5VV, DLs 1FF 1VU 7EN 8ET 9EM, many Gs, F3IL HC1DC, HI7JFR, HK1QQ, HL9KH, JAs 1EEO 2CSH 2WB 3GHV 7LK, KP4s galore, KV4CL, LA5HE, ON4UN, OKs 1AMS 1MG 2KGE 2KQZ 2KJU 2KOJ, PY1ADA, SMs 3CUN 5BOU, SPs 3DG 8CK, YB5UW, VPs 2MZ 9BO, YN1AA, YUs 1ICD 3HY, YV5ANT, ZLs 2BAJ 3FZ and 3QX.

**40** c.w. suffered a midwinter slump but enables Ws 1GDQ 3GQF 3WZL 7DJU 7POU 8YGR, Ks 1QYJ 1RNL 2JUA 2YFE 3VWH 5JVF 6TZZ 8NMG 9YRA ØJPL ØVSH, Ws 2HL 2IUQ 2RZJ 2RUB 4ARE 5CVK 6IVM 6ORS 6VAT, WB2CAV and CE2CR to get a load of CE4EC, CM2BB, CR7CI, DU7SV, FY7YD at 0 hours





5A3BC recently closed this Tobruk station for return to Surrey and G3NMQ after an 8000-QSO year-plus Libyan DX career. Bing used a Vanguard 50-watter, an 888-A receiver, a TA-33 beam, dipoles and long-wire. You also may have worked him as ZC4BC and/or GW3NMQ. (photo via W5WW)

GM1T, EI9J, GC2FMV, HI8X, several PK7s, HL9s KH (700z kn.) 7, KW (11) 15, HP1AC, JA3 1CFD 1DRQ 1EJK 1FNK 1GVA 1HNQ 1HB 1KFN 1KUX 1YL 2BLG 2BTV 2DAB 3BQH (15) 13, 3CHO 3DAZ 3ECC 3YT 5FP 6CY 7OD 8ARU 8C0D 8LN, KC6BD, KGs 4AM (30) 2, 6NAA, KV4AA (4) 2, a half dozen KZ5s, KX6BU, SL8AY/mm, SP8s ART DG, TG9AD, UA0s BP KFG (12) 11, LT (1) 9, UO2GA (35) 6-7, UW0JG (5) 16, VK6RU, VP8 7CS 7NT 8GQ (1) 7, VR3s O L, XEs 1B 1VT 2HW (52) 4, YN3KM, YVs in five call areas, ZB1CR, ZK1BA, ZSs 1A 1BH and 1O.

**40 phone**, as sticky as ever, produce HI8XAG, JA2BAY (90) 8, KP4s AZC BHV BFF WQ, VP8 2AP 2GAC 2VL 3RW, W5CAX/KP4, XE1YH (27) 4, YV5RDY and ZL2UD for Ks 6TZX 6GVA and KP4AXU. Skippy, eh? Well, let's see you do better on 7-Mc. phone, especially at noncontest times.

**15 phone** is always a favorite, particularly with WIBPM. Ks 1QEQ 1RNL 2YFE 4QGY 4ZNJ 5FSU 6TZX 7RVI 9CZV 9DKU 9GVA 9JPL, Was 2JIS 2MUA 2PJL, 2VFU 2ZVJ 6ORS and KP4AXU, coming up with CE3AG, CN8FD, CoS 5CN (250), 8CO, GR7AD, CT1SX, DJ4HM, EAs 7KR 9Z, EL2K (230), P3PK, a flock of Gs, HH2RV, HI8MMN, IIs BCX DBK SF, KG4BH, KP4s AYP BDA, PYs and LUs in quantity, TI2JR, VP8 2AD 2AE 2GAQ 2KJ 2SY 3PM 5LT 7CX (280), YV6AV/2, ZE2JA, ZSs 1AT 1BV 2GF 4OF 6BDD 9G, 5As 2TS 5TW, 5N2RSB and 9U5JH.

**15 c.w.** ranks high in the estimation of Ws 1GDQ 1HEZ 3GQF 3WZL 5WW 7POU 8YGR, Ks 1QYJ 1RHZ 1RNL 1TIM, KNIWVL, Ks 2YFE 3VWH 4QGY 4ZNJ 6TZX 7RVI 9DKU 9GSD 9GVA 9VSH, Was 2JIS 2PJL 2VFU 4DA 5CVK and W5CBAQ because of GEs 1AD 4EC, GRs 6CA 7IZ 15, CX2CO, EA1AB (40) 17, Ps 2IU (55) 16, 2TP 3II 8KA 8VN, FP8EL, HA3CJ 15, HC1DC (35) 20, HK3HY 23, HP1LE, IIMNL, IT1AI, JAs 1MJ 5FQ 23, KV4CR (50) 18, KX6BU, LZ1KSP, OA1NPI, ON5BM, PI1KMA 16, SPs 1LH/mm 6FZ 15, TT8s AL CN, VP8 2KJ 7NQ, VO8s 2IE 2W (20), 2WMI 4DW 4IV, VRs 3L 3R 5AA, VS4RS, W1CY/KM6, XE1s AX VT, YU2QZ, ZD6s JJ JO, ZE8s 3JJ (5) 19-20, 5JF, ZSs 1OU (25) 19, 2PX (40) 18-19, 2YK (78), 5BK (90) 20, 7MI (40), 3V8CA 15-17, 4X4LS (20) 14-16, 5B4LB, 5N2s 1KO RSB, 5R8AB (75) 16, 5X5s IG (22), IU, 601MT, 6W8s DD DE 20-22, 9Q5s AV (61) and KH.

**10 phone** keeps polishing the doorknob, saying fond farewells to W3s GQF WZL, Ks 2YFE 3BEQ 5FSU 7RVI 9CZV 9DKU 9YDY, WA2s PJJ VFU RUB and KP4AXU in behalf of CE1FH, CT1s LC LN OR, FG7XL, HI8AAB, KP4s AQQ BEW BID, KZ5SS, PJ3AO, PYTAC, TG9s BJ RB (750), VO2W, ZEs 1BD 2IA, ZK2AJ, ZSs 2GF 3E 6BDT 6EB 6FU 6VJ and 7L. . . . WA2s PJJ and RUB keep an ear on 10 c.w. where XE1PJ and a few South Americans hold a 28-Mc. wake on week ends.

**160 c.w.s** DX is improving in quality as well as quantity. WIBB's 1.8-Mc. newsletters and W3GQF have the W/K top-band gang working or hearing DL1FF (1825) 5, EI9J, Gs 2PL 3ERN 3FGT 3FPQ 3IGW 3OQT 3NEB 3PQA 3PU 5JU 6BG 6GM 8PG/A, GM2BUD, GW3JL, HA3CJ, HC1DC, HI8XAG, HR3HH (25) 4, OH3s NB NY, OK1KCI, OY7ML, several PA8s, SV0WZ, VO1BD, VP8s 5XG (20) 7, 7NY 8GQ, VR3O, UB5WF, UO5AA, XE8JJ, ZK1BS, a few ZSs, 5B4PB and 5N2JKO. Beginning to sound like any other DX band, b'gosh, except for that loran clatter and some personalized QRN styles. Thanks to Ws 1GDQ 3GQF 3WZL 5WW 7DJU 7POU (96/84 countries worked/confirmed), 8YGR, Ks 1QYJ (56/44), 1RHZ 2UYG 3VWH 6MQG 6TZX (100/86), 7RVI 8NMG 8UZX 9CZV 9DKU (106/50), 9GSD 9GVA 9JPL 9VSH, Was 1HLH 2PJL 2RZJ (33/21), 2RQZ 2RUB 2VFU 4ARE 4DA 4DJH 6ORS 6VAT, WB2CAV, GE2CR, I1ER and ZS2U for their 20-meter c.w. gleanings, as well as W3s GQF WZL, Ks 2TDI 2UYG 6TZX 7RVI

9GVA 9JPL, Was 2RZJ 6ORS and KP4AXU for 14-Mc. phone jottings. Perhaps we'll take up these subjects next month, space permitting. But now on to the Q111 front. . . .

**Where:**

Cyprus Amateur Radio Society president 5B1P tells ARRL Assistant Secretary W1ECH that QSLs for 5B1s now may go via CARS QSL Bureau, P.O. Box 216, Farnagusta. . . . Former HL9KT on K21BK/1 writes, "Before departing Seoul in April, 1962, I had approximately 5000 letters and QSLs that I intended to answer upon my return to the States. Unfortunately all correspondence, excluding my log extracts, was destroyed. I want to make clear that my QSL managers, K2s EUJ and H1WF, were not at fault in that many did not receive HL9KT QSLs. At present I invite QSL inquiries concerning my HL9KT activity at [the address in the list to follow] and will be happy to forward deserved cards. . . . From ex-E2AF, now K4IOH: "Advise any of the gang who have not yet received due QSLs that I have just received my Iran logs and cards and expect to catch up on the backlog shortly. All valid claims will be answered. Self-addressed stamped envelopes will expedite things somewhat. . . . "I have arranged to be JA5FQ's QSL manager for W/K QSOs," confirms WA6PMK. "He will send me a package of some 500 JA5FQ cards, then a monthly copy of his W/K QSO list. I will dispense QSLs to stations requesting them if the log checks okay." . . . KA2EB, DX editor of PEARL News, observes, "The slow DX season of poor conditions is the time to go through your logs and check for absent QSLs. Many times a second or third request brings response. Be patient - I just received a card the other day for a 1959 QSO. Is that guy ever behind!"

Africa - "My exotic DX call is now extinct," laments ex-VQ8BM. "Please make it known through QST that QSL inquiries can be sent to my U.K. address in the list to follow where I hope to fire up G3GVQ soon. . . . W4HUE has it that 9G1DT will return to W3OVU in June. His replacement will be 9C1EF, and W4HUE will assume QSL responsibilities for the latter. . . . "I received about 150 QSLs from ZS6ADP for W/K stations and have forwarded them to the Bureau," notifies W5RJ. "You might advise the gang to make sure they keep adequate s.a.s.e. on file with their local ARRL QSL Bureau managers." . . . K1KOM, formerly of ET3s 2US and 3RC, and now awaiting his EP license in Tehran, apprises: "I can take care of QSLs for ET3RC QSOs made on October 4 through 21, 1962, and for ET2US/ET2 contacts dating November 27, 1960, through October 4, 1962 - operator 'Dick' only. I have about 200 cards for ET3RC and ET2US/ET2 QSOs still to go out, and this will raise my outbound ET record to about 7000 QSLs." . . . K3HQJ can satisfy your QSL desires concerning ET3s 6VW and JK. S.a.s.e. is requested from each W/K applicant, International Reply Coupons from foreign points. . . . According to the DX Bulletin of WGDXC, ex-9U5KU welcomes QSL inquiries at the address in the roster to follow.

Oceania - WNIUO of KC6CG writes W1ECH: "QSLs for KC6 stations may be sent to Navier High School, Truk, Caroline Islands Trust Territory, Pacific, c/o Father Jack Walsh." This may solve the dilemma of ex-KC6UZ, described here last month. . . . Regarding the KJ6BZ listing in the catalog to follow, KJ6BZ staffer K7SFA tells W1ECH, "We cannot handle cards incoming to other KJ6s because there are so many portables in and out of here. We are unable to keep track of them." . . . "I'll be acting as QSL manager for KH6EDW contacts made in January through August of this year," declares KH6CYT. "The usual s.a.s.e. from W/Ks, IRCs from others, are desired." . . . Ex-W6VUN/KW6 testifies, "All cards received from the gang for my Wake caper have been answered via bureau or the s.a.s.e. route. Inquiries on the subject are invited at my new KH6EYP address." . . . W1ECH relays W9UCL's disclaimer of FO8 QSL responsibilities. . . . WGDXC's organ notes that QSOs with

VR5AA operator Oak may be confirmed through W9FXE. All other claims go direct to VR5AA at Nukualofa. . . . No such animal as VK9XO, VK4CC informs the Gulf gang. . . . W2VCZ, dealing with KH6PD/KG6 QSL matters, stresses the s.a.s.e. requirement for W/K petitioners. WGDXC hears that logs will be shipped every two weeks from Marcus Isle. An initial batch of 1000 blanks is dwindling fast. . . . EA3AL *News* lists DUICE as the new QSL manager for the Philippines at this address: Philippine Amateur Radio Association, 1546 Requesens, Sta. Cruz, Manila.

**Europe**—Special request from K1ZBQ who worked plenty of DX as HA2U in 1938-41: "Since I lost all my belongings during World War II I have nothing left as a souvenir of those happy humming years. I would appreciate the return of one of my old HA2U QSLs, and will acknowledge the gesture with one of my present K1ZBQ cards." Oh also sent out many s.w.l. cards from Hungary as HRS-2008 in the middle '30s. . . . "I've received LZ1HA's logs for recent single-sideband operation and have answered all but the DX cards," states W0EJG, formerly VP7NT (1959-61). "Ted sends me his W/K and some VE data, so others should write LZ1HA direct." . . . UBA QSL chief ON4OZ points out to W1ECH that there are no legitimate three-letter ON4 and ON5 calls. . . . SV1AB missed a year's liaison with QSL aide W4HUE but Doc still hopes to hear from him. . . . Because of the precarious standing of amateur radio in Albania, PA3LOU of VERON's *DV press* emphasizes the importance of QSLing ZA stations without reference to radio on envelopes. Mail bearing radio connotation usually winds up in the Radio Tirana BC-voripic phonehouse, anyway. . . . North and South America QSOs with DJ0s IR and IRA can be confirmed through K7BVZ. QSLs from the rest of the world should be sent to J. Simonsen at (DJ6IR) Park str. 17, bei Bressler, 35 Kassel, Germany, or (DJ6IRA) Burgstr. 266 bei Plail, Felsberg (bez-Kassel) Germany.

**South America**—W1ECH allirms the necessity of GMT on your pasteboards when seeking HK0AB and KS4BF QSL favors from W1BF. Good gosh, are there DXers who still quote *local* clocktime? . . . PY1HX is hungry for a Turks confirmation from VP5GB worked in '55, or from VP5FP of '59, both on 20 meters. Any help? . . . W0VZL discourses on the Chilean antarctic QSL situation. "It appears that CE9 stations are quite active again as I received a number of cards for QSOs I did not make. I can QSL only for contacts I made when I operated CE9s AF AS AW and AY. All other confirmations will have to come from the Chileans themselves. I have the following suggestions: (1) When QSLing a CE9 contact, enclose a card for the operator down there to sign. QSLs are extremely hard to come by. (2) Chances of receiving reply will be greatly increased if s.a.s.e. is enclosed bearing Chilean airmail stamps. (3) If not instructed otherwise, mail each card to the base worked, in care of III Naval Zone, Punta Arenas, Chile. Probable calls of bases are CE9AF, Base O'Higgins, Antarctic Peninsula, and CE9AS, Base PAC, Deception Island. (4) Mail to these bases is run only during our wintertime, about December 22nd to March 5th, so do be patient. (5) The address CE9AS, Cesar Alvarez Mellado, Tucapel 1890, Tenuco, Chile, may help those who worked that station in 1962 when I was not at the switches. (6) Although I am out of QSLs I still confirm all contacts I made as CE9s AF AS AW and AY. Those I worked were told to QSL via W9VZL. Let me make it clear that I cannot forward QSLs for, nor can I confirm, QSOs I did not make." . . . In a note to W1ECH, K0TYP disclaims CE1 QSL connections.

**Hereabouts**—Let's have a large hand for our "QSLers of the Month": CE1AD, CO8RA, CR7IZ, EA3GV, E14J, F7YTI, G3NVA, HB9ET, HK3 3RQ 9ZU, HL9KH, JA5 1BN 1ITX 5FQ, KG4s AA1 BC, KP4CC, TI2FP, UD6GF, VP82GAQ 2SY 3FM 4VP 5DB 9FH, VQ9A, WZ6D/F/KM6, XE1MO, ZE5 1AK 4JN 7JV, ZM6AW, ZS7M, 4X4BG, 5A3CJ, 5N2RSB, 60Is MT ND, plus hardworking QSL managers Ws 2CTN 3AYD 4HJ 4ECI 8DWS 9VZP and K3MNJ. The reputable QSL policies of the foregoing are listed in their nominations by "How's" correspondents Ks 1MBM 4HF 6TZX 9CZV 9DKU 9GSD 0GVA 0JPL, WAs 2JIS 2RXU 2TIA 4CZM and 410AA. Any candidates for such recognition in *your* log? . . . K5HDU and WA2-RJZ offer their services as QSL managers for deserving overseas stations. . . . Halp! W1ECH seeks a lead on the Y2RAM he hooked in 1958; K1MBM wants the goods on EA8CI and LU4ZL; W3FWD desires data on AP2AD of January, '62; WA4DAA needs a tracer on CR4AT, '61; and W9QYH yearns for some scoop on CR5UP, '50, KJ6BU, '57, and ZC6UNJ, '48. . . . WGDXC indicates that VP5GT responds to s.a.s.e. QSL approaches. . . .

KL7BJD writes W1LVQ: "Many cards destined for KL7SOA/7, the Alaska Sourdough Net Station at the Seattle World's Fair, went astray because of improper addressing. Some finally reached us but I am sure some amateurs have not received their QSLs. We have cards available for those who still need them." . . . Ex-HI8DGC records that "All logs now are at hand and any cards sent to my Canadian address will be acknowledged promptly." . . . "I've gotten a lot of pleasure dispensing QSLs for overseas stations during the past few years," writes W3AYD to W8BX. "Otherwise it has been a thankless job for the most part." I continued to hang in there even though my free time was cut shorter and shorter and my expenses mounted higher and higher. Mike has changed QTH to 2308 Branch Pike, Birchwood, Riverton, N.J., by the way, and expects to become one of those W2s. . . . WA2-PVW disclaims responsibility for FP8 QSL matters, recent radiated evidence notwithstanding. Same goes for late spurious K5A activity so far as W3KA is concerned; WA2-RUB and WB2CAV learn that KS4AZ operation terminated about two years ago. In like vein, W2OLU declares that FP8AT QSOs after 1958 have no basis in fact despite recent postal evidence to the contrary. . . . ARRL staffer W1ECH reminds us that VP6AF no longer manages the Barbados bureau. VP6-bound QSLs must go direct to stations worked, at least for the time being. W1ECH also learns from VE7HR, "Most VE6s are listed in the *Call Book*. Those unlisted may be QSL'd via the VE1 bureau or via me." . . . "I am W/K-only QSL source for VP5MJ," stresses K0TYO in lines to W1ECH. "I'll accept incoming QSLs from other areas but I can merely forward them to VP5MJ who answers them himself."

LoRoy Waite of Newark News Radio Club continues yeoman efforts to man his SWL/QSL Bureau. Listeners and amateurs interested in the project can reach Roy at 39 Hannum St., Ballston Spa, N.Y. This enterprise has no official connection with NNRC or ARRL but has already helped alleviate the s.w.l.-card load burdening ARRL QSL Bureau personnel. . . . "I was active as VP7BP from San Salvador, Bahamas, from October, 1960, to October, '62," records ex-VP7BP-VP5RH. "Anyone still due a QSL for one of my 6000 QSOs can obtain one from W2CTN by submitting log data and s.a.s.e. to Jack." . . . Now let's see what we have in the mailbag in the way of specific postal recommendations:

- AP5DC, J. Geil, Technical Training Center, City Road, Ramna, Dacca 2, E. Pakistan
- CE9s AF AS AW AY (see preceding text)
- GP5EA (via W1BAN)
- DJ0s IR IRA (see preceding text)
- EP2AM, A. Monsees (W4EXM), Signal Advisory Unit, ARMISH-MAAG, APO 205, New York, N.Y.
- ex-EP2AF (to K4LOH)
- ET3TW (via K1QDC)
- ET3USN, APF 843, New York, N.Y.
- FG7XF (via W2CTN)
- ex-HA2U (V. Karpathy, K1ZBQ, 3 Meadowcroft Rd., Burlington, Mass.)
- ex-HA85-HA8Z, P. Somssich, K3VWH, 1120 Hokendauqua St., Coplay, Penna.
- ex-HI8DGC, D. Crowe, VE3FKC, 1454 Windermere Crescent, Sarnia, Ontario, Canada.
- HL9KE, Capt. F. Galloway, 8th Eng. Bn., 1st Cav. Divn., APO 24, San Francisco, Calif.
- HL9KT (see preceding text)
- HM5s BF BG, c/o H. Dyess, P.O. Box 840, Corpus Christi, Texas
- HR2FG (via W2CTN)
- JA1DLN (via W6FOJ)
- JA1DM, M. Ebisawa, 1793 Kanamori, Machida, Tokyo, Japan
- JA5FO (W/Ks via WA6PMK)
- KC6CG, USCG Depot, Box 3, Navy 926, FPO, San Francisco, California
- KH6EDW (via KH6CYT)
- KH6PD/KG6 (via W2VCZ)
- KJ6BZ, MARS Stn., 1957th Comm. Det. I, APO 105, San Francisco, Calif.

PZ1BA is a popular possibility for your YL-type WAC and DXCC. Grace helps OM PZ1AQ manipulate this Paramaribo layout on several bands. (Photo via K1BDP)

March 1963





5B4WS, formerly ZC4WS, likes 14-Mc. c.w. with his 100-watt 807s rig and G5RV-styled antenna. Bill hails from Sierra Leone, and he expects to return there soon for extensive 9L1 DX doings. (Photo via W8KX)

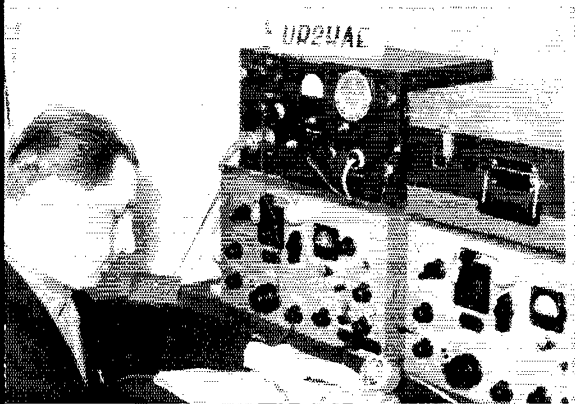
- KL7SOA/7 (via Alaska bureau)
- KP4BCL (via W9AQW)
- KV4CI (via W2CTN)
- LUIZN (via RCA)
- LX3s IR KW (via K7BVZ)
- LZ1HA (W/Ks via W8EUG)
- ex-MP4s BDT MAO QBB TAU, 5A5TA, J. Garrett, W5LAK, 9610 Riddlewood, Apt. 6, Houston, Texas
- PX1s IR KR (via K7BVZ)
- SV0WT (via W5GMS)
- TG5WH (via K2ESE)
- TL8AC (via W8KML)
- TU2AP (via REF or direct)
- VK9ZS (via ZS6LMI)
- VP2MZ (via W2ZMT)
- ex-VP5RH-VP7BP, R. Hyland, Ascension AAFB, c/o GMIRD, P.O. Box 4187, Patrick AFB, Fla.
- VP6LJ (via W2CTN)
- VP7NO (via K8BLT)
- ex-VQ8BM, H. Bates, G3GVQ, 118 The Dale, Widley, nr. Portsmouth, Hampshire, U.K.
- VQ9HD (to G3PEK)
- ex-VR1B, C. Hawker, P.O. Box 35, Dimboola, Victoria, Aus.
- VR2EK, W. Erich (W6AL), Deuba, Fiji Islands
- VR3A, F. Pridmore, 5124-3/4 DeLongpre Av., Los Angeles 28, Calif.
- VR4CU, c/o Box 3351, Auckland, N.Z.
- VR5AA (see preceding text)
- ex-VS5JA-ZL4JA (to EP2BQ)
- VS9ACH, Box 1158, Aden
- VS9MB, RAF, Can, Maldives, BFPO 180, c/o GPO, London, England (or via RSGB)
- ex-W6VUN/KW6 (to KI6EYP)
- YN1AK, T. Jibawy, Box 35, Damascus, Syria
- YN3EM (via K1KDP)
- ZD8JP, J. Packer, Ascension Auxiliary A.F., via Patrick AFB, Fla.
- ZS6IF/8 (via SARL)
- ZS7M (via W2CTN)
- ex-5B4CT-ZC4CT-G3PSM VS9A, C. Thomas, GW3PSM, 59 Maendy Way, West Pointnewdd, Cwmbran, Monmouthshire, South Wales, U.K.
- 5H3HV (via W2CTN)

- 6Q1ND (via W4KUA)
- 6O1WF, W. Franklin, P.O. Box 6, Mozadiscio, Somalia
- 6W8CB/mm (via K8GZN)
- 9G1EF (via W4HUE)
- 9Q5BZ (via UBA of Belgium)
- 9Q5RK (to LX1RK)
- ex-9U5KU, J. Morris, 15019 Hilliard Rd., Lakewood 7, Ohio

QTH donors this month are Ws 1ECH 1TS 2ETS 4HUE 8KX 9VZL, Ks 1RIZ 2TDI 2UYG 4JIF 6TZK 7SFA 9DKU 8JPL, WA2s 01D RUB VFU, KL7BJD, PY1HX, American SWL Club SWL, DARC D X-MB (DLs 3RK 9PF), Japan DX Radio Club Bulletin (JA1DM), Kanawha (W.Va.) Radio Club Splatter (K8BIT), Long Island DX Association D X Bulletin (W2MIES), Northern California DX Club D X'er (K6CGM), VERON D Xpress (PA9s FX LOU VDV WWP) and West Gulf DX Club D X Bulletin (K5ADQ). Much obliged! And, as we usually caution in these matters, the addresses in the preceding rundown are necessarily neither "official", complete nor accurate. Good luck, anyway!

### Whence:

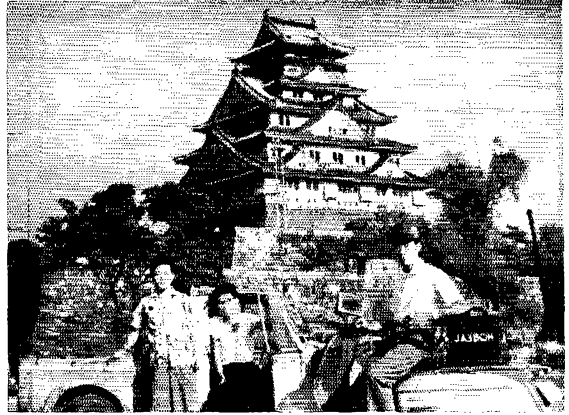
Asia — Tiger Amateur Radio Club invites your participation in the Pakistan Day DX Contest, a c.w. and/or phone affair to run 2400 GMT March 22nd to 2400 the 23rd. Non-Pakistan stations will collect AP contacts on 20 and 40 meters, a given AP station can be worked on both bands, the general call is "CQ AP" and the serial exchange, though not clear in the announcement, consists of RST or RS plus an indication of your location (one's state should suffice for W/Ks). "Although logs are solicited for the entire 24-hour period, only contacts made over a continuous 12-hour period will count," says AP5CP. For score, each complete contact nets 3 points, "each incompleting contact, 2 points", and you pick your best 12-hour stretch for point summation. To be eligible for certificates of performance your log entry, together with twelve International Reply Coupons, should be mailed to TARC Award Manager AP5CP, Dacca Signals, Dacca 6, E. Pakistan, postmarked no later than March 30, 1963. Describe your equipment and include this signed statement with your entry: "I certify, on my honor, that I have observed the competition rules as well as all regulations established for amateur radio in my country and that my report is correct and true to the best of my belief. I agree to be bound by the decision of the Contest Committee." Incidentally, AP5CP has details on WA-AP, a certification based on working a certain combination of nine Pakistan stations since August 14, 1962. Good fishin' on the short and long paths, OMs! — KH6IJ, recently back from a Far East sojourn, learns that AP5s KC and DC, West and East Pakistan, respectively, now are set for single-sideband work. — The U.S. Peace Corps program seems bound to produce a flock of DX QSOs. For example, K8DVL's friend K3DDS, ex-W8RPB, is about to fire up in Malaya. — VE7VC reports the passing of VS6CG, long an outstanding DX personality. — "I went QRT as MP4QBB last September 29th after almost four months of Qatar operation," writes W5LAK. "My DX total was 168 countries. Most of the time conditions were very poor for the W/K gang but I did manage to QSO a few of the boys on c.w. and sideband. Sorry that my MP4MAO operation did not come off but it's impossible to get a visa for Muscat unless one works for a company that operates in that country. I'm no longer in the oil exploration business but I'll be traveling quite a bit in Central and South America and hope to meet some of the gang. I worked from 5A5TA and MP4QBB." — "It's AG and KAB are the only actives in the M.P.R. at present," finds K2UYG. "They spend most of their time on 14-Mc. c.w." — W4EXM is enjoying DX sport as EP2AM these days with a KWM-2 on 20 c.w. and s.s.b. — KX6AJ discovers that JA is BBI FFB HLZ and ISL are dad, mom, daughter and son of a Tokyo ham family. — Korea DXers Society announces a WAK certification attainable by those who collect one HIM QSL and one HL9 QSL for QSOs dating after September 1, 1960. Check with KDXC chairman HIM1AP or the society's secretary, HL9KB, for full details. HIM1AP now gets around handily with his new 90-watt rig, an 8X-110 and vertical. — W5IXP apprises W1ECH, "Amateur operation in Nepal has been suspended for more than a year. Except for the king, only Pr. Moran, 9N1MM, has a legal call sign. I have assurances from government officials that details soon will be completed for handling amateur licensing and operation within the country. Both 9N1MM and myself are eager to make Nepal again available to DXers." — "Pulled the final switch at EP2AF in August,"



UR2KAE is well equipped for the DX fray. Club operator Heldur is shown in the pilot seat but there are plenty of staffers in reserve. (Photo via K1MEM)

**QST for**





JA3BQH likes to hunt U. S. Novice QSOs on Thursday mornings around 1300 GMT, transmitting on 7015-7020 kc. and listening on 7175-7185 kc. Tiger also gets around among interesting scenery on his "megacyclecycle" with pals JA3s BQX, left, and BEA. (Photos via WA6IVM and W7DJU)

writes K4HOH. "I find that my little old 75-watter doesn't do nearly as well with a Stateside call." . . . More Eastern items via the clubs press: AC5SQ pops up on 14,075-kc. c.w. at 1200-1230 GMT on occasion. . . TA4JV of Trebizonde is a fresh s.s.b. entry. . . EP2BQ, ex-VS5JA and ZL4JA, has a c.w.-s.s.b. rig with him on a four-month jaunt through Iran's southern mountains. . . KA2DC supplants KA2CM as FEARL awards manager but correspondence still goes to the society at APO 925, San Francisco, Calif. WFKAS (Worked Five KA Stations) and WTFKAS (Twenty-Five) certifications continue in steady demand. . . JA1AEA can supply specifications for SWA, the Side Winders Award, a sheepskin obtainable by working various combinations of JA KA and KR stations on one sideband.

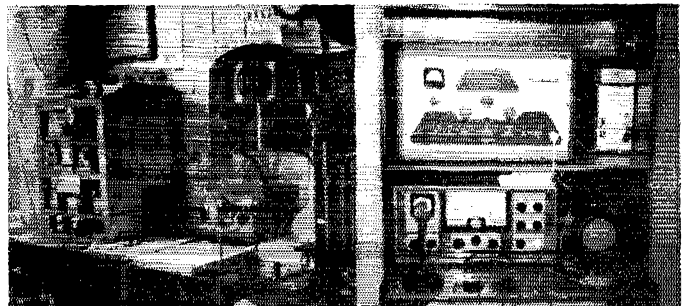
**Africa** — Long time since we heard from 6W8CB/mm aboard *Danae II*. Claude, Claudine and 8-year-old Gerald Goche are resuming their leisurely 'round-the-world trip after a long stopover in the Caribbean. They expect to hit the Galapagos, Marquesas and Tahiti shortly. You'll be hearing them on 10, 20 and 40 meters with their homebrew 6146 final modulated by 1625s, Geloso v.f.o., BC-312, SX-40, HRO-7, vertical and dipole antennas. No indication of nonshipboard operational plans, however. . . Ex-VP5RH-VP7BP writes from Ascension isle where he has hopes of eventual ZD8 authorization. "I've been able to get a look at DX from the other side of the fence in the last three years from the Bahamas and from Grand Turk. For the most part it has been enjoyable. Knowing what I'm in for in the way of pile-ups I'm not exactly over-anxious to receive my ZD8 call. But I'll do my best to live up to it should I receive it." Ralph's in the market for a good rig to help do the job right. . . TT8AJ has moved from Largeau, a distant outpost, to Ft. Lamy, a fairly large city," advises K2UYG. "As a result Yves expects to have regular electric power and more regular c.w. activity. He's constructing a 200-watt 813 rig and a converter for his old BC-348 to operate on 21 Mc. A modulator also will be built for that favorite French African a.m. phone band, 15 meters." . . . WA2VFU notes that 5R8AB particularly enjoys 21-Mc. c.w. QSOs in French around 1700 GMT. Same with 6W8s DD and DE who are catchable on Saturdays between schedules with France. . . According to WA2VFU, VQ2W likes to surprise 21-Mc. Novices now and then with a juicy answer to their plaintive CQs. . .

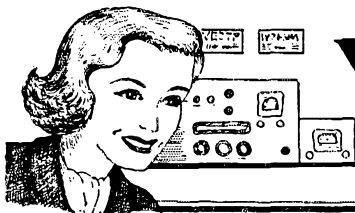
"ETs FW and JK are active on 7- and 14-Mc. c.w. and s.s.b. at 1500-2000 GMT, Monday through Friday, sometimes on week ends," informs K3HQJ, K1KOM, formerly of ETs 2US and 3RC, communicates from Tehran where he awaits EP credentials: "After waiting twenty-eight months for my own ET call and license I got to use mine only 16 days before leaving for the Middle East. Met W3ZA at an ET club meeting just before I left, so watch out for ET3ZA. Two years of rare-type DX work have resulted in a list of personal gripes against irksome operators who (1) can't hear the DX station in a pile-up but who call anyhow on the chance they will hear his comeback or get QSP; (2) hang on frequency after working a DX station to call DX stations who are still after the original DX station; (3) can't raise a DX station or fail to hear him, so start a dog-in-the-manger CQ or QRZ on frequency; (4) take up valuable pile-up time requesting all sorts of special data from the DX station; (5) pretend to have worked a DX station and badger him for a QSL with long letters, postage, etc.; and (6) can't stop calling long enough to hear instructions from the DX station as to his listening procedure." . . . African additions from aforementioned club periodicals: Tromelin, Sikkim, Tibet, Willis, Yemen, Heard, Rodriguez, Albania, Manchuria and the Comoros, in that order, turn out to be ARRL DXCC countries most desired by 133 members of the West Gulf DX Club. Would-be DXpeditioners, there's your script! . . . ZS1OU intends an operational visit to Marion isle next month. . . 5N2BAIW is game for Dahomey if adequately DXhorted. . . That restless rover, W4BPD, still plays his DXpeditionary itinerary by ear in famous style. After PR7 and Mauritius you'd better keep an ear on 14,034 kc. like everybody else.

**Oceania** — Ex-W6VUN/KW6 finds the bands much quieter now while working c.w. as KH6EYP. . . Pacific perusals of various club periodicals: After his Wallis doings and some early visits to other much-wanted Oceania points, VP2VB/mm and *Yasme III* may call it a day. . . VK0s JM and NL may close out some Heard DX business this month. Australia is reported planning to refurbish the base and thus keep a rare one DXtant. . . ZL3DX is willing to put the Solomons on sideband with the proper encouragement. . . VK0DS may score a one-day Macquarie single-sideband stand at any time while en route

(Continued on page 144)

LA4W's application for membership in ARRL's Old Timer's Club included these interesting shack shots. Contrast the rambling 1934 LA4W layout with Asbjorn's current cozier arrangement. (Photos via W1WPO)





# YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,\* W1QON

## THE IMPORTANCE OF BEING A YL

USUALLY the man of the house is the breadwinner, but often the lady of the house controls those purse-strings. Milady ham, have you seen to it yet that a contribution from your family has been made to the ARRL Building Fund? We're sure you will want to have the pleasure of helping to build the larger and better facilities that the League has needed for some time.

And between us girls, as a side effect, feminine wiliness (or is that too tactless a word for it?) tells us that a contribution to the fund might spark just the incentive needed for taking a pleasure trip to West Hartford, or Newington to be exact, to see the new building for yourself. If you are like most YLs we know, gal, you love to travel and a good excuse to travel is the next step to being there!

In any event, as duly licensed amateur radio operators who, thanks in large measure to the

ARRL, can pursue this wonderful hobby of amateur radio, we should all wish to do our part in this worthwhile campaign. A Building Fund Subscription form appeared on page 80A of December 1962 *QST*. Just detach the yellow page, fill it out and mail it with your contribution — or simply send your check to the ARRL Building Fund.

## THIRD YL VHF CONTEST

YLRL Vice President Blanche Randles, K11ZT, accompanied the rules for the 3rd YL VHF contest with the following note:

"The VHF Contest was started because you girls wanted it. Last year the Vice President received only about 15 logs. The WRONE Award is a lovely Revere Bowl engraved with the winner's name, call and date and is the permanent possession of the winner. It has been recommended that unless there is more interest, more participation and more logs received, we will discontinue this contest in the future. Let's show YLRL and WRONE that we appreciate this contest and the lovely award."

The contest will:

\* \* \*

Start: Wed. April 10, 1963 at 12 Noon EST  
(1700 GMT)

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



K9TRP, Diane Price of Chicago, points to her newest certificate to adorn her ham shack walls—CHC #634. A past president (1961-62) of the Ladies Amateur Radio Klub, K9TRP operates mainly 15 and 20 meters sideband. Diane's OM is K9PDT. (Photo courtesy W9GJB).



Attractive LU6NI, Maria Josefina Paz, sent us this photo taken during a party celebrating her engagement to OM LU5RF recently. We always like especially to note the instances where a YL has her own amateur license before marriage, such as is the case with Maria. Felicidades to the happy couple from Argentina.



SM5BMN, Barbara Nord of Linkoping, Sweden, speaks four languages fluently—Swedish, German, French, and English—and is one popular YL on 20 and 80 s.s.b. or a.m. Barbara, who became interested in ham radio through FD activities and transmitter hunts, runs 200 watts sideband and into the rig built by her OM SM5MN.

End: Thursday, April 11, 1963 at 12 Midnight EST  
(Friday, April 12, 1963 at 0500 GMT)

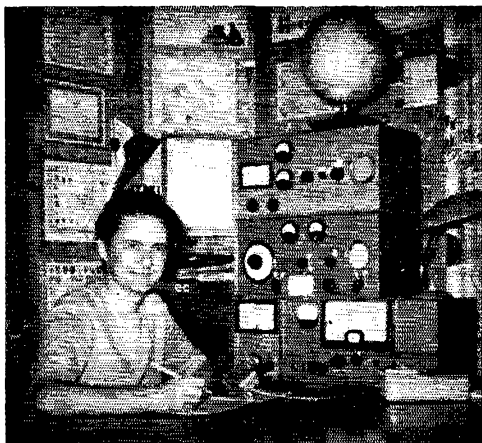
\* \* \*

**Eligibility:** All licensed YL and XYL operators are invited to participate. YLRL members only are eligible for the WRONE (Women Radio Operators of New England) award. A non-member will receive a certificate. Contacts with OMs will not count. A special certificate will be issued to the highest-scoring novice operator.

**Operation:** Bands 50 Mc. and above are to be used, phone and/or c.w. Cross band operation is not permitted. Only one contact with each station will be counted. A section may be counted only once toward multipliers.

**Procedure:** Call "CQ YL".

**Exchange:** Station worked, QSO number, RST report, ARRL section, U. S. possession, VE district or country. Entries in log should also show band worked at time of contact, whether A1 or A3, time of contact, date, transmitter and power.



DL3LS, Ursula Buerger of Remscheid, Germany, has been a ham since 1949. Ursula is usually on 80 meters, but when conditions are especially good, she switches to 20 meters. A "many-certificated" YL, Ursula is the YF of DL1RA. (The photos of DL3LS and SM5BMN were forwarded by globe-trotter W7QYA, Flo Majerus, who recently enjoyed hospitality in the homes of these two YLs, among other DX ARRL and IHHC, members.)

**Scoring:** Multiply number of contacts by total number of ARRL sections, U. S. possessions, VE districts or countries worked. Contestants running 50 watts input or less at all times may multiply the above results by 1.25 — low power multiplier.

**Awards:** Highest scorer will receive the WRONE Award (given to a YLRL member only). The top three scores will receive certificates. The top VE YL scorer and the highest novice scorer will receive a certificate.

**Logs:** Copies of all logs must show claimed score, be signed by operator and be postmarked not later than April 25, 1963 and received not later than May 10, 1963. Send

## RULES 14TH ANNUAL YL-OM CONTEST

**TIME:** 35 hours

**PHONE** — Starts Sat. March 2, 1963, 1300 EST to Sun. March 3, 1963, 2400 EST. (1800 GMT Sat. to 0500 GMT Mon.)

**C.W.** — Starts Sat. March 16, 1963, 1300 EST to Sun. March 17, 1963, 2400 EST. (1800 GMT Sat. to 0500 GMT Mon.)

**ELIGIBILITY:** All licensed OM, YL, and XYL operators throughout the world are invited to participate.

**OPERATION:** All bands may be used. Crossband operation is not permitted.

**PROCEDURE:** OMs call "CQ YL." YLs call "CQ OM."

**EXCHANGE:** QSO number, RS or RST report, ARRL section or country. Entries in log should also show band worked at time of contact, plus time, date, transmitter and power. (ARRL Section List available for SASE to YLRL V.P.)

**SCORING:** (a) Phone and c.w. logs will be scored as separate contests. Submit separate logs.

(b) One point is earned for each station worked, YL to OM or OM to YL. A station may be contacted no more than once in each contest for credit.

(c) Multiply the number of QSOs by the number of different ARRL sections and countries worked.

(d) Contestants running 150 watts in-

put or less at all times may multiply the result of (c) by 1.25 (low-power multiplier).

**LOGS:** Copies of all phone and c.w. logs, showing claimed scores and signed by operator must be postmarked not later than March 31, 1963 and received no later than April 15, 1963, or they will be disqualified. Please file separate logs for each section of the contest. Send copies of logs to Blanche Randles, K11ZT, 62 Linda Ave., Framingham, Mass.

**AWARDS:**

1st place phone: YL — Cup OM — Cup  
1st place c.w.: YL — Cup OM — Cup

The winner of the phone cup is also eligible for the c.w. cup. Certificates will be awarded to high place c.w. and phone winners in each district and country.

No logs will be returned. Be sure it is a copy of your log you send for confirmation.

**V.P. Note:** "Please note the multiplier has been changed from states to ARRL sections. Please know your own section or country." — K11ZT.

**ATTENTION OMs:** W9MLE, Peggy Putnam, has suggested that OMs send self-addressed stamped envelopes to YLs when requesting QSLs, especially for contacts made during this YL-OM contest. When a YL works a large number of OMs, most of whom seek QSL cards, the expense to a gal can mount up!



Some OMs have complained about the seeming dearth of active YLs in Kansas, according to Dorothy Hall, KØGIC. Dot forwarded this photo to prove that there definitely are some active YLs in the Sunflower state—the twelve shown here who got together at the Kansas Amateur Radio Convention held last Dec. 2 in Wichita, to name just a few. In the photo by KØJWS are front row, l. to r.—KØGZO, WØJUV, KØSMP, KØGIC, KØHEU; back row—KØSML, WØBJC, KØYHW, KØEBR, WØBBX, KØHQD, and KØREE.



Thirteen-year-old general class licensee Marlene Kaniuk, WA9FRW, averages 30 hours a week on the air according to her dad, W9CDQ. Marlene, who is a member of the ARRL and YLRL, operates 20-meter sideband.

certificate winners in 1962. OM KØVSH has advised us that KØVPH, Dolly Rohman of Arnold, Missouri, made BPL for traffic handled during July and August 1962. Our apologies to the YL from Missouri and thanks to KØVSH for bringing Dolly's traffic accomplishments to our attention.

### YLRL CERTIFICATES and CUSTODIANS

copies of log to YLRL Vice President Blanche Randles, K1IZT, 62 Linda Ave., Framingham, Mass. No logs will be returned. Be sure it is a copy of the log you send in for confirmation.

Remember the dates — April 10 and 11!

#### WRONE WEEK — March 18-22

Sponsored by the Women Radio Operators of New England

**Object:** A contest for members of the Women Radio Operators of New England YL club (WRONE) to contact as many YLs in New England as possible. YLs everywhere may participate, but the method of scoring given below should be noted. The primary purpose of this contest is to give the YLs of the six New England states a chance to get better acquainted.

**Time:** Contest begins at 1300 GMT Mon. March 18, 1963, and ends at 2300 GMT Friday, March 22, 1963.

**Scoring:** One contact with each station permitted (any band). Score 1 point if YL worked is YLRL member; 2 points if YL is WRONE member; 3 points if YL is both YLRL and WRONE member; ½ point if she is neither WRONE nor YLRL member.

**Logs:** Copy of regular log, with YLRL and WRONE member indication, must be received no later than April 7, 1963. Send logs to Edith McCracken, K1EKO, P.O. Box 285, Westwood, Mass.

**Prize:** High-scoring WRONE member will receive 100 Miss WRONE QSLs.

#### Another BPL YL

In our January column we listed YLs who were BPL



Israel YL 4X4NNW, Dvora Sha Al, enjoys chatting with other YLs on 15 meters. Dvora is a schoolteacher in Haifa. (Photo courtesy W1RLQ).

YLRL Vice President K1IZT sent along notice of a change of custodians of one of the four YLRL certificates, and so it seems like a good time to publish the rules for those popular certificates again. It is the WAC/YL award that changes custodianship at this time. Miriam Blackburn, W3UUG, takes over the duties from Barbara Houston, K5YIB. All other custodians remain the same.

**WAS/YL — Worked All States YL** — Issued for a contact with a duly licensed YL in each state of the 50 United States of America. District of Columbia may be substituted for Maryland. ARRL "single community" rule applies. No time or band limitations. Send QSLs and alphabetically-by-state list, showing call, date, band and whether A1 or A3. Include postage for return of cards by 1st-class mail. Custodian Grace Ryden, W9GME, 2054 N. Lincoln Ave., Chicago 14, Illinois.

**WAC/YL — Worked All Continents YL** — Issued for contact with a duly licensed YL on each of the six continents. All contacts must be made from within a 25-mile radius of original location. Send QSLs and list to Miriam Blackburn, W3UUG, Box 2, Ingomar, Pa.

**YLCC — YL Century Certificate** — Issued for contact with 100 different YLs. All contacts must be made within 25-mile radius of the original location. Send list in alphabetical order by operator's last name, showing operator's full name, call letters and date of contact. Enclose postage for return of cards by 1st-class mail. Endorsement given for each additional 50 YLs. Applications for stickers to be in same form as application for original certificate. This award is for working different YLs — same YL worked under different calls counts only. Send application



Net co-ordinator of the Upper Peninsula YL Net (Monday 1400 GMT-3920 kc.) has been K8KIT, Muriel "Kit" Rundell of Munising, Michigan. Holder of a public service award, Kit enjoys c.w. on several bands. (Photo via W8HAV)



Shirley Merrill, K7IVK, affords many a Wyoming YL contact on 15 meters. Shirley and her OM, K7CSW, are regular check-ins to a local CD net.

and QSLs to Katherine Johnson, W4SGD, Box 666, Fuquay Springs, North Carolina.

**DX YL** — available to YLs only! Work 25 duly licensed YLs outside your own country as defined in the ARRL DXCC countries list. All contacts must date after April 1, 1958. Send log extracts showing date, time, station, band, mode, RST report and own QTH, name, and call. QSLs not required. No charge, but return postage will be appreciated. (Note: work 25 different DX YLs, not necessarily 25 different countries.) Custodian: Maxine Willis, W8UHA, 6502 Wynkoop St., Los Angeles 45, California.

For a complete listing of some 45 YL nets and roundtables conducted during the winter months see the October 1962 column.

### COMING EVENTS

**YL-OM Contest** — The 14th annual, conducted by the Young Ladies Radio League. Phone section March 2-3; c.w. March 16-17. See rules this column.

**WRONE Week** — March 18-22, sponsored by the Women Radio Operators of New England. See rules this column.

**Third YL VHF Contest** — April 10-11, sponsored by the YLRL. See rules this column.

**Annual California YL Get-Together** — April 5-6 at the Miramar Hotel, Santa Monica. Los Angeles VLRC is



Grace Crory, W1EYK, of Harwich, Mass. is one of the few YLs of olde Cape Cod. Grace, who works all bands but mainly 75 phone, is EC for her town and a member of the Texas Tower Net and Cape Cod and Islands ARA.

hostess club this time. Registration Friday evening; YL luncheon Saturday; YL-OM dinner Saturday evening. K6BUS, Midge Rommel, is chairman of arrangements. **Dayton Hamvention** — April 26 and 27 at the Dayton Biltmore Hotel, Dayton, Ohio, sponsored by the Dayton ARC. There will be a separate day-long program for YLs and XYLs.

**13th Midwest YL Convention** — June 22 and 23 at Falls Hotel, Newberry, Michigan. W8HAV, Zelma, and W8JXJ, Vi, co-chairmen. Many interesting events planned. Registration of \$2.00 must be sent by May 15 to Zelma Neault, W8HAV, P.O. Box 483, Marquette, Mich.

**YLRL International Convention** — June 19-21, 1964! It's a long way off yet, but Shirley Rex, K8M2T, and her committee of Buckeye Belles, wants all YLRLers (all thousand plus of them) to start planning on attending this big event now!

### Silent Key

It is with deep regret that we record the passing of Inez Morton, W7PUV, of Scottsdale, Arizona, on Dec. 29.

**QST**

## Strays

### FEEDBACK

We made it hard for you on page 13 of January, 1963, *QST*. In Fig. 2, a drawing of metal parts for a 432-Mc. converter described by W2VCG, we specified "1/2-inch brass or copper." K2VAM, pointing out that this is pretty heavy stuff, also notes some missing dimensions. Obviously, the material is 1/32-inch brass or copper. Flashing copper will do nicely. Partitions A, B and C have no height dimension in the drawing. This is not critical, but it should be about 1 3/4 inch, before bending. A and B are square.

In W5SQT's 807W amplifier, page 30 of the

February issue, the cathodes of the amplifier tubes should be connected directly to ground.

W7QBR's Q-multiplier circuit, page 39, January, 1963, *QST*, lacks one component essential to the success of the "null" operation. Instead of the direct connection between pin 6 of the 12AX7 and the lower contact of S<sub>1B</sub>, there should be a 180K, 1/2-watt resistor between these two points. Supplementary information: The author says that the circuit also can be used for intermediate frequencies from about 35 to 90 kc, if L<sub>1</sub> is changed to a Miller type 6314 coil, which has an inductance range of 2 to 18 millihenrys.

# Strays

The *Reseau des Emetteurs Francais*, French counterpart of ARRL, and the French Broadcasting Company are jointly sponsoring a unique contest, open only to amateurs and s.w.l.'s who are members of the International Amateur Radio Union affiliate in their respective countries (for U. S. and Canadian amateurs, the ARRL of course). The object is to work F2TF/MM aboard the sailboat *La Constance* as many times as possible (but limited to once per day per band) as she sails around the world. F2TF will operate phone and c.w., 80-10 meters. The operator is Andre-Armand Cahard, a broadcast engineer who qualified for his amateur license just before the trip. *La Constance* was scheduled to leave the Azores early in February to cross the Atlantic on the first major leg of the journey.

Certificates or other recognition will go to the first and second highest scorer in each continent as supported both by the log of F2TF and QSL cards sent to the address below. Up to five reports can be made on each card, showing band, mode and RS or RST report. The card should include the expiration date of ARRL membership. QSLs go to: Radiodiffusion Television Francaise, "Cap a l'Ouest," 107 rue de Grenelle, Paris, France.

The *Union Belge des Amateurs-Emetteurs (UBA)* invites foreign amateurs visiting or stationed in Europe to attend its International Mobile Rally to be held on April 28, 1963, at Verviers, Liege. Special mobile licenses for all Belgian amateur bands and modes, valid for the period April 26-May 3, 1963, and bearing ON5 calls, may be obtained by writing UBA President Rene Van Muysen, ON4VY, 81 rue Joseph Baus, Wezenbeek-Oppem, Belgium. The letter should clearly state that the applicant intends to take part in the rally, should indicate the car license number, should be accompanied by a photocopy of the amateur's home-country license, and should reach M. Van Muysen before April 5.

The affair starts with a talk-in contest on 80- and 2-meter phone from 0800-1100 local time April 28. Informal meetings and picnic will follow from 1100 to 1330. There will then be a tour to the Barrage d'Eupen, with the program terminating at 1700. The Rally fee is 100 Belgian Francs, (approximately \$2.00 U. S.) of which half is for "insurance of civil responsibility." The fee should be made payable to Post Office Check #652667, and sent to M. Julien Coumbaye, 33 rue Bellevue, Lambermont-Ensival, Belgium, by April 1.

## J. Howard Dellinger

Radio lost a distinguished pioneer with the passing of Dr. J. Howard Dellinger, Dec. 28, 1962. Joining the staff of the Bureau of Standards in 1907, he initiated radio research by NBS in 1911. He is credited with many discoveries in the radio propagation field, and the simultaneous occurrence of solar eruptions and fadeouts in h.f.

## Silent Keys

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

W1BIA, John G. Mahler, sr., Belmont, Mass.  
 W1KAR, Clinton R. Story, Salem, Mass.  
 K1KWL, William A. Zarth, Stamford, Conn.  
 W1UPC, Harold W. Geddes, Winsted, Conn.  
 W1VM, John H. Elmore, Hull, Mass.  
 K2EEJ, David R. Berret, Pleasantsville, N. J.  
 K2HEP, David K. Eiffe, Utica, N. Y.  
 WA2JZV, Dolores B. Daskam, Lebanon, N. J.  
 W2KCI, Fred G. Cooper, Averill Park, N. Y.  
 K2OLX, Willard T. Dolby, Sewell, N. J.  
 W2UYH, Howard G. Firestone, Pearl River, N. Y.  
 WV2ZRZ, Albert E. Grant, Saint Albans, N. Y.  
 W3DMQ, Julian D. Mathis, Glenside, Pa.  
 K3EYT, Albert A. Weirnerman, Pittsburg, Pa.  
 W3JMS, Albert C. Cavileer, Glen Burnie, Md.  
 W3LHW, Francis J. Werner, St. Marys, Pa.  
 K3QQQ, Samuel B. Davis, Pittsburg, Pa.  
 W3TGO, Peter Kowall, Arnold, Pa.  
 KN3UWS, James W. Zdarko, Erie, Pa.  
 W4AKF, Gordon B. Woodruff, sr., Orlando, Fla.  
 W4BHR, James D. Handolph, Greenville, S. C.  
 WN4DIG, Brenda G. Allen, Charlotte, N. C.  
 W4DLO, D. W. Barnes, Madison, Fla.  
 W4EYV, Frank W. Stout, Safety Harbor, Fla.  
 K4LEN, Harlan M. Davis, Montezuma, Ga.  
 W4NCC, Manfred M. Oppegaard, Winston-Salem, N. C.  
 W4PL, Benton White, Chattanooga, Tenn.  
 K4SLT, Nonie B. Goggans, Macon, Ga.  
 W4WAB, Garland E. Anderson, Galax, Va.  
 K4ZGZ, Bruce G. Chalfin, jr., Rustburg, Va.  
 W5ERC, John A. King, Kingsville, Tex.  
 W5IMT, Albert S. Johnstone, New Orleans, La.  
 K5YMZ, Ashley J. Goudeau, Ville Platte, La.  
 W6GAA, Leo R. Vernon, Pacific Palisades, Calif.  
 W6RJI, Reginald J. Burrows, Los Angeles, Calif.  
 WV6VKV, Louise L. Kirk, Twentynine Palms, Calif.  
 K7BSM, Dennis H. Shanklin, Kellogg, Idaho  
 K7CQH, Gerald Chilton, Phoenix, Ariz.  
 W7PUV, Inez M. Morton, Scottsdale, Ariz.  
 W7QDH, Merlan G. Wood, Chalis, Idaho  
 ex-7RB, John K. Todd, San Diego, Calif.  
 W8AIF, George R. Beckett, North Kenova, Ohio  
 WN8DLA, William A. Holland, Spencer, W. Va.  
 K8DSI, Harold E. DePue, Mendon, Mich.  
 W8HYM, William O. Mattingly, jr., Detroit, Mich.  
 W8JYU, Charles W. Mallory, Dearborn, Mich.  
 K8NZF, Joseph J. Bernaciak, Grand Rapids, Mich.  
 W9CXX, Howard J. Fischer, Plymouth, Wis.  
 W9DOD, Donald F. Hunt, Speedway, Ind.  
 W9SGO, Emal S. Hillery, East Peoria, Ill.  
 W0HED, Harvey Wald, Paynesville, Minn.  
 W0JRY, William P. Peterson, Council Bluffs, Iowa  
 W0OZK, J. Bert Deck, Winfield, Kans.  
 G5HH, Henry Hunt, Reading, Berks., England  
 VE3ANT, Vincent E. Tapp, Richmond Hill, Ont., Canada  
 VE3FR, Frederick Reynolds, Toronto, Ont., Canada  
 VE5AY, M. R. Geddes, Lancer, Sask., Canada  
 VE5RT, Adolf Ropertz, Moose Jaw, Sask., Canada  
 4X4MX, Menachem Halfon, Neve Sha'anun, Haifa, Israel

radio propagation was named the "Dellinger Effect" in his honor.

Though not himself a licensed radio amateur, Dr. Dellinger maintained an interest in the work of amateurs, particularly that relating to radio propagation discoveries and pioneering. He directed several cooperative projects in which amateur observations were used for scientific purposes.



# Correspondence From Members -

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

## WHAT IS A HOBBY?

☐ Sometimes I pity the poor guy who has to read, and prepare for publication, all of the Correspondence From Members in *QST*. I guess, however, that my sympathy should really be directed toward others; in fact toward about 90% of the letter-writers: the s.s.b. man who thinks that a.m. should be outlawed; the a.m. operator who believes that the introduction of sideband into amateur radio was a crime; the traffic-hound who can't pass traffic for the QRM; the ragchewer who can't QSO for the traffic nets; the frustrated would-be amateur (would-be provided he doesn't have to exert any effort) with a Technician license who wants General privileges; the real Technician who hates to see his respected class of license degraded by said would-be ham; etc., etc. At the rate we're going, perhaps we should start a fund for the purchase of bicarbonate to be sent free of charge to each new licensee.

Sure, everyone has his own opinion on almost every subject, and in some cases one may feel very strongly about an issue. Before we all get ulcers or worse, I say let's all give a thoughtful, unbiased answer to one question: what is a hobby? Mine is a source of pleasure and enjoyment, even though like any other human activity, it has its disagreeable features. As for myself, when those disagreeable aspects grow to such proportions that I can't pass over and forget them, I'll get out of the rut and find myself another hobby which *can* be a source of enjoyment and relaxation to me. I will be better off, and so will the amateurs who want their favorite pastime to be respected and enjoyed as a fine hobby. I, for one, plan to try to prevent such a day from coming to me. — *Ed Juge, W5T00, Fort Worth, Texas*

## THOUGHTS ON QST

☐ K4ZQR's letter in January *QST* has some good points, but the wrong solution. Dick may not understand some of the technical articles, but he should understand that technology is an important part of ham radio.

Instead of limiting the number of technical articles, the "Beginner and Novice" section should be revised slightly. Rather than showing newcomers like myself how to build five or six different rigs with approximately the same specifications, you might introduce some articles that describe the operation of the oscillators, pi-network tuners, keying systems, and numerous other things that we all use.

Let's not lower the number of technical articles; let's increase the number who can benefit from them. — *George Caplan, K3JHF, Havertown, Pennsylvania*

☐ Ever since I joined ARRL back in 1956, I have read every issue of *QST* with enthusiasm, and I would like to commend the League on the many excellent articles. In the January issue, I read with considerable consternation a complaint that the

technical articles in *QST* were too advanced for the average amateur. Let us all keep in mind that the only way one can learn is to venture into those areas that one knows the least about. This is the way to expand one's knowledge, and to take advantage of the enjoyment that ham radio has to offer. I sincerely hope that there will never be an issue of *QST* that contains only those technical articles which *everyone* can understand. — *D. W. Huff, K6KDE, Glendora, California*

☐ The technical articles in *QST* are, as a whole, above the head of an average ham, who is probably like myself — ignorant of how my transmitter really works, why I don't get out, or what to do when harmonics pop up. Therefore, an average ham passes up the 59% of *QST* devoted to technical articles just because he doesn't know what an ohm is, how a tank circuit works, or how to read a schematic. Consequently he is the one who overmodulates, has key clicks, etc.

I believe that *QST* could carry on a more effective campaign by a regular series on basic radio theory. . . . — *John R. Vance, K0IIGII, Spencer, Iowa* (Editor's Note: See page 20 of this issue for the first article in just such a series.)

## SSB ULTIMATUM REACTIONS

☐ In the January issue WIBGJ takes ARRL to task for not campaigning for a prohibition of conventional amplitude modulation on the ham bands, leaving the implied criticism that ARRL has not pushed sideband sufficiently. Those of us who work a.m. will dispute this. Look at some of the back issues of *QST*, when amateur radio first came on the air after World War II. It got to the point that practically every issue was full of nothing but articles on what a fine mode sideband was. It got pretty sickening. Don't tell me that ARRL doesn't push sideband! . . . — *Jack E. Davis, W6YOL, Santa Fe Springs, California*

☐ I suggest WIBGJ go one step further and make it mandatory for everybody to go s.s.b., transistor driver, 17.6-volt tube final with appleberry pie coupling to a three-phase vertical squirrel cage antenna mounted on an inverted skyhook lightning rod support.

As can be seen, all equipment would then be the same and we would have a wonderful world of complete conformity among hams where individuality would no longer upset the serenity of his private applectart, no one would have to dirty his hands in building equipment, no new ideas would ever again rear their ugly heads — and amateur radio would be as dead as dinosaur hunting! — *Theodore K. Rigger, K2IINM, Elmira, New York*

☐ How would WIBGJ feel if, instead, he got a slip from FCC saying: "One of your brother hams has complained about your s.s.b. operations. You have six months to get on a.m. — or else."

I can only say what has been said many, many times: there is a little something in ham radio for everybody. You want to work s.s.b.? Quack right ahead. You prefer c.w.? Pound away. But don't try to force everybody else into your own mold. — *Bob Seals, K9AIK, Chicago, Illinois*

¶ The way WIBGJ came out against everything except s.s.b. reminds me of the days when club meetings ended up in near fights on which was the best to use for a detector — galena crystal in alcohol scratched with a phosphor bronze cat-whisker or a piece of anthracite clamped in tin-foil and held in a Fahnestock clip against a straight piece of flexible steel. . . . — *Charles L. Meistroff, W4TFA, Richmond, Virginia*

¶ I feel that a.m. is out of date for practical communications and that it takes up twice as much space as s.s.b. But I do not feel that FCC should make it illegal. . . .

I believe that in due time s.s.b. will become the prominent mode of operation in the future years and that transmitter and receiver prices will fall enough to allow the poorer amateur to purchase s.s.b. equipment.

Then the amateur spirit itself — and not the FCC — will relieve our bands of congestion. — *James S. Beck, K0JQI, Cedar Falls, Iowa*

¶ Making everyone go s.s.b. would not solve our problem, mainly because everyone cannot afford it. — *Joseph Leo Lynch, W4GPD, Bonita, California*

¶ It is time to stand and be counted — Is it the intent of our League leaders that, in the future, all phone communication be s.s.b.? A clear statement would help.

If not, does the League intend to formulate and promote a practical solution to the problem of a.m. and s.s.b. incompatibility? — *Emerson Corson, W1TTI, East Pembroke, Massachusetts*

¶ If the entire band goes to s.s.b. how can we hope to communicate with our many friends in other countries that do not have it? Do we have to give up QSOing these people for a selfish few?

I agree that s.s.b. can be copied better than a.m. So we do give up all phone bands to s.s.b.; now we have a real problem. C.w. can be copied better than s.s.b. — will you give up all freq. to c.w.? You are not making sense! — *John E. Leary, W9WHM, Fortville, Indiana*

¶ S.s.b., despite all the fanfare, has sickened many hams who have given it a fair try, among whom I can include myself. Daily on 20 one can hear disgruntled comments about s.s.b., not only with respect to the dreadful audio response, but with accent on the boring practices of s.s.b. operation. Specifically, as a sample: the multi-station gang-ups which some people refer to as QSOs. This type of communication goes far to defeat our time-honored personal touch of two-way contact, contacts which on a.m. allow one to gauge through the timbre of a fellow's voice, his personality and character: not a tintype semblance of a voice such as rasped over s.s.b. . . . — *John M. Murray, W1BNN, Bloomfield, Connecticut*

¶ I have nothing against s.s.b. personally. I am for progress but not for the extinction of the hams who make progress possible. Someday I may go s.s.b.

and the attitude of the s.s.b. ham will have more to do with that than the price of a new transmitter. Personally I prefer to talk to more friendly and broadminded hams on a.m. — *Harold E. Eckes, W7KYO, Bend, Oregon*

¶ While I like the side-band mode, I feel that Mr. Fichtorn's point of view is rather selfish. I think that an amateur should be allowed to work a.m., c.w., s.s.b., RTTY, or any other mode he wishes without being pushed by one group or another into using some mode of transmission he doesn't care for. — *Mike Warner, K5JIN, Turpin, Oklahoma*

¶ In order to reduce QRM to the lowest amount, all phone transmission should be eliminated, and use made of the mode least likely to cause interference, which is c.w. This would take a large percentage of stations off the air permanently, perhaps 80% of those now active. But it would reduce QRM to a negligible amount, and make ham operation a real pleasure; for the short time that the small number of remaining stations would be allowed to operate at all. — *A. W. McAuly, W3CEO, Oakmont, Pennsylvania*

¶ The pressing problem is a reasonable use of whatever mode desired as to technical adjustment and lowest power input necessary for the QSO at the time. As we increase in numbers of course our bands will be more crowded. — *J. E. Wofford, W5AFI, Cleburne, Texas*

¶ The "chaos" on 20 phone is not so much a result of the use of a.m. as it is of improper operating practices i.e.: using more than the necessary power to maintain contact, failure to listen before transmission, etc. — *John Dunn, WA2IBI, Flushing, New York*

¶ Although s.s.b. might seem to be the ultimate mode to some people, it has faults which prohibit more extensive use. Much more technical know-how is required both to maintain and operate properly a s.s.b. station. Unfortunately relatively few have this ability. Unless one is willing to spend large amounts of money or possesses this ability sideband is not practical. — *Brian Alsop, WA2KSD, and Steve Berens, K2GTF, Troy, New York*

¶ WIBGJ seems to be a believer in, "What is good for General Bull Moose is good for the rest of the country." This is not necessarily true and for a freedom-loving people, should never be true.

Let's hope ARRL encourages more than one mode of operation — *Martin D. Johnson, W0RJA, Alliance, Nebraska*

¶ The methods pushed by the ARRL (turning to 10 meters for local nets and QSOs, etc.) are the only real solution. If we all join together and support these ideas, elimination of any mode of operation becomes unnecessary. Sideband will replace a.m. eventually, but let us not push such a great change ahead of its time, or we may destroy amateur radio completely. — *Tim Turner, K7PIL, Spokane, Washington*

¶ A.m. and s.s.b. can, and do, work peacefully side by side on our bands. I say let each ham have the same consideration for his fellow operator as he would want them to have for him and each of us

(Continued on page 160)





# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
GEORGE HART, WINJM, Natl. Emerg. Coordinator

ROBERT L. WHITE, WIWPO, DXCC Awards  
LILLIAN M. SALTER, WIZJE, Administrative Aide  
ELLEN WHITE, WIYYM, Ass't. Comm. Mgr., Phone

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**OBS and VHF-PAM Posts Opened to Technicians.** Effective March 1, 1963, SCMs will consider applications from Technician members, as well as from members holding other classes of FCC-amateur license except Novice, where there are appropriate openings in field organization work in these capacities.

*Official Bulletin Stations* are appointed by SCMs only in accord with geographic needs for local coverage. They must (a) guarantee a minimum of 3 scheduled transmissions per week (b) adhere to schedules agreed upon with SCM and (c) return information when there are periodic surveys. Monthly report of activity must be sent to the SCM. SCMs will establish regions or consider the several larger cities or populated areas as qualifying for a single VHF OBS appointee. An OBS application form will be provided by Headquarters on request, also the Operating Booklet that describes appointment qualifications in more detail.

**VHF PAM:** SCMs, effective March 1, are authorized to endorse PAM certificates for VHF-PAM to give recognition and support to continuing v.h.f. phone-net communications activities where this covers significant section areas or substantial parts of sections. Regular periodic netting identified with the section must be accomplished. Where there are openings for VHF-PAM, Technicians as well as other classes of operator (except Novice) may receive SCM consideration. PAMs like RMs are generally appointed by SCMs with a designated responsibility for specific bands and geographical areas, not to exceed an ARRL Section in size. A PAM or RM will receive suggestions (CD-1) on the organizational objectives and problems with the idea of tying all communications capabilities to

National Emergency and Traffic objectives. We have both training and public-service possibilities in mind.

**The Other Posts for Techs.** ARRL's OES (Official Experimental Station) post is open to every Technician and Novice working actively on v.h.f. It has been our fastest growing appointment in recent years; about 44% of the OES are Technicians. All v.h.f. workers should aspire to OES. Then also the Amateur Radio Emergency Corps (AREC) invites registration of all active amateurs—those in every band and holding every kind of amateur license, AREC and RACES plans emphasize the importance of two- and six-meter net operation in public service work. We invite Techs and all amateurs not registered with AREC to get our Form 7 blanks and fill them out. If you have not already done so, get these to your nearest ARRL Emergency Coordinator (or SEC or SCM). As has been pointed out Technician operators and others in AREC groups are eligible to be named Assistant EC too, where the plans and numbers involved call for such posts. There's an AREC decal and Emergency Communications Manual available for those getting into AREC, as they show consistent support and activity in the group. See your EC!

**OBS System and Technician Appointment Studies Completed.** Some rather extensive Operating Department studies were undertaken in '62 and we're happy to report on the results. A study of the Official Bulletin Station coverage was made based on reports of 182 of the

Officials and appointees gathering at the new club station of the Jefferson ARC, W5GAD, (the call in memory of Albert Lestelle, deceased club member) are, left to right: K5HEK; K5FYI, OPS; W5CKP; W5FMO, SCM; K5AGJ, ORS/OPS; W5MXQ, SEC; W5EBK; K5IZD. The fine photo thanks to K5PME.



454 appointees in the system. *Without* including W1AW's 24 transmissions a week (on 8 bands simultaneously), the system's code transmissions totaled 274, with 588 by voice, in a given week. Data were sent on every amateur band between and including 1.7 Mc. and 220 Mc. . . . and utilizing RTTY as well as c.w. and phone. We compared the transmissions in each different band and mode with the interest or occupancy figures shown in the blue card survey for each such band. In general the voluntary bulletin work "of, by and for the amateur" is closely compatible with band use. However, we could use some more transmissions on the 15-20-40 meter bands. System transmissions per band were reported to each of the elected SCMs. Any amateur from anywhere in the North American continent who wants to go after them certainly can get the radio bulletins addressed to amateurs, either direct from W1AW or from one of the OBS appointees transmitting on h.f.

We suggested to SCMs that for the benefit of individuals who may confine their work to v.h.f. and even though with modern band switching receivers there's lots of switching from band to band, and everyone has a crack at these transmissions, that there could well be v.h.f.-OBS appointees covering all the larger cities and communities. As usual SCMs must pick stations with high antennas that work on 2 and 6 meters and have considerable power and can cover as large a radius as possible. It goes without saying of course that appointments are made by SCMs as there are openings for stations to give section coverage. The idea is one of service to members rather than a favor to the person being appointed OBS.

**Variety of Views Presented on Technician Appointments.** The subject of changing the name of the Official Experimental Station post to Official VHF Station is being deferred pending receipt of further responses pertinent to that subject. We proposed to the field (SCMs) that since the Tech. has a renewable ticket and no time limit hanging over him that, if found practicable, we expand the appointment horizons. The Tech's present work in AREC, and in Assistant EC posts and as OBS having proved an excellent thing we wondered about new posts (for him) such as OBS and OO and VHF-PAM. The only restriction to his communications capabilities is the FCC-maintained limitation in his use of frequencies. A careful analysis of all the responses from all over the field organization was made. Here are examples of our replies which are fairly representative of the wide variety of views received. The reader is referred to ARRL's booklet *Operating an Amateur Radio Station* for the detailed descriptions of each of the Appointments here discussed.

"Qualified Techs should have the chance to help on v.h.f. bands; many can't qualify. But give those that *can* a chance to help the others." — *K9GSC, Wisconsin SCM.*

"Suggest SCMs ask OBS to show two or three years experience or stress the exceptional coverage and times per week expected, otherwise every new Tech will want to be-

come an OBS. Please show age and class license on every application form . . . W1AWA our General Class PAM for 6 has done a great job with the Cross Band Net. How could a Tech VHF-PAM ever have a better following than a General? Any such should be an older person with Leadership Capability . . . For a broader concept Official VHF Station (OVS) would seem to become "the" post replacing OBS or any other v.h.f. posts." — *W1ALP, SCM E. Mass.*

"As our R. I. section net is on SIX the new classification for Techs would be helpful and eliminate the problem of the OBS having to be a General Class licensee." — *K1AAV SCM R. I.*

"Not in favor of this OO post being given to the Technician Class; it could well lead to improper OO actions committed by some over eager appointee, and hard feelings arising in the fraternity." — *Bob, W7PGY, SCM Washington.*

"Several years on the air on all bands is desirable and should be required in an OO post; there's resentment in either inexperience or license-classification giving the older ham a criticism, however constructive." — *W7SFK*

"Agree that more information could be passed along in the way of Official Bulletins via the v.h.f. . . . hope the League will see fit in the future to change the rules to allow Technician Class licensees to hold this appointment to help in the dispersion of such needed information." — *Al Hill, W6JQB, SCM L. A.*

Analysis of a rather full expression from all SCMs clears the deck for action. In summary: (1) OBS and VHF-PAM posts, but not OO, are to be made available to Techs best qualified for the assignments, as SCMs find volunteers available and vacancies exist. (2) Without change of OBS objectives, a future reissue of certificates to all holders, with a renaming of the post to Official VHF Station is contemplated, especially if favorable comments on this continue to be received. (Problems are chiefly administrative.) (3) Official Observer applicants henceforth must show *four* years licensed amateur experience. OO cooperative-card notices will be filled out using Greenwich time. This conforms to Board policy and where date and time follow GMT the indications are clear, regardless of time zone differences.

**Time Indications On Observer Cards.** Another field explored in our study was that of the ARRL Official Observer Service to members. It was the consensus in SCM opinion that we add certain practical questions on the back of the application blank for prospective new Observers. This action is being taken when the forms are updated as our supply is replenished. Another avenue explored was that of the time put on OO cards by Observers in mailing their helpful reports. A few SCMs held out for giving *both* GMT and local time, but the consensus ran 42:26 in favor of straight GMT reports. Most of our forms now have a blank spot to put in the time. As they are reprinted soon, we'll have the spot for GMT clearly stipulated on the form.

**Putting "Ten" to Work.** Didja read our January copy on "use that bandswitch" . . . on being versatile in Band Use? We talked about getting the most from v.h.f. and 160 for local contacts. Mike of K5KQR/5 sends us a cute circular by W5LXF "Wake Up and Live" that tells of the mobile and fraternal work TEN

METERS is so capable of: "That old QRM got ya down buddy? A tough time with skip and WØ's buttin' in? 75 and 40 loaded at night. For a tune-up with little or no QRM, get on 10. . . . It's nice for solid contact local group work, and the band even opens for real surprise DX stuff now and then. . . . Let's go."

**Do We Need a Designated Two-Meter Frequency for RTTY?** Is a new common spot for a.f.s.k. (audio frequency shift keying) RTTY desirable, helpful, needed? This would give teletypers a place to congregate and should minimize the possibilities of interference with those amateurs who prefer A-3 or A-2 telegraphy. But *what* frequency? K4ZAD constantly recommends 52.525 Mc. and 146.94 Mc. for wide-band FM calling and working frequencies for general amateur use. (Our C.D. Bulletin reports the list of FM Nets, available from K4ZAD; also a Directory of Wide-Band FM stations from W4CTU/9.) ARRL's National Calling and Emergency Frequency 145.35 Mc. has proved excellent for general use . . . *proper* use is to call, contact, and *move off-frequency* for QSO. It's fairly well used, a good spot in the Novice-Technician segment. There are available surplus crystals for 145.35 Mc. (8075 kc.). This provision continues useful for mobiles that move about point-to-point as a common convenient frequency. All amateurs, we hope, will keep 145.35 Mc. in *this* kind of general use.

Now the RTTY a.f.s.k. fellows formerly used 147.96 Mc. for two-way working, auto-start and so on until FCC's choice of this upper-end 100 kc. (restricted to A-1 operation for c.w. propagation-and-DX purposes) put an end to the A-2 and a.f.s.k. operations. If FCC were to recognize that this is *not* now so used, and drop the proviso for this band we would say the 147.96 Mc. RTTY use should continue. There are MARS and CAP channels just outside the band. However, W2JTP now raises this question, whether a new common-frequency for RTTY use should not now be chosen. He is contacting some RTTY users about it. His proposal is that 146.7 Mc. be such a new country-wide frequency for RTTY to settle down on. But for such a purpose regional rather than national determinations seem fairly adequate. What do *you* think? ARRL as well as W2JTP will be interested in comments from any amateurs or group of amateurs interested.

**DX Contest.** Make it a point to handswitch to any and all the bands bearing signals from those *far points* in the second period of ARRL's International DX Competition. If you missed the two week ends in February you still have two week ends of opportunity in March! Let's have those DX contest scores, large or small, so we can credit your operation in QST. Luck and DX.

— F. E. H.



There is a lot of paper work connected with AREC organization. Some ECs disdain it completely and concentrate on operational activities, while others keep super-accurate records but never really do anything operationally. Somewhere in between these two extremes, of course, are the majority of ECs who do both, or cause both to be done — some in balance, others very much out of balance.

To an active, energetic leader, paper work can be a blamed nuisance, and much of it either imposed or recommended by headquarters is considered totally unnecessary, a means for digging out useless and meaningless statistics to prove contentions that may not be sound at all. You can prove anything with statistics — or so they say.

About this time, ECs will be filling out and returning their annual report forms. From these reports, headquarters will make summaries and glean statistics to be compared with those of former years and competitively with each other, the purpose being first to see how we are doing, and second to give AREC groups an idea how they compare with others in their own area and throughout the nation.

The former purpose, of course, is the more important. We suppose we are a pretty poor bunch of statisticians, because we have a tendency to let statistics speak for themselves. That is, if they show we are lousy, we have a tendency to assume that we *are* lousy. Many statisticians consider this mighty poor analysis, that the data should be used to show how good you are, or how much improved you are — either that, or junk the whole analysis and start over again until you arrive at a method which will lead to the desired result.

Again and again we have been told that statistics and paper work aren't everything. This is true, but another way of stating it is that statistics and paper work are *something*, and moreover they are something you can get your teeth into, that you can total, summarize, collate, compare, and analyze arithmetically. You can also use them to make pretty educated estimates and prognostications.

Any statistical analysis is only as accurate and significant as the data on which it is based. Furthermore, estimates based on them are of deeper significance and likely to be more accurate when percentages of data are higher. If your data are inaccurate or wistful, if you "load" your data not with the way they are but with the way you wish they were, or the way they must be to show improvement, then our overall analysis to that extent will be inaccurate and misleading.

We promise you that we will report to you the statistical facts based on the facts you give us. If you give us not facts but fancy, our analysis will contain some fancy too. And if you give us *nothing*, the analysis will suffer incompleteness because of insufficient sampling.

So, Mr. EC, have you sent in your annual report? If not, how about attending to this little chore? And while you are filling out the card form, please, *please* read the instructions carefully so you give us the information we need. — WINJMM.

When an elderly man suffered a heart attack at Lost Lake, Utah, K7CTB was on hand to call for help by amateur radio, telephone facilities not being available. The call was received by WAØALX in Delta, Colo., who notified the Colorado Highway Patrol who advised the Utah Highway Patrol and an ambulance was dispatched to the scene, arriving within 30 minutes of the first call. K7PPB acted as relay during the aftermath of the activity. — WAØALX.

On Dec. 3 a lumber freighter was washed against the north jetty of Coos Bay Bar, Ore., where it received a tremendous pounding, endangering the lives of the crew aboard. K7HBA, whose location allows him a view of the bar, notified authorities and local hams. Within minutes, mobile W7AA1, with W7LEU assisting as a passenger, was on the way to the scene, maintaining contact with K7HBA. Although rescue operations were well under way by means of civilian helicopter, the circuit between W7AA1/mobile and K7HBA was useful in keeping a local radio station informed. W7s RLJ NTH and K7RMT checked in and assisted in keeping the frequency clear and in relaying as

needed. The circuit was kept alive until about 1900 local, at which time all crewmen had been rescued. — *W7AAL*.

Here is an addendum to the writeup on the west coast floods (see p. 92, Jan. 1963 *QST*). At 1430 local on Oct. 13 an emergency was called by the Police Dept. of Pacifica, Calif. because of heavy rainfall that put the shopping center and other parts of Linda Mar under water and consequently disrupted telephone service. A net was set up under the jurisdiction of EC W6QIE, who operated many hours and handled over 50 distress messages. Requests for beds and blankets and other vital necessities were handled over the circuit. Military units set up close by and depended on the amateurs for communications because their own signals were weak; the same applied to the local telephone company. Operating from W6QIE's emergency van in South San Francisco were K6MLR, *W6s* WPM QIE, *W6s* RCT MIXJ NJS UAO. Operating from the unit installed at the Pacifica Police Department were W6YBT, *W6s* VKL AME OXS BTH ITR TJY AVR MXO. — *W6BIP, SCM San Francisco*.

Rhode Island SEC W1YNE reports two AREC alerts in his section during October. The first occurred on Oct. 10 when K1STB reported what sounded like an aircraft distress call on 51 Mc. He notified the nearest airport tower and officials there requested that monitoring be continued. The West Warwick AREC Net was activated and remained on alert for two hours, but no emergency situation requiring the services of the amateurs occurred.

On Oct. 17 K1STB alerted the local fire department to a fire near the Coventry-West Warwick town line. K1OZI, EC, assumed net control while K1STB and K1VOU proceeded to the scene and offered their services. At the fire department's request, they stood by at the scene, but no emergency need developed.

Several AREC groups in Tennessee assisted in handling returns for the elections on August 2. The amateurs were used to check on late-reporting precincts and to arrange contact between election headquarters and election officials. The amateurs were also asked to relay unofficial election results from the ten counties surrounding Chattanooga. Operation was on 50.4 Mc. W4AM/4 was set up at the local TV station studio and the messages were relayed from the outlying counties direct to election central via W4JVM at his home station. Amateur mobiles were stationed at county courthouses and relayed election information to local stations, who beamed it to W4JVM. A more successful operation could not have been hoped for, and the result was much excellent publicity for the amateurs. EC W4JVM lists 39 amateurs who took part.

On Aug. 25, amateurs of Santa Clara, Calif., put on a test drill simulating an earthquake, combining RACES and AREC facilities. In addition to EC and RO K6TCC, SEC W6GEIC and Asst. EC W6RBB supplied leadership and official contact. Eleven other operators took part.

W4RIIZ, EC for Florence, Ky., alerted WA4AAJ when word was received of an airplane crash in the area. W4RHZ/mobile was on the scene within 15 minutes, maintaining contact with WA4AAJ all the way. However, police had the situation under control and amateur radio was not needed.

On August 5, W4RHZ reports, a dozen or so amateurs in the Florence AREC groups assisted in supplying communications in a polio vaccine drive. Most of these amateurs were on the job all day long.

On Aug. 5 and Sept. 16 amateurs of the Dearborn County, Ind., AREC, assisted with communications in a mass polio immunization program. NCS was set up at the pharmacy of the Dearborn County Hospital where the concentrated vaccine was mixed and stored. Other stations were set up at eight schools throughout the Dearborn and Ohio County areas. These stations kept track of the number of doses given each hour at each location and correlated this information with the hospital so that each dispensing point could be kept supplied with vaccine. The operation was so smooth that during the second week one doctor put his hand on one of the pieces of radio equipment and said "This is the most important piece of equipment in this whole operation." — *K9RLM, EC Dearborn County, Ind.*

Thirty-eight SECs submitted reports for November, representing 16,293 AREC members, a whopping big record for

the month, although down from the all time highs of October and September. We have within our AREC ranks many hard-working and dedicated SECs who deserve a world of credit for the progress the AREC has made in the past year. We can hardly wait to start analyzing the EC annual reports to see what our AREC looks like compared to previous years.

Sections reported: West Fla., E. Mass., Maine, NYC-LI, S.C.V., Alberta, Wash., Nevada, Ohio, Tenn., S. Texas, Mich., Ind., N.C., E. Bay, S.J.V., Colo., Iowa, Ga., Utah, Ore., E. Fla., Mont., Mo., Los A., W. Mass., New Mex., S. Dak., Kans., N.N.J., N. Texas, W. Pa., R.I., W. Va., E. Pa., Minn., Ill., Miss.

### RACES News

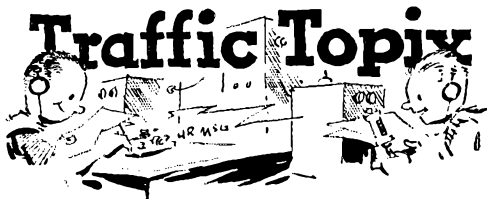
The RACES group of Medina County, Ohio, had its first experience in emergency communications on Dec. 7 and 8 when the worst snowstorm in 12 years struck the northeastern Ohio area. Primary activity was centered at Brunawick, southwest of Cleveland, which was declared a disaster area by its mayor because of impassable roads. Alternate RO W8BID set up operation on 2 and 6 meters at 0900 Dec. 7, and established contact with Medina RO K8EXK who was in a position to report to the county e.d. director through W8IJT at Wadsworth. W8BID was in direct contact with city officials. Typical messages handled concerned requests for snow removal equipment, availability of cots and blankets for stranded persons, and welfare of children left alone at home. Many amateurs in surrounding counties maintained contact with W8BID during the emergency, thus furnishing almost immediate communications with any place any time. Emergency operation was secured Dec. 8 when highways were again passable. W8BID records the following additional stations as having participated: *K8s* MDC QLT USW RZP DJV NCH, *W8s* BEJ OIS ZJQ ACJ HPD GMI ADV SRF, *W4s* Aqv DAR ANX ECM, WN8DUE.

A tidal wave alert was declared in the state of Hawaii at 1200Z Dec. 21 as a result of an earthquake in the Aleutian Islands at 0830Z the same day. State and county RACES units on Oahu and Kauai were called out. Operation on both islands was on 3.9 and 1.4 Mc. The nets were secured after the alert was cancelled at 1255Z. A total of 22 amateurs turned out, demonstrating the readiness of the Island State's RACES. — *KH6ARKL, Acting SCM Hawaii*.

A lot of ROs are asking a lot of questions about RACES these days, especially about the frequency allocations plan which went into full effect on Jan. 1, 1963, with the requirement for all plans to conform by making provisions to replace all a.m. with s.s.b. on 75, 40 and 20 meter RACES segments. OCD in Washington assures us they are proceeding with discretion in enforcement of these requirements.



The Baltimore Amateur Radio Club and the FM 6 Meter Club provided communications for a "Toys for Tots" campaign on Dec. 14, 15 and 16. There were 40 operators using 11 mobiles and 19 fixed stations in the operation. The photo shows BARC Prexy W3NO at the club station, W3FT.



Are you a hotshot c.w. traffic operator? Most traffic men, when asked this question, will smile modestly and deny any such pretention. Yet many of them, if the truth be known, think they are pretty good.

Many of us old timers in the traffic game will loudly declaim any aspirations by young squirts to traffic proficiency with the words "You guys don't know what a real hot traffic circuit is like." This is all very well, but it makes no impression unless it is supported by further information. What are the little tricks of being a real traffic hotshot? We'll mention a few of them herewith; no doubt others will contribute more after they read this.

To be a hotshot, the first thing you have to have is perfect break-in. It doesn't matter *how* you do it, as long as you are able to hear the other signal not only during word spaces but even during letter spaces. When both stations have such break-in, there is no need to stand by for QSL between messages. You just send them in a string, stopping only when the receiving operator breaks you.

When he does break you, he sends the last word received or the first letter of the word he missed. If the former, you send AA and continue with the word *after* the one he sent. If the latter, you start with the word he missed. You *never* repeat words unnecessarily.

It is *never* necessary to repeat words when using break-in, but if you should start repeating and the other operator breaks you, this means he got it the first time and stop wasting time; send AA and go on with the next word. Just as it is unnecessary to repeat, it is *very* necessary to send carefully. Any breaks by the receiving operator should be caused by receiving difficulties, *not* by your sending.

## A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

- Mar. 1: CP Qualifying Run — W6OWP
- Mar. 9-10: DX Competition (phone)
- Mar. 22: CP Qualifying Run — W1AW
- Mar. 23-24: DX Competition (c.w.)
- Apr. 1: CP Qualifying Run — W6OWP
- Apr. 13-15: CD Party (c.w.)
- Apr. 20: CP Qualifying Run — W1AW
- Apr. 20-22: CD Party (phone)
- June 8-9: V.H.F. QSO Party
- June 22-23: Field Day

## OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

- Mar. 2-3, 16-17: YL-OM Contest, YLRL (p. 73, this issue).
- Mar. 11: WINJM High Speed Code Test, Conn. Wireless Assn. (p. 84, this issue).
- Mar. 16-18: Kansas QSO Party, Emporia Amateur Radio Club (p. 112, this issue).
- Mar. 22-23: Pakistan Day DX Contest, Tiger ARC (p. 70, this issue).
- Mar. 23-25: Sixth Pennsylvania QSO Party, Harrisburg RAC (p. 88, this issue).
- Mar. 30-Apr. 1: West Virginia Centennial QSO Party, State Radio Council (p. 128, this issue).
- Apr. 1-30: Goose Bay QSO Party, Goose Bay Amateur Radio Club (next issue).

A hotshot operator copies behind at least one word. He doesn't write (or type) a letter at a time, he does it by whole words or, in the case of long words, by syllables. He never breaks you for a repeat of the word you are sending; it's always for the last word you sent or the one before that.

Some expert operators like to have the receiving operator send something between messages to assure that their receivers haven't drifted. Just a short dash will do it. This doesn't mean "QSL" or even "RK." It means "received okay" and "I'm still here" at the same time, but the latter is all the transmitting operator really wants to know; if the receiving operator had missed anything, he would have broken.

What of the procedure signals for "getting fills"? Phooey! A couple of really hot operators have no use for them. However, if one of the stations does not have break in and fills are necessary, the procedure can be cut to the bone. If the receiving operator asks for "WA JONSS," give him the word after "Jones" — *just that and nothing more*. If he asks for a missing phrase by sending the last word received, a question mark, then the next word received, send him *just* the part he missed, not the two words he already has.

Hotshot operators leave out all superfluous procedure signals, but religiously include all necessary ones. The letters CK, TO and SIG are superfluous in transmission of a message by c.w. You might say the same about NR, but mostly the hotshots include this because it signals the start of a new message. The name of the month can be omitted. But the procedure signals AA between parts of the address, RT (not X) to bracket the text and AR to signify the end of the message are necessary and only lids omit them.

Hotshot operators aren't necessarily speedsters, although they can speed up if they are asked to. When sending messages, they gauge their speed by conditions and what they judge to be the receiving ability of the other operator. They never slow down unless asked to. To slow down without being asked can be insulting if the guy on the other end is also a hotshot. If solid copy is being made, they sometimes gradually increase their speed, but never at the expense of proper spacing. If you slow down for a hotshot without being asked, he will say, sarcastically, "TNX FOR QRS."

Hotshot operators copy traffic on a typewriter, ten words to a line, and check the length of the text as they go along. If they don't happen to have a typewriter handy, they copy by hand but make the sending operator slow down so that the copy is legible. They always count the words in the text of a message and make sure it agrees with the check. They never transmit a message without a check, even if it is received that way. Only lids use CKXX.

Hotshot operators never uses the word SAME in place of any part of a message. This is another lid-ism. Any message that is worth sending is worth sending as a complete message. If a group of messages have common parts extensive enough to make the repetition monotonous or ridiculous, they should be combined into a book.

Hotshot c.w. operators will avoid operating in phone nets if they possibly can; however, they will participate in such nets if this is the only way to get the traffic through. When they do participate, they are usually a great deal more proficient than most of the phone operators.

The above was written by one who was a hotshot c.w. operator in his youth but is now a glass-armed lid. — W1VJM.

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*Net reports.* Listing in this column is available only to nets having wider than section coverage. Section-level nets and local nets should report to their SCMs. Reports for this listing are not specifically solicited, but we'll be glad to list any who do report the data indicated.

*December reports:*

Net	Sessions	Check-ins	Traffic
7290	42	1821	1524
Northeast Area Barnyard	—	879	25
Mike Earl E & T	53	536	1374
Eastern Region Traffic	23	95	64
Fourth Region Day	31	199	227
75 Meter Interstate SSB	31	1302	876
Early Bird Transcontinental	31	—	299
20 Mtr. I.S.S.B.	18	449	1527

**National Traffic System.** In listening around 80 meters these days, we are a little concerned at the effect conditions (ionospheric, that is) are having on the NTS traffic flow and time sequence. Of course now that March is here the long skip will have somewhat abated, at least for the summer, but this fall it is going to set in again and be even worse than it was this past winter. Section and region nets have alternatives available (per C'D-24), but area nets run into trouble because there is only one time they can meet and that is 0130 for EAN, 0230 for CAN and 0430 for PAN.

During periods of bad skip, section and region nets not only take advantage of the option of an early-early session in place of the late one, but they have a tendency to bypass some of the NTS channels because of pessimism concerning the area net session. A little of this does no harm and is perhaps justified, but too much of it can take us back to the old hodge podge days when traffic was routed by the seat of the pants of the operator rather than through any regular established channels. Alternative routes and temporary expedients are one thing, and are okay as long as they don't damage the system; but use of them on a long time basis to the detriment of NTS's flow pattern and time sequence is quite another. Let's get back to normal as soon as we can, and stay that way as long as we can.

#### December reports.

Net	Ses- sions	Traffic	Rate	Aver- age	Representa- tion (%)
EAN	29	2025	1.179	69.8	98.9
CAN	31	2404	1.105	77.5	99.4
PAN	31	2022	.929	65.2	96.6
1RN	57	825	.444	14.5	73.7
2RN	62	964	.584	15.5	99.7
3RN	62	925	.471	14.9	96.5
4RN	62	1013	.456	16.4	94.9
RN5	62	1443	.524	23.3	81.7
RN6	23	351	.510	15.2	79.1
RN7	57	795	.314	13.8	88.2
3RN	62	528	.243	8.5	81.2
9RN	59	1491	.892	25.2	75.5
TEN	66	1049	.491	15.9	61.7
ECN	31	145	.183	4.7	73.6 <sup>1</sup>
TWN	31	382	.623	12.3	77.5 <sup>1</sup>
Sections <sup>2</sup>	995	7082		7.0	
TCC Eastern	126 <sup>3</sup>	691			
TCC Central	87 <sup>3</sup>	1935			
TCC Pacific	121 <sup>3</sup>	1690			
Summary	1720	28760	EAN	14.2	2RN
Record	2045	44109	1.387	23.5	100.0

#### Late Reports:

2RN (Oct.) <sup>4</sup>	62	363	.403	5.8	97.7
2RN (Nov.) <sup>4</sup>	60	499	.468	8.3	98.0
3RN (Nov.)	60	636	.346	10.6	99.4
RN6 (Oct.)	12	129	.247	12.6	78.5 <sup>1</sup>
RN6 (Sept.)	23	439	.465	18.2	88.0 <sup>1</sup>
RN6 (Nov.)	10	125	.375	12.8	70.0 <sup>1</sup>
TCC Eastern	120 <sup>3</sup>	521			
(Nov.)					

<sup>1</sup> Region net representation based on one session per day. Others are based on two or more sessions per day.

<sup>2</sup> Section nets reported (35): CPN & CN (Conn.); MJN, MSPN Noon, MSN (Minn.); TEX (Texas); BEN, WSB & WIN (Wis.); SCN (Calif.); ALDDS & MDD (Md.-Del.-D. C.); BUN (Utah); KYN (Ky.); SCN (S. C.); EPA (Pa.); NGSN (N. C.); GEM (Idaho); TLGN (Iowa); BN (Ohio); NEB (Neb.); GBN (Ont.); Wolverine (Mich.); AEND, AENO, AENP Morn, AENR, AENM & AENB (Ala.); ETPN, TSSN & TN (Tenn.); WFPN (Fla.); POI (Hawaii); ILN (Ill.).

<sup>3</sup> TCC functions reported, not counted as net sessions.

<sup>4</sup> Correction of previous report.

With no missing reports, all figures are still far down from the record December (mostly 1959) and most of them are down from last year. This is the first winter when skip conditions have really been bad, and the downtrend was to be expected. By now the skip should be letting up. Next winter it will be even worse.

A total of 114 different stations participated in EAN during December, just to show that net control and liaison duties are well divided; WA2SRK and WA2WLN received EAN certificates. EAN and CAN are alternating net control and or relay stations to take care of long skip difficulties.

W9DYG complains about stations reporting into CAN not listing all their traffic, then holding a station on QNY to send him traffic not listed with the NCS, thus fouling up the NCS's procedure. This is a very selfish practice, fellows; let's can it. WA6ROF points out that 11 certificates were awarded to PAN operators in 1962, with top honors to W7DZX for both NCS and TCC functions. K1BCS is giving N. H. representation a big boost on 1RN. WA2GQZ has put out a combined Region-Section Net Bulletin that's a beauty; 2RN certificates have been issued to WA2s KQG WLN and K2MYU. W3UE hopes to see 3RN on top of the heap for its 1962 performance. K4AKP's first report as RN5 Manager shows improvement over December of 1961. K6KCB sends in all back RN6 reports. RN7 data also were up in all reports from 1961, according to Net Manager K7JHA; W7APS has been keeping Alaska represented. W8CHT says "Watch out for 8RN in the future, we're going places!" Certificates have been awarded to K8MITI, W8s CKX BEZ IBB. TEN is having representation troubles, and some sessions NCS'd by other than the regular assignee are not being reported; but a big pile of traffic was handled in December just the same. W0PFO is not satisfied with the performance of TWN and is thinking that a new manager may help.

**Transcontinental Corps.** W1SMU has finally succumbed to the demands of six kids and an extra-time job. In Mid-January, W3EML took over as TCC Director for Eastern Area. NTS owes Frank, W1SMU, a great debt of gratitude for the work he put in trying to get TCC-Eastern on its feet and keep it there. K4AKP and W7DZX are putting the pressure on to eliminate station D, which is supposed to receive eastern traffic every night from Station J, after PAN meets. Most of this traffic is handled via TCC-Central at present because no eastern stations are available at the late hour required. K4AKP commends W0SCA, who has been working hard on TCC.

#### December reports.

Area	Func- tions	% Suc- cessful	Traffic	Out-of-Net Traffic
Eastern	126	79.0	1908	691
Central	87	88.2	3898	1936
Pacific	121	83.9	3362	1690
Summary	334	83.3	9168	4317

#### Late reports:

Eastern (Nov.)	120	75.8	1182	521
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The TCC roster: Eastern Area (W1SMU, Director): -- W7s EMG NJM, W2s EBZ MITA, WA20FG, W3s EML FAF, W4DLA, W5s CHT UPH, W6s FAS CWA. Central Area (K4AKP, Director) -- W4ZJY, K4AKP, K9s DIHN UGY, W9s ZYK JOZ DYG VAY CXY PSP, K0YRQ, W0SCA. Pacific Area (W7DZX, Director) -- K0s LKD DYX GID, W0s EOT HC, W1A6s RGD ROF, K7s NHV NWP, W7DZX, W0s WHE-7 WAIE KQD, VE7AGF.

## NEXT CODE TEST MARCH 11

The Connecticut Wireless Assn's high speed code proficiency program continues apace, with W1EIA sending weekly code practice at speeds ranging from 15 through 65 w.p.m. in 10-w.p.m. increments simultaneously on 3637 and 7120 kc. on Mondays at 0130 GMT (Sunday evening, local time). Code tests for high speed qualification are transmitted twice a year, usually the first week end in March and September.

Although not an ARRL program, these code tests have attracted some interest among the c.w. men. The next one will be transmitted on Mar. 11 (Mar. 10 by local time) starting at 0100 GMT. W1EIA will transmit as usual on 3637 and 7120 kc. In addition, it is expected that W6EOT will transmit on 7005 kc. and K6DYX on 3690 kc. Also, in order to take care of listeners in the northeast who might be bothered by long skip conditions, W3NF has been enlisted to make a transmission on 1805 kc. All transmissions will be synchronized and identical. Speeds will be 60, 55, 50, 45 and 40 w.p.m., in that order, five minutes of plain English text at each speed. Copy five minutes consecutively solid at any speed and you qualify at that speed. Wanna try it?

## CONTEST NOTES

Gremlins of the worst sort, aided by ole' man Murphy, found their way into the Dec. '62 QST report of the Sep-



## NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: c.w. — 3535, 7050, 14,060; phone — 3765, 14,160, 28,250 kc.

### SUGGESTED RTTY OPERATING FREQUENCIES

3620, 7040, 14,090, 21,090 kc.

### GMT CONVERSION

To convert to local times subtract the following hours:

ADST —3, AST —4, EDST —4, EST —5, CDST —5, CST —6, MDST —6, MST —7, PDST —7, PST —8, Hawaii —10, Central Alaska —10.

## CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from WIAW will be made Mar. 22 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on 1805, 3555, 7080, 14,100, 21,075, 28,080, 50,700 and 145,800 kc. The next qualifying run from W6QWP only will be transmitted Mar. 1 at 0500 Greenwich Mean Time on 3590 and 7129 kc. **CAUTION:** Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given: *Example:* In converting, 0230 GMT Mar. 22 becomes 2130 EST Mar. 21.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

WIAW conducts code practice daily at 0230 GMT on all frequencies listed above with speeds of 15, 20, 25, 30, and 35 w.p.m. on Tuesday, Thursday, and Saturday, and at 5 7½, 10, and 13 w.p.m. other days. Approximately 10 minutes' practice is given at each speed. To check your copy, the texts used on several transmissions are listed below. The order of words in each line of QST text is sometimes reversed. To improve your list, try to see (in step with WIAW.

Date	Subject of Practice Text from Jan. QST
March 4:	"It Seems to Us . . .", p. 9
March 7:	The W4JWV S.S.B. Exciter, p. 15
March 13:	Minimizing Interference . . . on 160 meters, p. 24
March 15:	S4 + 30 Db., p. 29
March 19:	Using the 4X250B . . . to 432 Mc., p. 30
March 20:	Easy-Match for High-Impedance Antennas, p. 47
March 23:	The Templeton Case, p. 68
March 25:	CQ de AP Land, p. 72

## WIAW SCHEDULES

(March 1963)

### Operating-Visiting Hours

Monday through Friday: 3 P.M.—3 A.M. EST  
Saturday: 7 P.M.—2:30 A.M. EST.  
Sunday: 3 P.M.—10:30 P.M. EST.

The ARRL Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 4 miles south of West Hartford. A map showing local street detail will be sent on request.

### Operating Frequencies

C.w.: 1805, 3555, 7080, 14,100, 21,075, 28,080, 50,700, 145,800  
Voice: 1820, 3945, 7255, 14,280 (s.s.b.), 21,330, 29,000, 50,700, 145,800

Frequencies may vary slightly from round figures given; they are to assist in finding the WIAW signal, not for exact calibrating purposes.

### Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in Greenwich Mean Time:

C.w.: Monday through Saturday, 0100; Tuesday through Sunday, 0500.  
Voice: Monday through Saturday, 0200; Tuesday through Sunday, 0430.

**Caution:** Note that in the U. S. and Canada, because times are GMT, bulletin hours actually fall on the evening of the previous day.

## WIAW CONTACT SCHEDULE

Would you like to work WIAW? WIAW welcomes calls from any amateur station in accordance with the following schedule:

GMT	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0030-0100	.....	.....	7255*	.....	7080	.....	7255*
0120-0200 <sup>1</sup>	.....	.....	7080	3555	7080 <sup>2</sup>	3555 <sup>2</sup>	7080
0210-0230 <sup>1</sup>	.....	.....	3945	50.7 Mc.	145.8 Mc.	3945	3945
0330-0430	.....	.....	3555	3945	7080	1820	3555
0440-0500 <sup>1</sup>	.....	.....	3945	14,280	3945	14,280	3945
0520-0600 <sup>1</sup>	.....	.....	3555 <sup>2</sup>	7255*	3555	7080 <sup>2</sup>	3945
0600-0700	.....	.....	14,280	14,100	3555	14,100	.....
0700-0800	.....	.....	7255*	3945	7080	3945	7255*
2000-2100	.....	.....	14,280	21/28 Mc. <sup>3</sup>	14,100	.....	.....
2100-2200	.....	14,280	21/28 Mc. <sup>3</sup>	14,100	21/28 Mc. <sup>3</sup>	21,330*	.....
2200-2300	.....	14,100	14,280	21,075 <sup>2</sup>	14,280	14,100	.....

<sup>1</sup> General-contact period on stated frequency begins immediately following transmission of Official Bulletin which begins at 0200 and 0430 on phone and at 0100 and 0500 on c.w. Starting time is approximate.

<sup>2</sup> WIAW will first listen for Novices before checking the rest of the band for other contacts.

<sup>3</sup> Operation will be conducted on either 21,075, 21,330, 28,080 or 29,000 kc.

\* Operation may be on s.s.b. as announced at the beginning of the period.



**DXCC NOTES**

Announcement is hereby made of two additions and one deletion to the ARRL Countries List.

**Bouvet Island:** This is an addition to the Countries List. Bouvet Island is located in the South Atlantic Ocean approximately 1600 miles south of the Cape of Good Hope at Latitude 54 degrees South and Longitude 5 degrees East. Bouvet Island is territory of Norway. DXCC credit claims for contacts with Bouvet Island may be made starting May 1, 1963. Such confirmations must be for contacts made November 15, 1945 or later.

**Eritrea:** This is a deletion from the Countries List. Only those contacts made with stations located in Eritrea before November 14, 1962 will be creditable toward the Eritrea listing. Contacts made November 14, 1962 will be creditable as Ethiopia. On November 14, 1962, a plebiscite held by Eritrea determined that Eritrea would unite with Ethiopia.

**Channel Islands:** Heretofore the Countries List has had the single listing of Channel Islands. Confirmations of contacts with all stations in the Channel Islands have been

creditable toward this one listing. Upon request, we have reviewed the question of whether this procedure of a single listing for the Channel Islands is a true reflection of the actual basic governmental relation between the Channel Islands and Great Britain. To better reflect the basic governmental relationship between the Channel Islands and Great Britain, effective May 1, 1963, the listing of Channel Islands will be dropped and replaced by two listings, *Guernsey & Dependencies*, and *Jersey*.

This change will not be considered as a deletion. Credits which have already been given toward the Channel Islands listing will automatically be credited toward the appropriate listing upon presentation of a confirmation for whichever of the two new listings the applicant has not previously submitted. This new credit may not be applied for before May 1, 1963. Confirmations for contacts with Guernsey & Dependencies and Jersey must be for contacts made November 15, 1945 or later.

While no difficulty is anticipated in identifying the location of the Channel Island stations, as a possible aid, the Dependencies of Guernsey are; Alderney, Brechou, Great Sark, Little Sark, Herm, Jethou and Lihou.



**DX CENTURY CLUB AWARDS**



*Honor Roll*

The DXCC Honor Roll consist of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date of receipt. All totals shown represent submissions received from November 1, thru December 31, 1962.

W1FH ..... 312/327	W8BRA ..... 309/322	W8UAS ..... 307/319	G4CP ..... 305/318	W1BTH ..... 304/317
W6CUG ..... 311/325	W3KT ..... 308/321	W9YFY ..... 307/320	W1GLX ..... 305/317	K2ZGQ ..... 304/317
W2AGW ..... 311/324	W8JIN ..... 308/322	W8DMD ..... 307/319	W2HMK ..... 305/317	W9HUZ ..... 304/316
W1GKK ..... 311/325	W8BKP ..... 308/320	CE3AG ..... 307/320	W5MMK ..... 305/317	W8DU ..... 304/316
PY2CK ..... 311/324	W6AM ..... 308/322	W5ASG ..... 307/320	W7PHO ..... 305/316	G3AAM ..... 303/316
W4DOH ..... 310/323	I16DJX ..... 308/321	HB9J ..... 306/320	W6GPB ..... 305/317	W9LNM ..... 303/317
W3GHD ..... 310/323	W2HUO ..... 307/320	G2PF ..... 306/318	VE7ZM ..... 305/318	W3LMA ..... 303/315
W8KIA ..... 310/323	W5ADZ ..... 307/319	4X4DK ..... 306/317	W3JNN ..... 304/317	W2LPE ..... 303/316
W9RBI ..... 309/323	W6BEG ..... 307/321	W6QVZ ..... 306/317	W1ME ..... 304/317	W4TM ..... 303/316
KV4AA ..... 309/323	W8BF ..... 307/319	W7GUV ..... 306/319	W8KML ..... 304/316	W8DAW ..... 303/316
		W2BXA ..... 306/319		

*Radiotelephone*

W3RIS ..... 312/326	W8GZ ..... 308/320	W8POO ..... 304/315	VO4ERR ..... 304/317	W8KML ..... 302/314
PY2CK ..... 311/324	W1FH ..... 307/319	4X4DK ..... 304/315	W4DQH ..... 304/315	CX2CO ..... 302/315
W9RBI ..... 309/321	W8BF ..... 306/318		W7PHO ..... 303/314	W6AM ..... 301/314

*New Members*

From December 1, through December 31, 1962 DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

W5LBI ..... 172	OH2SF ..... 117	W4FRO ..... 109	UA3KWA ..... 104	K1PZB ..... 101	W3JHT ..... 100
W1NJL ..... 146	W60HF ..... 113	W4ACXR ..... 108	D16QB ..... 102	W9LKL ..... 101	K7EQM ..... 100
W9QYH ..... 136	OK1AAW ..... 111	ZS6AU ..... 107	OE5LX ..... 102	D19LL ..... 101	W9PTZ ..... 100
P40PRF ..... 128	W2LJX ..... 110	K1LWL ..... 106	UA3XX ..... 102	HK7ZF ..... 101	K0MRB ..... 100
UA1KAG ..... 128	VE2BGT ..... 110	W21BF ..... 106	UA9WL ..... 102	K1LPL ..... 100	K0TZX ..... 100
ZD2CKH ..... 123	J1HYM ..... 110	ZS5UP ..... 105	UB5DQ ..... 102	K1UDD ..... 100	VE3BCF ..... 100
W6UQT ..... 117	OK3JR ..... 110	UA2VQ ..... 104	XE2OK ..... 102	K3JCT ..... 100	

*Radiotelephone*

UR2AR ..... 207	K8OHG ..... 140	PA0PRF ..... 118	ZD2CKH ..... 109	OZ4IP ..... 101	K5OPT ..... 100
W1VVR ..... 142	CX8BM ..... 121	W5DNL ..... 111	K5ODC/4 ..... 101	K1LBR ..... 100	W6TSH ..... 100

*Endorsements*

W5AFX ..... 313	KWLSG ..... 263	W9PZL ..... 243	K2JFY ..... 211	W1FJJ ..... 181	W7D8 ..... 145
W4ALF ..... 311	W7TZ ..... 261	W7BT ..... 241	W6SL ..... 210	W8QNW ..... 181	K9V RU ..... 140
W7ENW ..... 311	W6MYL ..... 261	W1RAN ..... 240	W8QWL ..... 209	W6PAL ..... 180	VQ2WM ..... 140
W8AIPW ..... 311	W1JNW ..... 260	K9PPX ..... 240	W3KDF ..... 206	OZ9N ..... 174	5U7AC ..... 140
W8TMA ..... 310	K4ASU ..... 260	W2WAG ..... 231	W8KSR ..... 201	W2HDW ..... 173	K8WOT ..... 137
W3EPV ..... 303	W6CWK ..... 260	K48XR ..... 230	VU2MD ..... 201	WA6DUG ..... 173	W4BWR ..... 133
W5MMD ..... 301	W2ZKO ..... 256	W6FWW ..... 230	W4YMJ ..... 200	W3JQM ..... 171	W7B8P ..... 133
W9GHL ..... 301	G8HF ..... 256	K9GWF ..... 229	W2MJD ..... 200	W2MJE ..... 170	K3RJB ..... 131
W43AU ..... 300	W9HLY ..... 254	W3BLV ..... 226	W5RHU ..... 200	K6MAS ..... 161	W2NCG ..... 130
W4VPD ..... 300	W4SSU ..... 253	VE3CO ..... 225	W9ALL ..... 200	OH3TQ ..... 161	W4MIF ..... 130
W7WVE ..... 300	W2QKJ ..... 251	JA6A ..... 225	W9LJU ..... 200	K2ZRO ..... 160	WA6MWC ..... 130
K21AW ..... 290	W6HYG ..... 251	SM3AGD ..... 225	UA3HI ..... 200	W48NU ..... 160	K8YCM ..... 130
W3OP ..... 290	K6HDE ..... 250	K8OHG ..... 223	W9WJ ..... 199	W6QW ..... 160	SM7TV ..... 125
K4G8U ..... 283	W8BYB ..... 250	K4TEY ..... 222	W3EAL ..... 194	K9DJV ..... 160	K3RJB ..... 122
LA3DB ..... 282	W8PHZ ..... 250	W4NO ..... 222	W2ABN ..... 193	W5EHV ..... 157	K6LGH ..... 122
W5QK ..... 281	J8AQ ..... 250	D1LQT ..... 222	W5FEJ ..... 193	VE3PV ..... 151	W4HOS ..... 121
W58UK ..... 272	W3AYS ..... 249	W8ZMW ..... 221	W9FKH ..... 190	K1MEM ..... 150	VP6PJ ..... 121
K2CPR ..... 271	W9HKL ..... 249	K8TKB ..... 221	PA8DI ..... 190	K2YOR ..... 150	WA6FTM ..... 120
W3EES ..... 271	V5AAE ..... 248	K4WB ..... 220	W2BXY ..... 187	W8VBA ..... 150	W70EB ..... 120
K6LGF ..... 270	K2UKQ ..... 247	W6GRX ..... 217	W8AIF ..... 187	W8HVN ..... 150	P2PO ..... 120
SM7MS ..... 264	K8ONV ..... 245	W8IPH ..... 217	W8QZA ..... 182	W8NAN ..... 150	W3SQX ..... 119
W4LRN ..... 263					W0PAH ..... 110

*Radiotelephone*

W2JT ..... 300	W2QKJ ..... 222	KWLSG ..... 196	I1TBU ..... 170	W3ROB ..... 150	W7HTH ..... 131
W6GVM ..... 290	W3BVL ..... 212	W8ONA ..... 193	CT1QP ..... 166	W4BXG ..... 150	K6UXV ..... 125
W2LV ..... 260	E47GF ..... 202	K2ONV ..... 185	K8MAS ..... 161	W4YQB ..... 150	W4BWR ..... 124
W7ADS ..... 250	K1JMV ..... 200	K9PPX ..... 185	VE2VY ..... 161	W8ALJ ..... 150	W6PAL ..... 123
W5KC ..... 240	W4FWC ..... 200	CT4P ..... 180	W4ZEO ..... 160	W8WFO ..... 150	K4B8S ..... 122
W2TF ..... 240	K4PC ..... 200	W8GIC ..... 180	W4CFO ..... 160	W9QYH ..... 143	W7DQM ..... 120
K6LGF ..... 230	W4SSU ..... 196	K1JWV ..... 171	W1BHP ..... 151	W5HZZ ..... 131	K2KGS ..... 110
W6HYG ..... 225					VE2BCT ..... 110

• 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**

**SIXTH PENNSYLVANIA QSO Party**

March 23-25, 1963

The Harrisburg Radio Amateur Club announces the Sixth Pennsylvania QSO Party, in which all radio amateurs of the world are invited to participate.

**Rules:** (1) **Time:** The contest begins at 2300 GMT Saturday, Mar. 23, and ends at 0500 GMT Monday, Mar. 25. (2) Suggested congregating frequencies will be 60 kc. above the low end for each band and sub-band, i.e., 3560 for c.w., 3860 for phone. This party is being conducted for the purpose of aiding stations obtain their *Keystone Award* and endorsements, and to work counties for WAPC; therefore, each Pennsylvania station will be worked once during the party. (4) **General call:** "CQ PA." Pennsylvania stations sign "DE PA." (5) **Exchange:** Penna. stations send QSO number, RS(T), and county; outside stations send QSO number, RS(T), and state, VE province, or country. (6) **Awards:** Every station working 100 different Penna. stations during this party will receive a **KEYSTONE AWARD** or an endorsement if they already have the award. (7) **Entry:** A copy of the log, showing station, date, time, band, mode, and station worked QSO number, should be submitted to the contest manager, Charles T. Vogelson, W3BOA, R-3, Dillsburg, Penna., postmarked not later than Apr. 15, 1963. All logs become the property of the Harrisburg Radio Amateur Club. No charge for Keystone Awards issued on this basis. Complete information and revised rules for Keystone Awards can be obtained by sending a self-addressed stamped envelope to the above address.

**EASTERN PENNSYLVANIA—SCM,** Allen R. Breiner, W3ZRQ—**SEC:** W3DUL. **RM:** W3EML. **PAM:** K3BHU. **V.H.F. PAM:** W3SAO. New appointments: K3SEH as OES and K3QJU as the new EC for Lehigh County. The former EC, K3LKQ, has moved to W6-Land. The mid-holiday wind storm antenna toll was quite heavy. Among those reported was the installation of K3MDG. K3EEL is active on 3825 kc. and will be glad to confirm contacts for Susquehanna County. K3MPW and K3KDF spent the holidays in the hospital. W3EU has joined the QCWA. K3WFB, the protégé of W3JKK, received his General Class license Dec. 24. W3BNR will be operating out of Otis AFB, Mass. The Lancaster Transmitting Society has issued 117 "Hex Certificates" to date. Holiday traffic activated W3-AMC again. New Gear Dept.: K3DSM a Heath monitor scope; KN3SUB an HT-40; K3NBU an NC-300; K3SLP a beam plus crank-up tower; K3MNT a three-element beam and rotor; K3NLW a "Sixer"; K3OMP a receiver; K3RZI a new SX-140; K3SPU an 80-meter vertical. KN3SME is now General Class. K3VYB and K1RAC are new operators in the Fairless Hills area. W3NNL is designing a miniature 6-meter version of the QST 28-Mc. job. The Big "K" ARC issues a club bulletin called the *Big K Bull Sheet*. K3MTE almost froze while raising antennas for K3JHF. W3ELI is finding some time from MARS to lend a hand to the EPA and PFN nets. The usual Christmas traffic rat race was reported at W3CUL. New club officers—Frankford RC: W3QMZ, pres.; K2CPR, vice-pres.; K3JNP, secy.;

W3MWC, treas. The Philmont Mobile RC: W3GOW, pres.; K3GNJ, vice-pres.; W3MHR, treas.; K3HJI, secy. The Reading RC: W3WJC, pres.; W3EYN, vice-pres.; W3UQC, secy.; W3CDS, treas. The Shamokin ARC now has an AREC plan which includes K3BLZ, W3GDK, K3HMJ, W3JEL, W3KDU, W3MOZ, K3QEL and W3QGK. The Con-Penn 6 Net handled 688 pieces of traffic. The EPA C.W. Net reports 723 QTC with 478 QNI. Your SCM's annual report for '62 shows 116,107 pieces of traffic reported handled from 111 stations and an average of 86 activity reports per month received. Traffic: W3CUL 9735, W3IVS 2782, W3EML 1209, W3YR 1147, K3JSX 755, K3MQE 613, K3MVO 441, K3ONW 410, K3CAH 401, K3BHU 172, W3RV 165, W3ZRQ 124, W3JXX 87, K3HNP 66, W3NNL 65, W3AMC 63, W3BTR 52, K3TLX 52, K3NLW 47, K3MNT 44, K3LKQ 39, W3BNR 35, W3ITI 33, K3ARR 26, W3EEN 25, W3OY 21, W3BFF 16, W3QGK 14, KN3SUB 10, K3MDG 8, W3DUI 7, W3GJA 6, K3ADS 5, W3BKF 5, K3EMG 5, K3NBU 4, K3AKN 3, K3HTZ 3, K3SEH 3, K3SLP 3, W3HNK 2, K3DSM 1, W3LC 1.

**MARYLAND-DISTRICT OF COLUMBIA—SCM,** Andrew H. Abraham, W3JZY—**SEC:** W3CVE. **RM:** K3JYZ and W3TN for MDD Traffic Net which meets on 3649 kc. daily at 0000Z. **RM:** W3ZNV for MDDS (slow) on 28.1 Mc. daily at 0130Z. **PAM:** W3EQK. **MEPN** meets on 3820 kc. MWF at 2300Z on Sat. and Sun. at 1800Z. K3DNO has been tied up with examinations at the U. of M. K3PRN is working on d.s.b. for v.h.f. W3EQK has a new SB33 transceiver. Look for Art on s.s.b. from now on. W4EXM/3 is all fired up and waiting for an EP2 call. Art hopes to work many U.S. stations before leaving. W3HQE reports things are looking much better for 1963. K3GZK has his transmitter on the work bench. K3JTI sure made an FB score in the SS Contest. John has a new HR-60 receiver and runs 500 watts to an 813. K3JYZ is busy making up the quarterly MDD Net bulletin. W3MCG reports K3PIV/3 is now in Okinawa signing the call KR6BQ. K3NCMI is busy with traffic on the MEPN. W3NO has his new trap vertical working after some changes, and is converting an ART-13 for the ham bands. K3OWX is working mobile on 10 meters. K3RBM has his General Class ticket. K3QFG has an EPA Net certificate and checks into that net regularly. Phil is helping W3UE with QNS. K3QDD has liaison with ITN for inter-American traffic. K3QOO is at Holy Cross College in Washington, D.C. W3MSR is ready for DX work. W3PQ sends in a very fine traffic report. W3TN is RM on the MDD and will assist K3JYZ when Andy is out of town. W3YZI reports that W3JNN is chasing DX in a big way. W3TLN is using a 25-watt transistor transceiver on the 20-meter band. K2NGB and his NYL are operating on 20-meter s.s.b. W3CB operates from his Kent Island location and has a whooping big signal from there even on v.h.f. W3ZAQ is busy with OO work and sends in a very fine report. W3WTO has a new HX-30 and has a very fine s.s.b. signal on the 6-meter band. The Baltimore Amateur Radio Club was very busy before the holidays with traffic working with the Marines in the campaign "Toys For Tots." W3FT handled 109 pieces of traffic. The following stations made BPL: W3IVC, K3QFG, K3WBJ, K3QOO, K3JYZ, W3TN and K3OSX. Station activity reports received late are not put in the next news column unless they contain unusual news or record traffic. Traffic: (Dec.) W3IVC 693, K3QFG 376, K3WBJ 243, W3TN 221, K3QDD 210, K3QOO 181, K3JYZ 147, K3OSX 130, W3FT 109, K3NCMI 56, W3HQE 50, W3RKE 38, W3PQ 36, K3OXW 24, W3MCG 22, W3NO 13, K3GZK 5, W3YZI 4, W3ZNV 4. (Nov.) K3QFG 143, K3QDD 23.

**DELAWARE—SCM,** M. F. Nelson, K3GKF—**PAM:** K3LEC. **RM:** W3EEB. Thanks to all First State amateurs who helped us attain our status as the Delaware section. New appointees: W3HC as ORS. Renewals: K3BRR as OBS; K3EWK and EBB as OES; W3FKO as ORS; W3EJU and W3IYE as OOs; K3LEC as PAM. The '63 State Hamfest Committee includes W3CMR, W3IOU, W3LOE, W3SPL, K3AZH, K3CNI, K3NPA, K3NVV, K3COE and K3OCP. K3AXW now has a 1-kw. linear on 50 Mc. John also gave a talk on RTTY to the Delaware ARC. W3CCT reports the U. Del. ARA now is on 7-Mc. c.w. with a borrowed Eico 720. EJU is turning into one of the top OOs. Ted has been helping many amateurs with candid reports of faulty transmissions. K3OBU reports a Novice Net on 3715 kc. at 0200Z Fri. with himself as NCS. K3LEC is busy

(Continued on page 98)

# BETTER SIGNAL REPORTS

**W**E have felt for some time that the presently accepted "R.S.T. System", adequate for CW and AM, leaves much to be desired for reporting ssb signals. To say that an ssb signal is "5 by 9 plus 20 db" only gives a partial description; it says that you have a strong, readable signal but nothing about the audio quality and/or suppression of carrier and unwanted sideband. This "strength" report should be but one part of a system which also includes a report of audio quality and suppression. Since signal quality is closely allied with ssb signal readability, we feel that a new system should be adopted which would more adequately present an accurate "picture" of the received ssb signal.

**W**E should like to suggest the following QSA system:

## READABILITY

- Q-5 Completely Readable
- Q-4 Readable with Difficulty
- Q-3 Readable with Considerable Difficulty
- Q-2 Barely readable
- Q-1 Unreadable

## AUDIO QUALITY

- S-5 Excellent Quality
- S-4 Good Quality
- S-3 Acceptable Quality
- S-2 Poor Quality
- S-1 Very Poor Quality

## SUPPRESSION

- A-5 Excellent Suppression
- A-4 Good Suppression
- A-3 Acceptable Suppression
- A-2 Poor Suppression
- A-1 No Suppression

**T**HE real superiority of ssb exists in its ability to put more readable signals in a given band of frequencies. The amount of suppression of carrier and unwanted sideband and the "cleanliness" of the audio are the real reasons for ssb superiority. Our reporting systems should reflect and confirm these wanted characteristics and assist in their realization. If we do not make an earnest effort to preserve this superiority of ssb, we may soon not have any reason to realize its benefits.

IRV STRAUER, K2HEA  
DOROTHY STRAUER, K2MGE

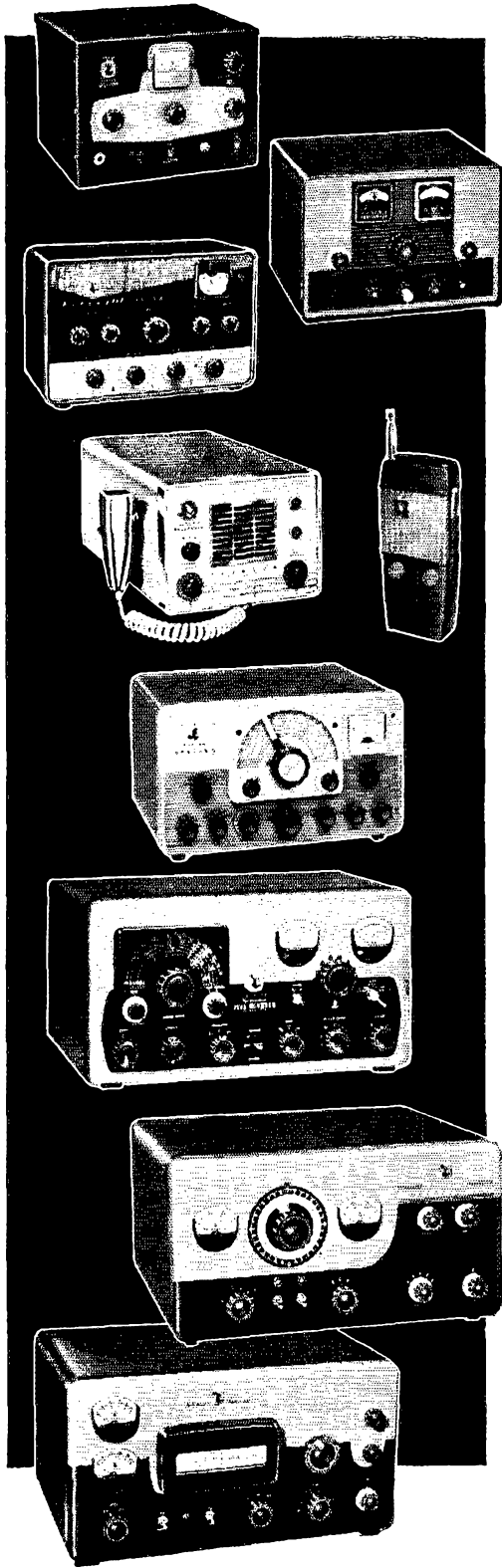
*W. J. Hallogan W9AC*

*Leslie Marshall K9EBE*



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**ADVENTURER**—Self-contained . . . 50 watts CW input . . . rugged 807 transmitting tube . . . instant bandswitching 80 through 10 meters. Crystal or external VFO control—wide range pi-network output—timed sequence keying. With tubes, less crystals.  
Cat. No. 240-181-1 Kit. . . . . Net \$69.95

**CHALLENGER**—70 watts phone input 80 through 6; 120 watts CW input 80 through 10 . . . 85 watts CW on 6 meters. Two 6DQ6A final amplifier tubes. Crystal or external VFO control—TVI suppressed—wide range pi-network output. With tubes, less crystals.  
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**6N2**—Rated 150 watts CW and 100 watts phone—Instant bandswitching coverage 6 and 2 meters. Fully TVI suppressed—use with "Viking I, II", "Ranger I, II", "Valiant" or similar power supply/modulators. Operates by crystal control or external VFO with 8-9 mc. output. With tubes, less crystals.  
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**10 METER "MESSENGER"**—A compact, superbly-engineered transceiver. Ideal for fixed location or mobile operation. Completely crystal controlled, the 10-Meter "Messenger" contains 10 tubes (including rectifier). Instant selection of five frequencies in the range of 29.4 to 29.7 mcs., within a 300 kc. segment of the 10-meter band. Super-heterodyne receiver has excellent sensitivity and selectivity. ANL, AVC—positive action "squitch" . . . wide range pi-L network output . . . push-to-talk ceramic microphone! Transmitter section uses a 7054 crystal oscillator coupled to a high gain 7061 final amplifier—delivers a clean, crisp, well modulated signal! Unit is light weight, easy to install. With power cords, tubes, microphone and 29,640 kc. crystals for National Calling and Emergency Frequency.  
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**10 METER "PERSONAL MESSENGER"**—Two models: 100 milliwatts for short range; 1 watt for extended range—11 transistors and 4 diodes—super-heterodyne receiver with tuned RF amplifier gives excellent sensitivity, two stage transmitter punches signal home. "Quiet" control silences receiver on standby. With battery compartment for penlight cells (less cells). Rechargeable cadmium battery and other accessories available.  
Cat. No. 242-103 10 Meter "Personal Messenger", 100 milliwatt, with 29,640 crystal, 8 penlight cell battery case . . . Net \$109.50  
Cat. No. 242-104 10 Meter "Personal Messenger", 1 watt, with 29,640 crystal, 8 penlight cell battery case . . . . . Net \$129.50  
Cat. No. 251-806 Leather carrying case and strap . . . . . Net \$8.50  
Cat. No. 250-804 Rechargeable nickel cadmium battery, Plugs into 115 V AC outlet to recharge . . . . . Net \$19.95

**RANGER II**—Now—a new version of the popular 75 watt CW or 65 watt AM "Ranger". The "Ranger II" transmitter also serves as an RF/audio exciter for high power equipment. Completely self-contained instant bandswitching 160 through 6 meters! Operates by built-in VFO or crystal control. High gain audio-timed sequence keying, TVI suppressed. Pi-network antenna load matching from 50 to 500 ohms. With tubes, less crystals.  
Cat. No. 240-162-1 Kit . . . . . Net \$249.50  
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**FIVE HUNDRED**—Full 600 watts CW—500 watts phone and SSB (P.E.P. with auxiliary SSB exciter). Compact RF unit designed for desk-top operation. All exciter stages ranged to VFO tuning—may also be operated by crystal control. Instant bandswitching 80 through 10 meters—TVI suppressed—high gain push-to-talk audio system. Wide range pi-network output. With tubes, less crystals.  
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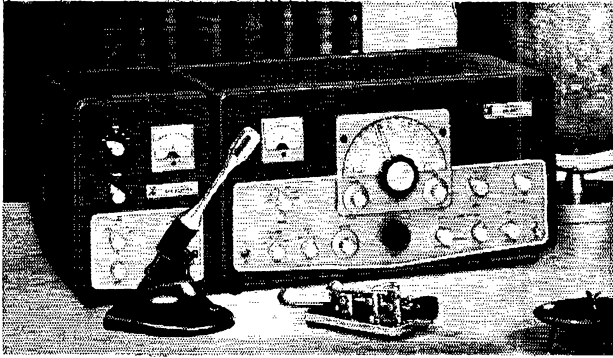
**"6N2 THUNDERBOLT"**—1200 watts (twice average DC) input SSB and DSB. Class AB1; 1000 watts CW, Class C; and 700 watts input AM linear. Continuous bandswitched coverage on 6 and 2 meters. TVI suppressed. Drive requirements; approx. 5 watts Class AB1 linear, 6 watts Class C CW. With tubes and built-in power supply.  
Cat. No. 240-362-2 Wired . . . . . Net \$549.50

**"THUNDERBOLT"**—The hottest linear amplifier on the market—2000 watts P.E.P. (twice average DC) input SSB; 1000 watts CW; 800 watts AM linear. Continuous coverage 3.5 to 30 mcs—instant bandswitching. Drive requirements; approx. 10 watts Class AB2 linear, 20 watts Class C continuous wave. With tubes and built-in power supply.  
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**on SSB, AM and CW with**  
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**"SSB ADAPTER"**—The new filter-type SSB generator—with bandswitching 80 through 10 meters . . . more than 50 db sideband suppression . . . more than 45 db carrier suppression! When used with the Viking "Valiant" or "Valiant II" it places 275 watts P.E.P. at your command. Two compact units and interconnecting cables . . . RF unit is only 8" wide—may be placed on your operating desk. Power supply unit may be placed in any convenient location. Features built-in multiplier requiring VFO input only—band-pass interstage couplers require no tuning—design and front panel make operating practically fool-proof. Superb audio fidelity and balanced audio response; excellent sideband, spurious and carrier suppression. Other features: positive VOX and anti-trip circuits with built-in anti-trip matching transformer and adjustable VOX time delay. With remote power supply, tubes and crystal filter, less microphone.

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**"VALIANT II"**—Outstanding flexibility and performance—bandswitching 160 through 10 meters—delivers 275 watts input CW or SSB (with auxiliary SSB exciter or Viking SSB adapter) and 200 watts AM! Low level audio clipping—differentially temperature compensated VFO provides stability necessary for SSB operation! High efficiency pi-network tank circuit—final tank coil silver-plated. Other features: TVI suppression; time sequence (grid block) keying; high gain push-to-talk audio built-in low pass audio filter; self-contained power supply; and single control mode switching. As an exciter drives any popular kilowatt level tubes and provides quality speech driver system for high power modulators. Provision for plug-in SSB operation with no internal modification. With tubes, less crystals.

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**INVADER**—More exclusive features than any other Transmitter/Exciter on the market today! Specially developed high frequency, symmetrical, multi-section band-pass crystal filter for more than 60 db sideband suppression—more than 55 db carrier suppression! Instant bandswitching 80 through 10 meters—no extra crystals to buy—no realigning necessary. Delivers a solid 200 watts CW input: 200 watts P.E.P. SSB input; 90 watts input on AM! (25-30 watts output—upper sideband and carrier.) Built-in VFO—exclusive RF controlled audio AGC and ALC (limiter type) provide greater average speech VOX and anti-trip circuits. Fully TVI suppressed. Self-contained heavy-duty power supply. With tubes and crystals.

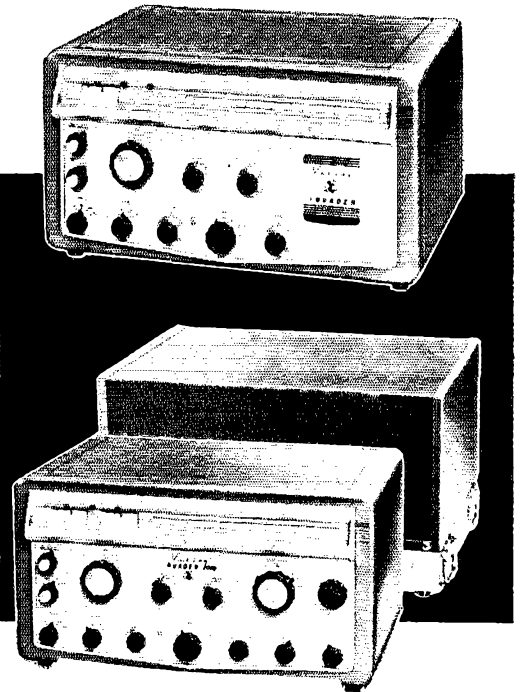
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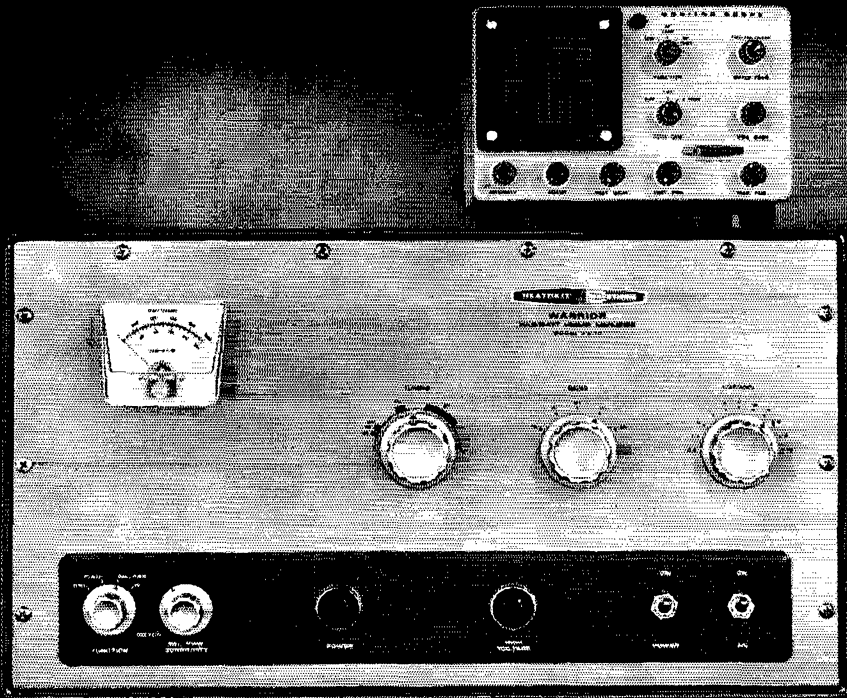
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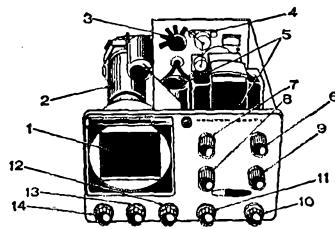
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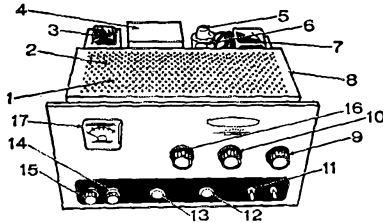
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1. 3" CRT 2. Neckshield minimizes external field effects 3. RF attenuator accommodates 5w to 1 kw power levels 4. Rear panel RF feed-through connectors and input and output jacks 5. Compactrons for space-saving layout 6. Sweep frequency adjust with "clamp" position to prevent CRT burns under SSB no-modulation conditions when using trapezoid function 7. Wave envelope, AF or RF trapezoid selector 8. Built-in single or two tone test generator 9. Horizontal gain 10. Horizontal position 11. Vertical position 12. Vertical gain 13. Focus 14. On/Off/Intensity

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Stay Linear with the Heathkit Monitor 'Scope... \$59.95

Put this space-saving twosome to work in your shack for a clean KW of single sideband. The "Warrior" in a short time has justly earned a world-wide reputation as the finest watts-per-dollar value anywhere in kilowatt linears. QSO an amateur who has one, there are hundreds on the air. The new Heathkit Monitor 'Scope is especially designed for hams with useful patterns for checking "flattopping" and non-linearity in SSB linear amplifiers, observing modulation characteristics of AM and SSB transmitters, and monitoring the quality of received signals. Send for free specification sheets on these ham-engineered, quality kits from Heath.



**HEATHKIT DESK-TOP KILOWATT LINEAR... \$229.95**

1. Four 811A's 2. Fan cooling 3. 5-50 hy. swinging choke 4. 8 ufd, 2 KV, oil-filled filter capacitor 5. Two 866A's 6. Monitor scope output with level control 7. 1500 v. Power transformer 8. Internal RF shielding 9. Loading control 10. Band switch, 80 through 10 meters 11. Power and High Voltage interlocked switches 12. High Voltage pilot light 13. Power pilot light 14. Relative Power sensitivity control 15. Meter switch with Grid, Plate, Relative Power, and High Voltage positions 16. Tuning control with band markings 17. Meter



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# GOTHAM VERTICALS DELIVER THE CONTACTS

THE ULTIMATE PROOF OF THE FINE PERFORMANCE OF THE  
GOTHAM VERTICAL ANTENNAS IS IN THE ACTUAL FIELD  
RESULTS, BY HAMS ALL OVER THE WORLD.

## PROVEN! PROVEN! BY THESE EXCERPTS FROM UNSOLICITED TESTIMONIALS:

### CASE HISTORY #71

"I am very delighted with the first V80 and want another for a different location." A. C., California.

### CASE HISTORY #159

"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more." W. A., Alaska.

### CASE HISTORY #248

"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a WAC of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

### CASE HISTORY #111

"The V160 did a beautiful job on a VE1 for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when bought it." D. S., New Jersey.

### CASE HISTORY #250

"I have one of your vertical antennas and have been having fine results on 10, 15, and 20 meters." N. S. P., Missouri.

### CASE HISTORY #613

"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success — i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

### CASE HISTORY #483

"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

### CASE HISTORY #123

"I am full of praise for your vertical. In the recent field day, we went up to the mountains near here and QSO'd a KA2, KZ5, and an XE at 2100 PDST on 15 meters. We got a 59 plus from the KA and KZ and 58 from the XE." D. P., Nevada.

### CASE HISTORY #398

"Some months ago I purchased one of your V80 vertical antennas. I have had wonderful results with this antenna, and I think it was of far greater value than the small amount I paid for it." R. C., Utah.

### CASE HISTORY #766

"The Gotham vertical takes almost no room. I don't see how I could have used any other type very well. Sure do appreciate the fine record this antenna has made so far." H. C., Haiti.

### CASE HISTORY #146

"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. L., Nebraska.

### CASE HISTORY #555

"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

### CASE HISTORY #84

"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

### CASE HISTORY #407

"I recently purchased a Gotham V80 vertical antenna and I am very pleased with the results. Up until now my home brew antenna has had a very high SWR, but with the V80 the SWR is 1:1." J. D. R., Virginia.

### CASE HISTORY #414

"Just a quick note to tell you how pleased I am with my 2 day old V80. My old SX-28 just seems to be re-born. An excellent receiving antenna as well as a fine transmitting antenna." D. J., Utah.

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Catalog of all Gotham antennas,  
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## ANNOUNCEMENT!

GOTHAM proudly announces our appointment  
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ORDERS AND INQUIRIES SOLICITED



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- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Non-corrosive aluminum used exclusively.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price.

73,  
GOTHAM

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2. LOADING COIL NOT REQUIRED ON 6, 10, 15 AND 20 METERS. FOR 40, 80, AND 160 METERS, LOADING COIL TAPS ARE CHANGED MANUALLY EXCEPT IF A WIDE-RANGE PI-NETWORK OUTPUT OR AN ANTENNA TUNER IS USED; IN THIS CASE BAND CHANGING CAN BE DONE FROM THE SHACK.
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V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS..... \$14.95

THE V40 IS ALSO MADE FOR CITIZENS BAND OPERATION, WITH SPECIAL INSTRUCTIONS. DESIGNATE CB-11 ANTENNA. PRICE SAME AS THE V40

V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... \$16.95

V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... \$18.95

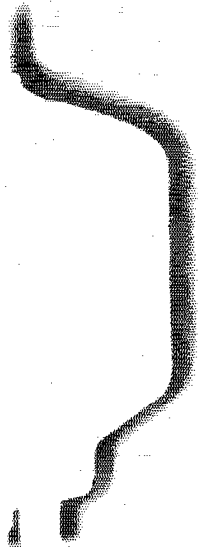
**HOW TO ORDER.** Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

Name.....

Address.....

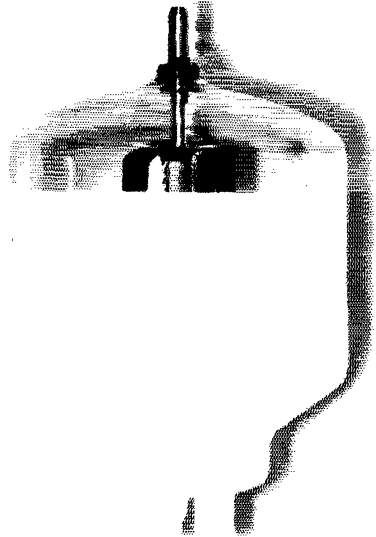
City.....Zone.....State.....

# SSB TUBES DON'T JUST HAPPEN



From its radiation-cooled graphite anode and all-glass envelope, to its unique internal structure, the new Amperex 8179 Tetrode was designed from concept through accomplishment to be a better SSB linear amplifier than any other tube ever before available in its power class.

# THEY



How well Amperex has achieved its objective is expressed in the significant facts that the 8179 will provide **more power**, with **lower intermodulation distortion**, at **higher operational efficiency** than ever before attainable in SSB linear service—and we mean *linear!*

The highly efficient heat radiation properties of the 8179 eliminates the need for costly, space-consuming cooling fans, blowers and related accessories. The tube incorporates a thoriated tungsten filament with high reserve emission rated at 7.5 volts and 22.6 amperes.

HAVE TO BE



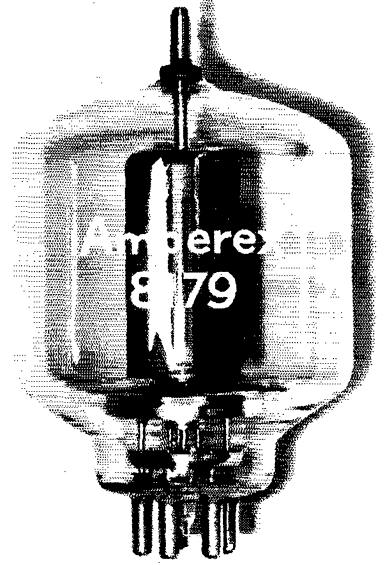
Class AB<sub>1</sub> Grounded Cathode Linear RF Amplifier  
Single Sideband Suppressed Carrier Operation

Typical Operation at 2 Kw PEP Input

DC Plate Voltage ..... 4000 volts  
DC Grid No. 2 Voltage ..... 600 volts  
Zero Signal DC Plate Current ..... 150 Ma  
Max. Signal DC Plate Current ..... 515 Ma  
Max. Signal DC Grid No. 2 Current ..... 115 Ma  
Tube Efficiency at Peak of Envelope ..... 68%  
Average DC Plate Current (two tone test) . . . 360 Ma  
Average DC Grid No. 2 Current  
(two tone test) ..... 60 Ma  
Peak Envelope Plate Power Output . . . 1410 Watts  
3rd Order Intermodulation Distortion ..... 34 db  
5th Order Intermodulation Distortion ..... 38 db

For complete data on this and other transmitting tubes, write: Amperex Electronic Corporation, Communication and Industrial Tube Department, Hicksville, Long Island, New York.

DESIGNED  
FOR SSB



(Continued from page 88)  
working out NCS schedules for DEPN. Traffic: (Nov.)  
K3GKF 11, K3ANW 4.

**SOUTHERN NEW JERSEY**—SCM, Herbert C. Brooks, K2BG—SEC, K2ARY, PAM, W2ZL, RM: W2VAT. New appointment: W2AKP, Palmyra, as OPS. With regret we report the passing of K2OHA, Sewell, N.J. W2ZVW, Burlington Co. EC, has been appointed Asst. Director of the Atlantic Division by Director Crosby. Also K2BG's appointment was renewed by the Director. Gloucester County ARC officers for '63 are W2AFR, pres.; W2ATZ, vice-pres.; K2OJX, secy.; W2YNR, corr. secy.; W2AIAZ, treas. The club held its Annual Birthday Party, Jan. 19. NJ Phone Net Dec. totals: QNT 522, 31 sessions, traffic 233. W2ZL, the Net Mgr., is real happy with a new transmitter, W2BZJ, Pennington, is QRL installing s.s.b. equipment at N.J. State RACES Hq., K2KVS, OBS Meadow Lakes, keeps the area well informed with ARRL Bulletins. W2HJB, Ocean City, is training at Pensacola, Fla. W2SN, W2ANXV, Gloucester, has a kw. running FB. W2QNL, NJN Mgr. reports Dec. totals as 31 sessions, QNT 546, traffic 522, Falcon (McGuire AFB) Radio Club officers for '63 W2DBY, pres.; W2ACSL, vice-pres.; K4RGT, secy.; K8TEC, treas. Southern Counties ARC's new officers are W2AQOQ, pres.; W2AQOZ, vice-pres.; W2ASNN, secy.; K2LZB, treas. The Lovittown (N.J.) Radio Club's officers for '63 are W2AQZQ, pres.; W2N2CPS, vice-pres.; W2N2CKK, secy.; E. Schaeffer, treas. W2N2CRT, Beverly, is now W2Z. W2DAJ was SJRA's top scorer in the recent SS Contest. W2ORA was tops on phone in the same contest. Cherry Hill High School ARC (W2ABC) *School News* is published in SJRA's *Harmonics*. K2KTS is director of the high school's radio activities. Reports from club secretaries are solicited. ECs are requested to make monthly reports to K2ARY, SEC, for this section. Traffic: W2WLN 223, K2RXB 218, W2RG 166, W2ARI, V 115, W2VAT 74, W2ZL 42, W2BZJ 38, K2JJC 10, W2ANXV 8, W2ARJ 7, W2AKAP 7.

**WESTERN NEW YORK**—SCM, Charles T. Hansen, K2HUK—SEC, W2LXE, RMs: W2RUF, W2EFZ, W2FEB, PAM: W2PVL. NYS C.W. meets on 3670 kc. at 1900; ESS on 3590 kc. at 1800; NYSPTFN on 3925 kc. at 1800; NYS C.D. on 3610.5 and 3993 kc. at 0900 Sun. and 7102.5 kc. at 1930 Wed.; TCFN 2nd call area on 3970 kc. at 1900; IPN on 3980 kc. at 1600; 2RN on 3960 kc. at 0045 and 2345 GMT. RPL was made in December by W2OE and W2RUF. Congratulations. Appointments: W2RKU as ORS, W2IYB/W2ATFV as OPS. Endorsements: K2DNN as EC Chemung County. K2TDG reports that W2AKZQ has been elected mgr. of NYSPTFN with K2SPO 1st asst. mgr., K2QKK 2nd asst. mgr. and W2AZUK secy.-treas. W2ADAC is working on ham TV using an old TV set. W2ATHY received CP-25. W2ATGC is going 6-meter s.s.b. W2EMW now has 257 countries confirmed using 30 watts. K2HERE gave a talk to the RAWNY on s.w.r. W2BPE is getting AR22. The RDNA and NFDNA held a joint meeting in Batavia. W2UYE, K2INP, K2GXI, W2CBA, W2SNI, W2SAW, W2PHT, W2EDE, K2HUK, K2ITM, W2SOV, W2QWS, W2KWB, K2JDJ, W2FXA, K2LWR, K2HWF, W2OIAJ, W2DUJ, W2AIBV, W2PDB, W2SRP, W2ADQL, K2IAJ and W2CUIY heard W2NSAW and saw slides of his European trip visiting DX stations. K2-SWL has a full-size 20-meter beam on a new 50-ft. tower to go with the new HT-32B and HT-41. W2CMT and W2UZF have a new 6-meter and 20-meter beam tower set up. W2ATCZ and K2DNN have 2, 6 and a T433 on a 40-ft. tower. W2ZJ, Elmira club station, has new quarters. The ARATS elected K2KAM, pres.; W2IXN, treas. and vice-pres.; and K2RTQ, secy. The Syracuse V.H.F. club elected W2ADVI, pres.; W2ADG, vice-pres.; K2RYU, treas.; W2IYR, act. mgr.; K2TXX, secy.; and W2RHQ continues as round-up chmn. The Genesee Radio Amateurs Assn. was officially organized in December with K2PBK, pres.; K2-YXW, vice-pres.; W2ACTI, secy.; W2UCY, treas.; W2GIR and W2TST, directors. The town of Parma needs RACES operators. Contact W2ELP. Same for the town of Oden. Contact W2ARVO. W2IUTH/K2KLP is now operable on s.s.b., a.m. or c.w. on 2 through 75 meters. W2FDI is building a 40-element 2-meter beam for 2-meter s.s.b. Traffic: (Dec.) W2OE 883, W2RUF 665, W2AKQG 390, W2FZR 321, W2FEB 210, W2RKU 194, W2IYB 190, W2ALKW 160, K2ODT 129, K2RTQ 96, K2RVH 81, W2HSB 76, W2FCF 64, K2OFV 50, W2RQF 47, W2AKZQ 42, W2AZNE 40, W2AGLA 36, K2PBU 32, K1BVI/2 31, K2SPO 26, W2ADAC 18, W2A-WEE 16, W2PVI 11, K2HOH 5. (Nov.) K2RTQ 64.

**WESTERN PENNSYLVANIA**—SCM, Anthony J. Mroczka, W3UHN—SEC, W3LIV, RMs: W3KUN and W3UCG. It is with deep regret we record the death of W3GEG, of Greenville, Pa. A former ARRL Atlantic Division Director (1952-53), Clyde will be sorely missed by the entire amateur fraternity where he received the nickname "Ace" for his flawless c.w. oper-

ating. The WPA Traffic Net meets Mon. through Fri. at 2400 GMT on 3585 kc. The Keystone Slow Speed Net (KSSN) meets at 2330 GMT on 3585 kc. Mon. through Fri. Silent Keys: K3LUM of Altoona, Pa., and K3QQQ, of Pittsburgh. Pa. W3MFB extended his string of QNTs to 96 consecutive appearances on WPA. KN3TQW received his General Class ticket. The Uniontown ARC reports via *The Maapie*: Club officers are K3RTG, pres.; K3OQP, vice-pres.; W3CAV, treas.; W3IUZ, secy.; W3CAV, W3RUK and W3PQR, trustees. The recent snow and ice caused the cancellation of the Steel City ARC Christmas Party. K3OWN has a Health Tower mobile. The Butler County ARC conducts code classes every Thurs. evening at 0030 GMT. Officers of the Bureau of Mines ARC (K3RZX) are W3MHD, pres.; K3LAV, vice-pres.; W3HID, secy.; K3PXE, treas. KN3TZX is W3HID's jr. operator. Up Erie way: KN3UWS of Westerville, Pa., is a Silent Key, W3AU soon will retire from Biley Electric; K3HFL is on 2-tube s.s.b.; K3VLQ is home from the hospital. The Coke Center RC reports: K3PPZ and K3PPW passed the General Class exam; a new Novice is KN3VXS; W3QZY passed the 1st class commercial exam. The Horse-hoe RC reports via *Hamateur News*: K3LAV is on 6 meters with an HE-45A; K3MIL is operating RTTY on 80 meters; K3BDI is putting a kw. linear together; K3HDH is starting code classes. The Etna RC reports through the *Oscillator*: K3MQX is on 20-meter S.S.B.; W3RSB is home from the hospital; W3OJM has his Marauder back on the air. The members of the Nittany ARC participated jointly in the recent SS Contest. Traffic: (Dec.) W3MFB 479, K3OOU 386, W3KUN 259, W3UHN 236, K3DKE 189, W3JHG 74, K3EOD 47, W3LSS 39, W3OHO 39, W3IYJ 34, W3SMV 29, K3OWN 16, W3IUU 14, K3SMB 9, K3COT 5, W3-KNQ 5, W3ISZ 3, W3KWO 3, W3SYY 3. (Nov.) W3-SMV 13.

## CENTRAL DIVISION

**ILLINOIS**—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Kyden, W9GME, SEC: W9RYU. RM: W9USR, PAM: W9WVJ. EC of Cook County: W9HPG. Section net: ILN; 3515 kc. Mon. through Sat. at 1900 CST. W9RYU, the newly-appointed SEC of this section, will establish an EC net which will meet Sun. at 1600 GMT. All ECs are asked to report into this net, which will be inaugurated Mar. 3, 1963. All EC monthly reports also are to be mailed to him at 705 Hillcrest Road, RFD 3, Milan, Ill. W9KPC, W9REA, K9ATK and W9YYG were elected as the new officers of the Joliet Amateur Radio Society, Inc. New licensees in the Joliet area are W9NGHJ, W9GHR, W9GHH, W9NGHS, W9GHT, W9GHU, W9GHW, W9GHHX, W9NGHY, W9NGHZ, W9NGIA, W9NGIB, W9NGIC, W9NGID, W9NGIE, W9NGIF, W9AGIK and W9NGGZ. K9LXG and W9AXV are using a new Drake 2B receiver. W9TO spoke at the Jan. 8 meeting of the North Shore Amateur Radio Club (Deerfield). K9-UCG received his WAS certificate. K9CIL reports that the Breakfast Club Hamfest will be held again this year at Ferry Park on July 20 and 21. The 75-Meter Interstate Single Sideband Net had a traffic count of 876 for December and for the same period the North Central Phone Net's traffic count was 398. Our deepest sympathy to the family and host of friends of W9RIM, who passed away suddenly in January. He will be missed by the SARA and there will be a great void in the Southern Illinois amateur ranks. The new officers of the Starved Rock Radio Club are W9IET, pres.; W9NIU, vice-pres.; W9QLZ, secy.-treas. The club celebrated the 25th anniversary of W9QLZ. W9ZEN received his WAS. W9HPJ is recovering from a recent illness. W9LMI, W9PRC and W9BKB were elected to guide the Central Illinois Amateur Radio Club of Bloomington. The Bloomington Club also participated in the Mothers' March of Dimes. K9HEU has a new tower and a 42 ft. tower and five-element beam. K9AMD and K9AKF have announced their engagement. K9AMD has authored a new book, *The Care and Feeding of a Ham Club*, which is currently available. W9UCY is now K7VPZ and his QTH is Boise, Idaho. K9OXD received an HA-1 TO keyer for submitting the best entry in the Allied Ham Shack S.S.B./C.W./V.H.F. Contest. K9DRR and K9ZQT have started RTTY on 3600 kc. at 4 p.m. Sun. New appointments are W9OEG as OBS; K9DRS as ORS; K9TOK and K9IUN as OOs; W9EOQ, W9OEQ, W9ABR and W9BHU as OESs. K9DCZ has a new Penco 6N2 and beam on a 60-ft. tower. W9IDA, K4WRM/4, K9NBH, W9AJF and K9BTE are recipients of the BPL awards for December traffic. Traffic: (Dec.) W9IDA 3255, K4-WRM/4 2030, K9NBH 1253, W9AJF 780, K9BTE 549, K9ZB 434, W9AKV 169, W9JXV 132, K9GSC 98, K9CYZ 94, W9EET 89, W9MAK 63, W9AFT 60, K9ZQT 48, K9DRS 28, K9LXG 17, W9YJG 13, K9CRT 12, W9PRN 11, K9RAS 11, K9OCU 7, K9QMJ 4, K9UCG 4,

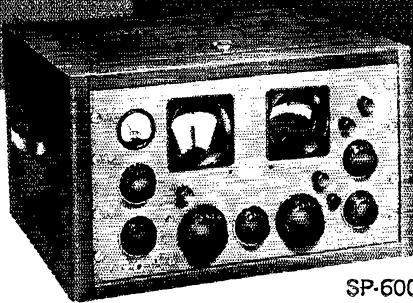
(Continued on page 100)

# RIGHT ACROSS THE SPECTRUM!!

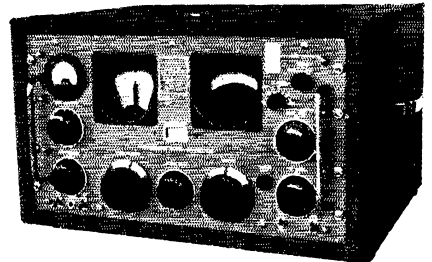
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The widest frequency range  
parameter in the industry

to  
54  
MCS



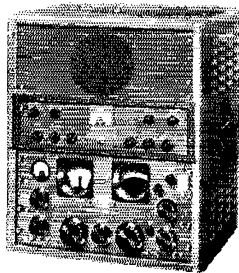
SP-600 JX



SP-600 VLF

This unique combination of two matched SP-600 communications receivers permits continuous coverage from audio frequencies (10 KCS) to VHF (54.0 MCS). Hammarlund SP-600 receivers have attained a world-wide reputation for excellent stability and calibration and have seen continuous use as laboratory and/or professional instruments for AM radio telephone, CW telegraph, AM-MCW telegraph, carrier-shift teletype, and in military communications.

**HAMMARLUND SP-600 JX** 6 bands provide continuous tuning from 540 KCS to 54.0 MCS. Stability of 0.01% or better at 540 KCS to less than 0.001% at 54 MCS. Sensitivity is 0.75 to 1.0 mv on CW and 1.5 to 2.3 mv on AM for a signal-to-noise ratio to 10 db. Provision for six crystal controlled fixed frequencies. **\$1140.00**



**HAMMARLUND SP-600 VLF** 6 bands provide continuous tuning from 10 KCS to 540 KCS Low drift — between 0.05% and 1.0% depending upon frequency. Provision for four crystal-controlled fixed frequency channels. Available in rack mounted or cabinet model. **\$1975.00**

FOR SSB Unexcelled SSB performance is yours through use of a Hammarlund SPC-10 converter and the SP-600 JX. The SPC-10 can be integrated with any standard communications receiver which has an IF of 450 to 500 KCS. It adds a degree of selectivity not found in commercially available receivers designed for AM/MCW. SPC-10 **\$375.00**

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(Continued from page 98)

WA9AWP 3, K9VUL 3, K9FNB 2, W9SXL 2, K9TOK 2, W9LNQ 1. (Nov.) K9OCU 9.

**INDIANA**—SCM, Donald L. Holt, W9FWH—Asst. SCM; Clifford M. Singer, W9SWD. SEC: W9SNQ. PAMs: K9KTL, K9CRS, K9GLL. RMs: W9TT, K9SGZ, K9WET. Net skeds (all times in GMT): 1FN, 1300 daily except Sun. at 1330 and 2300 M-F on 3910 kc. 1SN (s.s.b.), 0030 daily on 3920 kc. 1N (training), 0000 M-W-F on 3745 kc.; QIN, daily at 0030 and RFN at 1300 Sun. on 3656 kc. With deep regret, the following Silent Key is reported: Donald F. Hunt, W9DOD. A new Tech. in Kendallville is WA9GCA, W9EGV and K9CJE are recovering from illnesses and are back on the air. The Delaware County Amateur Radio Club has a new club house which was built and finished by club members. W9AQW has a new s.s.b. adapter. W9QLW has a new Mohawk receiver to match the Apache. QIN Honor Roll: W9TT, K9KTL, W9QLW, K9SGZ, W9VAY and W9ZYK. Those making BPL: W9M1N, W9ZYK, W9NZZ, K9DHN and W9TT. *Amateur radio exists as a hobby because of the service it renders.* December net reports: 1FN 348, 1SB 1866, QIN 256, QIN (training) 25, Hoosier V.H.F. 141 and RFN 114. Traffic: (Dec.) W9M1N 1296, W9NZZ 696, W9ZYK 653, K9DHN 566, W9VAY 319, W9TT 309, K9LEJ 258, W9QLW 234, K9KTL 193, K9RWK 179, K9SGZ 174, K9IVG 142, W9SWM 105, K9ZLB 96, W9B1Q 90, K9INP 68, W9VWF 63, W9PMT 63, W9CC 54, K9ARW 52, W9SNQ 52, K9CRS 48, W9BDG 43, K9HYV 41, W9RTH 35, K9ILK 34, W9QYQ 34, K9DZD 33, K9AUI 29, W9AB 26, W9DGA 25, W9QWI 25, W9DOK 23, W9OG 21, W9RE 21, K9QJR 20, W9EJW 18, W9BTZ 17, K9GL 15, K9MWC 11, W9VYS 10, K9BSL 8, W9BZI 8, W9YXJ 8, W9BDP 7, K9MAN 6, K9WVJ 6, W9AQW 4, W9J5V 2. (Nov.) K9TFJ 4.

**WISCONSIN**—SCM, Kenneth A. Ebener, K9GSC—SEC: W9BCC. PAMs: W9NGT, W9NRP and W9SAA. RMs: W9VTK and W9VHP. Nets: W9SN on 3985 kc. at 0115, all nets daily. New appointments: W9SFE as OES and K9KJT as OBS, sending Official Bulletins on 2 meters in the Milwaukee area. Renewed appointments: W9PZC and W9WJL as OEs, W9NGT as OPS and PAM, K9HBT as OEs, W9LRF as OO Class 1. W9YT has received the W99W award for working 99 Wisconsin stations. W9CXY has been welcomed back on the c.w. nets with his new Ranger 2. K9YPT and W9ILJ are on s.s.b. with new equipment. W9M1N is busy organizing RACES in Douglas County. K9LGU and W90PL have remodeled their respective shacks. W9KQB has been appointed Assistant Director of the Central Division, succeeding W9JZO. K9CJP has a DX-pedition to rare Alcomine County during the Wisconsin QSO Party. W9CDA received a Health Tower for Christmas. K9BLN is now keeping the records for the HEN. BPL certificates for December traffic were sent to W9DYG, K9IMR and K9GDF. Don't forget the Southern Wisconsin QSO Party at Racine May 25. An invitation is extended to all stations to apply to the SCM for appointment as OPS, ORS or OES. Also OOs and OBSs are needed on the v.h.f. bands. Traffic: W9DYG 1000, W9SAA 431, K9IMR 329, W9CXY 323, W9VHP 134, K9BLN 114, K9GDF 105, W9AOW 101, K9CSG 68, K9LGU 68, K9CJP 35, K9YPT 30, W9NRP 25, W9OTL 20, K9BQD 18, W9ALWQ 18, K9DOL 15, W9HPC 14, W9VJH 14, W9UEB 4, W9EKZ 2.

### DAKOTA DIVISION

**NORTH DAKOTA**—SCM, Harold A. Wenzel, W0HVA—SEC: W0CAQ. PAM: K0TYY. RM: K0QWY. W0AQR has a new HT-37 and an SX-111. The Ward County Races plan has been approved and new 6-meter gear is in the office. Al Phares, Williston, has received his zero call, W0HKK. A new call in Bismarck is W0NEHQ, K0AIV, formerly of Dickinson, is now living in Bismarck. No net reports were received this month and only two traffic reports. Remember, I can't send in news if I don't get it. Traffic: W0AYL 27, W0IHM 3.

**SOUTH DAKOTA**—SCM, J. W. Sikorski, W0RRN—SEC: W0SCT, W0GWD (formerly W6WPU), of Rapid City, is operating RTTY and has been appointed OBS. He reports the Ellsworth ARC is conducting code and theory classes. W0ZVL has added two more poles to her antenna farm, for a beam and 160-meter long wire. Veterans Administration Center, Hot Springs, has received the call W0BSG. Operation is in charge of W0EDY. W0HOJ is trustee, W0NCXA, W0NCWV, W0NCWX and W0NECK passed the General Class exams. K0HEA, Ipswich, is new on the nets, using the Cheyenne and Comanche purchased from W0CRD. W0ZLS moved from Minnesota to Canton, W0FAM moved from Nebraska to Sturgis. K0CLT and W0FNM are on 50 Mc. K0ZTV has received an OPS appointment. Traffic: W0ZVL 672, W0SCT 559, W0BSG 263, W0DVB 242, W0A0Y 228, K0BMQ 134, K0VYV 34, W0OFP 31, K0ZBJ 28, K0TVJ 25, W0NNX 22, K0YZZ 22, K0CXL 20, K0BSW 14, W0DIY 12, K0TXW 12, K0TMM

10, K0GSY 6, K0DHA 5, K0HQD 4, K0JGM 4, W0QDU 4, K0ZTV 3, W0OCH 2, K0TAM 1, W0WVF 1.

**MINNESOTA**—SCM, Mrs. Lydia S. Johnson, W0KJZ—Asst. SCM; Charles Marsh, W0AIW. SEC: K0KKQ. PAMs: W0GCR, K0EPT. RMs: K0UXQ, K0IZD, MSSB Net Mgr.: W0HEN. Minnesota nets: at 1805Z and 2400Z, MSPN on 3820 kc.; at 1730Z on 3805 kc. and 0045Z on 3812 kc. MSSB; C.W. MSN at 0030Z, and MJN (training-slow speed 8-10 w.p.m.) at 0100Z (7 P.M.) on 3595 kc. K0ZMH now resides in Minneapolis. K0TEC, who is with the Navy, stationed in Florida, was home in Cokato for the holidays. K0LBA is with the Army at Fort Riley, Kan. W0E0JQ, a new Novice in Olivia, is using an AT-1 and an SX-99. W0E0LE built an electronic keyer. OES W0HPS will be on c.w. nightly at 2100 to 2300 CST on 50.093 and 145.008 Mc. with a nine-element Yagi antenna and a Johnson 6N2 Thunderbolt. OO W0KLG listed a total of 50 violations in the December report, mainly Novices with second harmonics above 7.4 Mc. W0A0NU, age 13, applied for OBS appointment. He has a DX-100B transmitter and an SX-107 receiver. K0KLV runs a Viking Valiant and a Collins S-Line receiver. K0GNH, near Owatonna, also has a Valiant transmitter and an SX-99 receiver. K0PYQ uses a DX-40 transmitter and an SX-110 receiver in Pemberton. A new "ham family" in Dexter consists of K0YRA (Cliff, his XYL Mary, W0DFN and their oldest daughter Sharon, W0PID, W0UMX, who visited them, informed me that Mary is confined to bed so her hobby means a great deal to her. New NCs for the Noon MSPN are W0S HEN, OPX, UMX, K0S, ZKK, JLU, VPI, with K0S LWK and MIZ alternating Sun. Approximately 250 hams, XYLs and YLs attended the Minneapolis MRC Christmas Banquet. DXers note when you hear DL5UW; he is W0SIL, formerly of St. Paul. The RARC, Rochester elected its first YL president, W0E0CG. Other officers are K0EWA, vice-pres.; K0A0Z, secy.; K0JFY, treas. K0SAZ will continue as editor of *The Flyer* and W0TJA as club station custodian. W0RIF, of Kansas, flew up for the MRC Annual Christmas Banquet, and, of course, to meet his first grandchild, a YL. Congrats! Our deepest sympathy goes to K0KKQ, our SEC, and his XYL, on the loss of their son, age fifteen, who died Dec. 1; also to W0MIV's family of Mound. Lee was killed in an airplane accident in the Philippines at the age of 24. Traffic: W0A0BI 250, K0QBT 180, W0ATO 175, K0UXQ 154, W0HEN 137, W0KJZ 110, W0GCR 106, W0B0YO 100, W0TBY 80, K0IHD 56, W0KLG 49, W0WMA 49, K0LJU 46, K0ZKK 41, K0VPJ 27, W0OPX 26, W0ALW 24, W0UMX 24, K0GCT 21, K0LWK 20, W0LST 19, K0ZRD 18, W0RIQ 13, K0FLT 12, K0GNH 12, W0DQL 6, W0GFP 6, K0ICG 6, K0CNI 3, W0URQ 2.

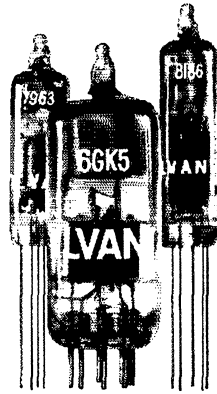
### DELTA DIVISION

**ARKANSAS**—SCM, Odia L. Musgrove, K5CIR—SEC: K5TYW. PAM: W5DYL. With much sorrow we report the passing of Bill Winzard, W5NDH. Our deepest sympathy goes to W5ENZ, his son, and all of the family. Congratulations to W9PHR/5 on earning BPL three times in a row. W5VQD has been pretty busy lately putting up a new tower. W5GUE/6 was a recent visitor to this section. He is serving with the Air Force in Sacramento, Calif. A new ham is reported in Marianna, W5BDP. K5EEF is back on the air after a couple of year's absence. Jay, whose call was K8BOK, now has a new call, W5LZU. QTH Lake Hamilton, Ark. K5CIR has been ill recently. The roll of the Arkansas Emergency Phone Net continues to increase. The net meets daily on 3885 kc. at 0600. The OZK C.W. Net seems to be coming to life since cool weather has arrived. The net meets at 1900 on 3970 kc. We encourage all stations to support your section nets. The above report was written by W5ZZY, former SCM, as your SCM is temporarily unable to carry on. Traffic: W9PHR/5 418, K5GTN 290, W5DTR 89, K5SGC 28, K5P5P 17, W5ZCD 10, W5HPL 8, W5DYL 6, K5ABE 4, W5PFP 4, K4IKA 4, K5ICH 1.

**LOUISIANA**—SCM, Thomas J. Morgavi, W5FMO—W5CEZ and K5QNV made the BPL again in December. K5PGS, who many of us worked when he was operating the Tulane University Radio Club Station W5YU, was banged up pretty badly when he fell asleep while driving but is rapidly recovering and is now very active on 20-40- and 75-meter s.s.b. W5WGC is now in Kuwait and plans to get on the air soon. W5SUM is in the process of building another pelican. W5JFB graduated from L.S.U. and is back in New Orleans and active on 6 and 2 meters. K5KQG got a 75A-4 for Christmas. K5FYI, who is the most active net control in Metairie, got his Warrior going on all bands. W5CWD reports 6-meter band openings were very good during December with W3, 8, 9, 0 and New Mexico and Texas. K5LZA reluctantly turned off his rig and headed back to Texas A&M. W5CRW with 280 worked and 279 countries confirmed, is now content to hold skeds with W5BMM on

(Continued on page 102)

## Hot tubes with cool noise figures...

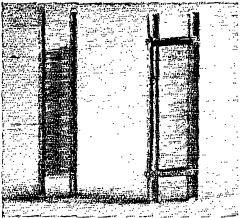


There are numerous ways of escaping receiver background noise. One is to move to the hills.

But, even with such heroic countermoves, we're all confronted with "The Years of the Quiet Sun" and weaker signals. So, what to do?

There's nothing one can do about noise from outer space and little about antenna and first-circuit noise. But there's a lot to be gained by using a hot tube in the r-f stage...and that goes for all bands. Because a tube with good gain and a beautiful noise figure lets you dig down into the mud for a bare whisper of a signal.

All of which you know. We mention it only to point up something that may have escaped your notice: Tubes have not become just a little bit better, but much better over the years. Which accounts for the fact that more than a single, conventional r-f stage today is a superfluous appendage.



A contributing factor is Sylvania's "Strap Frame Grid." Compare it with the conventional grid structure in the illustration. The Strap Frame looks like the support of a suspension bridge. It has such unusual rigidity that it is possible to use a far finer grid wire and thereby vastly increase the number of turns per inch, and at the same time place the grid much closer to the cathode. The end result is a tube with much greater transconductance and a considerably lower noise figure.

A notable example in the inexpensive class of receiving-type tubes is the Sylvania 6GK5 triode. We checked its performance in a conventional tuned circuit at 50 megacycles and came up with a gain of 30 db for a 2-mc bandwidth, and a noise figure below 2 db. Even better figures are coming from a new version, the 6HK5.

The Strap Frame Grids are also used in a series of nine subminiature triodes and pentodes that offer unusual performance in industrial and military gear. For instance, the type 8210 sharp cutoff pentode for r-f and i-f service to 400 mc offers 50% greater gain/bandwidth and has a Gm of 8500.

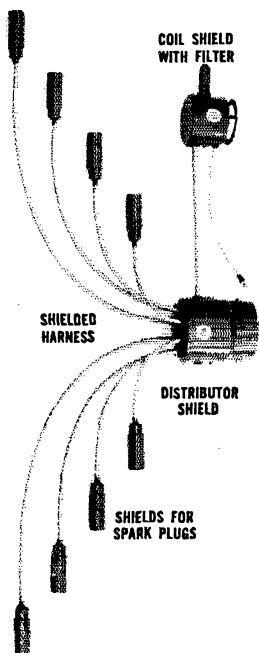
These new subminiatures will interest you if you're involved in commercial or military designs. You can get a brochure on the available types by writing the Electronic Tube Division, Sylvania Electric Products Inc., P.O. Box 87, Buffalo, N. Y.

73, *Bob Lynch*  
K2RMM

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## ELECTRO-SHIELD SYSTEM

Now . . . stop ignition noise interference at its source without cut-or-try, by-passing, phasing or extra resistance "losser" methods . . . and without impairing the performance of the engine.

Band-spanner Electro-shield System (illustrated) is entirely mechanical, positive, permanent—provides shielded leads and enclosures to shroud completely the entire engine ignition system complex. The Electro-shield System is preassembled, ready to install.

Plug shields fit standard and resistor type spark plugs. Molded shield inserts prevent spark-over, also waterproof plugs. Leads to the snap-on plug connectors are swaged, won't pull out or loosen when removing shield.

System as illustrated: For 8 cylinder cars. . . . . 78.50  
For 6 cylinder cars. . . . . 66.50

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21.3 Mc., 30 miles away. K5CZV has been busy handling traffic. W5MXQ, who was off the air because of transmitter trouble, is now back on. W3CME sends ARRL bulletins on RTTY. K5TNS, inactive last year, is back on with his new HX-50. W3ZBC has been working on RTTY to receive only and a 6-meter station. W5EA is working to get his AKT-13 going. W5CEZ got a TO keyer for Christmas. Carter is our RM. Look for him on RN5 at 0145 and 0330Z on 3645 kc. K5FKG has reentered in the Navy for six years and is to be stationed on Okinawa. He will probably be on as a K6R. Traffic: K5QXY 973. W5CEZ 572. K5CZV 136. W3ZBC 64. W3CME 41. W5MXQ 32. K5FNT 24. K5LZA 20. K5KQG 15.

**MISSISSIPPI**—SCM, S. H. Hairston, W5EMM—SEC; K5SQS. The Jackson Club has been reorganized with K5GVV, pres.; K5OFH, vice-pres.; W5OFE, treas.; WA5ARD, secy. Its DX club snagged Z10AM and LH4C. W4CJD/5 has a new son, K5MDX has 280 DX contacts. K5LFS has a new c.w. rig. W5AMZ started a key linear. K5RUO has a sked with VR5TC Mon. Congratulations on the new tickets to W5EGGC (who has worked over 400 stations). W5BNH (his father is W5GGZ), WN5EZS, WN5FEL (his father is K5ORE and his brother is K5KSK) and WN5CKS. New appointments: K5RUO as OC; W5JDF as RAI and ORS; K5KSK as ORS, OPS, and OBS; W4CJD/5 as ORS; K5FNU as OPS; K5MOH as Jones Co. EC. The Mississippi CW net meets Mon. through Fri. at 1845 CST Sun. at 1345 CST on 3760 kc. NCSS: W5JDF, K5YTA, W5WZ and K5TYP. The Jones County Amateur Radio Club is getting back on its feet. K5KIP, K5FNU, WN5DXL, K5UBL, WN5CKM and WN5ENS would like all Jones County hams to come to meetings Monday nights at 7 at the Civic Center. Traffic: W4CJD/5 52. W5JDF 37. K5KSK 33. W5BNH 32. K5FNU 19. W5AMZ 8. K5DGL 6. K5RUO 5.

**TENNESSEE**—SCM, David C. Goggio, W4OGG—SEC; W4WRK, RMs: W4OQG, K4AKP. PAMs: K4WWQ, W4LLJ. Net reports:

Net	Freq.	Time	Days	Sessions	QTC	QNI	Average
TN	3635	1900C	M-S	26	170	182	7
TSSN	3980	1830C	M-S	26	82	763	30
ETPN	3980	1640E	M-S	23	45	391	17

New appointments: WA4EPY as OES; K4DJV as EC Blount Co. WA4CRH as OPS. Coming events: Mar. 9-10 DX contest (c.w.); Mar. 23-24 DX contest (phone). W4PL is convalescing at home after a heart attack. Clubs: The MARA collected \$67 for the ARRL Building Fund with an auction. Delta purchased a new 3-kw. generator. The Frye ARC announces the Choo Choo ham award and new officers: K4ICH, pres.; W4JVM, vice-pres.; WA4BVP and K4QNI, secy.; WA4BWZ, treas. A new Nashville club is the Radio Amateur Transmitting Society with W4WHN, pres.; WA4CBK, vice-pres.; K4LGW, secy.; K4OKW, treas. With deep regret we announce a Silent Key, K4LVR of Nashville. All ECs note: SET one hour during the period Mar. 15-30. Please report to the SEC by radiogram and letter. OES WA4EPY worked VPTX on 50 Mc. Joe would like to hear from v.h.f. stations regarding the state net. Address Ozone, Tenn. K4AKP (RN5 mgr.) publishes an FB bulletin on net activities. W4ZNY has been appointed manager of the new Navy MARS state net. If interested in joining write him at 3118 Aden St., Memphis. OES K4KYL is building a 432-Mc. rig, K4JIG, 761 University, Memphis, sponsors the King Cotton and Worked All Tennessee Counties certificates. Contact him for details. Your SCM invites club secretaries to pass along information of club activities for this report and especially requests news from the Johnson City, Kingsport, Knoxville and Nashville clubs. Traffic: K4AKP 1809. W4ZJY 535. W4OQG 251. WA4AVX 241. W4PQP 109. W4KAT 106. W4OQG 101. K4WWQ 98. W4MXP 57. W4CVG 52. W4TZG 49. K4QA 40. K4OUK 35. WA4JC 20. K4LPW 20. W4RMJ 19. W4TYV 18. W4TJ 17. W4CSX 14. K4JNG 11. W4LJ 14. K4CPC 11. W4CRH 10. WA4AIS 7. K4RN 7. K4EPS 5. W4HDG 6. W4WRK 6. W4HPN 5. W4EET 4. K4LTA 4. K4ROP 4. K4TAN 3. K4UMW 2. K4VOP 2. W4ZBQ 2. W4SGI 1. K4WUH 1.

### GREAT LAKES DIVISION

**KENTUCKY**—SCM, Elmer Leachman, W4REW—SEC; W4TFK, PAMs: W4SZB, K4ECI, V.H.F. PAM; K4LOA, RM; W4CDA, Asst. RM; K4NYO. Net activity reached a new high in December with 29 stations reporting traffic and four BPLs: K4KWQ, K4HSB, K4WJI, K4HOE. KYN (c.w. net) reports 41 sessions, 304 messages handled with an increase in the number of stations participating. AIKPN reports 30 sessions, 580 calls-ins, 166 messages, 3 stations 100 per cent, 11 stations 50 per cent. EAIKPN reports 24 sessions, 7 messages cleared. W4SZB reports that *Ether Clippings* is looking for a new publisher. Any takers? KPN (evening s.s.b. net) report is incomplete but it met more than 20 times with a traffic increase. The Louisville Civil Defense base station

(Continued on page 106)

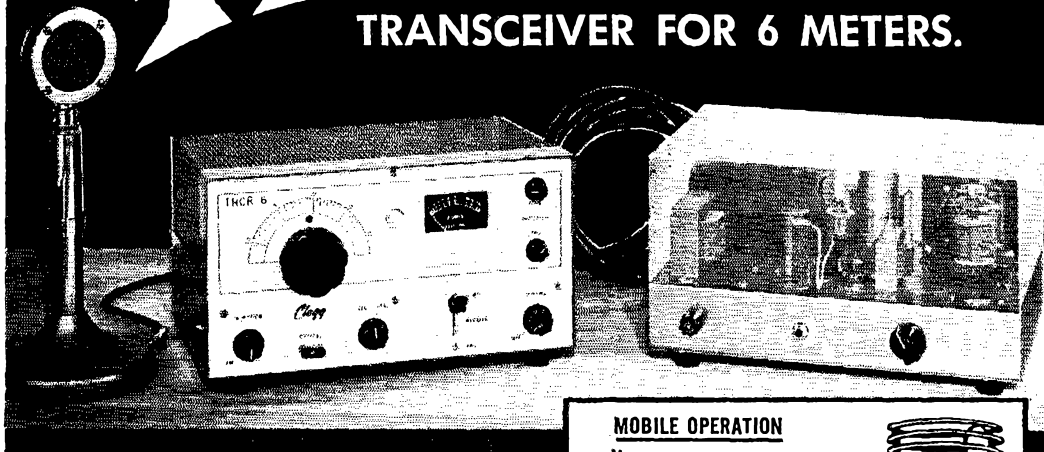


BRAND NEW FROM CLEGG LABS . . . THE

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# THOR 6

TRANSCIVER FOR 6 METERS.



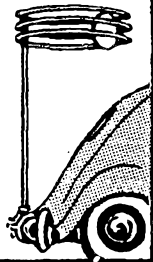
Come on up out of the noise . . . let 'em know you're around! For contests, marginal openings or just overriding the Qrm . . . your new sixty watt, VFO controlled, 100% high level modulated THOR 6 transceiver makes you the "Voice of authority" on six . . . and what's more you'll hear them too! The receiver section with its crystal lattice filter, is selective to the nth degree and so sensitive that even S1 signals are Q5. Sound good? Here's the rest of the story.

#### TRANSMITTER FEATURES:

- FULL 60 watts input on phone or CW to 6883 final.
- BUILT-IN VFO that automatically tracks the receiver or switches to crystal control for fixed frequency operation.
- ALL stages broadbanded for easy QSY.
- SPEECH-CLIPPING FOR MAXIMUM talk power.
- BUILT-IN PUSH-TO-TALK.
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Now you can run a mobile "power house" using the new Clegg Model 418 transistorized 12V DC power supply / modulator unit to power your THOR 6 transceiver.



#### RECEIVER FEATURES:

- NUVISTORIZED front end for extreme sensitivity at lowest noise level.
- CRYSTAL lattice filter for maximum selectivity.
- BFO with variable carrier injection for SSB reception.
- ULTRA-STABLE tuneable local oscillator that also functions as VFO for transmitter.
- EXCELLENT audio characteristics. 2 watts into 3.2 ohm speaker.
- Sharp reduction in spurious responses and cross modulation.
- Effective noise limiter.

The THOR 6 is of two unit construction with attractively styled receiver and transmitter rf section mounted in one cabinet for convenient desk top operation. The power supply/modulator section is mounted in a second cabinet for remote location. A ten foot interconnecting cable is provided.

Amateur net price for AC operation \$349.95. 12V DC Mod./Pwr. Sup. \$100.



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| 5 What You Should Know About Phone | 13 Modulators and Speech Amplifiers |
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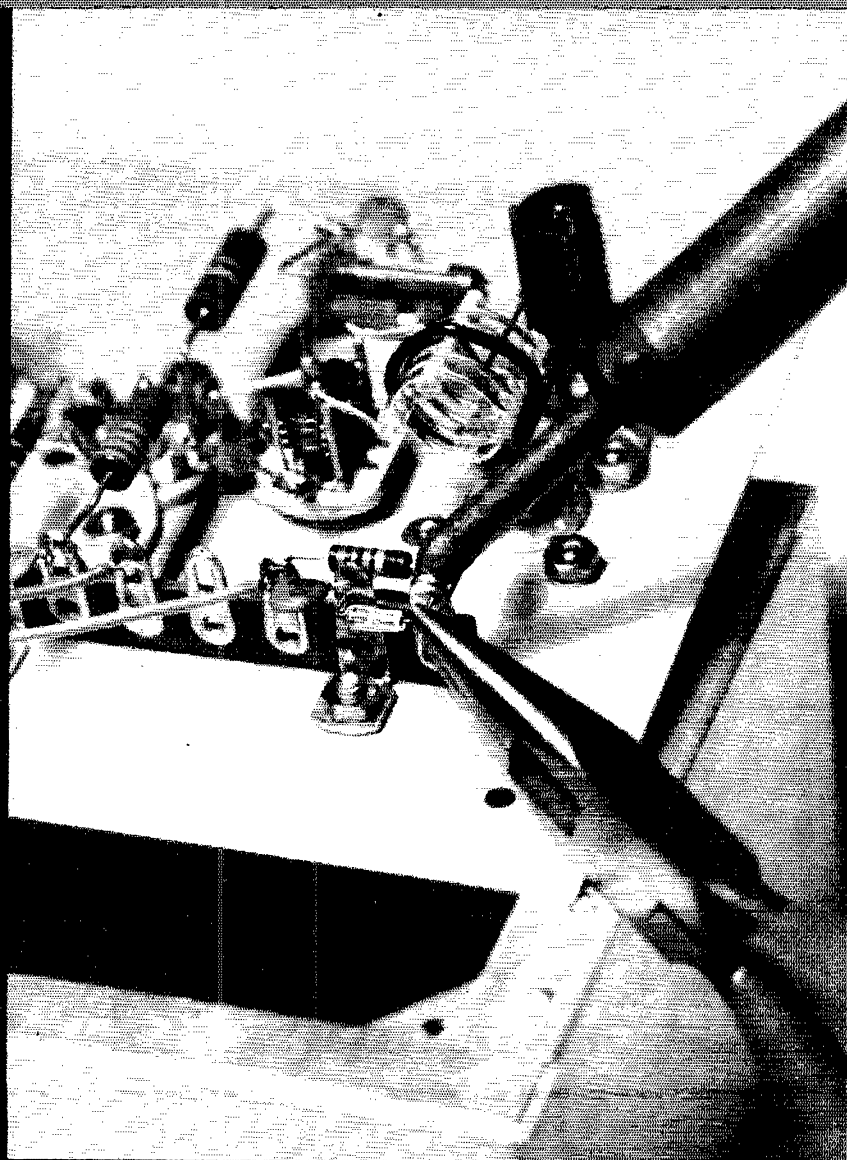
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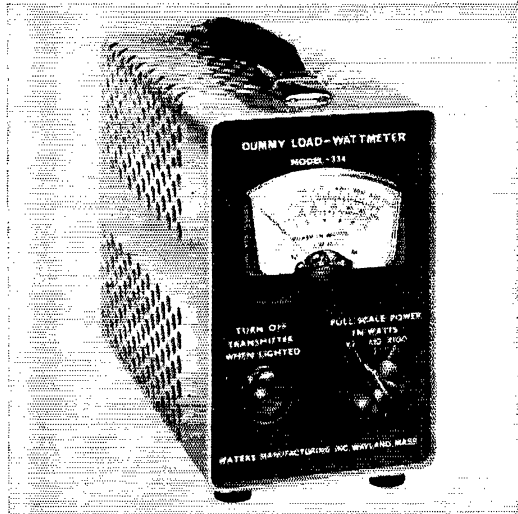
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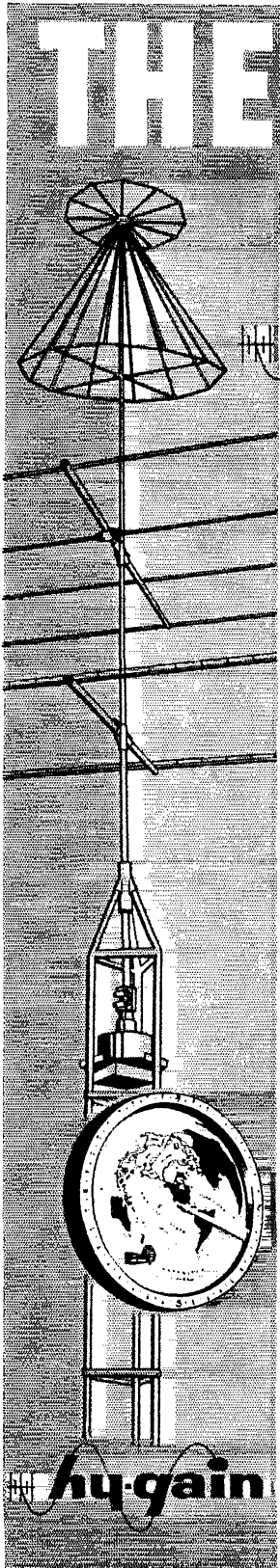
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has been assigned the call WA4FYH, while the c.d. bus holds the call W4ABK; the Red Cross soon will use K4CSH (formerly held by Al Hall). A new traffic net (AIKTN) has been started at Maysville and will handle traffic in and out of 9RN, 4RN, CAN, KYN, KPN, EAN, PAN and the Ohio nets. Present active stations are K4HSB, K4WJI, WA4ELB. New appointments: W4-APU and WA4ELB as OPS; K4NYO as ORS; K4ECJ, K4HSB, W4NDY, W4NOA and K4QHZ as ECS; K4HSR as OO; W4USE as OBS. Traffic: K4KWQ 633, K4HSB 501, W4RHZ 204, K4QZU 169, K4WJI 139, K4HOE 133, K4PNG 91, W4USE 90, W4CDA 82, WA4AGH 50, W4BGY 45, WA4GCL 42, WA4APU 36, WA4ELB 35, W4SZB 35, K4LOA 32, W4AGFN 29, K4QIO 28, K4TQZ 28, W4KJP 17, K4VD 16, W4REW 15, W4YYI 14, K4ZQJ 12, K4-ALM 6, W4RNF 5, WA4GQG 3, W4HKP 3, W4JUI 2.

**MICHIGAN**—SCM, Ralph P. Thetroun, W8FX—SEC: W8LOX, RMs: W8EGI, W8XNJ, W8FWQ, K8KMG, PAMs: W8CQU, K8LQA, V.H.F. PAM: W8PT. Appointments: K8HCG and K8PET as ECs; W8SCW, W8SJJ and W8FX as ORS; K8JED as OPS; K8IVG as OBS; WA8ASD as OES; W8DVB as OO. New officers—Adrian ARC: WA8IEQ, pres.; K8NCL, vice-pres.; K8NFO, secy.; W8MIQ, treas. Saginaw VARA: K8KWG, pres.; K8JLD, secy.; W8LNE, treas.; W8HZP, W8CTY and W8QQK, trustees. Central Mich. ARC: W8WWT, pres.; W8FSZ, vice-pres.; W8RQD, secy.; K8ZNP, treas.; K8-BGZ and W8VPC, dir. The Michigan Station Convention will be held in Saginaw Mar. 15-17th. See you. The Michigan 8-Meter Club's Christmas Operation (Veterans Hospital) had the following handling traffic from there to friends: WA8AEK, W8AOY, K8APF, WA8BKS, WA8CEP, K8CST, WA8DOJ, W8DSW, K8EUC, K8IPN, K8JGF, W8KPN, K8KQV, K8LUV, K8MDY, K8NKB, K8ONL, K8SRH, K8SXF, K8YAV and K8ZLA. Co-operating: Ford ARL, Metro Raghewers, and MARS nets. Genesee County RC has a rather complete, permanent 2-meter hospital setup in Flint, which works. W8CAM sends code practice each night at 7 p.m. on 1804. ke. The Post Office Net (PON) demonstrated its efficiency at the Grand Rapids P.O. dedication with help from W8DCL. The following GRARA men assisted the Sports Car Club at the Johnson Park Hill climb: WA8CDL, WA8CTC, K8DCS, K8EQO, W8FOL, WA8FGQ, W8IEE, K8KBN, K8LZL, W8ONH, K8SDA, K8TLX, K8VEZ, W8AHV "retires." W8DOI has a new 75S-3, W8FSZ a Thunderbolt and W8IX an HQ-170. W8AHV likes his 2000 Invader. W8UFS is making a 4. linear. K8Y7P is putting 600 watts on 50 Mc. W8IUI lost his "long wire" antenna and now has an "Inverted V." W8UA "blew" the 1-kw. modulation transformer. Clubs having membership trouble and needing a real "purpose" are invited to enroll all members in the AREC and dig into emergency work. Six meters is suggested for this activity, and is being used a lot. Traffic: (Dec.) W8ELW 369, K8NJV 234, K8KMQ 191, K8QKY 167, W8RTN 147, W8-IXJ 119, W8BEZ 114, K8GOU 117, W8QFO 102, K8LNE 92, W8DSW 86, W8ENO 85, W8FWQ 83, K8QLL 82, K8WQV 81, K8LUV 79, W8IBB 63, W8EU 49, W8FX 41, W8IUI 38, K8TTE 35, K8Y7P 30, K8CIP 29, K8WMI 29, K8VDA 28, K8JJC 26, W8U8Z 25, WA8AS 24, W8-IUJ 22, W8AUD 21, W8SWP 20, W8HKT 19, K8HJR 18, W8DSE 16, W8EOI 16, K8PYU 16, W8U19 16, K8ZZV 15, W8MSK 14, WA8ASK 12, K8JED 11, K8CKD 9, W8-AHV 8, K8CJD 2, K8KQV 2, K8JH 2, (Nov.) W8USZ 47, K8MKG 29, W8TBP 4, K8YAY 3.

**OHIO**—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE, SEC: W8FNP, RMs: W8BZX, W8DAE, W8VTP and K8ONQ, PAMs: W8VZ, K8BAP and K8URK, K8PEL and K8WMM received Worked Piqua awards. WA8BVZ spoke to the Seneca RC on Electric Power. Its Generation, Transmission and Distribution. W8ADOM has a new S-53A, Scioto Valley ARC's 1963 officers are K8MKN, pres.; W8OP, vice-pres.; and K8OUQ, secy.-treas. Clermont County ARC's 1963 officers are K8ZFJ, pres.; K8CKO, vice-pres.; W8OWP, treas.; K8BON, secy.; K8OQC, net mgr.; and W8ZRL, trustee. K8RND has a new HX-50. Canton ARC's *Prod-line's* cover page is a lithoed picture of K8LZN's daughter dressed as Santa seated at a table in W8ADQ's store piled high with ham gear such as we dream of, and tells us the members heard a tape of a number of passes of Oscar II, and it had a listing of its members and their phone numbers. Warren ARA's *Q-Match* informs us the club will meet in the main studio of WIIHH until a new meeting place is obtained. Columbus ARA's *Carascope* tells us 1963 officers are K8CZK, pres.; W8-RRJ, vice-pres.; W8GKQ, secy.; W8UHZ, treas.; W8-ZCQ and K8DJ, directors. Its v.h.f. section has WA8BGF, chairman; K8YCH, vice-chairman; WA8ADL, secy.; W8THU, treas. Toledo's *Ham Shark Gossip* names W8-BHL as its Ham of the Month and tells us W8LJN is a Silent Key. South East ARC's *Ham Fax* says Bob Johnson, of General Motors, spoke about generators, alternators and their associated noises. Findlay RC's *W8FT News* states that the club's code and theory classes have

(Continued on page 108)



# THE WINNERS

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From the thousands of outstanding entries received by Hy-Gain during Operation Skyhook II, the impartial Board of Judges selected the following winners:

**FIRST PRIZE**... 3.5-500 MC Antenna System including RBX-1 Rotator and Directional Indicator, DS-1 Discone with range of 50 thru 500 MC., TH-4 Tribander, 402-B 40 Meter Monobander, 2BDP Multiband Doublet and 56' Spaulding Tower. *Awarded to...*

**IVAN HARRISON, W5HBE,  
DALLAS, TEXAS**

**2nd PRIZE**—DB-24 Duobander, 20-40 meters *Awarded to...*  
**LEWIS W. WETZEL, K3KCJ/Ø,  
OMAHA, NEBR.**

**3rd PRIZE**—18 HT All Band Vertical *Awarded to...*  
**KENNETH E. GIES, K7IQI,  
BELLEVUE, WASH.**

**4th PRIZE**—TH-4 Thunderbird Tribander *Awarded to...*  
**ROBERT D. HUNSUCKER, KL7CYS,  
COLLEGE, ALASKA**

**5th PRIZE**—TH-3 Thunderbird Tribander *Awarded to...*  
**WILLIAM NEW, JR., W6OQU,  
HILLSBOROUGH, CALIF.**

**6th through 25th PRIZE**

<b>WØAIH</b>	<b>VK5LC</b>	<b>WB2DFU</b>	<b>W4WHO</b>
<b>WAGNCD</b>	<b>WA6TOZ</b>	<b>KP4BJG</b>	<b>K4YZE</b>
<b>W7JOV</b>	<b>K6AHD</b>	<b>SM6CSC</b>	<b>WA8BVQ</b>
<b>WA8AJI</b>	<b>K6LZX</b>	<b>W9IHO</b>	<b>W6SMU</b>
<b>VE3UX</b>	<b>WA6ZXJ</b>	<b>K9KLK</b>	<b>WA6HIG</b>

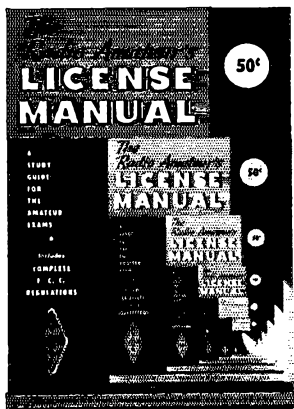
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30 enrolled. Parma RC's *P.R.C. Bulletin* says 1963 officers are: W3CZM, pres.; K8NCZ, vice-pres.; W8SUS, secy.; K8BQY and K8EBP, asst. secy.; K8JZI, treas.; K8NPH, asst. treas. The CACARA's 1963 officers are: W8UWJ, pres.; K8STK, vice-pres.; W8OIS, secy.; W8EPM, treas. K8DJC is home after a 4-year tour of duty. K8HTM is stationed in the Naval Hospital at Charleston, S.C. The ARC of Ohio State University's W8LT claims its housing problem has been solved and K8IKK is in the Air Force. The Babcock & Wilcox RC's 1963 officers are: W8IKT, pres.; K8PBR, secy.; K8RWG, treas. W8CHT, W8DAE and W8UPH made the BPL in December. I want to thank the Parma RC, South East ARC, Findlay RC, Canton ARC, Greater Cincinnati ARA, Columbus ARA, Seneca RC, Warren ARA, Dayton ARA, Springfield ARA, Inter-City ARC, Marie Helmin, Six Meter Nomads, ARC of Ohio State Univ., Massillon ARC, Babcock & Wilcox RC, Queen City Emergency Nte, Butler County V.H.F. Assn. and the OH-KY-IN V.H.F. Society for sending me their bulletins. Traffic: (Dec.) W8UPH 1828, W8DAE 670, W8CHT 616, W8BZX 399, K8UPK 290, K8LGA 173, K8MTI 140, K8SQK 103, W8KCN 95, W8ZYU 80, K8AGN 63, K8ONQ 59, K8PBE 42, W8IEP 37, K8RND 36, W8ECB 25, W8LZE 24, W8ACXY 22, W8ADB 18, K8DTU 18, K8BAP 17, K8OJU 15, W8HNP 10, W8AJD 9, W8DII 9, W8UID 8, W8AEB 6, W8BBOV 6, W8YGR 6, K8DDG 4, K8KLA 4, K8KXS 4, K8LGB 3, W8WY 3, W8AGH 2, W8ASP 2, W8PMJ 2. (Nov.) K8MTI 30, W8LZE 25, W8PMJ 24.

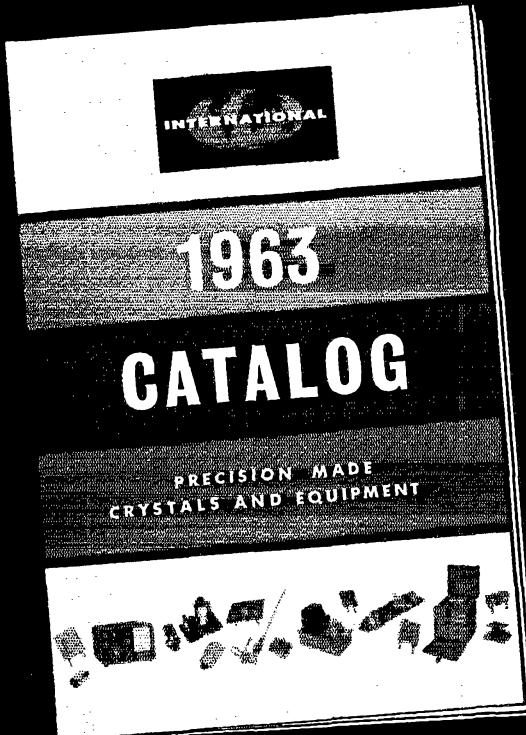
## HUDSON DIVISION

**EASTERN NEW YORK—SCM,** George W. Tracy, W2EFU—SEC; W2KGC, RMs.; W2PHX and K2QJL, PAM; W2JIG, Section nets; NYS on 3670 kc. nightly at 0000 GMT; NYSPTEFN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; MHT (Novice) on 3716 kc. Sat. at 1800 GMT; Inter-club on 28,800 kc. Mon. at 0130 GMT; Emergency Coordinators on 146,550 kc. Fri. at 0015 GMT. The Union College Club, with the call W2GSB for more than 30 years, now is W2UC; World traveler W2APF showed films of his many trips at the December meeting of the Schenectady Club. K6RXU, who lost all in a fire, would like duplicate QSLs from section stations worked. W2URP has a kw. on 80 and 10 with 60 watts on 6 meters. The guest at the December meeting of the New Rochelle Club was W1VQ, of ARRL. W2HFT was chairman of the December Dinner at th Albany Club and W2CYW won a prize. W21RK reports a new TA-36 Tri-bander and 6-meter converter. Among the six hams in Earlton there is a new YL, WN2EMU. We welcome WA2JWT as the new EC for Rensselaer County. For the first time in many months there is an Emergency Coordinator in all counties of the section except Orange and Ulster. How about good candidates in these counties being recommended to our SEC, W2KGC, for complete AREC organizational coverage. It's an important leadership post. Let's hear from you. All appointees are reminded to check the last enforcement date and if over a year old, send in your certificate for renewal. Traffic: W2THE 359, K2TXP 912, WA2ZK 197, WA2HGB 122, W2PKK 110, W2URP 84, W2A2ND 68, WA2VYS 67, K2DXP 51, K2JSN 43, W21RK 12, W2PIX 10, K8HNW 9, W2EFU 7.

**NEW YORK CITY AND LONG ISLAND—SCM,** George V. Cooke, Jr., W2OBU—SEC; K2OVN, RM; W2WFL, PAM; K2HCU, V.H.F. PAM; W2EW, Section nets; NLI, 3630 kc. at 0015Z nightly; NYCLIPN, 3908 kc. at 2230Z nightly; V.H.F. Net, Tue.-Wed.-Thurs. on 145.8 Mc. at 0100Z and Fri. through Mon. on 145.25 Mc. at 0000Z; Mike Farad, on 7238 kc. at 1700Z; All Service Net, 1800Z Sun. on 7270 kc.; Q5 Net, on 3935 kc. at 2100Z daily. December holiday traffic went over the 9000 mark and for exceptional effort and participation in this high total WA2GFT, WA2TQT, K2UBG, W2EW, W2MTA/2, WA2JSG, W2WFL, WA2NCE, WA2EXP and WA2GAB, in that order of points, received BPL certificates. The Commissioner of Traffic for New York City has revoked the traffic law which in the past prohibited radio amateurs, in city limits, from operating mobile stations while driving with a car in motion. This revocation was circulated to the police by the Commissioner of Police as of Dec. 4, 1962, and is now effective. Please be good citizens and cooperate with our city fathers. The Levittown RC elected WA2OGU, pres.; K2JMH, vice-pres.; K2IWX, treas.; and WA2GFH, secy. The QSRAS elected K2JBK, pres.; WA2IQS, vice-pres.; WB2OFZ, corr. secy. WN2FIY, treas.; and WA2ZXR, rec. secy. WA2ZWP makes an appeal for all radio amateurs in N.Y.C. housing to contact him where difficulties are being experienced in denials of operation. Call NI 99441 for information. The Lincoln HS ARC official slate for '63 is WA2PUL, pres.; WA2QJU, vice-pres. and WN2CX, secy. WA2TYU has been appointed

(Continued on page 110)

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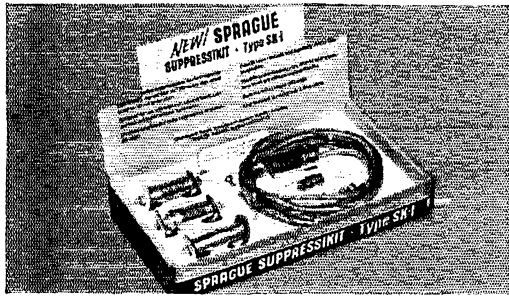
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For additional information on the Type SK-1 Suppressikit, see your Sprague Electronic Parts Distributor.



65-105-63

110

EC for Manhattan and amateurs in that borough are urged to back up the AREC program there and put it on a good basis. Officers of the Tu-Boro RC for 1963 are WA2PWF, pres.; W2YSM, vice-pres.; WA2RUT, treas.; and W2CRQ, secy. The Malverne HS RC, with the assigned call WB2AAK, is doing a fine job of advancing young amateurs in licensing grades under the guidance of WA2OLP, the faculty advisor. K2PHF now is operating as IIDFE. When WA2GAB and K2SLD brought in QSTs, donated by K2HYS, to the Brooklyn VA Hospital the patients shouted "We must have hit the jackpot." Let's help the needy to know about the aid amateur radio can give them. Under the direction of WA2QJU the NLI Slow Speed (SS) Net is operating on 3630 kc. at 2300Z Fri., Sat. and Sun. Contact either W2WFL or WA2QJU for further data. WA2EXP now is operating RTTY on 80 and looking for contacts. K2KYS put up two 40-ft towers to hold his antennas and reports considerable improvement in signal reports and contacts. WA2UQ became QRP No. 499. WA2EFN got his 400-watt linear working and struggling for DXCC. WA2RMP received CQC No. 538. Santa brought WA2KSD a new HT-37. WA2TGI obtained a surplus parabola and is using same with converted APX-6 on 1296 Mc. K2UYG mounted a three-element beam atop the three-element 14-Mc. beam for added coverage on 21 Mc. K2IWC, 10-meter EC for Brooklyn, urges that additional members join the AREC and RACES Net on 29.64 Mc. Mon. at 0200Z in that borough. W2WAG, on Christmas eve, received a QSL from Christmas Island. K2AHS has set up audio i.s.k. RTTY with a Communicator II on 2 meters and is seeking contacts. All hams interested in radio classes or club membership are invited to join the Multiband Amateur Radio Club. Contact Ed Winters (52-24 65 Place, Maspeth 78, N.Y.) Traffic: (Dec.) WA2GPT 1513, WA2TQT 907, K2UBG 813, W2EW 807, W2MTA/2 787, WA2JSG 661, W2WFL 572, WA2NCE 517, WA2QJU 487, WA2EXP 428, K2UAT 382, K2KYS 198, WA2GAB 183, WA2RUE 140, W2JGY 127, WA2IUC 105, WA2ZXR 101, WA2LJS 100, WA2TKS 63, WA2GFP 62, W2GKZ 62, WA2RZJ 45, WA2EFN 41, WA2ZDT 41, WA2RAIP 36, WA2FUL 26, WA2VLK 26, WA2IMH 23, W2EC 19, K2SPG 17, K2THY 16, WB2CAV 11, W2DBQ 10, W2PFF 9, WA2RKK 8, WA2RZJ 7, WA2YNH 7, WA2PSL 5, K2PHF 4, WA2STV 3, WA2RAQ 2, WA2KSD 1. (Nov.) WA2GFP 79.

**NORTHERN NEW JERSEY**—SCM, Daniel H. Earley, WA2APY—SEC: K2ZFL, RM: W2QNL, PAM: K2SLG. VHF PAM: K2VNL. Names, frequencies and times of the NNJ NTS nets: NJN, 3695 kc. at 0000Z; NJPN, 3900 kc. at 2300Z; NJ 6&2, at 0400Z, Thurs. and Sun. on 51.15 Mc., at 2300Z, Tue. and Sat. on 146.70 Mc. Sessions, attendance and traffic: NJN: 31-546-522; NJPN: 31-522-233; NJ 6&2: 21-157-102. We are glad to see that the operation of the v.h.f. nets is steadily increasing. I'm sure they could do with more fellows who are capable of operating the v.h.f. bands and the h.f. bands. We are sorry to hear that K2SLG was laid up with "the bug," as he calls it. WA2UOO still has no v.i.o. but the traffic report still is there. "School work is starting to take over," reports WA2OVK and I might add quite a few others. WA2KIY would like to hear more fellows on the 10-meter band. W2NIY has received the WNYC-LI Class III and All Zone Five Awards. Did you ever hear that tauntless CQ NJN coming from W2CVW? Sounds like a tape because it is. WA2SRK is now running 150 watts. WA2JHQ plans to put up an eleven-element beam for 200 Mc. K2UKQ has undone it again; the rig is out of whack and the antenna is down. How did WA2CCF make 14 BPLs in 12 months? He has two stations, WA2CCF and WA2UZH. W2NKD still thinks his 2-B Drake is the most. WA2WSB has a new homebrew receiver on the air. W2EWZ says illness and rig trouble hurt his traffic total. WA2EJZ got the Class C Twin City Award. K2UCY expects a jump in his traffic with the OGD training center starting up. K2SBS lost his vertical in the storm and has to use the open-wire job. We are very sorry to hear that Father Charles, K2VMX, is ill. Hope that everything turns out well. K2RGP was the only new appointee made in December. He is an OES. K2VNL renewed his OPS appointment. It seems that I get more and more reports of fellows playing music over the air and anything else that will further the hobby down the drain. I would like to say that most of these fellows are recognized by other hams and in some cases have been reported to the FCC. You must remember that in this day and age you can't get away with anything; this means that the good will be recognized along with the bad. Anyone with enough intelligence to operate and understand the media of communication known as radio should be above the "kid stuff." I thank all of you for your cooperation in '82 and hope you all had the best possible holidays. Traffic: (Dec.) WA2CCF 753, WA2SRK 510, K2VNL 373, K2UCY 295, WA2GQZ 179, WA2WSB 119, W2QNL 108, K2SBS 92, K2CCF 84, W2CVW 83, WA2ZKT 67, WA2JTZ 62, WA2-

(Continued on page 112)



**A**LMOST 30 YEARS AGO, in the March, 1934, issue of *QST*, *National* published the first in a series of monthly pages devoted to discussion of amateur equipment design. This series ran uninterrupted until 1955, and after an eight year interval we are again resuming the "National Page".

**WE'RE** particularly happy to renew this series, for in a way it symbolizes our present concentration of amateur design effort on advanced products of the type which made *National* the criterion in ham radio since the days of the HRO Senior and the SW-5 "Thrillbox". The new NCX 3 SSB transceiver, for example, is only one item in a whole new line of equipment designed to fill big holes in the current assortment of gear available on the amateur market.

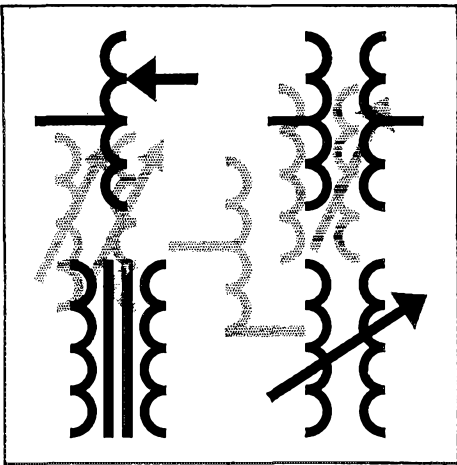
**AS THOSE** of you working in military and defense electronics know, *National's* primary product emphasis has been on sophisticated military equipment for some time. . . . Products such as the famous Atomichron<sup>®</sup> atomic frequency standard — the most accurate commercial time and frequency standard available in the world; the drift-cancelled WRR-2 super-stable SSB receiver developed for the Bureau of Ships (the Navy standard SSB receiver for shipboard use, with long-term stability and resetability of one cycle); the "Mark Eighty" tropospheric scatter communications system; synthesized solid-state VHF SSB transceivers; wide-dynamic-range solid-state receivers (hailed by the Military as the most significant development in receiver design in the last 25 years) — and a host of other similarly advanced products.

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**WE'VE GOT** a lot to tell you this year, and we'll do our best to always make this page as interesting as ever. We'll also enjoy (and welcome) your comments on subjects discussed.

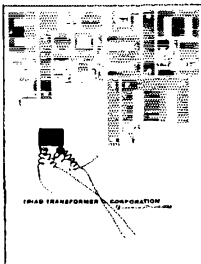
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ZRR 59, WA2UOO 50, W2NKD 32, W2DRV 30, W2TFM 25, WA2OVK 24, K2VNK 19, W2ABL 18, WA2LUD 18, WA2APY 17, WA2QPX 14, W2SJB 13, K2SLG 12, W2CFB 11, K2UKQ 10, WA2ZQH 9, WA2JHQ 8, K2EQP 6, W2EWZ 3, WA2EJZ 1, (Nov.) WA2OVK 61, W2TFM 22, W2CFB 6, K2SLG 6, K2MFX 3.

### MIDWEST DIVISION

**IOWA**—SCM, Dennis Burke, W0NTB—Sec: K0EXN. PAMs: W0SLF, W0PZO, RM, W0LGG. New appointments K0ARA, W0ACKZ, K0MHX, K0QKR, W0YOZ, K0YWA as ECs, K0MHX as OPS, W0USL as OO, K0MHX as ORS, K0TCZ spent the holidays in Texas with kinfolk. We are glad he came back to Iowa. Fr. Tom Maney, CE4FY, has been home on leave from Chile. He tells an interesting story of his work there. He visited the Webster City and Eldora clubs with the SCM. World-wide DX on 160 meters: I suggest these are the busiest 50 kes. in the ham bands. Don't forget to nominate your choice for SCM in a few weeks. Although I expect to run again, I would not mind being defeated by a better man (or woman). Net activities for Dec.—160 meters: QNI 998, QTC 30, sessions 31, 75 meters: QNI 1175, QTC 301, average 12, sessions 25, TLGN: QNI 177, QTC 139, sessions 22. New officers—Sioux City Club: K0MMS, pres.; K0MHC, 1st vice-pres.; K0JFZ, 2nd vice-pres. Ames Radio Club: W0III, pres.; W0NFL, vice-pres.; K0QWM, secy.; Bob Fitz, treas.; W0LSF, act. mgr. Will the secretaries of other clubs send me information about their groups? Traffic: (Dec.) W0SCA 3055, W0LGG 1657, W0BDR 185, W0NTB 130, K0MMS 95, K0AUU 42, W0YDV 31, W0GQ 25, W0CTJ0 24, W0QVA 24, K0UAA 23, W0FMZ 18, W0USL 15, W0FDM 12, K0HGH 10, K0JYF 10, W0BLH 9, W0JPI 9, W0TTT 9, K0TDO 7, K0QKD 6, K0JMA 5, K0JXZ 5, K0JYZ 5, K0VBM 5, W0BQJ 4, K0KAA 4, W0NWX 4, W0QVZ 4, K0RIT 2, (Nov.) K0UAA 14, K0JYZ 5.

**KANSAS**—SCM, C. Leland Cheney, W0ALA—Asst. SCM: Richard G. Caspari, W0YZB. SEC: K0BNF. Asst. SEC: K0EMB. PAMs: K0EFL, W0BOR, RM's: W0SAF, W0PFG, V.H.F. PAMs: W0HAJ, K0VHP. Lack of reporting is a good reason for appointing replacements, so get your reports to the SCM on the first of the month and protect your appointment. Openings have been good on 6 meters with the Eastern stations getting into the area quite regularly. V.h.f. nets are now operating throughout the eastern part of the state. V.h.f. appointments are available to qualified applicants. Section meetings are being held each month. Listen in on the nets for places and dates, then attend if possible. The March meeting is scheduled for the Southeastern area. Clubs and individuals are invited to send news items to your SCM for inclusion here or elsewhere in QST. This section is what you make it. Nets: KPN, 3920 kc. Mon.-Wed.-Fri. 1245Z; 31 sessions; QNI high 14, low 6, total 309, average 9.8; QTC high 23, low 1, total 255, average 9.6; NCSs K0BNF, W0BYV, K0EFL, K0IRL, W0GGG, K0YTA, W0SAF, QKS, daily 3610 0030Z; 23 sessions QNI high 48, low 7, total 425, average 18.5; QTC high 36, low 0, total 129, average 5.6; NCSs K0YTA, K0QKS, K0EFL, W0FHU, W0ORB, K0GII, W0IFR, HBN, 7280 kc. Mon. through Fri., 1800Z; QNI total 397, QTC 1031; NCSs K0YWT, K0ICB, K0EFL, W0TWJ, K0VYV, K0HGI, SCAN, 0100Z Tue. SCAR, 0100Z Wed. Traffic: K0HGI 965, W0BYV 450, W0RFJ 196, K0YWT 92, W0IFR 89, K0EFL 49, K0BNF 33, K0TGR 32, K0PSD 27, W0YZB 25, K0GII 24, W0TSR 20, K0VQC 16, K0QKS 14, W0EXG 9, K0LHF 9, W0BSS 8, K0JID 6, W0QCA 2, W0PFG 2.

### KANSAS QSO PARTY

March 16-18

All amateurs are invited by the Emporia Amateur Radio Club, Inc. to participate in the 1963 Kansas QSO Party which commences 0601 GMT Saturday March 16 and ends 0601 Monday March 18, 1963. No numbers are necessary for this contest, participants should exchange station call, city, county and state. A. R. R. L. national calling and emergency frequencies may be used only to establish contacts. An engraved wall plaque will be issued to the highest scoring station in and out of Kansas. Certificates will be awarded for the next nine places in each category. Logs should be mailed no later than April 1, 1963 and sent to R. J. McGilinn, K0ZSG, 929 Garfield, Emporia, Kansas.

(Continued on page 114)

# Mosley TOWERMASTER

Mosley, the top name in beam manufacture, now has a complete line of quality Built towers designed to fit every need, application and requirement.

Mosley Towers are designed for 30 pound wind pressure areas in which full engineering calculations and specifications are available with the purchase of a tower to meet and exceed building code requirements in areas requiring special permits for tower installation.

## Features

- A- Heavy Duty Steel Channel Bracing Members-  
Conforms to ASTM standard for structural members.
- B- Low Friction Section Guides.
- C- Vertical Guy Attachment Loops.

- D- Welded Section Stops.
- E- Heavy Duty Safety Clips.
- F- Metal Ball Bearing Pulley Sheaves.
- G- All Welded Construction (done by certified personnel under strict inspection and manufacturing controls).
- H- Galvanized Aircraft Type Raising Cables.

- I - Geared Crank-up Winch and Safety Lock.
- J - Extra Reinforcing Spreader.
- K- Heavy Steel Winch Frame.

### features not illustrated

- L- Predrilled Rotor Mounting Plate with series 300 will accept CDR type rotor - series 400, 500, 650, 700, 750 will accept either CDR or Prop-Pitch types.
- M - 2 inch I. D. Mast Sleeves.
- N- Iron Phosphate Rust-proof Undercoating plus a Tough Triple Coat Epoxy Resin Finish - Galvanized series are also available at only a slightly higher cost.

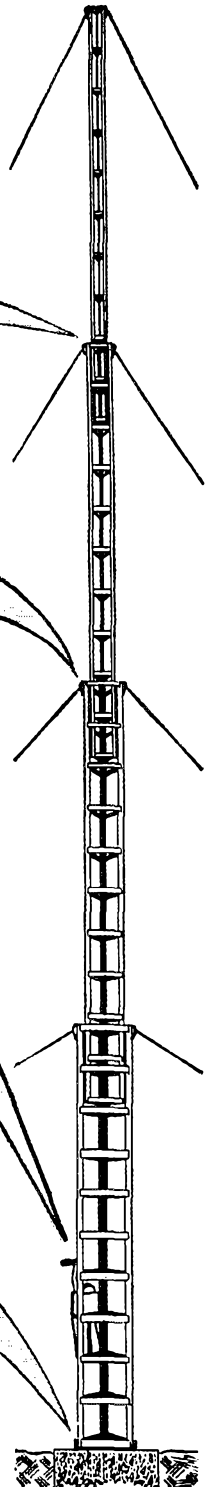
- O- All Tubular Leg Members of High Strength Mechanical Steel Tubing-Conforming to the Formed Steel Institute standards.
- P Heavy Duty Steel Hinged Base Plate.

The Mosley "Towermaster" design is available in a complete tower package unit which includes all Guy Cables and Cable Clips, Guy Plates, Thimbles, Guy Anchors and Extension Mast.

Mosley No.	Height ft.	Weight lbs.	Price
CTL-40237	37	165	\$ 144.95
CTL-40354	54	275	199.95
CTL-40471	71	395	274.95
CTL-50237	37	210	179.95
CTL-50354	54	320	245.95
CTL-50471	71	460	346.95
CTL-50588	88	620	476.95
CTL-506105	105	890	784.95
CTL-30237	37	145	99.95
CTL-30354	54	220	159.95
CTL-30471	71	290	229.95
CTL-30588	88	390	319.95

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**POWER TRANSFORMER**—New Production: Pri: 115 VAC @ 60 CPS. Sec: 6000 V.C.T. (3000-0-3000) @ 350 Ma. \$39.00.

**PLATE XFMR:** Operates from 115 or 230 VAC @ 50-60 CPS. Sec: 3750-0-3750. Tested @ 250 Ma. Oil-filled. \$35.00.

**UTC #63833 PWR XFMR:** 115 VAC @ 60 CPS. Sec: 250 VCT @ 250 Ma. Also 5 VCT @ 2 Amps. \$2.50.

**PLATE TRANSFORMER:** Pri: 117 or 125 VAC. 50-60 CPS. Sec: 2780 VCT @ 150 Ma. CCS. \$6.95.

**STANCOR MODULATION XFMR:** Pri: 3500 Ohms. Sec: 2000 Ohms. Orig. designed for modulating parallel 807's with push pull parallel 6L6's. \$5.95.

**VIBRATOR XFMR:** Supplies 500 VDC @ 170 Ma. CCS. Simultaneously supplies up to 300 VDC @ 70 Ma. Dual pri. operates from either 6 or 12 VDC when hooked up as per schematic furnished. \$3.75.

**AUTRONIC TRANSISTORIZED ELECTRONIC KEYS:** \$69.50. Autronic KEYS \$16.95.

**Only TX-86 MOBILE OR FIXED XMTR.** Amc 5" x 5" x 7". 6 thru 80 Meters. \$119.95.

**PS-3 AC POWER SUPPLY FOR TX-86 (factory wired).** \$44.95.

**MOBILE POWER SUPPLY. MINN. HONEYWELL #W612A.** 12 V./500 VDC transistorized. \$49.95.

**Highest Trades Offered Towards Clegg 99'ers.** Zeus Xmtr Interceptor VHF Recvr.

**LATEST EDITION RADIO AMATEUR CALL BOOK USA @ \$5.00. FOREIGN @ \$3.00.**

**ARRL PUBLICATIONS AND LOG BOOKS IN STOCK.**

**HAMMARLUND SP-600JX-17:** 540 KC to 44 MCS. Ideal SSB. Rack mount. Good, lab tested okay. \$475.00.

**SILICON RECTIFIER:** 750 Ma/600 PIV. 36c each. (Ten mounted on board, ready for hook up. — Ten for \$4.50).

#### COAXIAL CABLE

Type	Nominal Impedance	Price Per 100'	Price Per 1000'
RG-8/U	52 Ohms	\$8.50	\$80.00
RG-8A/U	52 Ohms	12.00	90.00
RG-11/U	72 Ohms	8.00	75.00
RG-11A/U	72 Ohms	9.00	85.00
RG-58/U	52 Ohms	4.50	40.00
RG-58A/U	52 Ohms	5.00	44.00
RG-59/U	72 Ohms	4.50	40.00
RG-59A/U	72 Ohms	5.00	44.00

**HARVEY-WELLS 100 to 156 Mcs Receiver (R-264 GRD)** With Pwr Supply. (115 VAC 60 CPS). \$150.00.

**GONSET G-28 10 Meter, 50 Watt Transceiver.** \$159.00.

**POLYCOM II CB TRANSCEIVER.** \$79.95.

**HAMMARLUND 320/320 Split Stator Xmtg Capacitor:** .08" meshed spacing. KW. \$4.95.

**Heavy-duty Prop-Pitch Mtr.** \$35.00 fob. Ga.

**VHF RECEIVER #R79/CPS-1.** W/2K28 oscillator. Operates up to 2,000 Mcs. W/115 VAC 60 CPS Pwr Supply. Used-surplus. \$44.00.

**EIMAC 4X150A/4010 Air System Socket.** \$6.95.

**RCA 4X150A Power Tetrode.** New JAN '59-'60 prod. \$12.50.

**C. D. Ham "M" and AR-22 Rotators in stock.**

**G. E. PLATE XFMR:** Pri: 115 or 230 @ 60 CPS. Sec: 3535 VAC @ 2KVA. 40 lbs. \$19.95.

**Largest Diversified Tube Stock in USA. Write for Quotes.**

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- Send copy of new 1963 "Green Sheet" Catalog.
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**MISSOURI**—Acting SCM, Major R. C. Gordon, K0-WNZ—SEC: K0WNZ, RMs: W0OOD, K0ONK, PAmS: W0BVL, W0LFE (v.h.f.). Net reports: MEN (3885 kc, 0000 GMT, Tue., Thurs., Sat.) 12 sessions, QNI 270, QTC 114; NCSs W0TPK 6, K0VPH 4, K0KUD 1, K0ONK 1, Mon. (3580 kc, 0100 GMT, Tue.-8) 28 sessions, QNI 165, QTC 252; NCSs W0OOD 13, W0KIK 5, K0VPH 4, K0FPC 4, K0BVT 1, MSN (3817 kc, 2200 GMT M-F) 10 sessions, QNI 132, QTC 17; NCSs K0FPC 3, K0ONK 3, K0GFA 4, M. SSB, N. (3963 kc, 0000 GMT, W-F) 7 sessions, QNI 121, QTC 45; NCSs W0ECA 3, W0OMM 4, PON (MIO) (3810 kc, 2100 GMT, M-F) 20 sessions, QNI 219, QTC 80; NCSs W0HVJ 8, W0AQN 5, W0TFC 4, K0BWE 3, SMN (3580 kc, 2200 GMT Su) 5 sessions, QNI 28, QTC 40; NCS W0OOD 5. OO reports from W0PME and K0VPI and OES reports from K0FPC, K0JWN, W0RVA and W0YHT are gratefully acknowledged. Several tests on 10 meters have been run between Green, Laeude and Pulaski Counties but have been only partially successful. The "long skip" and holidays have been a bit rough on the various traffic nets in this area. K0LTP and K0LTJ now are operating under the calls K0IOB and W5LPZ from Tyler, Tex. but are regularly heard on the old frequency of 7280 kc. Traffic: K0FOC 432, K0VPH 288, K0VBT 155, W0OOD 135, K0ONK 111, W0KIK 105, W0BVL 102, K0VPI 73, K0VNB 40, W0ZLN 34, W0GBJ 31, W0EOJ 26, K0WNZ 20, K0FHE 10, W0PXE 9, K0VPI 2.

**NEBRASKA**—SCM, Charles E. McNeel, W0EXP—SEC: K0TSU, Western Nebraska Net, W0NIK NC, reports QNI 596, QTC 545, 138 formal and 407 WX, 100 per cent check-in W0AES, W0ABIK and K0ITP. K0DGW reports Morning Phone Net had QNI 520, QTC 139, K0JXN, NC for the Storm Net, reports QNI 557, QTC 20. This net will change time Apr. to 1930 CST daily on 3983 kc. Nebraska Emergency Phone Net, W0HXH NC, reports QNI 538, QTC 81, 100 per cent check-in W0ABES. New members are W0KZF, K0PNY, W0CXH, K0JFN, K0HJY and W0ABID. W0OKO reports the Section Net (c.w.) had 31 sessions, QNI 135, QTC 40. With deepest regret we report the passing of K0RUL, George Purfle of Ord. Section news this month is short because of the holiday season and long skip of 75 meters. Traffic: (Dec.) W0GGP 306, W0NIK 183, K0OAL 117, W0LOD 112, W0SJP 85, W0EA 70, W0BYK 62, K0DVG 59, W0JCF/0 50, W0OKO 50, W0EGQ 45, K0KJP 44, K0YDS 43, W0FIO 40, W0OUC 27, W0AHT 26, K0JXN 26, K0RRL 26, K0UWK 26, W0FTQ 22, W0RHI 22, W0HOP 21, W0YFR 20, W0BOQ 18, W0NYU 18, K0AIL 12, W0ABES 12, W0ZOU 12, K0MSS 8, W0FQB 7, W0BOO 6, K0BRQ 6, K0ZEO 5, W0CIW 4, W0KDW 4, K0EYS 2, W0HQE 2, W0NOW 2, W0PQP 2, W0SWG 2, K0VZP 1. (Nov.) W0JCF/0 85.

#### NEW ENGLAND DIVISION

**CONNECTICUT**—SCM, Henry B. Sprague, jr., W1-CHR—SEC: W1EKJ, RM: W1KYQ, H.F. PAM: W1-YBH, V.H.F. PAM: W1FHP. Traffic nets: CPN, Mon.-Sat, 1800, Sun, 1000 on 3800 kc.; CN, daily at 1845 on 3640 kc.; CVN, Tues., Thurs. and Sat. at 2030 on 145.98 Mc.; CTN, at 0900 on 3640 kc., all local times. CQRC's new officers are K1CFW, pres., W1MRB, vice-pres.; K1JXB, secy.; K1WIK, treas.; W1TNU station trustee for K1BCI; K1AQE and K1NYGS 1-year trustees. W1RNB will return soon to his regular QTH. K1REC reports a ragchew net on 28.9 Mc. nightly with W1s KGT, MGX, QOO and K1s KSD, REC, TAX and VDM as regular attendees. W1UPC's key is silent—it happened suddenly and is a blow to his many friends. K1QVX is on 2 meters with a "Twoer" along with W1GVJ, who uses a Pawnee and a five-element beam. W1VW is portable on s.s.b. in Florida above 14,300 kc. 2215Z week days and 1400Z Sat. and Sun. K1RCK has a 144-Mc. rig building and K1VHT has a 50-Mc. transceiver underway. K1s VML, QPM and PLR had their 2-meter beams clobbered by the high winds at the year end. W1MPW and K1NBZ are new CPN actives. K1-RWH now is General Class and is traffic-minded. He also is converting an ARC-3 and 4 to 2 meters. K1DCK just put a new 400-watt linear to work. W1CTI made the RPL on originations and deliveries. K1SDX says the SS finally brought c.w. activity to 50 Mc. K1PQN, now an OPS, visited K2MHW/1 in Mass., put up a "V" beam for DX and then lost it in the Big Wind. W1EOR is resigning as SEC because of the pressure of his business. We are sorry to lose John's able leadership in this capacity. W1EKJ, the new SEC, is well known to most of the section's ECs. Both are to be congratulated particularly for the development and progress of ECEN, the EC net. CVN had 11 sessions handling 6 messages; CPN 31 sessions with 233 messages and CN 31 sessions and 321 messages. Traffic: W1CTI 283, K1GGG 177, W1RZG 170, W1KYQ 147, K1PQS 139, K1PQN 122, W1RFJ 97, K1EIR 86, W1AW 85, K1LFW 84, K1PPF 84.

(Continued on page 116)



# LEADER in COMPACT, QUALITY HAM GEAR

## NUVISTOR PREAMPLIFIER

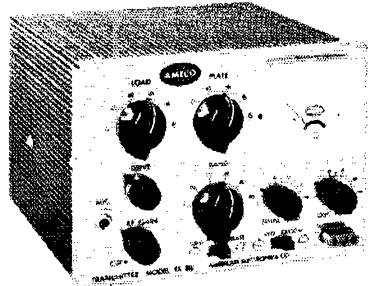
for 27, 28, 50, 144 or 220 MC.  
Lower noise figure  
Over 20 db gain.



Model PV—  
Uses 6CW4 Nuvistor. Improves gain and noise figure of present converter or receiver. Specify frequency.

Model PV Wired & tested \$13.95

Model PH—Uses 6CB6 tube—for any frequency or ham band, 2 to 27 MC. Wired & tested \$13.95



MODEL TX-86

## COMPACT 6 thru 80 TRANSMITTER



SCOPE PATTERN  
SHOWING 100%  
MODULATION OF  
TX-86

The TX-86 is an attractive, compact (only 5" x 7" x 7") transmitter that can handle 90 watts input on CW and 90 watts peak input on phone on all bands. It is ideal as a fixed or mobile unit. The new modulator circuit produces modulation that cannot be distinguished (with a scope) from push-pull plate modulation (see photo above).

Tube lineup:—12B7 oscillator, a 6BQ5 buffer, a 6146 final modulated by a 12AX7 and a 6AQ5. Power requirements of 6 V at 3.2A or 12 V at 1.6A and 300 V at 75 ma. plus 600 V at 150 can be supplied by PS-3 for fixed use or W612A for mobile. Smaller power supplies can also be used. Other features include: Final operates STRAIGHT-THRU on all bands, push-to-talk mike jack; Pi-net output ckt., true potentiometer drive control (no detuning of circuits), can take crystal or VFO.

- Model TX-86K Kit (specify 6 or 12 V)..... 89.95
- Model TX-86 Wired (specify 6 or 12 V) .....119.95
- Model PS-3 Power Supply, Wired ..... 44.95
- Model W612A 12 V Mobile Minn.-Honeywell Power Supply .....54.95

## MOBILE CONVERTERS

Require only 12 volts B+. Crystal controlled. For any FM or AM frequency or band from 2 to 54 MC. Model CLB—for 6 meters or citizens band. \$24.95 Add \$1 for any other frequency



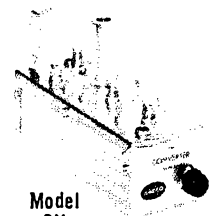
Model CLB

## Squelch ANLimiter

A combination squelch & noise limiter. Requires only 12V B+. Model ... SNL-12, for 12V or SNL-6, for 6V, \$17.95. Noise Limiter alone, Model ANL-6 or ANL-12, \$7.95

## NUVISTOR CONVERTERS

For 50, 144 & 220 MC  
High Gain, Low Noise



Model CN

\$49.95 wired \$34.95 kit

Two Nuvistor RF stages, a Nuvistor mixer and a 616 osc. give lowest noise figures and high gain. Ameco converters do NOT become obsolete as their IF output is easily changed to match any receiver. All CN models (CN-50 for 6 meters, CN-144 for 2 meters and CN-220 for 1 1/4 meters) are available in ANY IF output. (Specify IF output in order.) Specs. Noise figure 2.5 db at 50 MC; 3.0 db at 144 MC; 4.0 db at 220 MC. Gain 45 db average, image and spurious rejection—better than—70 db. IF rejection—better than 100 db. Power required—100 to 150 V at 30 ma, 6.3 V at .84 A. See PS-1 Power supply.



CB-6

- CB-6—6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. ..only \$19.95
- CB-6W—6 meter wired & tested .....\$27.50
- CB-2K—2 meter kit, 6ES8 1st rf amp., 6U8—2nd rf amp./mix. 616 osc. only \$23.95
- CB-2W—2 meters wired and tested. \$33.95
- Model PS-1—Matching Power Supply—plugs directly into CB-6, CE-2 and all CN units. PS-1K—Kit .....only \$10.50
- PS-1W—Wired .....\$11.50

Tube-type low noise, high gain converters. IF easily changed. Specify IF.



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- Amateur Log Book ..... .50
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Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4" speaker and can be converted to a CW monitor.

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**EASTERN MASSACHUSETTS**—SCM, Frank L. Baker, jr., W1ALP—W1AOG, our SEC, received reports from ECs: W1FON, K1STD and K1QLN. How about our other ECs? New appointments: K1PNB as EC for Townsend, W1FAW as OO, K1s PHJ and SMT as OBSs, W1VLB and W1WJD as ORSs, W1VHZ as OES, W1BIA is a Silent Key, W1YMW is on s.s.b., W1KQJ is the new Radio Officer for Quincy, K1VCO has his General Class license. The T-9 Club met at W1AMV’s, K1QVU now is in So. Boston, K1PJT and K1PPP are on 75 meters, K1WYF is now Tech. Class, W1AYG has s.s.b. on 2 meters, W1NF is on 20-meter c.w. W3JSL/1 is at Fort Devens, K1KBO, W1BGW got the 86S Award from CZECH, K1QJT made 20,500 points in the SS and built a Heathkit linear and is working on a rig for 432 Mc. The Middlesex Club had a Christmas party. Its semi-weekly net meets on 28.9 Mc. and new members are joining. Appointments endorsed: W1DVS Palmouth, K1GYM Winchester, K1MBU Attleboro, as ECs: K1GYM as OPS; W1EMG and K1MEM as ORSs; K1MEM as OBS; K1AH as OES, K1SMT has a 100-watt rig on 20-meters and a four-element beam, W1EMG says 80 meters is very poor, W1SVU was ill but is OK now, K1VLB is on our c.w. net, EM2AIN reports 24 sessions, 259 stations, 404 pieces of traffic handled, K1VZX has a net certificate, W1QFK believes he is the first one to make BPL on 2 meters alone, W1PEX made it with 2174, the highest we have had in this section; also K1TSD, W1ZSS and W1AOG, Somerville e.d. communications is being reorganized with drills again, W1AED and W1ALP spoke at the Wellesley ARS, K1WTK reports a lot of skip on 6 meters with many districts worked and many working V7CX, He has a 50-watt r.f. amplifier, The Townsend ARS held a meeting, K1QPD has a new beam for 6 meters, K1MTT is mobile on 6 meters, W1NZD has an inverted “V” on 75 meters, K1SGZ is on 6 meters, Thanks to all for the many Season’s Greeting cards, K1ONW is NC for our c.w. net, K1WJD also is K2KIR, K1MOD is going to school in N.H. K1MEM has a tower on the way, K1VLB has a new v.f.o., K1TSH has a Challenger transmitter, a four-element beam and a converter for 6 meters, The Milton Amateur Radio Club will hold an auction Sat., March 16 at 8 p.m. at the Cunningham Jr. High School, Pleasant St., Milton, W1AKY will officiate, bring your money and parts, K2MHWL, in Essex, is on 75 meters, A bad wind storm ruined W1LAV’s tower and beams; several others had damage too. (Traffic: Dec.) W1PEX 2174, K1TSD 767, W1ZSS 660, W1QFK 558, K1PNB 276, W1EMG 246, W1AOG 190, W1LES 159, K1ONW 145, K1GKA 111, W1DOM 66, K1QNZ 50, K1MYE 40, K1LCO 36, K2KIR/1 35, W1AUQ 24, W1VNS 22, K1CMS 17, K1MEM 8, K1VLB 1, (Nov.) W1DOM 54, K2KIR/1 1, (Oct.) W1DOM 47, K2KIR/1 2, (Sept.) K1AH 10, K2KIR/1 5.

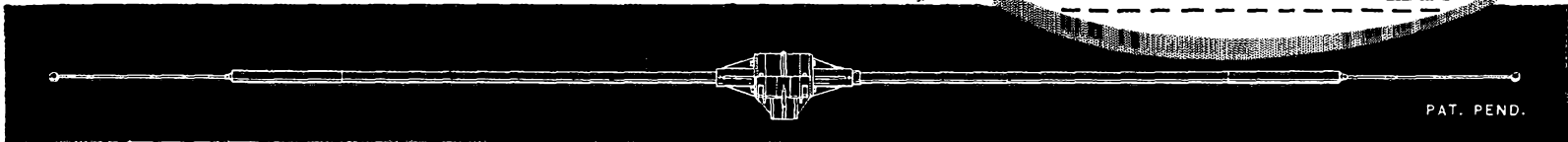
**WESTERN MASSACHUSETTS**—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR, C.W. RM: K1IJV, PAM: K1RYT, West. Mass. C.W. Net meets on 3560 kc. daily at 7 p.m. West. Mass. Phone Net meets on 3870 kc. daily at 7:30 p.m. We would like to have you in one or the other—or both! Our PAM reports the following: 176 AREC members (144 full, 32 supporting); 56 official mobile units; 39 emergency radio units; 13 local emergency nets (3 on 28 Mc., 8 on 50 Mc., 2 on 144 Mc.). Don’t forget, too, that our West. Mass. C.W. and Phone Nets on 80 and 75 meters are set up for emergency work if needed also! We regret to report the passing of old-timer ex-1ARE, Ex-W1SJJ is now W4FTN, W1TGE is cruising in the Mediterranean with the *Flying Enterprise*, W1CBR has a new HT-37, W1JVR is a new arrival in West. Mass. from the eastern part of the state, K1LJU and K1LJV have been working some 80-meter DX, Ex-K1NDJ is now W0HBB, W1HDQ, of ARRL Hq., was a recent speaker at the Montachusett Club in Fitchburg, W1GHI is on 6 meters with narrow-band f.m. The Nipmic ERC December bulletin runs 18 pages (we said before it is catching up with QST), K1PES has added a G-28 to his already vast array of equipment! K1IJV reports WMN still is going strong with 17 different stations reporting in during the month—the top six being K1LJV, K1SSH, W1BVR, K1LBB, W1DVW and W1ZPB, Traffic cleared—144, No responses came from a bulletin suggestion for a Novice traffic net, RM K1IJV sent it to 50 Novices, Let’s set a Novice frequency and time, Increase your code speed and enjoyment of ham radio! Traffic (Dec.) K1IJV 179, W1BVR 85, K1LBB 78, W1ZPB 73, K1LNC 52, W1DVW 26, K1TLY 4, K1TTT 3, (Nov.) W1DVW 40.

**NEW HAMPSHIRE**—SCM, Albert F. Haworth, W1YH—SEC: W1TNO, PAM: K1NXV, RM: K1BCS, GSPN meets Mon. through Fri. at 2400Z and Sun. at (Continued on page 118)

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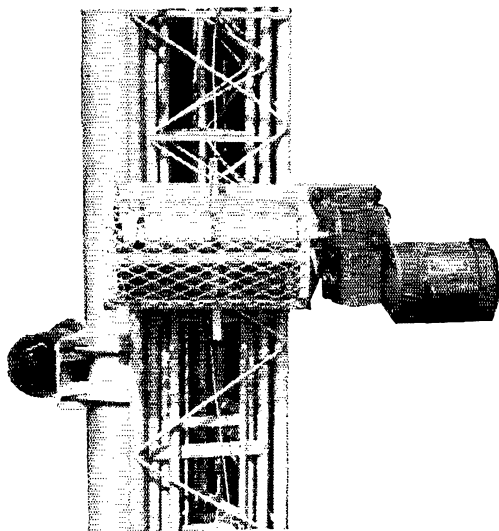
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1430Z on 3842 kc. CNEW meets Mon. through Sat. at 1130Z on 3842 kc. NHN (c.w.) meets Mon. through Sat. at 2330Z on 3685 kc. Those holding appointments should check certificates for renewal and those having applied for appointments should return completed applications. Congratulations to the new officers of the Manchester Radio Club, namely W1KGZ, pres.; K1PCY, vice-pres.; W1YHI, treas.; K1PWF, secy. The MRC meets the 1st and 3rd Fri. of each month at the Red Cross Building, Manchester. Many applications for AREC membership have been processed and a complete listing of members will appear in the near future. The Nashua Mike and Key Club's annual banquet was a grand success and our congratulations go to the entire committee. Congratulations to K1BCS on his fine traffic total. Traffic: (Dec.) K1BCS 580, W1CUE 52, K1DQM 12, W1TFS 11, W1SWX/1 4, K1IJK 2, (Nov.) W1JNC 21, W1SWX/1 10, (Oct.) W1QGU 35, W1JNC 11.

**RHODE ISLAND**—SCM, John E. Johnson, KIAAV—SEC: W1YNE, RM: W1SMU, PAM: W1TXL, RISP report: 31 sessions, 625 QNT, 127 traffic. RIN report: 36 QNT, 20 traffic. Appointments: W1PFO as EC for Charlestown, W1ESK as EC for Westerly, W1LUO as EC for Middletown, K1BWV as EC for Providence, K1TPK as EC for Aquidneck Island, K1OZI as Administrative EC. Endorsements: W1TXL as OPS and PAM. The W1AQ Club Rumford held its annual meeting and the following officers were elected: K1CZD, pres.; K1NSY, vice-pres.; W1BMG, secy.; W1YUT, treas. KIAA was elected a member and the first WRI certificate issued to a DXer was issued to OK3EA. The W1DDD Club of Woonsocket is working on an RTTY rig and hopes to be on f.s.k. soon. W1YNE was elected a member and the club compiled over 67,000 points during the SS Contest. W1HQV and K1QFI were the highest scorers of the club members. The NCR Club of Newport has begun another year of its emergency Net on 29.53 Mc. Heard on the RIN: K1s LDK, NEF, WKW, BRJ, W1s OR, IMY and W9CXY. K1HZN has completed a 2-meter exciter. Traffic: W1TXL 729, K1NEF 727, K1LDK 226, K1LYQ 153, K1TPK 59, K1DZX 29, K1NJT 29, K1GRC 22, K1PZY 17, K1OZI 15, W1YNE 11.

**VERMONT**—SCM, Miss Harriet Proctor, W1EIB—SEC: K1DGB, PAM: W1HRG, RM: W1KRV. Welcome to new licensees KN1ZKW and K1N1UYB. W1ETE has a new airplane. K1OAJ has moved to Barre. The Franklin Co. ARC has developed under the leadership of W1UCL, its president, so it now has forty members and a club house. The club station has a receiver and two transmitters. Code and theory classes are part of the program. ACES, the Addison County daily net on 145.8 Mc., has increased its activity. Please let us know about other local nets throughout the state so we can report on them. K1MPN is heading a committee at work on emergency planning in Montpelier. Traffic: W1KJG 43, K1YTD 4.

### NORTHWESTERN DIVISION

**IDAHO**—SCM, Mrs. Helen M. Maillet, W7GGV—The FARM Net meets at 1900 MST on 3935 kc. M-F; the Gem State Net daily at 2000 MST on 3580 kc.; The Boise Valley 2-Meter Net Sun. at 1930 MST on 145.44 Mc., The Magic Valley Net (TEN) at 1600Z on 3910 kc. Sun. and is sponsoring a check-in contest with a call book as prize. The Magic Valley Club held a Christmas Party at Ponderosa Inn in Burley with 20 members and XYLs present. The Eagle Rock Club met at the QTH of K7KBY and K7KBZ for a Christmas Party. V.h.f. activity is picking up around the state with 6 amateurs in the Jerome area and the Eastern Idaho c.d. group experimenting with SCR-522s. The Boise group is making progress with a 2-meter repeater station to be installed on Wareagle Mountain. W7BDL is getting good results with a new model v.h.f. vertical. A new call is KN7VKL and those dropping the "N" are K7UZU and K7PLX. FARM Net traffic: 34, Gem State Net traffic: 80. Traffic: W7EMT 149, K7KBY 98, W7KXJ 69, K7HLR 63, W7FBI 30, K7QIE 11, W7GGV 9, K7-OAB 4, W7MJZ 3, K7SJM 3.

**MONTANA**—SCM, Walter R. Marten, W7KUH—SEC: W7UPR, PAM: W7YHS, RM: K7AEZ. Montana nets meet as follows: MPH, M-W-F, 3910 kc., 1900M; MSN, T-T-S, 3550 kc., 1830M; TSN, Mon. through Fri., 7230 kc. 1200M; Flathead Valley, T-F, 50.135 kc.; Harlowton Emergency, 1st and 3rd Sun., 3885 kc.; Missoula Area Emergency Net, each Sun., 3890 kc., 0900M. Appointment correction: W7TYN as EC of Anaconda instead of Butte. Endorsements: W7LBK and W7FIS as OOs, W7LBK and W7FIS as ORSs, W7LBK as EC for Laurel. W7EVR has worked 68 countries. K7EWZ is back on the nets after remodeling the home QTH. K7OGF is holding regular code practice sessions M-W-F on 3825 kc. at 1900 MST. K0QBF/7 has changed his call to K7VMJ. Home for the holidays were K7BYC from

(Continued on page 120)





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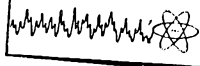
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M.I.T.; K7DES and K7RGL from M.S.U.; K7ZKA from the Marines in Alaska. W7ZOH received WAVE No. 568 and WACAN No. 272; he also has a WAZ/DXCC awards. W7TYN is building 2- and 6-meter rigs, and antennas for test with W7OIO and W7CJN in Butte. Congratulations to W7YIO, W7ZUQ and W7TYN on the new arrivals in their families. W7TLA installed a new transformer in the power supply, increasing the power output. K7MOY reported he is working DX on 20 meters. K7PKW made a trip to see W7HCJ. W7FGZ is working DX on 75-meters s.s.b. Traffic: K7DCI 203, W7TYN 58, K7DCH 34, K7OZF 18, K7NDV 16, K7IHA 7, K7MEG 7, W7OIO 7, W7FIS 9.

**OREGON**—SCM, Everett H. France, W7AJN—SEC: W7WKP. RM: W7MTW. Certificate endorsements: W7WKP as SEC; K7AXF as ORS, Nets; OFN, 3840 kc, 0200, 0300 GMT daily; AREC, 3875 kc, 0300 GMT Tue.-Sat.; AREC V.H.F., 50.550 Mc, 0400 GMT Fri.; OA-REC, 3585 kc, 0330 GMT Tue.-Sat.; OSN, 3585 kc, 0230 GMT Tue.-Sat. OSN December sessions 20, total attendance 126, traffic 31. BRAT awards to W7AJN and W7ZFH, AREC V.H.F. sessions 4, total attendance 74, traffic 12. Skip conditions disrupted low frequency nets to a point where it was almost impossible to check in or handle traffic. The Multnomah County Portland Area AREC members held their regular monthly meeting Dec. 21 at the Benson Polytechnic and it was noted the members realize the importance of communications as the result of the storm in October. W7RVN, Multnomah County EC, reports that various agencies have contacted him as to amateur radio communications and big plans are forthcoming. W7MYG, of KGW, gave a very interesting talk on broadcast station antennas, etc. W7DEM reports the Southern Oregon Radio Club is now conducting a code class. W7GTH makes RPL again. K7VMV is a new ham in Grants Pass. K7IWD is back in the swing again on OSN and RN7 after transmitter trouble during most of December. We're still looking for your reports. See you next month. Traffic: (Dec.) W7GUH 885, W7ZB 300, W7ZFH 148, K7IWD 63, K7QZF 36, W7MAO 18, W7DEM 13, W7AJN 7, K7CNQ 5. (Nov.) W7GUH 270.

**WASHINGTON**—SCM, Robert B. Thurston, W7PGY—Asst. SCM, SEC: Everett E. Young, W7HMQ. RM: W7AIB, PAM: W7LFA. Washington traffic nets are WSN on 3535 kc, NSN on 3700 kc, CBN, 3060 kc, and WARTS on 3970 kc. The WSN and WARTS nets have been moved ahead one-half to one hour to beat the skip conditions. 1963 officers for the Radio Club of Tacoma are: W7PWX, pres.; K7NPG, vice-pres.; W7-FUL, sec.; K7CZM, treas.; K7AYD and W7AEA, board members. W7JZJ renewed his OIS appointment. W7RGL has about completed his new kw. final and will be ready to transmit Official Bulletins on the lower bands 80 through 15 meters in the near future. New officers of the North Seattle Amateur Radio Club are: K7LET, pres.; W7ZXM, vice-pres.; K7REY, sec.; treas.; W7CO, W7IRK, W7LWB, W7OEX, W7PGY and K7JRE, trustees. We understand that W7EBU is sweating out a new car and mobile. K7CTP reports he had a visitor from Idaho, K7QMZ, who had a bear for Doralie. K7OXL, of Forks but when he found out where Forks was located it is reported he turned the bear loose in the bushes near Seattle and hopped a plane for West Virginia. NSN had 28 sessions, 283 QNIs and 90 QTCs for December. W7DND is conducting adjustments and tests on his four driven verticals, four reflectors and four directors. A new General Class licenser in the Bremerton area is K7VMEH. W7HMA is QRL examinations. The Spokane Club raised forty dollars from the Christmas auction for a newly family. W7IHD has a new vertical. K7HEF is bewildered trying to keep RACES and AREC straight. K7JRE is QRL heavy school load. K7QMF has finished his preslector and is now working on a quad. W7AMC installed a Heath monitor scope on the rig. W7EUI is the new net manager of WSN with K7QMF as associate manager and K7DED the net recorder. K7HEF received confirmation of XE1OP for country No. 3 on 6 meters. He now has 30 states, 3 countries and 4 Canadian call areas. The following amateurs assisted the Salvation Army during Christmas in distribution of needy packages in the Thurston County area: W7S, GLL, HML, UVI and K7S, SQW, QNC, IEL, PCP, RNO, QDO. A new OIS appointee is K7PIG in the Burlington area. W7NNF is the proud owner of a new Drake-2B. K7TB dropped the "N" from his call. K7GZM has a new tribander and a 35-ft. tower. K7OFX won the r.w. title for the seventh district in the last N.Y. AP. OFB has qualified for the USA/CA-500 award. K7OFW finally worked ZS for his "WAC." W7JVF and family visited in Virginia over the Christmas holidays. Last year's officers in the Walla Walla Club were re-elected for another term. K7RFN/7 is active on 146.76-Mc. 1-m. mobile. Traffic: W7BA 1520, K7JHA 1459, W7DZY 1259, W7APS 416, W7OEB 130, K7QMF 124, W7AMC 85, W7BTB 62, W7IEU 26, W7AIB 25, K7IRFX/7 21, W7GFW 20, K7HEF/K7HFN 17, K7-CWO 6.

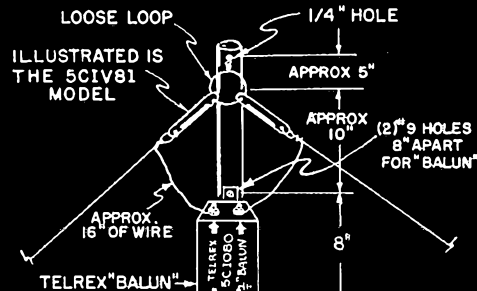
(Continued on page 122)

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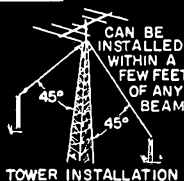
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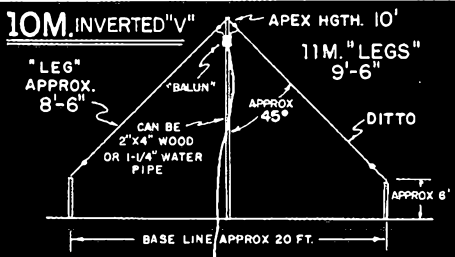
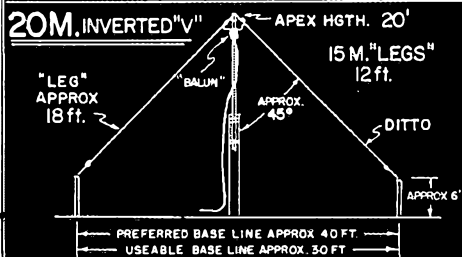
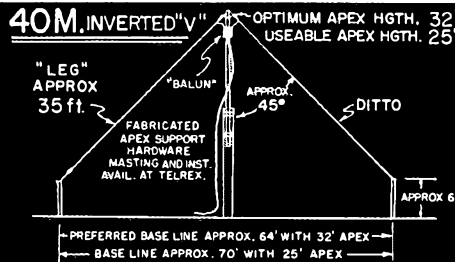
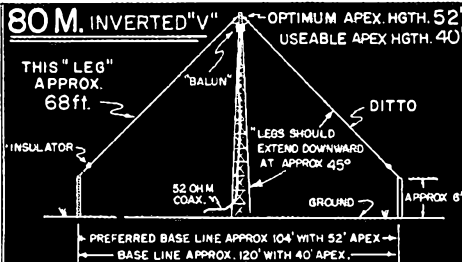
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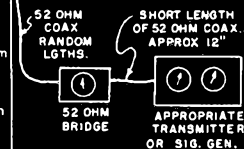
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  2. The "Balun" fed Inverted "V" automatically provides min. S/W/R over a max. bandwidth when installed at indicated height and base width because the "legs" will approximate a 45 degree angle from the vertical, thus effecting an input imped. of approx 52 ohms.  
Note! The "Balun" fed Inverted "V" lends itself to considerable variation from these definite recommended instructions, although some corrections may be required as indicated below.
  3. Properly installed and resonated to freq., a Telrex "Balun" fed Inverted "V" provides an imped. bandwidth of approx 3%, with a S/W/R of 2/1 or less. The pattern is primarily Omni-directional, with nulls off the ends of approx 6 DB.
  4. Performance, a Telrex "Balun" fed Inverted "V" is superior to a gnd-plane, or a 1/4 wave dipole with a costly radial system. Do Not install this antenna system, in a horizontal plane, unless you can install it 1/2 wave above ground.
- ORDER OF PROCEDURE: 1a. Cut copperweld wire supplied into designated lengths. Assemble to insulator and "Balun" as illustrated. Connect 52 ohm coax trans. line (any length) to input side of "Balun", raise antenna to its prepared supports.
- 2a. With S/W/R bridge (or sig. gen.) connected as illustrated, check resonant freq. of antenna. In all probability, the antenna will resonate too low, perhaps outside the low end of the band. To correct, shorten each "leg" approx one foot or so, then recheck for resonant freq. Repeat (shorten or lengthen), if necessary, until antenna resonates to your desired band sector.
  - 3a. Note! The antenna must be raised to its intended final apex and end post height every time you take resonant freq. and/or V/S/W/R readings. Properly installed and resonated, the antenna should have a 1.5/1 S/W/R. If necessary, S/W/R improvement can be effected by raising or lowering the doublet "legs" a foot or so.



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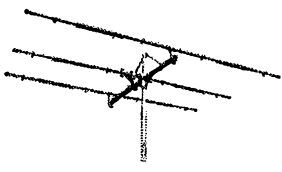
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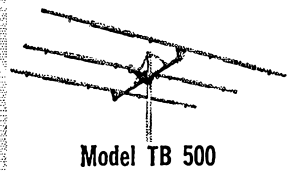
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PACIFIC DIVISION

**HAWAII**—Acting SCM, Mike Fern, KH6ARL—RM: KH6DVD, PAM: KH6PGL, SEC: vacant. Oahu and Kauai RACES nets were called out for the tsunami alert Dec. 21. New RACES officers are KH6DYC, state; KH6GG, Oahu; KH6BAS, Kauai; KH6ELW, Big Island. Give them your kookua; they have a big job. County RACES plans have been updated and await FCC/FCDA approval. KH6EOQ at Tripler Hospital was formally opened by Brig. Gen. W. D. Graham Dec. 13. They have S/Line gear with basement standby. Brig. Gen. Graham and the Honolulu YL club have worked for this for years. KH6CQV resigned as SEC Dec. 31 because of business pressure. He did well starting from scratch. KX6AJ has been DXing on 80 meters. WH6EZI is a new recruit on the Poi Net. KH6EGL left for Midway Jan. 15 and turned the 50th State Net over to KH6ATS and KH6EJZ. K6QKL/KH6 and KH6EOQ applied for OES appointment. Traffic: W6ZDF/KM6 131, KH6LWD 105, KH6EOF 43, KH6EGL 24, KH6DVD 15, KH6ARL 12.

**NEVADA**—SCM, Leonard M. Norman, W7PBV—The NARA of Reno holds regular meetings the 2nd Tue. of each month. The SNARC of Boulder City holds meetings the last Mon. of each month. K7HRW is conducting a class for amateur radio operators. The NARA 2-meter repeater is still out for repairs. W7ZVN furnished information on erecting amateur radio towers on residential property. K7KBN made BPL for the fifth consecutive month and will be missed by the traffic-handlers and DX boys. His QSOs and traffic will be with the U.S. Navy for the next couple of years. K7ICW, with his NYL (W7SNP), spent the holidays in Los Angeles. They have a new HX-50 and other high power 2- and 6-meter gear under construction. W7THH has moved to Reno. K7QPK is active on 75 meters. W7NRU was the winner of a 6- and 2-meter beam. K7USU and K7USR are new members of the Las Vegas AREC Two Meter Net. K7TDD is active with the Las Vegas AREC 6-Meter Net. Traffic: (Dec.) K7KBN 5244, W7PBV 11, (Nov.) K7KBN 2024, (Sept.) W7AL 1870.

**SANTA CLARA VALLEY**—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM: Edward T. Turner, W6NVO, SEC: WA6EIC, RM: K6KCB, PAM: WA6HVN. A late report from the South San Francisco area via the SCM of San Francisco shows much activity of amateurs in that area during the October 13-14 storm. Six amateurs are listed as being active under the direction of EC W6QIE in South S.F., and nine amateurs were active at Pacific Police headquarters. WA6HVN took over as PAM Jan. 1. W6PJW is the new EC for San Mateo. W6SXO is now EC for San Jose C.D. WA6RXM is a new OO in Salinas. Lockheed RC station WA6GFY is now OBS under the direction of W7WJB/6. WA6HRS works DX and received the AJD award recently. W6RSY is having much trouble on RN6 because of RTTY QRM. K6GZ reports much Guam typhoon traffic handled. K6DYX is organizing an RTTY traffic net on 80 meters. Section stations reported joining new Navy MARS are W4YHM, K6YKG, W6OH, WA6HVN and W6ZRJ. W8-OCU/6, Milpitas, is active on NCN and using a new B&W 5100 and NC-105. OES W6SHK reports that he and K6DYX carry on a nightly schedule on 220 Mc., and signals are always solid copy. W6HC attended the DX meeting held in Paso Robles in January. New officers of the San Mateo Radio Club are WA6CXX, pres.; K6TTL, vice-pres.; WA6STU, secy.; W6TUQ, treas. K6MNP reports that the SCARS club station now is active on the low bands. NCN meets at 1900 on 3635 kc. daily. SCVSN meets at 1900 on 146.7 Mc. daily. Traffic: (Dec.) W6RSY 1107, K6GZ 603, K6DYX 426, K6KCB 273, W6YBV 202, W6AIT 184, WA6UC 135, W6ASH 85, W6DEF 83, W6OH 74, W6HC 70, W6WV 29, W8OCU 29, W6YHM 28, K6YQK 27, K6YKG 18, W6ZRJ 16, K6EQE 10, WA6HVN 3, WA6UAM 3, (Nov.) W6HC 14, W6UW 6.

**EAST BAY**—SCM, B. W. Southwell, W6OJW—It is against my policy to use this column to let off steam but once in a while I feel that I should roll out the soapbox. Traffic handling in the section suffered a drop of 60 per cent for the year 1962 compared to 1961. Reports received here for inclusion in QST column have fallen off quite a bit. Some of you want to know how come your traffic or station activities have not appeared in this column lately, but do not stop to think that ye SCM is not a mind reader. In short, I cannot put in information I do not have so please, instead of writing me asking why no news, use the postage to send me station activity reports I can use. K6QKY had an eyeball QSO with W6OJW. WA6LGE is sweating out Alabama for WAS. WA6KJZ is holding skels with JAS, and has a new v.f.o., homebrew. HL9KH is looking for U.S. stations between 1230 and 1400 GMT. WA6LBB has

(Continued on page 124)

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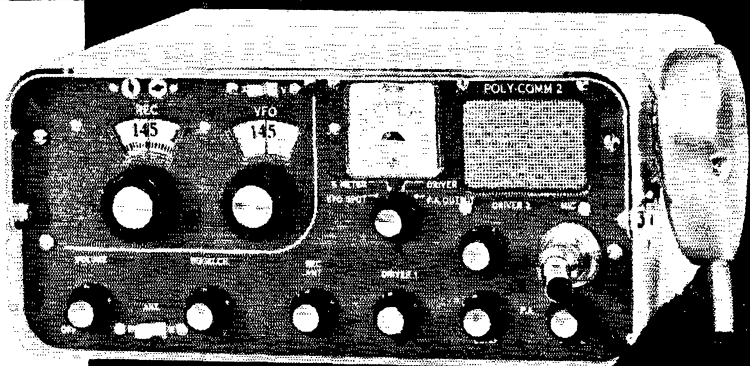
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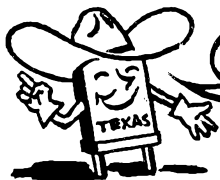
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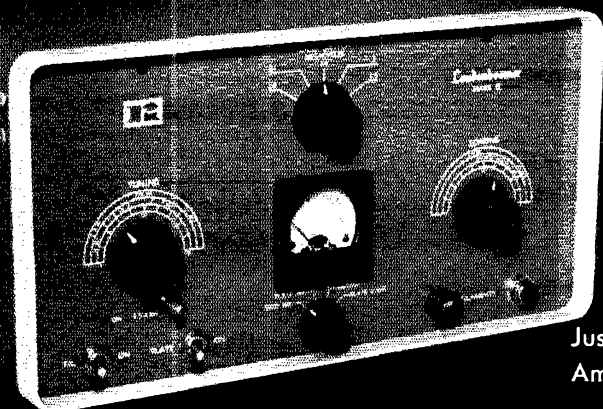
gone d.s.b. WA6RGD has a new 80-meter skyhook. K6OSO made WA6 at long last. WA6WLE has been rebuilding. W7QOH/6 got his mobile set-up worked over and sent Christmas greetings from the USN ammo. depot to relatives via radiogram. W6F7C reports he has been licensed over 50 years in ham radio and is approaching his 50-year commercial anniversary next year. WA6LGE has a new high-bander. WA6MJP had his rotor go kaput, but has a 112/82 DX total. NBARC 1963 officers are: W6I2U, pres.; K6QXY, vice-pres.; K6MIS, secy.; WA6LGD, treas. WA6FJX is building a 144-Mc. S.S.B. rig. W6BUR is 1-kw. s.s.b. on 50 and 144 Mc. K6OSO returned to the section from L.A. W6NDR is building a new 50 Mc. rig, 150 watts to a 4-65A. W6NCPN, 62 years old, is a new Novice in Napa. W6NOP is pres. of the Napa Club and W6NDR is vice-pres. WA6ECT has been QRL school but managed to knock at the door of DXCC. WA6ODP/6 was one of the top 14 in F.D. in the U.S. Congrats. WA6WRH operated on 144 Mc. while confined to the hospital. K7DRZ visited WA6RMY during the holidays. W7QIS/6 and his XYL had an eyeball QSO with WA61OU and his XYL. WA6OVF is mobile 7 in Arizona. W6ZRH, K6UGX, W6GSR, WA6SDA, W6TXY, WA6GHC and K6EKD, all portables, helped police in Livermore locate a missing boy. WA6ZLZ is a new General in the Oakland area. W6LWV and WA6FBS are assistant ECs in the Walnut Creek-Alamo area. WA6KJZ has a DX total of 61/48, needs Africa for WAC, and says his new SX-111 should hear 'em. The ORC elected 1963 officers at its January meeting. Thanks again for all your cooperation in 1962 and let's make it a banner year in 1963. Traffic: (Dec.) WA6RGD 259, K6GK 135, WA6ECT 47, WA6MIE 23, W7QOH/6 20, WA6WLE 7, K6OSO 3, WA6KJZ 2. (Sept.) WA6ECT 15, (Aug.) WA6ECT 4, (July) WA6ECT 2. (June) WA6ECT 4.

**SAN FRANCISCO**—SCM. Wilbur E. Bachman, W6-BIP—The Christmas Party was enjoyed by all the San Francisco Club members with a visit from Santa and carols as usual. WA6VMI was speaker at the regular club meeting. His subject: "Large Antenna on Small Lot." Also movies on "wave forms" were shown. W6-UDL was presented with a certificate at the Christmas Party. He did an outstanding job as president of the club during 1962. Those in the section on the sick list are: W6JKN, Red, a throat infection; WA6ALK, Estelle, hospital check-up; Marguerite Reed, the XYL of W6-C7H, a broken blood vessel; W6JSY, Elwin Johnson of Eureka (Humboldt Radio Club), heart surgery; W6-10QA, Charles Bel of Eureka, lung infection; and WA6CEX, Frank, who spent the month of January in Peninsula Hospital, at Burlingame. Hope that by the time this report reaches the press all of the above will be well on the road to good health once more. The BAYLARC had a surprise "bridal shower" for WA6-LYA at the club's Christmas Party. The Mission Trail Net notes in the *Blazer* copy that WA6JKB, George, is blind and requests that phone numbers be listed on all traffic being handled through him. The NCARTS (RTTY) held its Christmas Dinner at Spencers in Berkeley with a nice show-up. Marin Radio Club members enjoyed dinner at Rancho Nicasio. WA6AUD, is doing a fine job as publisher of the club paper *Oxas*. He is the new MC for his territory also. K6OJO, of the club, will serve as secretary for the Central California Radio Council for '63. Strawn Taylor, president of the East Frankfort, Ky., Optimas Club sent his personal thanks to all the San Francisco hams who handled traffic for the group in '62. K6RKG spoke on Beam Antennas at the Tamalpais Radio Club December meeting. K6LCF and other local boys have been holding for the Novices, a crash code and theory class at MARS station (Hamilton Airforce Base). I wish to thank the OESs for the nice reports sent me in December. W6FDU reports FB on the 6-meter final checks on the air. W6BUR is running 1 kw. on 6-meter s.s.b. W6OHJ had a housewarming party at his new QTH. W6K7Q reported to the local sheriff department, police, highway patrol and Red Cross that he is now EC for the Ukiah area. Congratulations to Gordon Smith in Novato. We note that he has a new YL at his address. Traffic: K6T7J 129, W6GGC 18, W6JWF 10, WA6OTE 9, W6FDU 4, W6GNI 4, WA6QXV 2, W6UDL 2.

**SACRAMENTO VALLEY**—SCM. George R. Hudson, W6BTY—*Flash*: Word has been received from ARRL Headquarters that yours truly will be your SCM for another 2 years. Thank you, gang, for your fine cooperation and wonderful hospitality. Your loyal support of the ARRL cause has made the Sacramento Valley one of the outstanding sections in the Pacific Division. OBS W6AF gave 1 Conditional and 2 Novice Class exams recently and skeds Official Bulletins at 0300Z on 14,000 kc. ORS K6YZU, the Valley's famous golfer, is back on the air after a trip to KH6-Land and is now liaison for RN6 to PN on Fri. nights. Bill handled 134 messages during Dec. OC K6HEZ is active in MFM at 1900 on 3854 kc., the SKETO SB Net at 1930 on 3830

(Continued on page 126)

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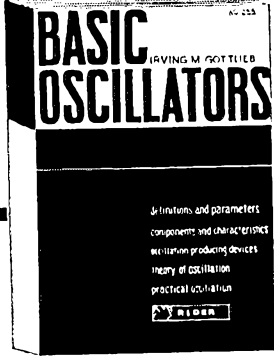
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ke. and the SJV Net at 1800 3915 kc. OPS WA6PVT says activity on 10 and 40 meters is perking up and he plans to go mobile soon with a homebrew rig. WB6CCT writes that 7 new hams, namely W6BPO, W6BCBH, W6BCT, W6BCHX, W6CUTL, K6KDU and W6BCUN, are all members of the Placer County Sheriff's Comm. Reserve and are installing mobile and base units to operate on 51.0-Mc. f.m. to furnish the county with emergency communications. New officers of the SARC in Sacramento are W6UCL, prexy; K6LOE, vice-pres.; W6BWB, secy.; W6BPN, tres. Up Chico way we hear that K6TQA is active on 21 Mc. and that W6TSR is now on 160 meters. W6WYZ, formerly of Sacramento, has moved to Pt. Mugu. Ex-W6PPN, now on 75 meters as K7HYV, has retired from the USN and his QTH is now Kirkland, Wash. W6JIG is the new prexy of the Golden Empire ARC and is looking for an editor of the GEARS *Ham Gazette*. Any volunteers? The Sacramento Chapter of the Western S.S.B. Assn. held its 2nd breakfast of the year at Sacramento Inn with WA6HYU and W6BNK as co-chairman. Your SCM attended representing the ARRL Fellows, there are several openings in the section for OOs, OPNs, OESS, etc. Write me if you are interested. Traffic: K6VZU 134. K6HEZ 28.

**SAN JOAQUIN VALLEY**—SCM, Ralph Saroyan, W6JPG—The Modesto Amateur Radio Club is moving to its permanent headquarters, the Old City Hall, and meetings are being held the 2nd Wed. of every month at 1930. K6ODA is working on his 3.5-kw. mobile generator. The SJN for December had 653 check-ins, 19 contacts, 40 traffic, 1 QST, 1 phone call and 7 bulletins. WA6YZA is active on 40 and 75 meters handling traffic. W6OBQ, after many years on a.m., is on s.s.b. with a GSB-100 and a 75S-2 receiver. W6KTW is on 20 and 75 meters with a pair of 813s in GG. K6SVM has a DX-100. WA6YPP is on 40-meter a.m. WA6ARC is building an s.s.b. exciter for all bands and has a triband beam ready to go up. WA6WXP and WA6ZGP both have Heath 6ers in operation. WA6CVX is on 75-meter s.s.b. WA6-BUH is on 75-meter s.s.b. WA6ZVY has a 6-meter mobile. W6HYR is recuperating in the Community Hospital from an automobile accident and is coming along fine. W6ADB is handling traffic on 80-meter c.w. K6OLN is attending college and is inactive temporarily. WA6ESH has an NC-200 and an inverted "V" antenna and is on all bands. K6AXV is building a new receiver. K6ROU is operating from WB6AMW and is attending college. W4GJR, ex-W6GEG, now is operating out of Roseville on 75-meter s.s.b. Traffic: WA6ESH 151. W6ADB 110.

## ROANOKE DIVISION

**NORTH CAROLINA**—SCM, N. J. Borrich, W4CH—SEC: W4MFK, RM: K4CPX, V.H.F. PAM: W4ACY. Our SEC has completed the N.C. AREC Plan and will mail a copy to anyone requesting same. Congrats, Jim! Also, an expression of deep gratitude goes to K4CWX, EC for Orange County, for reidering such a big service in editing, stenciling and running off 500 copies of the 5-page program. All those interested in an EC appointment, please contact the SFC or SCM and put your valuable emergency qualifications to good use! W4ACY will organize the v.h.f. nets to follow the new AREC plan. OBS reports from W4BUZ, W4COJ, K4QFV and K4SWN show the usual fine participation. K4HQM was elected president of Greensboro RC and the Carolina V.H.F. Society proudly announces its membership now totals a big 122! W4HBQ and W4DYH are board members of Wayne Co. ARA. WA2WBA/4 is now a real traffic handler. W44FJM and K4IEX. OOs keep logging a large number of violators on the bands. OES reports from WA4JCS, W4HJZ, W4OAB and K4WOD were interesting. Congrats were received from the President of E. Frankfort, Ky. Optimists to all N.C. amateurs who handled Optimist traffic this past year. We regret to announce the passing of Hal, W4BST and Brenda, W4ADJG, who was just 15, an auto accident victim. Traffic: W4PCN 271. K4NPE 222. W44FJM 130. W4EJQ 123. K4TPK 120. W4RGV 105. WA2WBA/4 102. W4EJP 78. K4QFV 60. WA4ANH 58. W4BDU 53. W4BAW 42. K4YCL 38. K4IEX 22. W4COJ 13. WA4DA 6.

**SOUTH CAROLINA**—SCM, Lee F. Worthington, K4HDX—SEC: W4HCZ, S.S.B. PAM: K4JOQ, A.M. PAM: K4KCO, RM: W4PED. Nets: c.w., 1900 and 2200 EST 3795 kc. s.s.b., 1900 EST 3914 kc.; a.m., 1900 EST 3930 kc. AREC s.s.b., 1400 EST 3980 kc. Sun. The Charleston ARC elected W4FFH, pres.; W4DAW, vice-pres.; and W4UEV, secy.-treas. as its 1963 officers. The Blue Ridge Radio Society of Greenville will be led this year by W4MAP, pres.; K4QDY, vice-pres.; and W4VWV, secy.-treas. Plans are being made by Blue Ridge for its annual hamfest to be held May 5. The Blue Ridge Club also led the state in Field Day scores with 5331 points using 9 operators and 4 transmitters. New appointments: K4VWL as OBS and CN8AW/K4SDC as honorary EC. The Mike & Key Club elected K4TJP, pres.; W4UDG,

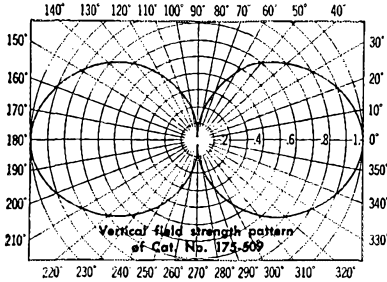
(Continued on page 128)



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Nominal input impedance..... 50 ohms  
Maximum power input..... 500 watts  
Internal feedline..... RG-8A/U  
Flexible terminal extension..... 18" of RG-8A/U  
Termination..... Type N male  
with Neoprene housing  
VSWR..... 1.5:1  
Bandwidth..... ±1%  
Lightning protection..... Direct ground

### Mechanical Specifications:

Radiating element..... 2" dia. red brass tube  
Radiating element housing..... 3" dia. fiberglass tube  
Support pipe..... 4" dia. hot-galvanized steel,  
24" length available for mounting  
Rated wind velocity..... 100 MPH with 1/2" of ice  
Lateral thrust at rated  
wind and ice load..... 150 lbs. at 30 Mc  
Bending moment 6" below top  
of support tube at rated wind  
and ice load..... 1400 ft. lbs. at 30 Mc  
Weight..... 80 lbs. at 30 Mc

\*Exact frequency must be specified (Formerly STORM/MASTER)



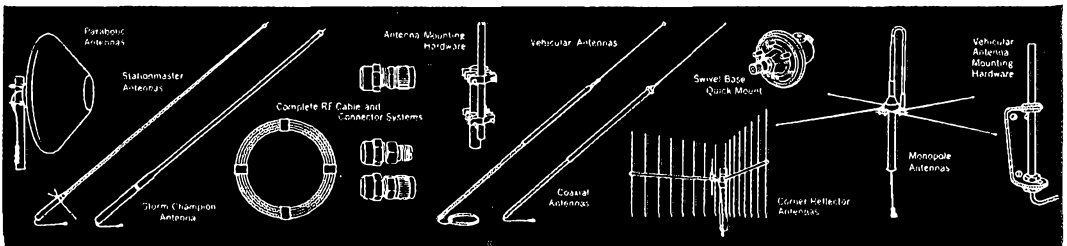
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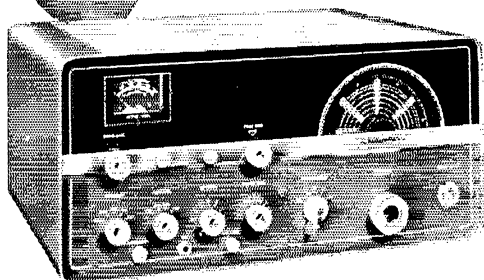
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vice-pres.: K4FYS, secy.: K4NFS, treas.: and W4CQG, member of the board of governors. Net traffic: s.s.b. 210, c.w. 101, a.m. 22. Traffic: (Dec.) K4LND 110, K4JMV 90, K4WOI 48, W4FFH 45, K4OCU 44, W4WQM 34, W44CSO 20, K44VL 24, W4NTO 17, K4PJW 14, W4VTW 12, K4YFK 9.

**VIRGINIA**—SCM. Robert L. Follmar, W4QDY—Asst. SCM: H. J. Hopkins, W4SHJ, SEC: W4VMA, RMs: W4LK, K4ITV, W4IA, W4SHJ, W4QDY, PAM: W4UFY. Virginia nets: Virginia Slow Speed (VSN) 3680 kc. Mon. through Fri. at 1830 EST; Virginia Net (VN) 3680 kc. daily at 1900 EST; Virginia Phone Net (VFN) 3835 kc. daily at 1900 EST; Virginia Sideband Net (VSNB) 3935 kc. daily at 2100 EST. BPLs for December: W4PFC, W4NTR, W4DLA, K4YZT, W4SHJ, K4PXY, W4RHA, K4WMP, K4FSS. Congrats, gang! W4PTR has a new all-band tuner and is putting in different keying and rigging gear for full break-in. Some of us missed out on holiday traffic because of other commitments. W4JFY got a 500-Watt final from K2UFT. The PVRC held its Annual year-end dinner with a nice crowd. K4UVT made CHC; he is working on a slow scan image system for the science fair. W4CVO spent December in Bermuda and Florida. K4AET says he's getting old—can't stand some of today's operating. W4NTR now holds Navy MARS call N0ASM and K4PXY is N0AUC. W4TE and W4BZE were slowed down by cold shacks! K4ARO is busy with college. W4DLA gets more information on a Form 1 than anybody. K4LTK says conditions were poor during December with long skip. K4GRZ is cutting the QRM with his Marauder. W4PFC's message total of 4312 helps the Virginia average! W4BZE had eye ball QSOs with W4WRG, W4LAO and K4DBD, who are with the FAA in Roanoke. K4WMP made the local paper with an article about his station and christmas traffic. Our message total for this year is 51,743 against 35,508 for 1961. Our December 1962 total is 10,825 against 5,187 of a year ago! We beat last year's total by 16,237 messages. Congrats to a fine Virginia traffic group. Traffic: (Dec.) W4PFC 4312, W4NTR 772, W4DLA 707, K4YZT 545, W4SHJ 512, K4PXY 444, W4RHA 362, K4WMP 327, W4GWD 259, W4JFY 256, K4FSS 255, W4DVT 209, W4FOR 144, W4IA 131, W4LK 129, W4BAG 109, K4ITY 106, K4PQL 106, W4WRG 75, W4PTR 72, K4MXP 65, K4CSY/P4 43, W4QDY 43, K4SDS 34, W4LRN 32, K4WYT 30, W4ZAU 18, K4AL 17, K4UVT 17, W4ADUW 12, W4TE 12, W4JUJ 10, K4AET 6, W4BZE 4, W4KX 4, K4LTK 4, K4GRZ 3, W4KFC 3, W4N4HP 2, K4ARO 1, K4BAY 1 (Nov.) K4PXY 591, K4SDS 24, W4BZE 12, W4OWV 5.

## WEST VIRGINIA CENTENNIAL QSO PARTY

March 30-April 1

In celebration of West Virginia's 100th year, the State Radio Council is sponsoring a QSO Party to aid amateurs in pursuit of the Worked West Virginia Award and the Worked All Counties West Virginia Award. The contest will be administered by the Kanawha Radio Club of Charleston.

**Rules:** (1) **Time:** The contest begins at 2300 GMT Saturday March 30 and ends at 0500 GMT Monday, April 1. (2) **Suggested frequencies:** 3570 3890 3903 7050 7205 14050 14300 21050 21350 21410 28050 28800 and 52250 kc. (3) Each station may be worked twice on each band, once by phone and once by c.w. West Virginia to West Virginia contacts do not count. (4) **Scoring:** Each complete contact counts as 1 point. Incomplete contacts do not count. Non-West Virginia stations multiply total points by the number of West Virginia counties worked. West Virginia stations will multiply total points by the number of ARRL Sections and Countries worked. Multi-operator stations are not allowed. (5) **Awards:** The highest West Virginia scorer will be awarded an attractive plaque. Certificates will also be awarded to the highest phone and c. w. stations, both in and out of state. An attractive award will be made to the highest over-all out of state winner.

Contest logs must be postmarked no later than May 1, 1963, and submitted to the contest chairman, Mr. Ross Kirk, K8YBU, 901 6th Avenue, St. Albans, West Virginia.

**WEST VIRGINIA**—SCM, Donald B. Morris, W8JM—SEC: W8SSA, RM: K8HID, PAM: K8CPT, WVN (c.w.) meets on 3570 kc. at 0000 GMT; (phone) on 3890 kc.

(Continued on page 130)

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at 2330; (S.S.B.) on 3903 kc. at 0100. New officers of the Kanawha Radio Club are W8WHQ, pres.; W8SHU, vice-pres.; K8VMO, secy.; WA8AYP, treas.; W8SET, act. mgr. The Mountain State (Elkins) ARC holds AREC meetings every Sat. on 29.6 Mc. at 0200. The Opequon (Martinsburg) Radio Society elected the following officers: K8WXB, pres.; K8VNL, vice-pres.; K8WVP, secy.-treas.; K2SDI, act. mgr. W8CKX is a new ORS. K8ZWM has a new Valiant in operation. The Kanawha, Elins and Fairmont Radio Clubs are sponsoring Centennial QSO Contests. WVN on c.w. held 22 sessions with 116 stations handling 75 messages; WVN on phone held 15 sessions with 319 stations passing 34 messages. K8JSX has a new rig and a six-element beam. Watch for West Va. amateurs on 3570, 3890 and 3903 kc. during the Centennial Year and plan to attend the West Virginia State ARRL Convention at Jackson's Mill, July 6 and 7. Traffic: (Dec.) K8CNB 99, W8CKX 87, W8NYH 75, K8UQY 32, W8HZA 14, W8JUE 12, K8ZWM 11, K8-TNX 10, K8JSX 2. (Nov.) K8CNB 11.

### ROCKY MOUNTAIN DIVISION

**COLORADO**—SCM, Donald S. Middleton, W0NIT—SEC: W0SIN, PAMS: W0CXW, W0JHR and W0GNK, RM: W0FFO, OBS: K0DCX, K0QMI reports activity in both the AREC and RACES on the western slope. WA0DRF reports 6-meter openings on Oct. 26, Nov. 7 and 8, Nov. 30 and Dec. 1. Rick has worked 5 states in 3 months with his Sixer. WAUGLQ received his A-1 Operator Award. K0SJK is the new RO for Grand Junction. K0TDF has currently enrolled at Pueblo Jr. College. Look for him on the HNN from W0ENA. Robert "Tim" Holt plans to operate from the hospital on 80 meter c.w. just as soon as he receives his station license. He holds a Conditional Class operator license now. Good luck, Tim. The Colorado Emergency Phone Net hit a new all-time high QNI on Dec. 2 with 59. Long skip caused considerable trouble for the Colorado WX Net in December. W0IA reports that Colorado stations on 75-meter phone could not be heard in many cases until as late as 0705. K0TTF has been declared elected as Colorado SCM. He was the only nominee and took office Feb. 14. Traffic: W4UGI 235, K0WGC 31, W0ENA 19, K0QGO 14, W0BWJ 8.

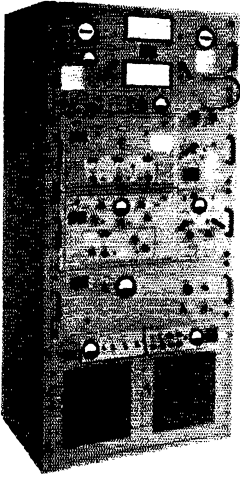
**UTAH**—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, W7OCX. SEC: K7BLR, RM and ORS: W7OCX. ECs: K7HFV, W7MSY, W7VYF, OOs W7BAJ. New officers of the Ogden Amateur Radio Club are W7ZJI, pres.; W7NHL, vice-pres.; K7MUY, secy.-treas. W7OCX, W7QWH, K7MPQ, K7QGW, and W7VTJ earned BRAT awards on BUN in December. Effective Jan. 1 BUN is using GMT and the ICAO phonetic alphabet. W7OCX is the only TWN liaison from BUN. Any volunteers? Ten more amateurs in Salt Lake have teleprinters. Several are already on the air. K7DAA and W7APY have been heard on 2 meters using RTTY. K7MPQ has been awarded the Master Traffic Handlers Certificate. K7NWP and W7OCX earned Brass Pounders Certificates in December. Traffic: K7NWP 732, W7OCX 245, W7QWH 25.

**NEW MEXICO**—SCM, Carl W. Franz, W4ZHN—SEC: K5QIN, V.H.F. PAM: W5FPB, 10-Meter PAM: W5WZK. I want to express my sincerest appreciation to those who have so generously contributed parts and other services to the members of the Yale ARC for the visually handicapped. Among them are W5FCX, W5WZK, K5IVR, W5YDK, K5WZA and W5WRS. A special thanks to K5WZA, who is giving many hours of her time to assist in the instruction of this group. The officers for the coming year in the Caravan Club are K5CXN, caravan master; W5ONK, emergency caravan master; and K5YTK, secy.-treas. We extend our best wishes for a speedy recovery to Clem and Helen Rose Burke, W5IXR, and W5IXS, of Los Alamos, who received injuries in a recent accident. How about some activity reports for this column, gang? Traffic: W5UBW 76, W5GB 11, K5ONE 8.

**WYOMING**—SCM, L. D. Branson, W7AMU—SEC: W7HH. The Pony Express Net meets Sun. at 0830 MST on 3920 kc.; the YO Net is a c.w. net on Mon., Wed. and Fri. at 1830 MST on 3610 kc.; the Wyoming C.D. Net meets on Wed. at 1900 MST on 3537.5 kc.; the TWN Net daily at 2000 MST on 7060 kc.; the Wyoming Emergency Net at 1215 MST every day on 3920 kc.; K7AHO is leaving for Mexico on vacation. K7GDW is going to Salt Lake City for a college term.; K7ONK is out of the Air Force and is attending college in Virginia. W7DW and his wife, W7IDO, moved to Lander, Wyo. to a new job. The Casper Radio Club holds code classes each week. W7IVK, Shirley, is a regular HT-37 Technician. W3BNR/7 transferred to Otis AFB, Mass. The Wyoming Hamfest will be held west of Buffalo during the middle of Aug. 1963. Traffic: W7AMU 64, W7HEB 64, W7DXV 62, W7BHH 46, W3BNR/7 35, W7NMW 18, W7AEC 14, W7HLA 9, K7MAT 6, W7LKQ 3, K7QGV 3, W7CQL 2.

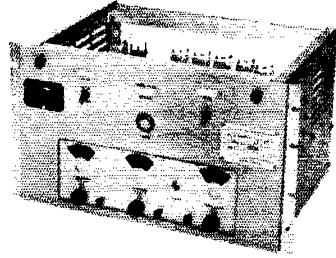
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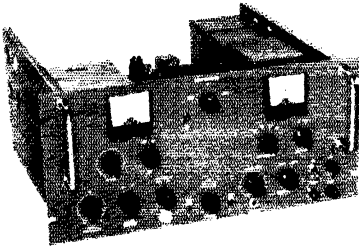
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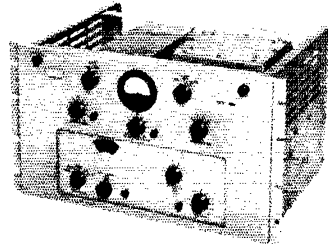


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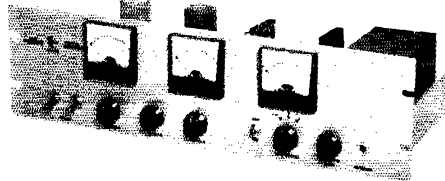
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## SOUTHEASTERN DIVISION

**ALABAMA**—SCM, William S. Crafts, K4KJD—SEC: W4NML, RM: W4USM, PAMs: K4BTO, K4TNS, K4WHW. New office holders: W4NML as SEC, K4WHW as PAM and AENP manager, K4TNS as PAM and AENM manager, W4ERN as AENR manager, W4GNG as AENH manager, W4OGT as AENO manager and K4BSK as a new OPS, W4USM, W4NML and K4YUD made the RPL. Thanks for your confidence in me in electing me SCM. Thanks to W4OXU for the job he did as SCM. K4NUW is liaison captain on AENP, K4CTB, W4A4WS, W4FUT, W4AQGS and K4FQG let the children in the Crippled Childrens Clinic & Childrens Hospital talk with Santa via ham radio. W4OWG will be in Alaska by the time you read this so listen for him 15 to 20 meters. Traffic: (Dec.) W4USM 586, W4AVM 403, W4NML 296, K4WHW 146, K4YUD 127, K4WQP 113, K4AOZ 85, K4BSK 82, W4ABDW 70, W4PEX 63, K4KJD 48, K4DJR 29, K4FZQ 28, W4AEEC 21, K4HJM 16, K4ZTT 13, K4NUW 12, K4AVM 10, K4VWP 10, W4OXU 8, W4AEDF 7, K4GNS 7, K4RIL 7, K4CTB 6, K4PHH 6, K4BRZ 5, K4WVD 4, K4JDA 3, W4CTU 2, K4NKT 2, (Nov.) W4AVM 21, W4ABDW 15, K4HJM 10, K4KDE 4, W4ITE 1.

**EASTERN FLORIDA**—SCM, Albert L. Hamel, K4SJJH—SEC: W4IYT, RM: K4KDN, RM RTTY: W4EHL, PAMs: 40 W4SDR; 75 K4LCF; V.H.F. W4RMU; S.S.B. W4OGX. This month's report finds me with much Christmas cheer and many wishes for a New Year which I reciprocate whole-heartedly but as a result it finds me minus practically any news whatsoever. By the time you read this we will have had many a pleasant eyeball QSO at the Convention/Hamboree. W4EXM has all his equipment over in EP2-land but no call yet. We will all sorely miss W4AKF, who joined Silent Keys Jan. 1. May he work without QRM from now on. W4BNE is at it again. Look for him on 420 Mc. W4IYW is a new club station at St. Pete Jr. College, which are looking for skeds with other jr. colleges. Traffic: (Dec.) W4A-BMC 1058, K4FMA 705, W4IJJH 671, W4DVR 602, W4MIN 571, K4SJJH 559, W4KIS 526, K4BY 514, K4COO 455, W4AKB 239, W4TRS 218, K4KDN 202, W4AGBM 200, W4ABGW 166, W4IXI 158, W4CJC 147, W4KKW 145, W4VWL 142, K4YSN 125, W4IYW 118, K4LCF 114, W4FHW 112, W4COR 104, W4VCX 103, W4LUD 83, W4CWD 79, K4DAX 75, K6SXX/4 74, W4AFGE 60, W4DCI 56, K4ILB 48, W4HXS 48, K4DBT 45, W4EAT 45, K4JWM 45, W4AAAE 44, K4AHU 42, K4NVD 41, K4FQP 38, W4HESS 34, K4MTP 30, W4SAIK 26, W4KCG 25, W4AYD 21, W4DSV 20, W4RNE 19, W4ZZZ 19, K4LVE 17, W4AGM/4 15, W4BKC 15, K4UKE 12, K4ZIF 11, K4QOE 10, W4TUB 9, K4RHL 8, W4NJXC 5, W4BBZ 4, W4AAZ 3, W4AKUT 3, K4CMK 2, (Nov.) K4FMA 100, K4JWM 84, W4IYW 72, W4FDU/4 36, W4NEKW 25, K4NSY 25, W4VCX 25, K4XN 20, W4ACN 10, K4URI 9, W4KZX 2, K4UKF 1, (Oct.) K4AX 8, K4UKF 7, (Sept.) K4AX 5.

**WESTERN FLORIDA**—SCM, Frank M. Butler, jr., W4RKH—SEC: W4MLE, PAM: W4WEB, RM: W4BVE, Tallahassee: W4DCN has a new DX-60 and v.f.o. W4ABMA now checks into WFPN with a Viking II. W4ADNY has a Sixer on to talk to W4AJQX, K4FOJ and W4B2DHO/4. W4MLE has a new GDO and s.w.r. bridge. He also has raised the ground plane and gone high power on 10 meters. K4VNJ joined the 10-meter gang. W4GAA has reactivated the 10-meter net, meeting at 0100Z Fri. on 29.560 kc. K4YPI and K4ARK put simple squelches on their Tenners. K4YPI has begun a new class for Novices. Panama City: W44FIJ/FJF have the new car equipped with 80-2 meter mobile. They also published the first edition of *QRPV*, newsletter of the WFPN, W4JTM and W4JZ/4 are on 2 meters. Madison: We were sorry to learn of the death of W4ACHE's father, W4DLO. Chipley: W4CYG is the new EC for Washington County. Apalachicola: W4GWU has been appointed Franklin County EC. For Walton: The new prexy of the EARS is W4RKH. Other officers are K8-JRB, W4PUG, W4UXW and W44BOZ. Pensacola: The V.H.F. Club held its annual Christmas party in the USO Building. New club officers are K4QAC, pres.: K5WTV/4, K4FMI and W4EJE. Traffic: K4VYF 535, W4BVE 391, W4MLE 115, W44FIJ 20, W4GAA 16, W4ZGS 6, W4MIX 5.

**GEORGIA**—SCM, James A. Giglio, W4LG—SEC: W4YE, PAM: W4KR, RM: W4DDY. The GCEN meets on 3995 kc. at 1830 EST Tue. and Thurs., 0800 on Sun. GSN Mon. through Sun. on 3595 kc. at 1900 and 2200 EST; The Fourth Region Day Net daily on 7125 kc.; Ga. S.S.B. Net Mon. through Sun. on 3975 kc. at 2200 EST; Oconee Valley Emergency net, sponsored by the Milledgeville Amateur Radio Club, alternate Sat. on 21.360 at 2030 EST. This is a training net for traffic-handling and emergency operation. The Columbus Amateur Radio Club will sponsor the second Annual Georgia QSO Party May 11-12-13. Watch QST for details. K4-

(Continued on page 134)

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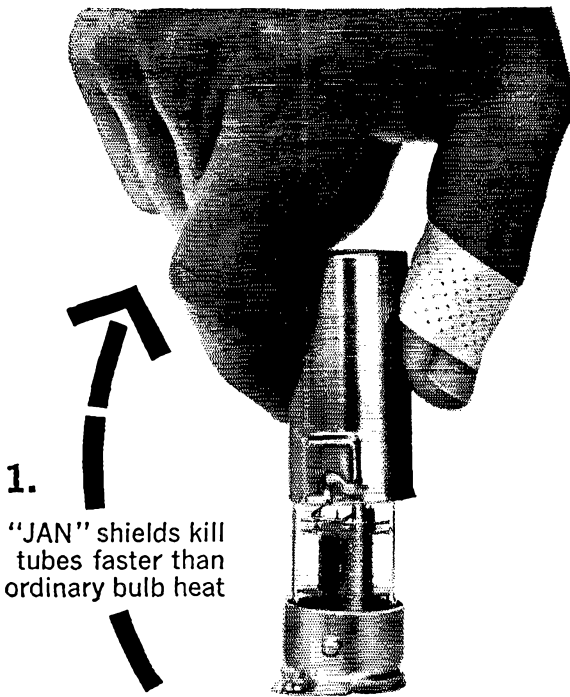
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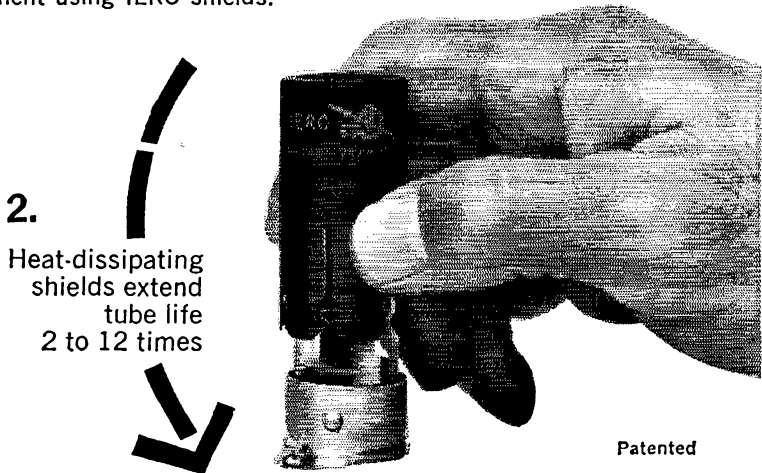
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ZSX celebrated his 31st anniversary as a minister in January. In those 31 years he has not missed a single Sunday in the pulpit. Congratulations to K4AVK, WA4-HIZ, K4BSP and W4SHP, who are proud parents of new harmonics. There are two separate c.w. romances flourishing in the Georgia section that we know about. Both couples have devised original text numbers and Q signals for their QSOs. All efforts to break their codes have been futile. Congrats to K4BAI on making the highest c.w. score in the nation in the Oct. CD Party; also to K4ZYI and K4TEA for second and third high scores. W4YE has been appointed Navy AIARS Coordinator for Georgia. K4GFE has a beautiful quad antenna, using a retractable arrangement atop a 75-ft. pole that is the sharpest thing we've seen lately. This station is 100 per cent homebrew. Six Colonel Awards were issued by the CSC in 1962. W4JNG reports progress on a design for a high-power amplifier for use on 432 Mc. Congrats to K4VWY on making the HPL. New appointments: K4ZYI as OBS and OO. K4VTP as EC. Traffic: K4MCL 828, K4WVY 527, W4DDY 301, K1KSM/4 227, W4PIM 133, WA4ARE 112, K4FRM 104, W4RZL 69, W4-LME 66, K4VHC 60, K4YRL 59, K4QPL 33, K4NGI 30, W4HYW 29, W4YE 19, W4RCM/4 8, K4BYD 7, W4BZ 4, K4DKY 4.

**SOUTHWESTERN DIVISION**

**LOS ANGELES**—SCM, Albert F. Hill, jr., W6JQB—Asst. SCM: Lyle G. Farrell, W6KGC, SEC: K6YCX, RM: W6BHG, PAMS: W6ORS, K6PZM. The following stations earned BPL for the month of December: K6-ETP, W6GYH, K6AIDD, W6QAE and W6BHG. Congrats, fellows! New officers of the Inglewood Amateur Radio Club are K6HCY, pres.; W6QLL, vice-pres.; W6JLL, rec. secy.; W6JXT, treas.; W6PFE, corr. secy.; W6-CQH, sct. at arms. K6UYK is now assistant advisor to the San Fernando Valley College Amateur Radio Club. W6ORS spent the Christmas holidays in New Mexico. W6USY is spending time in his Big Bear cabin with the temperature at 2° above! W6TBH has 14 states confirmed on 6 meters. W6LVQ has RTTY gear on the air! W6CG is checking over the World Wide RTTY SS logs. W6RES has a 6-meter converter and a four-element beam going and putting 8 meters in the 41-meter spot on the rig. W6AUSU received a new mike and lug from Santa. W6BBO is a new ORS in the section. W6SEL and his XYL, in Banning, celebrated their 50th wedding anniversary. Congrats, Ed and Stella! W6TNS has returned from a business trip to Honduras and has a fine batch of colored slides. Support your section nets! On c.w., the Southern California Net (SCN) meeting daily on 3600 kc, at 0300 GMT, on phone, the Southern California Six Net (SoCal 6) meeting daily on 50.4 Mc, at 0300 GMT. Traffic: (Dec.) K6EPT 1296, W6GYH 701, K6AIDD 614, W6QAE 531, W6WPF 364, W6BHG 322, W6WTR 310, K6ZDL 274, K6HIT 205, W6AITS 193, W6KAW 104, W6YLZ 103, W6USY 81, W6ATYX 77, W6TBH 30, W6AAH 23, W6VLZ 16, W6CG 15, W6BBO 9, W6ORS 6, W6USU 5, W6CK 4, W6ORS 2, W6SRE 2 (Nov.) W6NKR 11, W6FNE 4, W6TBH 4 (Oct.) W6PNE 94, (Sept.) W6FNE 40, (Aug.) W6FNE 130.

**ARIZONA**—SCM, Kenneth P. Cole, W7QZH—Asst. SCM/SEC: George Mezey, K7NIV, PAM: W7OIF, RM: W7LND. The Copper State Net meets at 1930 MST Mon, through Fri, on 3880 kc.; the Grand Canyon Net Sun, at 0800 MST on 3880 kc.; the Tucson AREC Net Wed, at 1900 MST on 3880 kc.; the Cochise County AREC Net each Sun, at 1400 MST on 7260 kc.; the Tucson 2-Meter Net at 1000 MST on 145.35 Mc.; the Arizona Interstate Net, c.w. Mon, through Fri, at 1900 MST on 3555 kc. The Maricopa County AREC Net will meet each Thurs, at 0200 GMT (7 p.m. MST) on 28,620 kc. We would appreciate news items from the Tucson, Ft. Huachuca, Yuma and Flagstaff areas. The Arizona Amateur Radio Club Christmas Party, held each year for the junior operators, was attended by over a hundred amateurs and their families. The Arizona OCWA, recently formed, now boasts 16 members. K7RUR is chairman; W7CS, vice-chairman; and K7TJN, secy.-treas. Any Arizona amateur who has held his ticket 25 years or longer is urged to join. The Sun City Radio Club celebrated the holidays by having Dinner at the Highway House, Sun City, Ariz. Traffic: (Dec.) W7FKK 697, W0WHE/7 539, K7AMM 401, K7CET 6, K7RUR 4, (Nov.) W7AMM 358, W0WHE/7 179.

**SAN DIEGO**—SCM, Don Stansifer, W6LRU—New officers of the Helix Club, oldest in San Diego County and 100 per cent ARRL, include W6AUB, pres.; K6IOT, vice-pres.; W6YSP, secy.-treas. Officers of the Orange County Club are W6DEY, pres.; W6WRJ, vice-pres.; K6KTX, secy.; K6LJA, treas.; W6WIV, activities. W6-IAB reports another operator, W44HKO, ex-K6H6JF, K6IME, in Tustin, Orange County, is now an ORS.

(Continued on page 136)

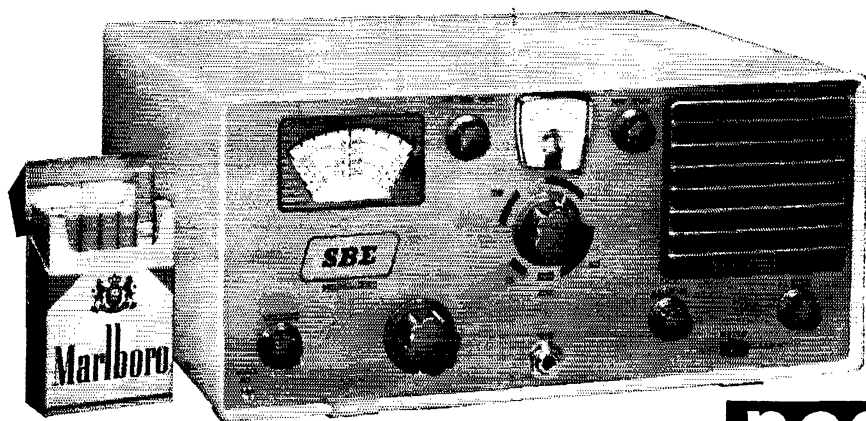


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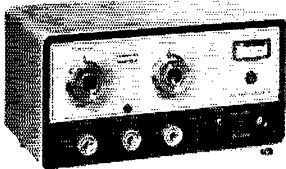


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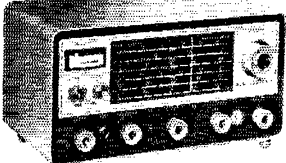
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New officers of the San Diego DX Club are K6ENX, pres.; WA6SBO, vice-pres.; and WA6OZL, secy.-treas. The January meeting was held at the home of K6EC, third San Diego EXer to break the 300 country mark. WA6BUX went skiing in Sun Valley during vacation. The W/K6 QSL Bureau shipped out more than 30 pounds of QSL cards after the Christmas mail rush before the postage rate went up. Officers of the San Diego QCWA Chapter are W6BkZ, chairman; W6AA, vice-chairman; and W6GWY, secy.-treas. Division Director W6MLZ and Vice-Director W6GTE attended the December meeting and election. WA6SBO now has 220 countries worked. All clubs in the San Diego area are again reminded of the San Diego Council of Amateur Radio Organizations meetings each month. This is the group underwriting the forthcoming ARRL Southwestern Division Convention in October, and all clubs should be represented at each council meeting. If in doubt check with Council chairman W6SK or SCM W6LRU. Traffic: W6IAB 7405, K6BPI 5159, W6YDK 2439, W6EOT 1045, K6LKD 337, WA6ROF 209, W6GPS/6 133, K6IME 132, K6GJM 39, W6ELQ 37, WA6UO 29.

**SANTA BARBARA**—SCM, William C. Shelton, K0-AAK—Very few reports have been received from the gang in this section, so please don't complain if your activities are not reported. My crystal ball is rather dim and tarnished. WA6TCX continues the fine work as the only reporting OO for this section. WA6MGH now has his own service shop and still is active on the bands with a Heathkit Twoer. The Tri County Net was very busy over the holidays with traffic for this area. The following participated: W6CYF, W6JPP, K6UOT, K6BVU, W6IHD, W6HUT, K6ODE, K6LQF, W6VWT, K6DJD, W6QHC, W6HJU, WA6ADP, W6YLD and K6-AAK. W6VWT's YXL presented him with a jr. YL for his birthday and Christmas present all in one bundle. Thanks for all the dope and fine report. Mel. Please send in your reports, gang. Traffic: K6AAK 18, W6YCF 18.

### WEST GULF DIVISION

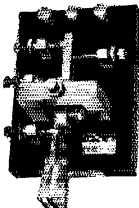
**NORTHERN TEXAS**—SCM, L. L. Harbin, W5BNG —Asst. SCM: E. C. Pool, W5NFO, SEC: K5AEX, PAM: W5AYX, RM: W5LR. The Arlington ARC has started a 2-meter assembly line for 8 transceivers. This club hopes to create more interest in 2-meter activity and anyone interested can get in touch with WA5DCH. W5-CQW gave a very interesting talk on the proper method for etching crystals at the November meeting of the club. The Kilocycle Club had a Christmas party instead of its December meeting; 35 members attended the dinner party. W5TOO is the new NCS for the Tarrant County Disaster Control Net; alternate NCS is WA5AHY. Eighteen members of the net attended a coffee party at a local pancake house and plans were made for future activities of the net. W5ARV, K5ILL and K5PCW have appointed OOs. W5ARV is an old-timer as OO and will be working with his son, K5PCW, as an observing team. W5YJ is on the air with a new 4CX1000. W5CUI no longer holds the distinction of being the most active ham in Camp County. Because of his efforts there are three new hams in that county: W5EZX, W5NFAA and W5NFAC. According to Milt they are keeping the Novice frequencies hot. W5NGX was elected president of the PBARC; K5HGR, vice-pres.; K5RXO, secy.-treas. K4RTP/5, act. chairman. W5NW has a new SR-150 installed in his car. Congratulations, Soupy, on your retirement. W5VSH got married Dec. 22. The Red River ARC started its annual Novice class of instruction Jan. 11 with 15 in attendance. Traffic: (Dec.) W5BKH 490, W5LR 79, W5CF 14. (Nov.) W5LR 115, W5CF 24.

**OKLAHOMA**—SCM, Adrian V. Rea, W5DRZ—W5PPE is the new SEC. His address is 1609 Glenbrook Terrace, Oklahoma City, Okla. Jim has a new sideband rig with a good signal. K5ETW has been appointed Asst. SCM. W5MIQ is the new EC for Oklahoma County. W5HXT is out of the Hospital but has a long period of convalescence ahead. K5ZCJ has a new GSB-100 and 101 linear. K5IXS just moved into a new home with a specially designed ham shack. K5KHA has developed a new "pocket size" high-power linear for 2-meter use. K5BPV has a new 70-ft. tower for his 2-meter beam. K5HIV won the Christmas lighting contest at Vinita by utilizing his amateur antennas. W5PML, manager, and W5EJK, W5OXX, W5VNC and W5ADC, NCSs, are doing a fine job with OPEN. Check in sometime. K5TEY was named Oklahoma Operator of the Month. Nina has done a tremendous job on Sooner Nooners and other nets. K5ZMW's new QTH is Norman. The SCM wishes to thank all the amateurs of Oklahoma for the fine cooperation in 1962. We especially want to recognize all clubs and individuals who have been so regular in sending in news of clubs and stations; W5EHC, ACARC, secy. and the Oklahoma V.E.F. Club of Oklahoma City did not miss a month in 1962. Another Enid amateur has joined

(Continued on page 138)

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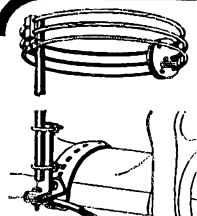
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TM-1 squelches receiver output and injects adjustable side-tone into phones for perfect monitoring of keying. Use TM-1 for code-practice and AM reception. Completely transistorized. Handles up to 300 V. at key terminals. A must for the shack; perfect for field day. Not a kit. Battery and complete instructions included. Order TM-1 for cathode-keyed rigs; TM-1G for blocked-grid keying.

**CW MONITOR**  
**\$16.50** PPD  
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**Radio, Inc.**  
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the ranks of Silent Keys. He is Gene, K5JTW. We send our sympathy to Gene's family, and simply say that Gene's voice will be missed on the amateur bands. Traffic: K5TEY 642, K5IBZ 532, W5PPE 207, W5DRZ 198, W5JXM 160, K5AUX 132, K5YTH 100, W5QMJ 97, K5-VNJ 85, K5OCX 76, W5JMQ 56, W5FEC 49, K5ZCJ 46, W5MFX 35, K5RWL 28, K5ZEP 22, W5PML 21, K5JOA 13, K5OOV 10, W5WDD 9, K5CBG 6, K5FSU 5, W5DNG 4, W5EHC 1.

### CANADIAN DIVISION

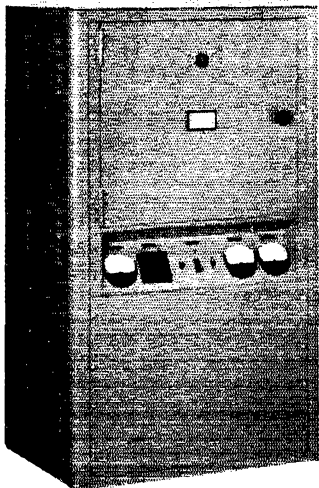
**MARITIME**—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK, and H. C. Hillvard, VO-ICZ. Congratulations to VE1EQ and his XYL on the arrival of a baby boy. Congratulations to VE1AJ who, as holder of an original 1912 license, was honored at a special banquet in New York. Congratulations, best wishes and welcome to ex-VE3BQL/SU and his DJ3 bride who have taken up residence in the section, near Timberlea. Elvin's new call is VE1AIC. Ex-VE8AT is now VE1ZQ. The Pictou Co. Club's officers are VE1HH, pres.; VE1HR, vice-pres.; VE1AFJ, secy.-treas.; VE1ADF, act. mgr. VE1VR is the call of the RCAF Beaverbank Club station. The Annapolis Basin ARC has just been formed. VE1GB reports that the Annapolis Valley ARC recently held a successful c.d. exercise. Amateurs participating include VE1MA, VE1AHL, VE1AJJ, VE1AAQ and VE1-IC. The Lovell City also staged a c.d. exercise recently. VE1JY is active with a new Valiant. VE1AFU, VE1GX, VE1LN and VE1UB are active on 20 meters from Yarmouth. Activity on 6 meters in the Lancaster-Saint John area is increasing with VE1AJI, VE1DG, VE1EE and VE1XN participating. Traffic: VE1OM 27.

**ONTARIO**—SCM, Richard W. Roberts, VE3NG—SEC: VE3AML, PAM; VE3CFR. Most clubs already are planning for 1963 Field Day. Remember, this is a test of emergency equipment. VE3CIL, VE3EZI and VE3EYC are now OPSS. VE3DUU gave a wonderful present to a lot of children on Christmas Eve. He played Santa on 2 meters and spoke to the tykes on their OMs' rigs. VE3CYR is the new RM for OQN. VE3CFR has a new HL-500 linear plus an Invader. The Windsor ARC, elected VE3ETM, pres.; VE3FJJ, vice-pres.; VE3FHE, secy.-treas. VE3FES has reverted to his previous call, VE3CWA. VE3EYC was top man in the recent V.H.F. SS. Cliff won the Ontario V.H.F. Trophy for his 205 contacts on 144 Mc. I reported VE3DSM as being sick in the December issue. My informant was incorrect and I am happy to say that VE3DSM is hale and hearty. My apology, Al. We are very shy of c.w. operators on our c.w. nets in Ontario. Perhaps the idea of Novices would be the answer to promote this recruiting of more operators. VE3DIR worked his W7 on 144 Mc. VE3ABE is now a Silent Key. VE3CYF is now in Toronto. The West-Side ARC elected Dave Bull, pres.; VE3CWN, vice-pres.; VE3FEW, treas., VE3DKI, secy. The Metro Two Meter Net has more than fifty members in the Toronto area. We hear that London has ten on the LARC Two Net. Hats off to the Skywide ARC for its paper, *Skyhook*. VE3RCR acquired a KMW 2. VE3BCL is in the Congo. The Award of Merit by the Sudbury ARC for outstanding service in 1962 was made to Father Leclair, VE3CNV. VE3DLS, Downsview, is looking for VE contacts on 26.975 kc. Traffic: VE3CYR 217, VE3UWO 172, VE3CFR 141, VE3NG 129, VE3BZB 119, VE3DPO 114, VE3RN 98, VE3BAQ 79, VE3GP 67, VE3CWA 66, VE3EHL 66, VE3GI 60, VE3RUR 42, VE3-AML 39, VE3DRF 38, VE3DWN 35, VE3ETM 34, VE3-EAM 30, VE3ELQ 25, VE3EYC 25, VE3FAS 18, VE3DHI 16, VE3EAU 16, VE3AKQ 9, VE3SG 8, VE3BZT 6, VE3VD 4.

**QUEBEC**—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Jean P. Archin, VE2ATL. The old year ended on a sad note with the passing of two old-timers, VE2AK and VE2CA. Despite awkward weather conditions VE2-CA's funeral was attended by a number of his old friends. Our deepest sympathy to the families of these fine fellows. The influx of new c.w. stations to the CQ Net is encouraging. Recent arrivals: VE2ALH, VE2CAS and VE2AIR/2. VE2AGQ, an excellent c.w. traffic man, has received his ORS certificate. VE2TK moved from Grand Mere to Montreal and resigned as director of the St. Maurice Valley Club. VE2AQV contemplates joining the RTTY group in the spring. VE2AGP, one of our lady operators, is back on 80-meter c.w. with reduced power. She takes traffic for the Trois Riviers district. VE2BME graduated in the civil defense course. VE2ANK, VE2AM, VE2AMA, VE2BJZ and VE2AZI operate a net on 160 meters. VE2AFM, president of the MECC, appeared in prominent newspaper write-ups with excellent pictures. VE2AUU, EC for the Montreal district, reports some 85 AREC members will be called to a meeting shortly to discuss emergency matters. VE4BG transferred from Winnipeg to Montreal. VE2BN expects to leave Sweden for Australia in the late spring. VE2ACC,

(Continued on page 140)

# USE AEROCOM'S AMPLIFIER FOR MORE COMMUNICATION POWER!



AEROCOM'S Linear Amplifier used with conventional low power SSB transceivers for excitation, provides power output of 1000 watts PEP,\* continuous service. The SSB exciter should have at least an output of 85 watts PEP to obtain maximum output of the amplifier.

The Model 10LA amplifier is housed in a cabinet (22" W x 14 3/4" D x 36 3/4" H) which can serve as a base for conventional SSB exciter, or amplifier may be placed a short distance away from the associated exciter, if necessary for convenience.

Frequency range of 10LA is from 2 to 22mc, covered in 6 bands. Up to 4 independent non-simultaneous channels are provided. These four channels are selected externally by exciter channel control. One tuning unit is provided for each frequency specified up to maximum of four.

The 10LA amplifier is designed to work into a 50 ohm coaxial feed line. One output coaxial receptacle,

common to all four channels, or 4 output coaxial receptacles (one for each channel) are available; each channel normally requiring its own antenna. For multi-channel operation with 1 antenna it is recommended that Aerocom Model ATU-410 antenna coupler be used.

A built-in directional coupler provides monitoring of output power and SWR. Grid current, plate current, filament voltage and high voltage are metered.

Harmonic output attenuation: second harmonic is at least 55 db down and higher harmonics are at least 70 db down. Noise level is 40 db below 1000 watts PEP output. Distortion products, in two-tone test, are at least 35 db down, depending on characteristics of exciter.

This linear amplifier, like all Aerocom equipment, is ruggedly constructed to give long trouble-free service. Additional information and technical data on request.



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\*FCC permits 1KW DC input for amateur service.  
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**Skylane PRODUCTS** 406 BON AIR DR  
TEMPLE TERRACE FLA

at Chicoutimi, does well with low-power on 20-meter phone! Congratulations to Mr. & Mrs. VE2AUT on the arrival of a baby girl. VE2JC's bi-monthly magazine, *Appelle*, is a fine presentation by the French group. Traffic: VE2AGQ 116, VE2DR 82, VE2AUH 57, VE2BB 55, VE2CP 38, VE2BAC 35, VE2AUU 29, VE2ALE 22, VE2HG 18, VE2BMS 11, VE2AQV 9, VE2AJD 4, VE2-ANK 4, VE2BAM 2.

**ALBERTA**—SCM, Harry Harrold, VE6TG—SEC: VE6FS. PAM: VE6PV. RM: VE6AEN. ECs: VE6-FK, VE6SS, VE6ABS. OPSs: VE6CA, VE6PV, VE6SS, VE6BA, VE6HM. OOs: VE6HM, VE6NX, VE6PL, OBS: VE6HM. ORS: VE6BR. OESS: VE6DB, VE6HO. Our SEC reports that emergency groups are working very well with regular drills. Our RM reports that with poor band conditions PTN check-ins are low. VE8CW will report for VE8-Land. VE8JJ worked 40 zones with 108 countries. VE8-Land is doing well with emergency traffic in the far north. Yours truly had the pleasure of attending the Vulcan County Amateur Radio Clubs first big "do". Gene Moyer, club president, reported that it was a very successful evening with the SCM making the presentation of the charter. The SCM gave a very good talk on membership in the League and the benefits that can be derived, also how clubs can benefit and conducted a question period. VE6DW is now Asst. EC. Vulcan is looking for a big year in 1963. Traffic: VE6HM 218, VE6AEN 21, VE6TG 16, VE6FK 14, VE8CW 14, VE6FS 10, VE6SS 8, VE6PL 7, VE8J 7, VE6PK 6, VE6UH 5, VE6CA 4, VE6IB 4, VE8RG 4, VE6VE 3, VE6AA 3, VE6AAX 2, VE8JJ 2, VE4VX/VE8 2, VE6ABS 1, VE6CO 1.

**BRITISH COLUMBIA**—SCM, H. E. Savage, VE7FB —The VARC reports two new amateurs, VE7BKU and VE7BKV; also VE7ANE and VE7BHM made Class A. VE7YG, who is a lover of fine things, paid a visit to VE7BCC and checked out his homemade single-seater aircraft and reports it is one swell job. Bill is waiting for DOT's approval to airborne it. The Nanaimo ARC is starting a club project on home-built u.h.f. equipment for fixed and mobile. New appointments for B.C. are VE7SE of Kimberley, as EC. VE7BJV Hughes, as ORS. There is room for more appointees. Contact your SCM; he will be pleased to hear from you. A nice report was received from VE7BHH, Burnaby District EC. VE7OM, our SEC, is spending time in the hospital which is the reason he is not heard. VE7ALE lost his tower in the wind and snow storm. What is happening in Prince Rupert? VE7AKG, where are you? It has been rumored that VE7AQW will be on again after four years to call south on the BCAREC Net. Also VE7AUF is preparing to break the silence. The Burnaby ARC now meets at Bonsor Park in Burnaby each Friday night. Traffic: VE7BJV 210, VE7KZ 55, VE7AC 17, VE7-AAF 15, VE7AMW 4, VE7DH 3.

**MANITOBA**—SCM, M. S. Watson, VE4JY—The Brandon ARC publication *Sparks* has a circulation of over 150 members and associates because of the efforts of its editor, VE4KN, and president, VE4DQ. The Manitoba Phone Net has been plagued by strong c.w. signals from the U.S.A. smack on 3760 kc. during the duration of the net from 1900 to 1930 hours CST. The ARLM election of officers took place at the January meeting. VE4FO has been appointed the new EC for Manitoba. VE4IW reports making an emergency phone call for W4IAR/VE3 to Red Lake for a plane to pick up a staff girl at Poplar Hill suffering with appendix. Last reports indicate the patient is fine. VE4JW reports a visit from VE6AHO and that VE4QP has a new SX-100 receiver. VE4EG has a 50-ft. and a 30-ft. steel tower on his antenna farm. VE4AU is heard on his new Marauder. The new officers of the WARC for 1963 are WOKLP/VE4, pres.; VE4XD, vice-pres.; VE4BF, business mgr.; VE4-BU, tras.; VE4OK, secy. Traffic: VE4IW 22, VE4JY 21, VE4QD 10, VE4JW 8, VE4KL 8, VE4KN 6, VE4JA 5, VE4NW 5, VE4EG 2, VE4HF 2.

**SASKATCHEWAN**—SCM, Jack Robinson, VE5BL—Ex-VE5BT is now VE7BIT at Merrit. B.C. VE5FC has a new VL harmonic. VE5GX has a Ranger transmitter. VE5CB is back on the air after being absent for some time. VE5VW is now s.s.b. Traffic: VE5HP 162, VE5LM 44, VE5HQ 7, VE5IG 6, VE5HX 2.

## Hammarlund HX-50 Transmitter

(Continued from page 51)

Vacuum tube and semiconductor rectifiers are used in the HX-50's power supply. Regulated voltage is applied to the oscillators to insure stability, which is rated at 500 cycles after a 15-minute warm-up.

(Continued on page 142)

a **NEW**  
**STANDARD**  
in **CLARITY**



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*This space contributed by the publisher*

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Operating controls for the transmitter number about 15, but as mentioned earlier, after initial adjustment only a few are actually used in routine operating. A rundown of controls is as follows: The FUNCTION switch, used to select the mode of transmission, has four positions, USB, LSB, AM, and CW; the OPERATION switch with POWER OFF, STANDBY, MOX, CAL, and VOX; CRYSTAL-VFO switch (located behind the panel door); BAND SELECTOR; FREQUENCY (tuning control); METER SENSITIVITY; AUDIO LEVEL; RF DRIVE; FINAL TUNE; FINAL LOAD; VOX SENSITIVITY, VOX and CW DELAY, and ANTI-TRIP SENSITIVITY (behind panel door); and BIAS ADJUST (on rear chassis apron).

The HX-50 is housed in a dark gray perforated wrap-around cabinet which extends out slightly over the front panel. Knobs are finished in black with most of the panel control markings in white.

— E. L. C.

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Height 9 1/2 inches.  
 Width: 17 1/2 inches.  
 Depth: 9 1/2 inches.  
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 Price class: \$450.  
 Manufacturer: Hammarlund Mfg. Co., Inc., 53 West 23rd St., New York 10, N. Y.

## Checking Signal Quality

*(Continued from page 38)*

tape recorder makes such an excellent addition to the test gear. If you have to use other voices, try to avoid those having entirely different pitch and timbre. If a radio is the "actuator," scout around among the disk jockeys and compare the results.

Testing in this way doesn't strain finances, but when done intelligently it will give you all the information you need about your signal. If your pals on the frequency miss you for an evening, you'll be all the more welcome when you get back, provided you've cleaned up the things that may have been wrong. This, and the confidence that your transmissions will stand critical examination, should be more than ample payment for the small trouble and the time off the air.

**QST**

## The Chartreuse Panels

*(Continued from page 37)*

oughta make these fellas stand right up there and solder up . . . er . . . hook up a receiver and transmitter before they let 'em take the exam even. Why, in a couple years there won't be nobody who can solder a thing . . . even wires . . . ahhh . . . coax fittings!

*(Continued on page 144)*



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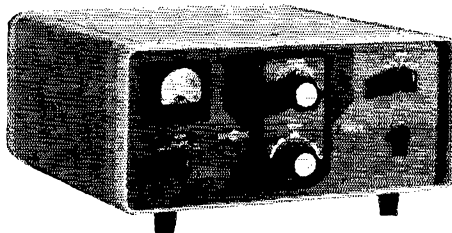
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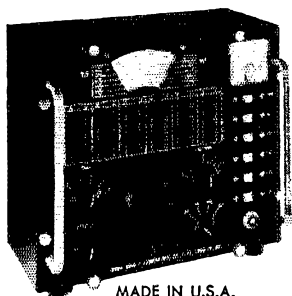
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+ Telephone.....+

(Continued from page 142)

"Of course, after you've been around as long as we have, Fred, ahhh . . . experience, yeeeeeaaahh.

"Well, like I was sayin' before, with the old sun spots on the loose, I definitely need a new receiver here. Been thinkin' I might order me one of them new Super Snooper 497-4A's. But ya know, Fred, it'll take weeks before they can get it delivered. And ya never can get everything ya really need in them commercial jobs anyway. So I decided I'd just sacrifice some Sunday afternoon here one of these days and build me up a new receiver — like ya say, Fred, it's kinda fun to build your own stuff — us homebrew manufacturers, eh, Fred, old buddy! Haw!

" . . . there's only one little thing though, Fred, that stops me from runnin' down and building that receiver this very instant! Ya know, I'm just not at all sure that I could get ahold of the particular shade of chartreuse panel I'd need here to match the Pulverizer-Paralyzer cabinets. Otherwise, Fred, ya know it 'ud be the old homebrew . . ."

QST

## How's DX?

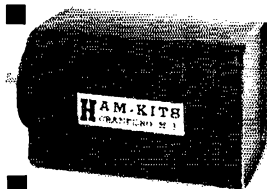
(Continued from page 71)

Australia from the antarctic. . . VR2AK has a new IIX-20 and likes to plant his a.m. on 14,150 kc. between hurricane alerts. . . W6CBE, back from the coral strand, says that Typhoon Karen was the last straw so far as W6CBE/KG6 Saipan plans were concerned. Guam airlines lost both its planes in the blow. . . KH6PD/KG6 hopes to keep Marcus isle available on 14,295-ke. sideband, 1900-2100 GMT, 1900-2400 on week ends, for another eight months or more.

Europe — This month DJs 5KW and 8IR expect to put LX3s KW and IR on the DX map for about a week, then PX1s KW and IR for a two-week stint, after which comes the possibility of San Marino — ten, fifteen or twenty meters depending on conditions. . . Next month comes the International SP DX Contest on the 6th-7th (e.w.) and 20th-21st (phone), participation details in April QST . . . SP2CO, according to W2s JTS and RND, wants to swap SP postage for a usable Call Book. Any collectors in the crowd? SP2CO's XYL is SP2BO and both can be found on 20 e.w. . . W1NTH writes of LA8SE/p's quick November removal from Jan Mayen for surgery. Bjorn should be back there by now with colleagues LA5 2NG/p who likes e.w., and 4WH/p who favors s.s.b. . . Cambridge University Wireless Society anticipates GD6UW operation later this month with an IIX-50 on sideband. . . NCDXC notes that DJ6IK (W6KYT) is watching for Stateside buddies on 14,100, 14,340 and 21,050 kc. Bill would like to join DL9PF on a summertime Corsica romp.

South America — W8KX comments, "Wes of KC4USN signed up for another far-south tour to start later this year, his fourth and last one, he promises. The heating bill runs to six figures there — the station has an elevation of 10,000 feet, really high, dry and cold. Temperatures have ranged down to minus 102° with 100-m.p.h. winds. Wilkes base has clocked 200-m.p.h. winds, according to Wes. We complain of radio blackouts up here, but their occurrence in KC4-land is more frequent and there's the oddity of 'whistler' interference to contend with." . . . K2UYG understands that an Argentine expedition may make South Sandwich less of a DX challenge. . . Club oddments from the

(Continued on page 146)

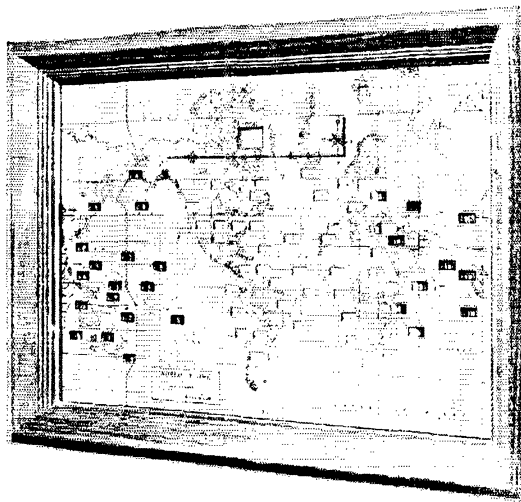


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HAM KITS

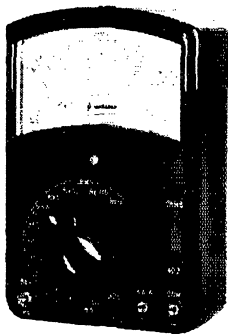
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### OTHER HARVEY VALUES OF THE MONTH

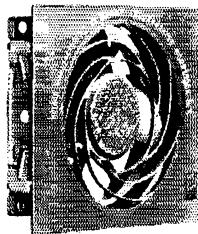


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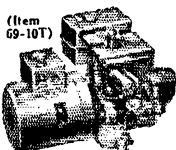
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OH0NI presents many a DX hound with Aland Islands DXCC credit. Sigge runs 50 watts on phone or c.w., receives with an S-85 and so far has accumulated about 2500 QSOs from Mariehamn. (Photo via W1WPO)

southland: FN7WQ continues irregularly active around 2200 GMT on 14.125, 14.112, 14.304 and 14.311 kc. . . . VP1TI radiates rare ssb. from Trinidad almost daily. 14.266 kc. at 1030-1130 GMT. . . . Wv. 4CRB JDQS 4QVJ 6HAW 8P3X 9EVI. HRs 1QQ 3LX and some CB brethren solidify plans for their projected CE8XA San Felix outburst next month.

Hereabouts — It was a long wait, but we think they'll find it worth while. We mean ex-HAs 2U and 8S-8Z who are enjoying DX once more as Kz 1ZBQ and 3VWT after attaining U.S. citizenship. Oli and Peter can now be found renewing old friendships and making new ones on 10 through 80 meters. . . . W8RJIH anticipates a lull of a DX program at this year's Dayton Hamvention scheduled for the 26th-27th of next month. Check with John reference your attendance. . . . ARRL Director VE3CJ intended to follow his January visit to the Southeastern ARRL Division Convention with another of his VP5BP Caymans swings. Noel's traveling companions included a Ranger and SR-150. . . .

Regarding St. Pierre DXpeditioning, W2OLU learns that FFS authorities keep your assigned suffix on file for life. You can reactivate it later at a cost of two dollars per elapsed year. . . . W3KVQ relates to W8KX that his final QSO before dismantling for a move to Two-land was with LH4C. "Got a special charge out of working Gus because I had already packed away the keyer and had to slap a couple of clip leads in there."

Ten Years Ago in "How's DX?" — Opening March, 1953, remarks observe that getting back from a DXpedition can be far more complicated than getting there, taking W0ELA's VS5ELA activity as a case in point. . . . It's really open DX season on good old 160 c.w. thanks to the solid signals of E1QJ, Gs 2GGD 3PFT 3PU 5JU 5RI 6JMI 8KP, GD3UB, Gls 2ARS 5UR, GW3FSU, KP4s DV KD, KV1AA, OH3NY, VP1LZ, ZL1s AH and NX. . . . Eighty c.w. puts on quite a show, too, with r.f. from EA9AP, FN7WD, F1R8A, F1NU/Trieste, KC6CQ, MB9CA, VP8AP, VRS 1AA 2CG 4AA, VS7NG, ZC1RX, ZD14B, ZS3K, 4X4RE, 5A8TU and 9S4AX. . . . Forty has a fair share of favorites: AP2K, FF8AJ, FQ8AK, JY3BUX, LX1HH, SU1XZ, TA3MP, YP2AM, ZB2I, ZC4 4K 5VS, ZSs 2MI 9I and 5A3TR. . . . The cream of 20's c.w. crop are CR8s AB NMC, KF3AA on Fletcher's ice, KJ6AG, LX1AF, OE13HP, OQ5s CP LL, SU1GG, VK1PN, VSs 2DU 7BB 7EA 7YL 9AW, YI3BU and 4UAG. . . . Twenty phone is fine for AP2L, FR7ZA, MF2AA, M13s LK MK, NP4s BRI HBK KAC, OQ5HQ, SUs LIP 5EB, VK1JC, VS7PW, YK1AA, ZDs 4AF 4BK 4BL 6LJ, ZSs 3S 7C and 9G. . . . Fifteen c.w. is the haunt of F18AG, HZ1MY, OQ5BQ, TAs 2AD and 3AA, but poor old 10 doesn't even make the reports this month. It'll be back, though! [QST]

**CQ de W2KUW**

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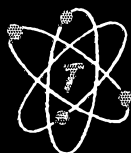
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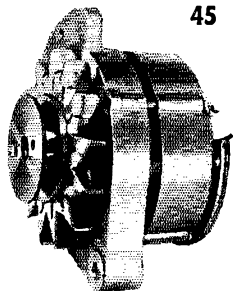
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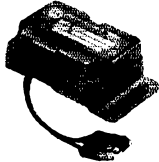
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## The HBR-8

(Continued from page 19)

Once the 7-Mc. signal is spotted, any one of a number of things can be done next.  $C_2$  must be peaked, and the 1st- and 2nd-i.f. slugs must be adjusted to bring these circuits into exact resonance, using the v.o.m. as the indicating device. The meter reading will increase as the alignment progresses. When the meter tends to go off scale it can be pulled back by retarding either the i.f. or mixer gain controls or by going to the next higher value a.c. scale on the v.o.m. However, the 2nd-mixer half of  $T_1$  must be peaked *only* when the mixer gain is *fully advanced*. This is vitally important to the subsequent proper operation of this control.

At this point in the over-all alignment procedure, remove the v.o.m. lash-up from the circuit and retune the secondary of  $T_3$  slightly to compensate for the differing load conditions brought about by disconnecting the v.o.m. The response of the receiver on noise will serve as the indicating device in this case. The secondaries of the 100-kc. i.f. transformers are tuned by the upper slug.

Finally, turn on the b.f.o., set  $C_{12}$  to half capacitance, and screw the b.f.o. transformer slug down from its extreme upper position until the b.f.o. frequency is in the exact center of the pass-band. This point is easily identified by listening either with the phones or speaker.

Once you are certain the over-all alignment is correct, there remains only the vernier adjustment of the  $L_2$  and  $L_3$  turn spacings, as discussed in the section on front-end tuned circuits. The  $L_3$  coil should be adjusted so the ham band is covered between "2" and "95" on the dial scale. This eliminates the nonlinear tuning at the two extreme limits of the capacitance range of the 1461-BS, and provides some small overlap at the band edges as well.

The proper adjustment of the plug-in coils for the remaining bands coincides with the 7-Mc. procedure exactly, and is all that needs to be done to make the receiver operational on these frequencies.

Composing these paragraphs on alignment was more difficult and time consuming than the actual alignment itself will ever be. I spent 90 minutes on the original draft. The alignment proper can be done in half the time. Recall what it was I had to say about that "hill of goods?" QST

## Happenings of The Month

(Continued from page 66)

seeking 1-Mc. bandwidth amateur television emission in the top halves of the 6- and 2-meter bands.

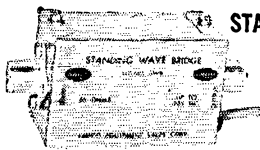
(Continued on page 150)

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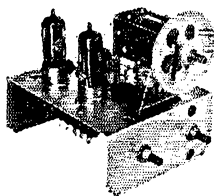
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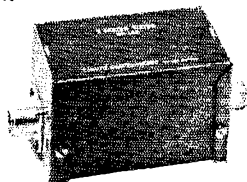
Mod. 4/102 for driving two 807's or 6146's final. Has 5 bands, Supplied with Mod. 1640 dial ass'y.

Mod. 4/103 for 144-148 mc bands. Combines VFO primary freq. of 18 mc with xtal fundamental freq. of 12 mc. Supplied with Mod. 1647 dial ass'y.

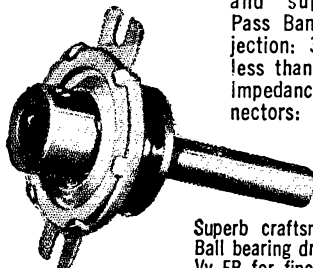
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BP-144 \$11.80



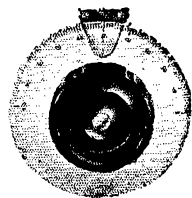
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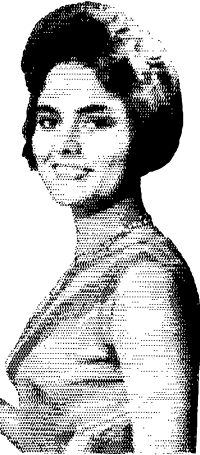
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On motion of Mr. Groves, unanimously VOTED that approval is granted for the holding of a Pacific Division Convention in Fresno, California, May 18, 1963; a West Gulf Division Convention in McAllen, Texas, June 7-8, 1963 (change of date only); a Saskatchewan Province Convention in Moose Jaw, June 30-July 1, 1963; a West Virginia State Convention in Jackson Mills, July 6-7, 1963, and an Atlantic Division Convention in Washington, D. C., August 31-September 1, 1963. The Committee accepted the request of the Amateur Radio Caravan Club for withdrawal of its application for a Rocky Mountain Division Convention in Albuquerque, New Mexico, July 6-7, 1963.

On motion of Mr. Groves, affiliation was unanimously GRANTED to the following societies:  
Barber County Amateur Radio Club, Kiowa, Kansas  
Biloxi Amateur Radio Club, Inc., Biloxi, Mississippi  
Boomtawn Amateur Radio Club, Burk Burnett, Texas

Central Indiana Mobile Radio Club, Inc., Beech Grove, Indiana

The Delray Beach Radio Club, Delray Beach, Florida

DeWitt Clinton High School Radio Club, New York, New York

Fall Creek Amateur Radio Club, McCordsville, Indiana

Germantown High School Radio Club, Philadelphia, Pennsylvania

The Glacier Radio Club, Columbia Falls, Montana  
Heart of Georgia Amateur Radio Club, Macon, Georgia

Hoffman Amateur Radio Club, Los Angeles, California

Logan High School Amateur Radio Club, Logan, Ohio

Maury Amateur Radio Club, Columbia, Tennessee  
Monadnock Radio Club, Inc., Keene, New Hampshire

Mt. Erie Radio Club, Anacortes, Washington  
Ninth Area Radio Club, Inc., Chicago, Illinois

The Ontario DX Association, Toronto, Ontario  
Radio Amateur Transmitting Society, Nashville, Tennessee

Red River Amateur Radio Club, Wichita Falls, Texas

Ruhr Valley Transmitters, Paden City, West Virginia

South Western New York Very High Frequency Association, Machias, New York

Texas Instruments Amateur Radio Club, Dallas, Texas

Tufts University Amateur Radio Society, Medford, Massachusetts

University of Delaware Amateur Radio Association, Newark, Delaware

Venard Radio Club (H.S.), Clarks Summit, Pennsylvania

Veterans Administration Research Hospital Amateur Radio Club, Chicago, Illinois

W.E.N.S. Radio Club, Philadelphia, Pennsylvania

The Committee recessed at 5:50 P.M., reconvening at 5:10 P.M. January 20 with all persons hereinbefore

(Continued on page 152)

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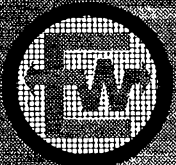


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*new SX-117* Triple-conversion communication receiver by *hallicrafters*



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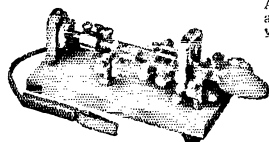
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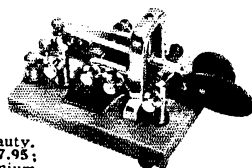
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mentioned in attendance except Messrs. Born and Doyle.

The General Counsel reported on the widespread problem of the effect of local zoning ordinances on amateur towers. After discussion, on motion of Mr. Denniston, unanimously VOTED that the General Counsel is requested to draft an appropriate article for publication in *QST* for the purpose of acquainting members with this and similar legal problems.

The Committee next examined the application of Maxwell Meyers, W2B1B, for membership in the League, action on which had been deferred to afford Mr. Meyers an opportunity to submit a written statement and proof in support of his charges of improper action and conduct by certain League officers and employees. It appearing that the reply of Mr. Meyers having been examined and found to be insufficient to substantiate his charges and it further appearing to the Committee that questions concerning his qualifications for membership are insufficient to require a denial of his application, on motion of Mr. Groves, VOTED to grant the application.

On motion of Mr. Denniston, unanimously VOTED to grant approval for the holding of a Midwest Division Convention in Wichita, Kansas, October 26-27, 1963.

There being no further business, the Committee adjourned at 6 P.M.

JOHN HUNTOON  
Secretary

### Pulse: A Practical Technique

(Continued from page 28)

50 turns of No. 26 enameled copper wire over the tape. When complete, fold the ends of the tape over the winding, thus securing the end turns. Continue with steps E, F, G, H, and J as listed in the winding-data diagram. Start all windings at the same end of the form and wind in the same direction. Label the ends of each winding according to Fig. 4 to facilitate wiring the transformer into the circuit.

When the winding is completed, slip the cardboard form supporting the winding stack off the mandrel and insert the core. Tape tightly around the periphery of the core with vinyl electrical tape to butt the ends of the core pieces together. Apply a finishing coat of coil varnish to the windings and the transformer is complete.

#### Operation

Checking the operation of the modulator and power-supply unit is relatively simple. Attach a dummy load, made by paralleling five 270-ohm 2-watt composition resistors, across the modulator output jack,  $J_2$ . Set the p.r.f.-adjust control,  $R_3$ , in the center of its range, and insert a

(Continued on page 164)

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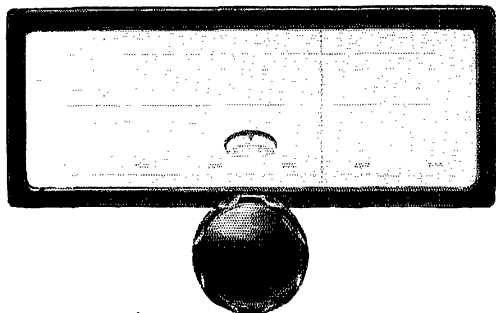
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key in  $J_1$ . Turn on the heaters and 300-volt supply with switch  $S_1$ , and check the voltages in the circuit against the values given on the schematic. The dual voltages on Pins 1 and 3 of  $V_2$  correspond to key-closed and key-open conditions. If the voltages agree approximately, turn on the high-voltage supply with  $S_2$ , making sure the key is open. Measure the high voltage at the power supply. It should be between +1300 and 1500 volts d.c. With the key closed, the 3C45 should ionize with a purple glow, indicating that it is being triggered properly. One should also hear a faint 1000-cycle tone. After five minutes of operation, turn off the high voltage and lightly touch the dummy load. It should be hot as, with proper operation, 6 to 7 watts of average power is dissipated. For those amateurs who have a fairly good oscilloscope, or can borrow one, waveforms are also given at four points in the circuit as a check-out aid.

Part III of this series will follow in an early issue. Q57

## The World Above 50 Mc.

(Continued from page 63)

never mind looking for him, his antennas came down with the winds on December 30 and put him out of business until spring.

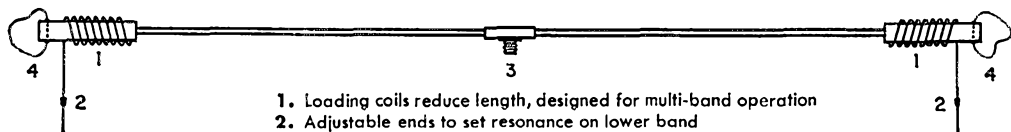
Interest in amateur TV grows slowly, but it does grow. In Doylestown, Pennsylvania, W3CJU tells us that W3ZFW has his A5 camera working at broadcast perfection and puts a Q5 TV signal into Doylestown 10 miles away. Since November 21 W3ELX (who is working to get on 432), W3ZCA and W3STG (both on 432), and W3CJU have all received W3ZFW's A5 transmissions Q5. Don (W3CJU) would appreciate it if the 432-Mc. gang will look for him evenings on 432.2; and W3ZFW would like to hear from those interested in A5. Also working with TV on 432 is WA4AME in Jensen Beach, Florida. Wes says the transmitter will be a T-9/APQ-2 radar transmitter. The camera will be homebrew and the receiver will be a converted TV.

### 50 Mc.

A number of skip reports have been received for the month of December, and it looks like Florida might have been a good spot to be during that month. From December 15 to 19 was the longest quiet period for Les, K4RNG, who lists openings on

(Continued on page 156)

## LOADED MULTI-BAND DOUBLET ANTENNAS



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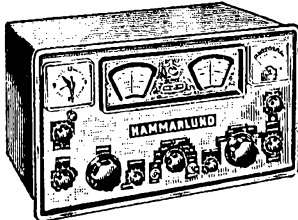
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# Says You're Wrong...

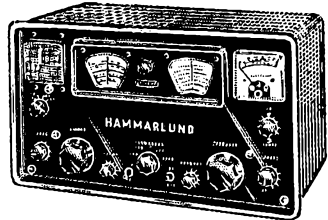
I'm trading high, wide and handsome on Hammarlund gear right now! Maybe you don't believe my trade in quotes are the best in the business? OK . . . try me out on any Hammarlund gear . . . like I've shown below . . . and let me prove what I can do for you! Rush the coupon telling me what new equipment you want and what you want to trade. I'll send you back a quote that will knock you off your chair . . . PLUS a gift certificate worth \$5 on any new equipment you buy that's worth \$100 or more! Are you listening?

Walter Ashe



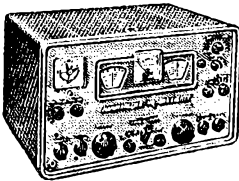
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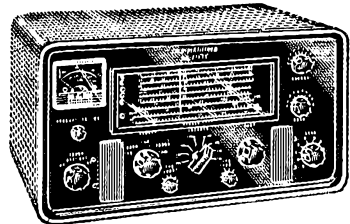
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December 1, 4, 5, 6, 11, 12, 13, 14, 20, 22, 23 and 27 when Tennessee, Missouri, Illinois, N. Carolina, Alabama, Washington D. C., Pennsylvania, West Virginia, Indiana, Wisconsin, Michigan, Illinois, Ohio, Iowa, Massachusetts, New Jersey, Pennsylvania, Rhode Island, Delaware, Georgia, Oklahoma, Texas, Arkansas, New York, Oklahoma, Kansas, Indiana, Connecticut, Kentucky, Puerto Rico, and the Bahama Islands, were all heard. That adds up to 30 states and three countries in twelve days; not bad for 50 Mc. at this time of the year. KP4CK told Les that FG7XT in Guadeloupe is getting on six meters during January so that's a nice one to be watching for.

WA4GDC in Sebring, Florida caught six of the sporadic B openings including one on the 3rd (how'd you miss that one, Les?), during which 5's, 9's and 0's were heard during the day and KP4AAAN was heard during the evening. Besides a few of the states mentioned above, Vince heard Maryland and Nebraska. Bertha, WA4BMC, also in Florida observed five days of openings on 50 Mc. during December, adding still another day, the 2nd, to the list of opening dates. This adds up to a grand total of fourteen days that the band was open with thirty-two states and three countries heard during the month of December in Florida. Bert also lists twelve different KP4's that were heard or worked, so there seems to be quite a bit of activity in Puerto Rico also. Til Young, W4ZGS in Fort Walton Beach, Florida, also caught the openings of December 5, 21 and 27 working 9 States during those three openings.

During the first five days of December, K4KYL in Knoxville, Tennessee, observed four openings on six and heard VP7CX during each of these openings. Worked him on December 2 making the Bahamas Country #19 for Jim on 50 Mc. Texas seems to have been the state most often heard during the ten December openings observed in Knoxville. W4RIX in Memphis noted that the opening best heard during the month was that of the 5th, which lasted from 2100 until 0000, and during which many stations from the east coast were heard but most of the stations were located in Florida. And Paul, WA4FIY worked K5LMM in Oklahoma on the 26th for his "first Oklahoma." Another Paul, K4SFIH in Mobile, Alabama worked 3's, 4's, 8's, 9's and 0's on December 5 and heard stations in Texas on two other openings.

In Louisville, Kentucky WA4CQG noted sporadic E on six different days of the month and sez that on the 22nd he had a direct pipeline into Massachusetts. Dale would like to set up skeds on c.w. and is interested in hearing from anyone else of the same mind. Charlie Dellinger, W4TLC, in Taylors, South Carolina, sez that on December 5 the band was open

(Continued on page 158)

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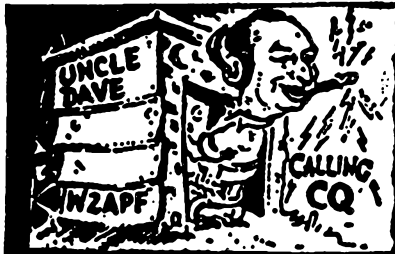
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Hammarlund HQ170C..... 325.00  
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AF67.....\$110.00  
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All individually boxed except where noted in bulk.

	Reg.	Each	Dozen
6H6.....	\$3.50	\$1.05	\$11.50
6SJ7.....	3.75	1.15	12.65
6J7.....	4.35	1.25	13.75
45 (Bulk pack).....	2.05	.65	7.15
2A6 (Bulk pack).....	3.65	1.10	12.10
6ABG.....	5.80	1.75	19.25
6AE6G.....	2.05	.65	7.15
6SBGT (Bulk pack).....	2.75	.85	9.35
6C4 (Bulk pack).....	1.50	.45	4.95
6J6 (Bulk pack).....	2.35	.75	8.25

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COPPERWELD WIRE (Nos. 12-14-16)..... per 100 ft. 2.85  
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Heavy Duty..... per 100 ft. 5.89  
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with your needs  
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UP TO 27 db  
NOISE  
ATTENUATION



KOLIN introduces the NL-1 and NLT Solid State Noise Limiters designed to effectively cut out impulse noise when receiving A.M. Signals that were never audible will suddenly be heard in the clear.

- For Hams, CBers, Marine, Aircraft, Mobile, Home, etc.
- Extremely effective semiconductor circuit uses no tubes.
- Suppresses noise from ignition systems, electric motors, power lines, lightning crashes, etc.
- Electronically self-adjusting feature insures optimum performance regardless of carrier strength of received stations.
- For all receivers that employ a diode detector.
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- Complete with switch and simple detailed instructions. \$14.95 NLT \$7.95 NL-1
- Improve your reception for the low price of only



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Adjustable speed control, maintains constant speed at any Setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

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STRATFORD NEW JERSEY

to Texas, Oklahoma, Kansas, Missouri, Arkansas, Iowa, Illinois, Florida and Cuba all at once; and that he worked COZZX and K5RCG/0 (Nebraska). In North Carolina both K4WOD and W4OAB noted several sporadic E sessions during the month and Stan (K4WOD) adds that he learned a mighty important thing last month. "Found out that four men cannot successfully raise a 55-foot mast with a 5-element beam. Mast and antenna got away first attempt, and after taking out 15 feet of mast we finally got it up, with the bent elements straightened out." W4OAB added "432! Sold my rig to a guy up north where there's some activity." Too bad, but I guess there must be some areas like that. All call areas except 6 and 7 were heard during December by K1WTK in Massachusetts, K3PRN and K3LLR report from Maryland: Don (K3PRN) operated during the first part of the month and noted openings to the south on December 5 and 11, while K3LLR noted a "beautiful opening" to the south on December 27.

From 5 land we hear from K5AKB in Grapevine, Texas that "the band opened on December 28 to Arizona. Band opened December 30 to Arizona and California. Signals were good and there were quite a few QSOs going on. One of the strongest signals here was from K7DU. We did work K7PLB in Phoenix on RTTY for our first out-of-state RTTY contact. This opening ran from about 2330Z to 0040Z and shifted into Florida." We hear from California via W6IBY, WA6NDZ and K6VXI that they too had their share of sporadic E, with openings on seven days into eight states plus VE6.

K7MQE in Burlington, Washington tells us that the band was open to California on December 29 for a fifteen-minute period; and K7CZT in Tacoma sez "During December 30 Mc. showed fairly reliable ground wave from VE7 land." South Dakota and K0FKJ worked K4OGU and WA4EUI on December 15 and WB2CZG on the 22nd. WA0CBY (S. Dakota) also reports working 4's and 5's on December 5 and Arizona the 11th.

Out in Las Vegas, Nevada, K7ICW sez that amongst the several skip sessions he observed during the month, the one of December 15 stands out. "A most unusual winter E opening to the East; at 1830 W3QQV phone signals from Delaware were coming into Nevada very FB. Other states heard were Maryland, Pennsylvania, New York, and New Jersey. I managed two QSOs, one with W4YEB in Alexandria, Virginia and W8MVN in Milford, Ohio on c.w. with no other signals heard from these states. Also noted the fact that E signals were being worked by the eastern boys (W0's) but nobody

(Continued on page 160)

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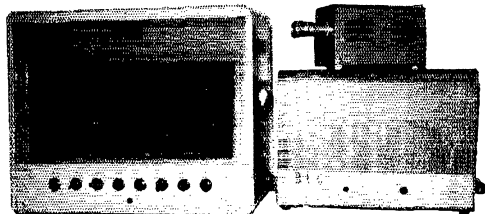
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# WRL

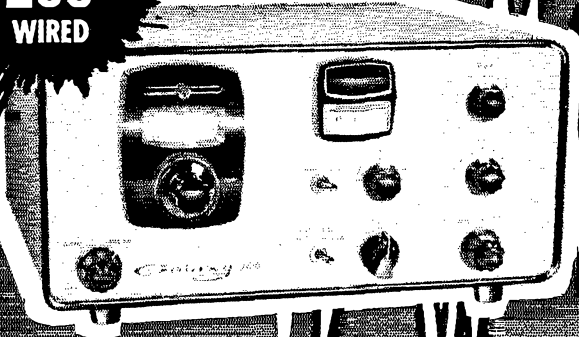
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 SSB-TRANSCEIVER

**\$299<sup>95</sup>**  
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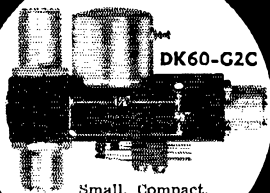
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MODELS  
A.C. or D.C.



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Light Weight,  
Less than 9 oz.

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with Type C,  
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VANGUARD ELECTRONIC LABS

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seemed to be making out west QSOs. The Oklahoma-Texas-Missouri gang were working both coasts simultaneously as per usual."

Reg. W8MBH in Detroit, Michigan reports that on December 16 and 17 he made contact with WA8AUZ, K8MZS, WA8BJZ, K8UBA, K9HMB, K8GND, K8NEY, W8HGE and W5BKP, with all contacts made on s.s.b. In Illinois WA9EJA worked into Massachusetts, Louisiana, Florida and Texas during the month and WA9BAS worked into Alabama, Pennsylvania, New York, Florida, Louisiana, Texas, Rhode Island. W0BMIN sez that six meters has been open quite regularly during the month to 3, 4, and 5 lands and that ground wave is excellent all the time. Many new stations on the air in the Omaha and Council Bluffs area according to Charlie. Also from Iowa, W0PFP in Ames reports skip on December 5, 6, 12, 16, 20 and 21 with 2's, 3's, 4's, 5's and 8's being heard. W0DRE in Newton, Iowa reports the six-meter band open on December 17 to the southeast and on December 27 when it was open into Virginia, Mississippi, Florida, Texas and Louisiana.

QST

## Survey of Communications Practice

(Continued from page 45)

perspective on our hobby on both a domestic and international basis.

We can take advantage of the store of knowledge we have accumulated with respect to communication via ionospheric reflection, together with data on our world wide distribution and operating activity patterns, all of which are controlled by the star we orbit around at a rate of one cycle per year. To do so, we must abandon the concept that a fixed allocation pattern is best suited to our needs. Flexibility can be written into the FCC regulations which takes these factors into account. We have much to gain and nothing to lose except the strong chains of ingrained habit.

QST

## Correspondence From Members

(Continued from page 78)

can pursue his hobby to the fullest extent. Kindness and consideration are contagious — they spread! — E. B. Charlton, W5WQX, Baton Rouge, Louisiana

☐ If such a proposal is to be followed up, then I propose that all commercially built equipment be abolished at the same time. Let the amateurs buy such things as wire, metal, ceramics and such things

(Continued on page 162)

## AMAZING NEW WORLD CLOCK

Instantly Shows Hams the Time  
in 70 Places

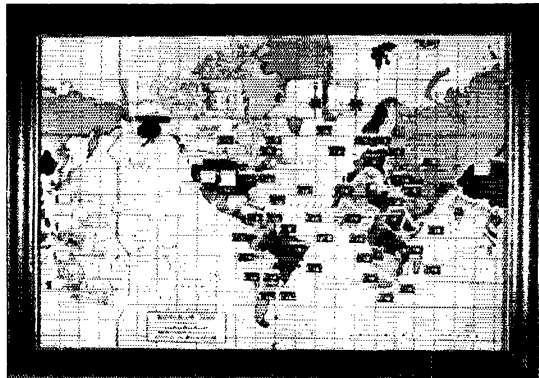
When Hams want the time in some distant part of the world, they need only look at this unique electric wall clock to find it, A.M. or P.M., in 70 key places. Face of this large portrait-size clock (15" high x 22" wide x 5" deep) is the latest world map, and in 5 colors. One setting adjusts clock forever.

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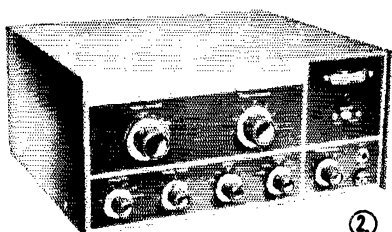


HE-80WX

**149<sup>50</sup>**  
NO MONEY DOWN

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①



**79<sup>50</sup>**

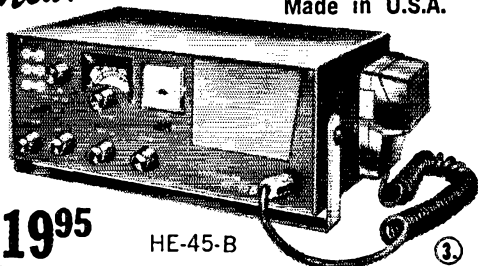
NO MONEY DOWN Made in U.S.A.

KT-390

②

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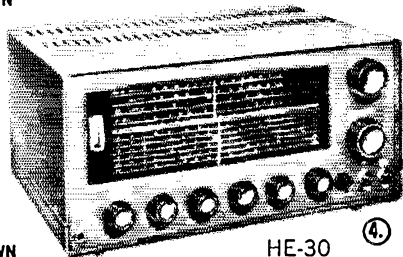


**119<sup>95</sup>**

NO MONEY DOWN

HE-45-B

③



IMPORTED

**99<sup>95</sup>**

NO MONEY DOWN

HE-30

④

# LAFAYETTE RADIO

## QUALITY AMATEUR GEAR SINCE 1923

**INVITATION:** Stop in at any of our locations and visit our fully stocked HAM SHACKS — FREE DEMONSTRATIONS without obligation. Lafayette carries a complete line of famous brand amateur equipment and accessories.

### 1. NEW LAFAYETTE HE-80 Professional Quality 14-Tube Amateur Communications Receiver

- 5 Bands: 550KC to 54MC • Extra RF Stage, Mixer/Osc For Dual Conversion on 6-Meters • 1 RF Plus IF Stages for High Gain Reception on all other Bands • Product Detector Circuit for Improved SSB Reception • Separate BFO and Q-Multiplier Circuits (can be used simultaneously) • Crystal Calibrator for Checking Receiver Calibration Markings • Improved Automatic Noise Limiter • Voltage Regulated Power Supply

Designed for Today's Congested Amateur Bands

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- 90 Watts Phone or CW on 80 Thru 10 Meters • Built-in 3-Section Low-Pass Filter • Clear, Chirpless, Grid Block Keying

Dollar for dollar you can't beat this new Lafayette Starflite transmitter. Easy to build and operate, it glistens with quality and performance all-over.

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- High Efficiency—Up To 100% Modulation • New Modulation and Power Transformers plus 7868 Power Pentode • New Heavy-Duty Communications Vibrator • Front Panel Antenna Loading Controls • New Standby Switch: VFO Power Jack • Sensitive Superhetrodyne Receiver • Built-in 117 VAC and 12 VDC Power Supplies • Rugged Push-to-Talk Ceramic Microphone

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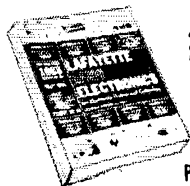
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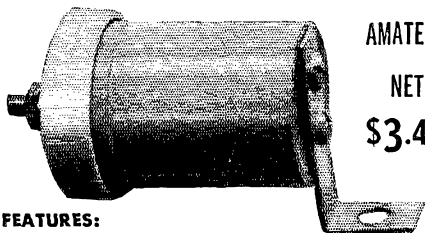
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and make their own tubes, coils, condensers and other parts from the bare raw materials. This will eliminate all of the crowding on the bands and will certainly eliminate such people as W1BGJ forever.  
— Robert Garner, W6EAJ/W6YSK, Oak Run, California

### DX DE-EMPHASIZED

☞ I would like to suggest that the League give serious consideration to the abolishment of the "DXCC Honor Roll." Its existence today engenders incredible amounts of QRM, with hundreds of stations, many using illegal power and violating operating procedure regulations, demonstrating sadly deteriorating manners in a mad scramble to gain a new country.

I don't advocate abolishing the DXCC, by any means. Continue to print the calls of new members as they qualify; print them once — that's all. No more "Honor Roll." No more "Hello-Goodbye" contacts. Just a return to plain, common sense ham radio.

The DX will still be there, and we can all relax and enjoy a friendly chat about technical matters, the weather, their part of the world, etc.

With over 250,000 licensed U. S. hams today, we can no longer afford to aid and abet those whose practices reflect to the detriment of us all. There are always others anxious to show their need for frequencies is more justified than ours. Let's quit helping them prove it. — Bill Hawley, W9ADV, Morton Grove, Illinois

### Strays

In an elderly art like hand telegraphy it's hard to come up with an idea that hasn't been tried in "the good old days." Thus, we are reminded by W8FX that W5HPB's mechanism ("Novel Key for Use with Electronic Keyers," August, 1962, QST) was anticipated by W5EH back in the '20s, when it was marketed as the "Cricket Key." It was first advertised in August, 1926, QST. W8FX still has one of the original "Crickets" in his collection of keys.

VE6AHN checked through Canadian customs while on his way to the Seattle World's Fair, and was inspected by VE7HP. Upon crossing over to American customs, he was greeted by W7AIN. Now, do you suppose that VE7HP and W7AIN have met?

K1JFF reports a really hammy neighborhood in Rockland, Maine. Within three blocks, and without resorting to "father-and-son" or apartment houses, he lists the following hams: W1CFS, K1JFF, W1NND, W1SUH.

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I can give you personal service on helping you select better gear per dollar for your operating pleasure. Over 30 years' experience. Big trades, easy terms. Used bargains.

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The HAM-M performs, consistently, in temperatures that range from  $-35^{\circ}$  F to  $+140^{\circ}$  F, under heavy antenna loading, through ice storms and hurricane-force winds. The HAM-M is safe—there is no voltage in excess of 24 volts in the rotor or control cable, and the control box is both fused and overload-protected.

CDE unconditionally guarantees every unit for 90 days and carries a complete stock of parts for field

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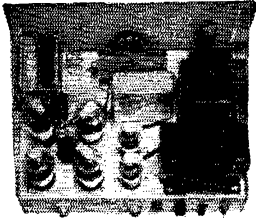
At \$119.50 amateur net, the HAM-M is the greatest rotor value around! For technical information, contact Bill Ashby K2TKN. Your local CDE Radiart Distributor has the HAM-M in stock.



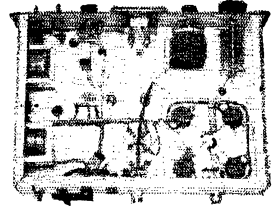
CDE makes a complete line of the world's finest rotors: Ham, heavy-duty automatic, heavy-duty manual, standard-duty automatic, standard-duty manual...and the industry's only wireless remote control rotor system!

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**LINEAR AMPLIFIER**  
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**ONLY \$179.95\***



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HEAVY WIND LOADS WITH REALLY BIG ANTENNAS TOPSIDE!

- IRON PHOSPHATE RUST PROOF UNDERCOATING PLUS EPOXY RESIN PRIMER AND BAKED ENAMEL FINISH COAT (GALVANIZED AT SLIGHTLY HIGHER COST)
- ACCOMMODATES ALL PROP PITCH AND OTHER ROTOR MOTORS INSIDE TOP SECTION
- HEAVY DUTY CRANK-UP EQUIPMENT

Model	Height	Price
H-237	37'	\$140.00
H-354	54'	190.00
H-471	71'	270.00
HS-237	37'	175.00
HS-354	54'	240.00
HS-471	71'	343.00
HS-588	88'	475.00

**NEW!** TOWER

ERECTION ACCESSORY

Tilt tower to any angle and "work" on your beam antenna SAFELY.

ONE MAN OPERATION

READY TO RAISE AND CRANK-UP

INSTALLING PROP PITCH MOTOR

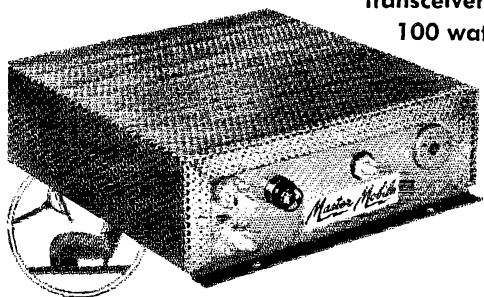
TRI-EX TOWER CORPORATION / 127 EAST INYO STREET / TULARE / CALIFORNIA / MU 6-3411

MASTER MOBILE presents  
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dc-dc transistorized POWER SUPPLY

dependably powers  
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100 watt output class.

**POWER**

**SMALL SIZE.** Unit measures only 2¾" High x 8" Wide x 9" Deep



MODEL MPS-800 \$119.50

MODEL MPS-1250 \$139.50

**TWO OUTPUT MODELS.** Model MPS-800 supplies all operating voltages for all the popular 100-watt SSB exciters: 800V @ 275ma; 300V @ 150ma, and a zener diode regulated -90VDC bias supply.

Model MPS-1250 supplies 1250VDC @ 400-ma for any type of a 500-watt linear amplifier; 300VDC @ 150ma, and a zener diode regulated -90VDC bias supply.

**EASILY INSTALLED.** Bias adjustment control and DC input fuse are located on the panel for easy access. A heavy-duty 12VDC primary control relay is actuated by shorting pin #6 on the octal socket to ground. All outputs are available on a standard 8-pin octal socket.

**Master Mobile Mounts** INC.

"Leading the Antenna Industry Since 1945"

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# COAXIAL TYPE SWITCHES

... multi-position, single or multiple gang

Now you can switch coaxial line circuits quickly and without error. These handy, inexpensive units are available with "UHF", "BNC", "N" and Phono type connectors for use with either 52 or 75 ohm lines. Phono connector types are specific for Hi-Fi applications. Other types are designed to handle RF Power up to 30 MC, 1 KW input.

Stock items ready for shipment are:

**Model 550A**—Single gang, single pole, 5 position switch with UHF connectors. Price: \$8.25 each.

**Model 551A**—Single gang, 2 pole, 2 position special purpose switch with UHF connectors. Ideal for switching any device in or out of series connection in coax line circuits. Price: \$7.95 each.

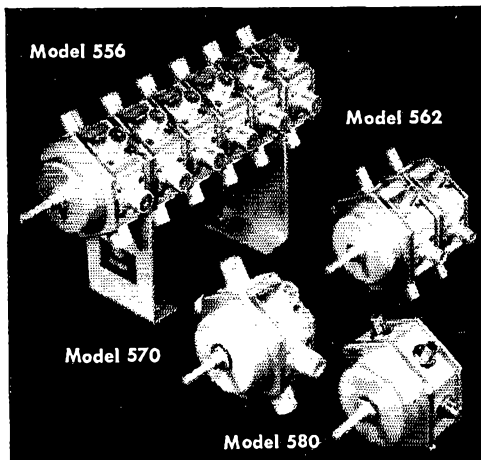
**Model 560**—Single gang, single pole, 5 position switch, same as Model 550A except with BNC type connectors. Price: \$11.95 each.

**Model 561**—Single gang, 2 pole, 2 position special purpose switch, same as Model 551A except with BNC type connectors. Price: \$9.95 each.

**Model 570**—Single gang, single pole, 5 position switch, same as Model 550A except with N type connectors. Price: \$13.35 each.

**Model 580**—Single gang, single pole, 5 position switch, same as Model 550A except with Phono type connectors. Price: \$7.35 each.

Multiple gang types, up to 6 gang for single pole—5 position switches, and as required for 2 pole—2 position switches, are made to order with any connector types listed above. Prices on request.



*Barker & Williamson, Inc.*  
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OTHER B&W EQUIPMENT: Transmitters AM-CW-SSB • Transistorized Power Converters and inverters • Dip Meters • Matchmasters • Frequency Multipliers • Low Pass Filters • T-R Switches • R. F. Filament Chokes • Transmitting R. F. Plate Chokes • Band-Switching Pi-Network Inductors • Cyclometers • Antenna Coaxial Connectors • Baluns • Variable Capacitors • Toroidal Transformers • Fixed and Rotary edgewound Inductors • Plug-in Coils with fixed and variable links • [Straight type air wound coils in a variety of dimensions.

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**LET'S FACE IT . . .** We all expect top performance from our gear. When the rig and receiver are perking along just right we can enjoy our hobby to the utmost. The DX comes a little easier and all is right with the world.

**BUT . . .** Unfortunately there are times when the equipment will develop a few bugs. Most of us do not have the test instruments or the time to do the de-bugging, ourselves. This is where Amatronics fits into the picture.

**AMATRONICS . . .** Has the facilities, know-how and personnel to handle your servicing problems. We are all Hams. . . . We know the business . . . We speak the language. Collins is our specialty . . .



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**AMATRONICS INC.** 91-46 Lefferts Blvd. Richmond Hill 18, New York Telephone (212) HI-1-7890

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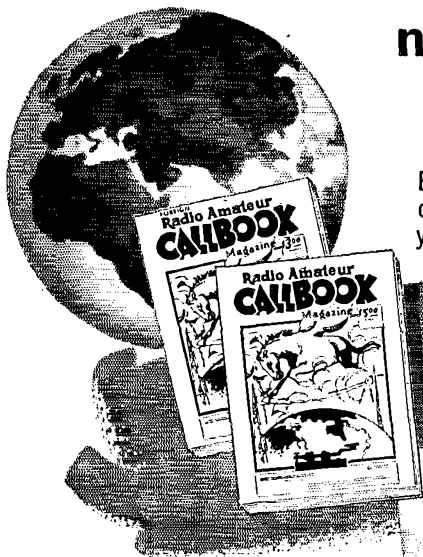
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Grounded grid operation, 2000 watts PEP (twice average DC), 160 watt driver PEP required . . . 80, 40, 20, 15, 10 meter operation . . . 115 or 230 volt operation available . . . Relay operated with exciter controls . . . Solid state rectifiers . . . Many other features . . . Size, 14 3/4" x 6 3/4" x 14" deep . . . Weight, 45 lbs.

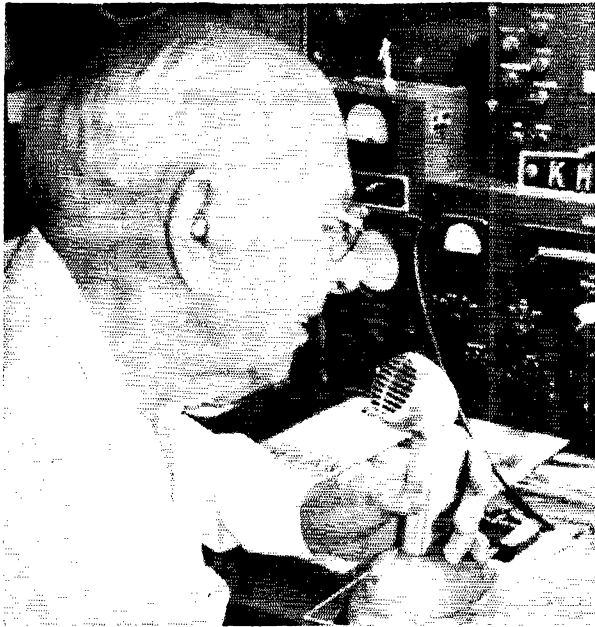
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Wahiawa, Oahu, Hawaii  
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**"most natural  
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SSB mike yet"**

We'll let Ken Bryan's (KH6AR) letter to us speak for itself:

"I've been using my Shure 440SL on regular skeeds with people who know my voice from eyeball QSO. That includes my daughter who doesn't ordinarily like the tone of sideband. Everybody tells me that it's the most natural sounding SSB mike yet . . . especially my daughter.

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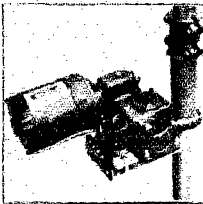
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(complete with stand, grip-to-talk switch, 7 ft. highest quality 2 conductor shielded cable.)  
**A87K Modification Kit, instant switching from VOX (with muted microphone position) to push-to-talk. \$3.25 net.**

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**CONTROLLED MAGNETIC SSB, AM, FM MICROPHONE**

Literature: Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Illinois



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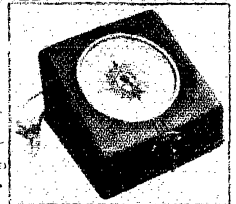
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YOU ALREADY HAVE EARNED ONE FCC LICENSE . . . YOUR HAM TICKET. IT HAS GIVEN YOU LOTS OF FUN. WITH A LITTLE EXTRA STUDY YOU CAN EARN ANOTHER — A 2ND-CLASS RADIO TELEPHONE. THIS TICKET CAN LEAD TO LOTS OF MONEY — IN A BUSINESS THAT'S A NATURAL FOR A HAM!

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(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No box may commercial type copy be signed solely with amateur call letter. Ham-ads signed only with a box number without identifying signature cannot be accepted.

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(6) A special rate of 10¢ per word will apply to advertising which, in your judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

*Having made no investigation of the advertisers in the classified column, except as obviously commercial in character, the publishers of OST are unable to vouch for their integrity or for the grade or character of the products or services advertised.*

MICHIGAN State Hamvention, Grand Rapids, 16th Annual, April 6, 1963, Paultiff Hotel, Michigan's best. Write Post Office Box 1333.

BREAKFAST Club Hamfest July 20 and 21.

SEE You at Dayton Hamvention Apr. 26 and 27!

HAMFEST June 2, Annual Starved Rock Radio Club Picnic. Watch this section for further details. See May Hamfest Calendar for late info or write W9MKS/W9QLZ, G. E. Keith, RFD #1, Oglesby, Illinois, after April 1 for brochure.

14 WEATHER Instrument Plans, \$2.00. Saco Industries, Box 2513, South Bend, Ind.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

DETROIT Area Swap & Shop—Sunday, March 31st at Henry Ford Museum Dearborn. Biggest ever! No speeches. No dealers. Just hams. CU there!

MOTOROLA used FM communications equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WE buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

TORONTO: Uncased 88 MH, like new. Dollar each. Five/\$4.00 P. P. DaPaul, 309 So. Ashton, Millbrae, Calif.

SOUTHERN California: Transmitters and receivers repaired, aligned. Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel. KEllogg 8-0500.

WANTED: Two or more 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

CASH For your gear! We buy, trade and sell. We stock Hammarlund, Hallicrafters, National, Johnson, RME, Hy-Gain, Mosley and many other lines of ham gear. Ask for used equipment list. H & H Electronic Supply Inc., 506-510 Kishwaukee St., Rockford, Ill.

WANTED: Military or Industrial laboratory test equipment. Electroncraft, Box 399, Mt. Kisco, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan Tel. NORMandy 8-8262.

CHICAGO LAND Amateurs! Factory authorized service for Hallicrafters, Hammarlund, Johnson, Gonset Service all amateur equipment to factory standards. Heights Electronics, Inc., 1145 Halstead St., Chicago Heights, Ill. Tel. SKYline 5-4056.

HAM TV Equipment bought, sold, traded. Al Denson, W1BYX, Rockville, Conn.

"FOR The operator that has everything." Samples 10¢. Call Signs, Box 933, Aurora, Ill.

FOR SALE: Complete instructions including 28-p. booklet and 26" x 36" schematic for converting the ART-13 transmitter to AM and SSB. \$2.50. Satisfaction guaranteed. Sam Appleton, RSM, Rt. 501 No. Maxwell St., Tulsa, Texas.

304TL tubes wanted. Also other xmitting and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

QSLs? WPE? Get greatest returns! Largest variety samples, 25¢ (refundable). "Rus" Sakkers, W8DED, Box 218, Holland, Mich. QSLs & SWLS, 25¢. Spicer, 4615 Rosedale, Austin 5, Tex. QSL, SWL cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo, Hamilton, Ohio.

C. FRITZ QSLs. Highest quality consistently for a quarter century! Samples 25¢ deductible. Box 1684, Scottsdale, Ariz. (formerly Joliet, Ill.).

RUBBER Stamp, Call, address, name, Case, ink-pad: \$1.00. K4ISA, Perry, Box 8080, Allandale, Fla.

QSLs. Twenty exclusive designs in 3 colors. Rush \$3.85 for 100 or \$6.90 for 200 and get surprise of your life 5 days' service. Satisfaction guaranteed. Constantine Press, Badensburg, Md.

QSL Specialists. Distinctive Samples 15¢. DRJ Studios, 2114 N. Laverne Ave., Chicago 39, Ill.

QSLs "Brownie." W3CII, 3110 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

QSLs-SWLS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio.

QSL-SWL-WPE. Finest. Since 1946. Largest assortment. Priced right. Send 10¢ for samples to: Glenn Print, 1103 Pine Heights Ave., Baltimore 29, Md.

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QSL Cards. Call-letter D-cals. Samples 10¢, or send 25¢ for extra large selection and free "Danger, High Voltage!" card. Dick, W8VXX, Rte. 4, Gladwin, Michigan.

QSLs-SWLS. 100 2-color glossy, \$3.00; QSO file cards, \$1.00 per 100. Samples, 10¢. Rusprint, Box 757, Kansas City 16, Mo.

QSLs: samples 25¢ (refundable). Schuch, W6CMN, Wildcat Press, 6707 Buck Ave., North Hollywood, Calif.

QSLs, SWLS, WPE. Samples 5¢. Nicholas & Son Printery, P.O. Box 1184, Phoenix 17, Ariz.

QSLs, SWLS, XYL-OMs (sample assortment approximately 934¢) covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fantabulous, DX-attracting, prototypical, snazzy, unarranged cards (Wow!). Rogers, K0AAB, 961 Arcade St., St. Paul 6, Minn.

CREATIVE QSL Cards. Free, new catalog and samples. Personal attention given. Wilkens Creative Printing, P.O. Box 1064-1, Atascadero, Calif.

SUPERIOR QSLs. Samples 10¢. Ham Specialties, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

DON'T Buy QSLs until you see my free samples. Bolles, W5OWC, 7701 Tisdale, Austin, Texas.

QSLs, 300 for \$4.35. Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Inletside, Ill.

QSLs-SWLS. Samples free. W4BKT Press, 123 No. Main, McKenzie, Tenn.

QSLs. Samples 25¢. Rubber stamps: name, call and address \$1.55. Harry Sims, 3227 Missouri Ave., St. Louis 18, Mo.

QSLs. Free Samples. W7IIZ Press, Box 183, Springfield, Oregon.

QSLs, 3-color glossy, 100- \$4.50. Rutgers VariTyping Service, 7 Fairfield Rd., Somerset, N.J.

QUALITY QSLs. New designs monthly, samples 10¢, Giant 25¢. Savory, 172 Roosevelt, Weymouth, Mass.

QSLs. Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 10¢. Agents for Call-D, Cal decals. K2VOB Press, 62 Midland Blvd., Maplewood, N.J.

HUNDREDS QSLs \$1.00 Samples, dime. Meininger, Jesup, Iowa.

POCKET Rubber Stamps. Your call plus name and address, \$1.00. Ralph, K0UMY, Box 238, New Ulm, Minn.

RUBBER STAMPS, \$1.00, Call and Address. Clint's Radio, W2UD0, 32 Cumberland Ave., Verona, N.J.

PRINT Them yourself QSLs, your design, we make silk stencil, single, multi-colored, samples, details. Tracey, W1IY, Groton, Mass.

QSLs, \$2.50 per 100. Free samples and catalog. Garth, Jutland, N.J.

QUALITY Rubber stamps. Low prices. Pocket Size, 3 lines, \$1.00. Sam Koury, K8TCJ, 3867 Fernleigh, Troy, Michigan.

QSLs, \$2.00 per 100 postpaid U.S. only. Glossy red and green. Free sample. Hobby Print Shop, Umatilla, Fla.

RUBBER Stamps for hams, sample impressions. Hamm, W9UNY, 542 N. 93, Milwaukee, Wis.

100 QSL cards, \$1.00. Lewalski, 1367 Perkiomen Ave., Reading, Penna.

QSL Cards. New, cute designs. Three day service. Low as \$1.50 for 100. Free samples. H. Hellwig, Box 425, Lake Wales, Florida.

LEAVE Your mark with a pocket stamp. Name, call, address, one buck. Coburn, 28 Grove St., Plantsville, Conn.

QSLs, Stamp and call bring samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLs, Samples, dime. Printer, Corwith, Iowa.

PICTURE QSL cards from your photograph, 1000 \$13.00. Also new and different designs of conventional QSL cards. Samples QSLs, Glossy, samples 10¢. Brigham, Colson St., North Billerica, Mass.

QSLs, \$1.75, 100, up. Samples dime. G.A.P., 624 Timothy Pl., Alexandria, Va.

BARNEY'S Best QSLs, 100, \$2.50, call, name and address. Rubber stamp, \$1.00. Yerkes, "Trade Winds," W6LXW, P. O. Box 278, Capitola, Calif.

COLOUR QSLs. Free samples. Filmmakers, Box 304, Martins Ferry, Ohio.

QSL Cards, low prices, free samples. Debbeler Printing, 1309-Y North 38th St., Milwaukee 8, Wis.

QSLs, SWLs. Highest quality, unusual styles. Same day service. Low prices. Samples 1¢ refundable. Joe Harms, WA4FE, 905 Fernald St., Edgewater, Fla.

ATTRACTIVE QSLs: Large variety of styles; cartoons, colors. Personal ham stationery. Samples 25¢ (deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn 13, N.Y.

KNIGHT R-100 receiver. Spotless condx. With xtal calibr. S-meter, spkr, \$100. Will ship. J. A. MacEwen, 20 Tower View Dr., Halifax, N.S., Canada.

CANADIANS! Sell plate supply 100 watts, 1000-2000 volts, or convert double triple. Unused 814 tube. Some QSTs to 1923. CQs. VE7CT, 17 Berkeley, Chilliwack, B.C., Canada.

CANADIANS Invader 2000, \$1250; KW Matchbox w/SWR indicator, \$140; Valiant, \$325; NC-303 with NC3006G, NC300C2 in cabinet XCUC303 calibrator, matching spkr, \$550; NC-60 new, \$50; TO keyer with Vibroplex Vibro Keyer, new, \$100; D-104 with G stand, new, \$35, used \$20; JT30, \$7; coaxial relay, \$10. All in excnt condx. VE3LS, Box 75, RCAF Station, Centralia, Ont., P., Canada.

CANADIANS: 1962 Johnson Valiant, factory-wired, perf. condx, will finance. VE3EQO, 1539 Warland Rd., Oakville, Ont. Phone VA 7-2394.

CANADIANS: National NC-300 with crystal calibrator. In excnt condx. Recently aligned. VY reasonable. R. A. McNeill, VE5RX, Box 472, Yorkton, Saskatchewan, Cana.

WANTED: SOJ-3 Select-O-Ject unit. VE7BHH, 6171 Brantford Ave., Burnaby, B.C., Canada.

ATTENTION: Amateur radio equipment repaired, work guaranteed. L & S Electronic Technicians, WA2GOG, Sid Levinson, 393 So. 3rd, Brooklyn 11, N.Y. Tel. EV 4-7564.

ATTENTION Mobiletels! Heavy-duty Leeco-Neville 6 volt 100 amp. system, \$50; 12 volt 50 amp. system, \$50; 12 volt 60 amp. system, \$60; 12 volt 100 amp. system, \$100. Built-in silicon rectifier alternators 12 volt 60 amps, \$100; 12 volt 100 amps, \$125.00. Guaranteed no ex-police car units. Herbert A. Zimmerman, Jr., K2PAT, 1907 Coney Island Ave., Brooklyn 30, N.Y. Tel. DEwey 6-7388.

HAM Discount House. Write us for lowest prices on ham equipment. Factory sealed cartons. Specify equipment wanted! H D H Sales Co., 327 Greenwich Ave., Stamford, Conn.

CASH promptly paid for your ham gear. Trigger, 7361 North River Forest, Ill. PR-8616.

TELEVISION Camera Kit easy to build step-by-step instructions, suitable for Ham TV, Educational, Industrial, Medical uses. Craftsman Instrument Labs, Inc. 60-30 34th Ave., Woodside, L.I., N.Y.

WANTED: All types of aircraft or ground radios, 17L, 618F or S 388, 390, GRC, PRC, 511, RVX. Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted James, W2KUUW, 308 Hickory, Arlington, N.J.

TOROID RTTY Kit: Mark-Space discriminator and bandpass filters. Includes 4-88 MHz and 1-44 MHz uncased like new condx. toroids; information sheet, mounting hardware and six mylar capacitors. \$5.00 ppd. Toroids; specify 88 or 44, less capacitors. \$1.00 each. \$/84.00. ppd. KCM Products, Box 88, Milwaukee 13, Wis.

WANTED: For personal collection: OSTs January through August 1916; ARRL Handbooks: Editions 1 and 5. W1CUT, Box 1, West Hartford 7, Conn.

TUBES Wanted, All types, highest prices paid. Write or phone. Lou-Tronics, Inc., 131 Lawrence St., Brooklyn 1, N.Y. Tel. LU-52615.

TRANSMITTER, 300W., 80-20, SX-100 Mark 11, \$325 (plus extras). K1NJH, 390 Roosevelt Dr., Seymour, Conn.

SELL, Swap or buy ancient radio sets and parts, magazines. Laverty, 118 N. Wycombe, Landsdowne, Penna.

SK-20 Tunable Preselector, calibrated 3.5-30 mc/cycles, boosts reception 3-4 "S" units. Complete kit, cabinet, built-in power supply, \$18.98 ppd. Holstrom Associates, Box 8460-T, Sacramento 22, Calif.

SELL: Heath MR-1, MT-1, HP-10, spkr., \$185.00. Johnson Viking 1, ten xtals, heavy duty 514's, \$55; RME VHF152, 3-6 meter converter; spare tubes, realigned, \$48.00; CDR TR-4 rotor indicator and cable, \$25.00. All in new condx. W2UGM, 66 Columbus Ave., Closter, N.J. Tel. PO 8-1884.

WANTED: Motorola FHTR-80D or 140D unit. Ralph Villers, Box One, Steubenville, Ohio.

IMMACULATE Valiant, \$250; HO-140X, HC-10, \$200; Vibroplex Presentation, Johnson key, plex base, \$35; UTC 3000V 300 Ma, 3000V 1A, xfmrms, \$50; two deluxe 48 in. racks, access doors, \$50. Sinkler, RD 1, 7690 Fields Rd., Chargin Falls, Ohio. Will ship.

COLLINS VFO for KWM-1 Part 70K-1, 75A4 part 70E-24, KWS-1 part 70F-23 new, \$39 each. Collins noise blankers for 75A4 part 136C-1, 75S-1 part 136A-1, new with instructions, \$49 each. Collins mobile motor 351A-1, \$39; 4X250B, clean, gud, boxed, 2 for \$9. Disoriented, fat and gud. Four for \$5.00. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

WILL Trade new or used ham parts and equipment for U.S. or Canada philatelic stamps. W9AU, P.O. Box 155, Barrington, Ill.

WANTED: Collins 51-3 4, R-388, R-309A, R-391, 75A-4, SP-600, teletype, Kleinschmidt, facsimile and test equipment. Cash or trade for new amateur equipment. Write: Tom, WIAFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. Tel. Richmond 2-0048.

GSB-100, \$295; SX-III, \$225 or both for \$500; in new condx. K1KRO, Glastonbury, Conn. 633-9243.

FOR Sale: 6146, 6883, 3 for \$5.00; RCA Monoscopes, 1698 \$2.50; lab type SWR Bridge, \$60; all new and guaranteed recorders, polar, \$3.00; Rect. co-ord., 575, Brush Instr., \$60. Free list, A & B Engineering, 1040 E. 45th, Brooklyn N.Y.

VY Gud Adventurer, \$42. QF-1, \$5. Lowell Guengerich, WA0CEB, Kalona, Iowa.

WANTED: Communicator 6M or other good 6 meter receiver. Crst. 4236 W. 36th St., Cleveland 9, Ohio.

LOOKING? Shopping? Trading? Trying to save money? Write Bob Graham for his special deals on new and guaranteed re-conditioned equipment. This month's "Special"—new Clegg 99's still \$139.95. Cash or Budget. Graham Radio, Reading, Mass.

COLLINS Owners work AMI S-Line, KWM-1-2! No drilling! No soldering! No chassis removal! Instant switching! Easy installation! Wired kit, \$5.00. Kit Kraft, Harlan, Ky.

SELL: Daven audio frequency meters, \$85 (\$250 new); RCA microphones; audio input, output, and power transformers. Bob Bishop, 911 East 7th St., Plainfield, N.J.

VISIT New York's largest surplus supermarket. Lowest prices on tubes, transistors, test equipment, parts. Send for "Bargain Sheet." B & M Component Supply Co., Inc., 153 Cedar St., New York 6, N.Y.

FOR SALE: 150 watt, all band, c.w. xmitr, VFO, TVI suppressed, excnt condx, \$75. Nine watt mobile xmitr, \$9. Also transformers, tubes and other gear. W2IQS, FR 4-3063, Woodmere, N.Y.

SELL Excellent tubes 417A, 396A, 404A, \$4.00 each. Have a few in shack. WA2AUX, 65 Graham Terrace, Saddle Brook, N.J.

WANTED: Repairable receivers. Stricker, 154 Sunset St., Windsor Locks, Conn.

USED AM Transmitters: 250 watt and 1000 watt AM transmitters for sale. Suitable for conversion to the 160 or 80 meter bands. 250 watt transmitters priced at \$200 and up, 1000 watt transmitters priced from \$2,000 and up. Units are located in Massachusetts, Virginia, Pennsylvania, New Mexico, Missouri, North Dakota, Kentucky, Louisiana, Florida, Alabama, and Minnesota. For complete details call or write Mr. Al Timms, ITA Electronics Corp., 130 E. Baltimore Ave., Lansdowne, Penna.

SWAN SW-120 with AVC modifications. Exc. condx. Four mo. old. Best offer over \$200. D-104 and G stand, \$20; two used 4CX250Bs, \$35. Write Don Char, K80JE/KL7, Site B-61 and APO-731, Seattle, Wash.

MARAUDER HX-10 neatly wired, factory aligned, brand new, \$500 or best offer. Heath lab oscilloscope, model 0-12, \$40; vak volt reg. power supply model PS-3, \$30, both in mint condx. Will deliver HX-10 up to 500 miles. WAR8BH, Coloma, Mich.

WANTED: Lampkin 105B frequency meter. In exc. condx. Will trade WR59A sweep generator, or cash. K8CMY, Adam R. Tuttle, 8266 Robindale, Dearborn, Mich.

CONSET G-76 w/DC supply and homebrew AC supply, all three for \$395 cash. Hallicrafters SX-100, \$135; Eimac A-54 w/AC supply, \$35. Furb. Lompop, or will deliver, 100 miles or LA area. Bill Hunter, K6OAT, P.O. Box 673, Lompop, Calif.

HO-170, like new condx. Little used. \$240.00. W9OTS.

SELL: Globe Scout 65 in perf. condx. \$45.00. Gud for Novices. K8UUX, 729 Alenton St., Kent, Ohio.

FOR Sale: SX-111, \$175; Viking Ranger, PTT, \$165; Viking Matchbox, \$50 w., \$35; all in exc. condx. Will deliver within 100 miles. K9OVB, 306 North Seminole, Ft. Wayne, Ind.

SELL HQ-145 with speaker and xtal calibrator, \$200; LW-51, 6 meter transmitter with pwr. supply, \$70; 6 meter Tecraft converter 14-18 Mc. IF with pwr. supp., \$25. National Radio 6 and 2 meter VFO, \$32; RCA 100v. coax relay, \$5. Dick Mehner, 72 Pennwood Dr., Trenton 8, N.J. TU 2-7414

QST 1952 thru 1962 excnt run, \$20. K. Conrad, Akron, N.Y. CLOSING Down 2000 PEP station, Apache, SB-10, Drake 2-A, 4-1090A final with variac pwr. supply and time delay circuit, TA-33SR, rotor, \$1,250. R. C. Ferris, K1JWC, 72 North St., Danbury, Conn. 743-4932.

SALE: DX-100 cabinet, \$8.00. W4VTS.

SALE: Johnson 500, new, on air July 1962. Best offer over \$550. WA2LIM, Tel. IN 1-1779.

NOVICES: Globe Scout 65A xmitr, in excnt condx, \$60. Richard Gale, 6 Devore Dr., West Orange, N.J. Tel. RE 1-4264.

WANT: Good ARC-1, Thompson, W1LWV, 99 Water, Millinocket, Me.

SALE: SX-101 Mk III, \$210; DX-100, \$140. Package deal, \$325. Will deliver 100 mile radius or ship F.o.b. upon receipt of certified check. WA2NWG, 141-43 73 Ave., Flushing, L.I., N.Y. Tel. Area code 212-BO-3-2811.

WANTED: Conset tuner or converter for aircraft band use in car. WA0AII, 1015 Glenside Pl., St. Louis, Mo.

SELL: HRO-50T and coils A, B, C, D, E, F, G, H, J; calibrator, NBFM adapter, coil rack, instructions. Harvey-Weiss IBS-50D. QSTs April 1943 thru April 1963, run all in perf. condx. Offers! Malvern, 223 Grimsby Rd., Buffalo, N.Y.

WANTED: Back issues of QST. I will pay one dollar each for the following issues of QST: April through December 1948; all 1949 issues; all 1950 issues (except Feb.); all 1951 issues (except May); January through May, 1952; March only 1956. K9IXI, Morgan, 1614 Broadway, Highland, Ill.

WANTED: Hallicrafters S-27 or R44/ARR. State appearance, condition, modifications and price. Pete DeCenter, K3EMA, 2345 Mt. Carmel Ave., Glenside, Penna.

FOR Sale: Polar relays type 255-A in mint condx, \$2.00; two for \$3.50 postpaid USA only. Bernard Feissle, W0ZKN, 1061 Gabriel Dr., St. Louis 37, Mo.

SELL: HY-110 w/clock, in perf. condx, \$170; AF-67 w/homebrew 110V P.S., \$115. Fred A. Oster, 1409 2nd Ave., Cedar Rapids, Iowa.

BACK Issues QST-CO magazine, several years, 15¢ each. Post-paid anywhere in USA. George M. Clark, W2JBL, 123 Davis Ave., Hackensack, N.J.

4-1000A filament transformers, \$12. Technical Systems Co., 11317 Olive St., N.W., Coon Rapids, Minn.

SALE: Heath "Cheyenne" transmitter with 80 and 10 meter converters, mic. Dick Long, 111 Cedar, Madrid, Iowa.

SALE: Heath DX-20, \$30; O-multiplier, \$10; Knight R-55, \$50; T-60 modified, \$40; V-44 VFO, \$25; Dow-Key IRP self-powered, new, \$25. You pay shipping cost over 100 miles. WA4ERD, Box 56, Frankfort, Ky.

WANTED: Shut-in seeks good used all-band rcvr. On low month guaranteed terms. Write: Tommy Baker, Rte. 3, Douglass Lane, Gallatin, Tenn.

WANT: Clean 75A4 with 800 CPS filter for 4000. Sell IRE Proceedings run 1946-1960, perf., unused, W3AFM, Paul Rockwell, 5800 Hillburne, Chevy Chase, Md.

SELL: Gonset twins—all accessories, in exclnt condx, first offer near \$300 gets. KOKOY, 431 Frank Ave., S.E., Huron, S.Dak.

SALE: Heath Comanche, Cheyenne, AC, DC, pwr. supplies, sprk all connecting cables, \$200, prefer local deal. WA4EKT.

TRADE: For perfect BC-221, a mint 135 mm Leica telephoto lens. I. S. Simpson, RFD 3, Plymouth, Mass.

SELL: Like new SX-115, \$375; B&W KW linear LPA-1 and pwr. supp. LPS-1, \$375; NC-125, \$75; HC-10, \$75; Super Pro, \$75; 150 watt A.M. xmtr comp. incl. modulator and pwr. supplies in 6 ft rack, \$75; Dick, Ache, W3NEC, 707 Barclay Lane, Broomall, Penna. Tel. 353-0226.

WANTED: Ampex 601 tape recorder, half track monoaural preferred, but could use stereo. W. C. Johnson, Norwich, Vt.

HALLICRAFTERS SR-34 6 and 2 meter rcvr-xmtr, operates on 6, 12 and 117 volts, hardly used, \$250. I. Seidman, W2GNZ, 2160 Bolton St., Bronx 62, N.Y.

SELL: Or trade: Dukane 90 watt PA ampfl. for 6 or 2 meter transceiver or? WB6BOW, 7736 Day St., Tujunga, Calif.

FOR Sale: National NC-125 in excellent condition with homebrew crystal calibrator and preselector, \$75 or good stereo amplifier. KOVOS/O, Cdt. Rick Strong, Box 1007, USAF Academy, Colo.

DC/AC converter transformers for mobile, epoxy cased high efficiency units. Also complete mobile power supplies. Send for lists and specs. Supermarine, Box 185, Melbourne, Fla.

WANT: To contact owner of a model 955 digital company counter. Robert Ireland, Pleasant Valley, N.Y.

CENTRAL Electronics MM-2 RF analyzer with 50 Kc. IF amplifier for sale. New condx. First reasonable offer gets it. Goodin, K4VUQ, 486 Hollyhill Drive, Lexington, Ky.

SP-600 JX-17 rcvr; for info. See page 91 March 1962 QST. Will ship and trade. Bob Clouse, 2637 McVey, Worthington, Ohio.

MOHAWK Receiver (Heath RX-), with sprk, \$229. Shipped express collect. Ex-K8NCT, Robert Booth, 1006 Sunset Blvd., North Canton, Ohio.

NC-105 Receiver, 6 mos. old, \$100. Ron Condry, Anamosa, Iowa.

SELL: DX-100 factory modifications, \$150; Motorola 80-D FMTR, \$50, complete mobile rig. Both in exclnt condx. Wayne, WA4CHM, Westmoreland, Va.

COLLINS 51J4, no scratches, like new, used under 100 hours. Will send from factory after checking there. Best offer over \$750. K. Yoshida, 41-11 Parsons Blvd., Flushing 55, L.I., N.Y. Tel. IN-1-9476.

HEATH Apache, \$200; NC-300, \$200; TA-33 and 40 ft. tower, \$110. K2PCZ, 779 Fay Rd., Syracuse 4, N.Y.

FOR Sale: Polycrom 62-B used 20 hours, \$290; Elmac AF-68 xmtr, new, \$160; Elmac pwr. supply M-1070, \$50; Elmac PMR-7, receiver, \$89; xmtr, \$25; Tellyx 6M 309 beam, new, \$15; Kruco 10 meter xmtr mobile, \$30. George Kossuth, WA2TFC, 92 Farouhar Ave., Yonkers, N.Y. Tel. YO 5-0388.

DAYTON Area: Sell: Heath Apache, SB-10, Hammarlund HO-10C, Hornet TB-500 beam, Tri-Ex 54 ft. tower, AR-22 rotator, Dumont 241 scope, K8HNC, 3651 Sharawood Ct., Dayton 29, Ohio. Tel. 298-3620.

SELL: Complete 12V mobile rig, 60 watts, 10 thru 75 meters. Will not split up; Johnson Viking mobile xmtr, Johnson VFO, 3 xtals, Heath HP-10 pwr. supply, Elmac PMR-7 rcvr, Elmac PSR-612 pwr. supply, 8 ft. center loaded whip with "All Bander" coil, body swivel base, heavy-duty spring, coaxial antenna relay, carbon mike w/PTT and spring cord, generator and distributor noise-suppressors, all cables, under dash mounting brackets for 59 Chevy, instr. manuals, \$220; you pay postage. A. S. Baran, WB2FGJ, 9 Tangewood Dr., Trenton 9, N.J.

PACEMAKER, Latest modifications. Refinished. New panel. Exclnt. \$300 or you make offer. Robert Campbell, Waseca, Minn., 7th St. and 9th Ave. N.E.

FOR Sale: National 183D receiver and speaker (covers six meters), with book, mint condx. Will ship freight prepaid, \$189.00. Robert Clark-Duff, W2OMM 85-14 66th Rd., Forest Hills, L.I., N.Y. TW 7-5259.

TEXAS: For sale, Heath Apache, \$200; SB-10, \$75; MM-2 scope, \$75. All in exclnt condx. Zack H. Byrns, 10207 Belfast Rd., La Porte, Texas.

NEW GSB-100, \$300; 1500 watt linear, \$75; SX 99 plus Q-multiplier, \$75; NC-125 and many accessories, \$50. Sell all packages or part. Complete SSB station, \$450. Contact WA6BJE, Jim Day, 1637 E. Merced, W. Covina, Calif.

GSB-101 linear, in mint condx, with factory final test sheet, manual, and original bill of sale, \$239.00 in original packing. K3JZH.

SELL: DX-1003, HO-170C, less than two years old, both guaranteed. KOMIK, Budge Hall, Univ. of No.Dak., Grand Forks, No.Dak.

ATTENTION: High Power Boys! Broadcast quality modulation transformer 1 KW of audio; 2-833 A's, sockets, filament transformers, audio choke, blocking capacitor. All new, unused. For \$125.00. First check for \$120 gets above plus components for 2 kw pwr. only. Lots of filter. Martin R. Peterson, 1311 W. 5th, Winona, Minn.

KNIGHT R100 with S-meter; T-60 and DX-20 transmitters, new Gotham vertical. All in exclnt condx; \$140.00. Don Wahle, 17W042 Indian Hill Dr., Bensenville, Ill.

NC-400 Receiver, in perf. condx, need money. Sell for \$500. K1AJC, 41 Army St., Providence, R.I. (Sry for error last ad.)

SELL: HQ-145, calibrator, sprk. WA2JIS, 1147-65th St., Brooklyn, N.Y. Tel. CL 6-3398.

KNIGHT R-100 in exclnt condx with xtal calibrator and sprk, \$95 plus shipping. John McCarty, K9KLS, 292 Snyder MRH, Champaign, Ill.

FOR Sale: Cheyenne, Comanche, push-to-talk mike, speaker, AC pwr. supply, all cables, in fine condx; \$180. WA2DCS, Steve, Tel. HY 4-9288, 1540-48 St., Brooklyn 19, N.Y.

FOR Sale: Stripped BC-348 and 250-watt VFO mtr. c.w. xmtr, \$75. Also Morrow 3BR, \$20. W1RIM, N.E. Main, East Douglas, Mass.

75A3, reduction knob, calibrator, A4 product detector, immaculate condx, \$300. Inquiries acknowledged. Tom Gipp, K2VWV, RD No. 1, Phillipsburg, N.J.

KWM-1, AC Power supply, matching speaker, DX adapter, xtra xtal holder, 12 extra xtals, never used mobile, \$475. L. S. Woolsey, W5HJA, 1015 N. McKinley, Little Rock, Arkansas. Tel. 501-666-5230.

"HOSS-Trader"—Ed Moory says, "No reasonable cash offer will be refused on Ham equipment during SWING Sale March & April." Specials: New Swan's, \$219.00; New 100-V's, \$659.00; New 200-V's, \$795.00; Collins 75S-1's in Sealed Cartons, \$419.00; Package Deal, New Ham-M Rotor & New Demonstrator TH-4 Beam, \$179.00; 75A-4's, \$449.00; 75S-3 in Sealed Carton, \$579.00; Demonstrator KWM-2, 6 month warranty, \$859.00. Used 3 Band Swan Demo, \$249.00. 2-B used 5 hours, \$229.00. Best cash offer on new Invader 2000. Also New HC-50 Xmtr—best cash offer. Heath Warrior Linear, \$179.00. Drake I-A, \$159.00. Terms: Cash. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone Whitney 6-2820.

OOPS! SX-100 should have read DX-100 my Feb. ad. Mod. needs work. \$90. W3MWC.

KWM-2, PM-2 and CC-2 case all like new only 6 months old, \$875. Harvey-Wells T90 and Heathkit Mohican, \$78 each. W5FGY, 613 Vernet St., Richardson, Texas.

SELL: HQ-129X rcvr with Model B Sideband Slicer, \$125; Central Electronics 20A with VFO, \$125. W. Wiegert, W9MND, 4217 N. Oketo, Chicago 34, Ill.

SELLING Station: In A-1 condx; Viking I, TVI suppressed, \$95; Heath VFO, \$12; S-76 receiver, \$100; Eico 3" oscilloscope No. 425, \$22; Ultra modulation clipper \$30. George Paulus, W2DTI, 231 Sherman Ave., NYC 34.

FACTORY Wired 20-A, QT-1, MM-2 'scope; 600-L linear. Also Deluxe 458 VFO. Like new, in orig. boxes with manuals. Package deal only, \$435.00. F.o.b. Bowling Green, Ohio. Earl Ensign, W8FGZ, RR 4, Box 94-C.

FOR Sale: Collins 30L-1 and 312B-5 station control in original cartons, used less than year. W5SZB, Box 330, Edinburg, Texas.

DRAKE 2A and HT-37, \$515; Clegg 999 with National 6N2 VFO, \$125; Ameco Nuvistor 6M converter, \$30; LW51 Deluxe 6 m. 50 watt transmitter, \$40; prop pitch motor with 2 relays and indicating compass rose, \$35. WA2FSD, 11 Burbury Lane, Great Neck, L.I., N.Y. Tel. 516-UH2-7857.

SELL: G-76 transceiver, model 3349, A.C., P.S. Exclnt condx, \$450. Richard Mullikin, 407 Hollyhock Lane, Georgetown, Ky.

FOR Sale: 75A4, No. 4871, KWS-1, No. 1439, unused since it was repaired and realigned by Collins Co., Nov. 1962; Guaranteed perf. condx, \$1400; KWM-1, No. 1024, 516E-1, 516F-1, 312B-1, 351D-1, E-V 600D mike, Hy-Gain Tribander whip, \$750; New 4-400A tubes, \$25. New 4-65A tubes, \$5. Linear, 3 Kw. HP 833A, 3200 YDC at 1.0 amp., built-in BC-610 cabinet, \$275. All F.o.b. Maj. James Craik, 1025 No. 34th, Omaha 31, Nebr.

GONSET GBS 101 linear amplifier with 3B28 rectifiers over 1,000 watts PEP with 75 watt driver. Will ship freight prepaid for \$250 or your best offer. Pepos S. Dounson, W5OSG, 314 Maverick Bldg., San Antonio 5, Texas.

W0SMJ selling out! 2 mtr. equipment successfully used at my station for meteor scatter contacts to W1 and W7! NC-300 with National 6 mtr. converter, \$215; Silver plated 2 mtr. 417-A converter, \$45; 800 watt CW-600 watt AM 2mtr. rig with power and modulator, \$250; complete 125 watt AM-CW-VFO 6 mtr rig, \$100; TB-50D with power, \$60. Will deliver within 100 miles of Indianola, Iowa. Direct correspondence to Jim Cessna, Dept. of Physics and Astronomy, SUI, Iowa City, Iowa.

CERAMIC Amateur call letter jewelry. Lapel pin, \$1.50; tie clasp, \$2.00; cuff links, \$1.50, matched set, \$3.00. Add 10% Federal tax (see Sept. 1962, p. 138). Donna's Ceramics, Box 111, Sylvania, Ohio.

HEATH Marauder, SSB-xmtr, professionally assembled. Hammarlund HO-180C, like new condx Johnson Matchbox w. SWR meter, W2BAA, 22-12-128 St., College Point 56, N.Y. Tel. 9-4489.

LINEAR (4 837's, also (1) section variable capacitor and new matched xtals for SSB. Package deal all \$75. K6JFE.

RARE National 1710A, 20-300 Mc. SoO. K5HUM, 4046 Iroquois, New Orleans 26, La.

WANTED: Gonset Communicator I or II for two meters. Price and condition must be right. All letters answered. W9VXE, 5001 West Lee St., Skokie, Ill.

30L1 Collins purchased 2 months ago, used less than 4 hours. In perf. condx. Shipped anywhere in the U.S. in original carton with cables and manual. Check or m.o. \$450. James C. Stearns, Engineering Dept., RCA Duncan Canal, Petersburg, Alaska.

STOLEN! New York area: KWM 2-A and mount, Serial No. 10472. Reward! W4OV, National Airlines, P.O. Box NAL, National Airport Facility, Miami 59, Fla.

SELL: Electron Corp., 12050 450 Mc. 50 watt ham tv xmtr, antenna. No. 1051 Spectator TV camera, tripod "1" and "3" lens, two V-4850 TV set converters and antennas, \$800. Collins J05 with spare 4CX1000A, \$325; KWM2, 312B3 and 316F2 AC PS, \$1,075. All this equipment is in exclnt wkg condx and shape. W5VVF, Box 883, Kermit, Texas.

TELETYPE Model 26. Looks and works beautifully: \$95. W2FUR.

JOHNSON Invader in exclnt condx, \$410. Will consider low power commercial AM rig as trade-in. Chuck Camp, RFD Ponon, Colo.

FOR Sale: Western Electric mercury wetted relays. #D-168479. Treadwell, K4DKJ, 3289 Hallwood Circle, Macon, Ga. \$3.00 each.

SALE: Viking II with matching VFO: \$150 or best offer. W8EWF, 949 Maxwell Ave., S.E. Grand Rapids 6, Mich.

WANTED: First seven volumes of OST. Hank, K4COA/8, Dept. of Mathematics, West Virginia University, Morgantown, W. Va.

SELL: HT-41 KW linear. Like new condx. Not a scratch! \$295. WA2MNF, Richard Nadelson, 688 Longacre Ave., Woodmere, L.I., N.Y. Tel. FR 1-0824.

SALE: SX-111, matching speaker, \$200. Doug Lutz, K8HFJ, 1109 Luray Dr., Ashland, Ohio. Tel. 27561.

SELL: Collins 32V3, \$300; exclnt condx factory checked. WA2JLM, 175 East 17th St., Huntington Station, L.I., N.Y.

WANTED: HRO coils, type AC 21 to 21.5 Mc and others. W8JDG.

WANTED: Surplus TV cameras. Type PH-55/AXT-2 or similar. State price and condx. Zima, Room 109, Warren Hall-109, RPI, Troy, N.Y.

OSTS: Sell run 1940-1961 inclusive, \$25.00. F.o.b. Mamaroneck, N.Y. W2NOR, 8 Wagonwheel Road.

COMPLETE! Novice rig! SX-43 w/ matching spkr, exclnt condx, \$90; Knight T-50 xmttr, looks rough, works gud, \$25; Heath, HD-11, O-mult., \$8; sell separate or complete for \$110. Also S-53, \$35. Ship collect. Bill Thompson, Box 66, Russellville, Ala.

VALIANT and D-104 mike. Both A-1 condition and only \$275. John Rogers, 207 Moley, Valley Stream, N.Y.

FOR Sale: AF-67 very gud condx, G-66B like new, M-1050 power supply, \$225 or best offer. Bob Creason, 775 Chamberlin Dr., Beaumont, Texas.

SELL: Tower, steel, 150-ft., \$500. One kilowatt Link AM transmitter, \$400. Recording milliammeter, G-E, \$50. F.o.b. W6QT, 2805 Russell St., Berkeley, Calif.

MOBILE Station: Elmac AF-68 transmitter; Elmac PMR-7 receiver; Elmac M-1070 pwr. supply; DK Electronic TR switch; Turner 350C mike; Master Mobile remote antenna tuner and field strength meter; all-band antenna system; station operates from 6 or 12 volts D.C. or 110 volts AC; FB fixed station. \$300. Bernard Fox, WA2IAP, Arlington Ave., St. James, L.I., N.Y.

FOR Sale: General Radio 726-A RF-VTVM with new probe and book, \$50; SX-28, new S-meter, gud condx, spkr and book, \$100; Heathkit AV-2 AC-VTVM, clean, \$15; RAK w/ low frequency rcvr w/pwr. supp & book, \$30; BC-906-1 freq. meter 145-235 Mc./s. gud condx, \$7.50. John Nagle, 626 East Main, Moorestown, N.J.

SELL: HT32A, \$500; 75A4, #2776 vernier dial 3.1 Kc filter, \$75; HT33, \$550. All in exclnt condx. WIECF, Lt. Col. W. M. Wood, 301 Shreveport Rd., Barksdale AFB, La. Phone 7461153.

HO-160, 2 years old, in perf. condx: \$190. Colin A. Campbell, WIPPD, 20 Lois St., Danbury, Conn.

WANTED: Commercial, Military, all types. ARC, ARN, ARM, BC, GRC, PRC, TRC, URR, URM, TS, 61RS, 17L, 51R, 51J, others. Ritco, Box 156, Annandale, Va.

FOR Sale: 200V transmitter, used less than 50 hours. No time to operate. Will ship in original crate. Buyer pays freight. Price: \$675.00. Stan Cokas, 16 Edgchill Rd., Swampscott, Mass.

HEATHKIT Comanche and Cheyenne AC supply and mike, complete station for sale: \$125.00. W9TPA, Bob Davy, Harvard, Ill.

HEATH Marauder, S.S.B. xmttr, professionally assembled, Hammarlund HQ-180C, like new, Johnson Matchbox w/S.W.R. meter, W2BAA, 22-12-128th St., College Point 56, L.I., N.Y. Tel. FJ 4-0009.

DB-23 Pre-selector, \$25.00. K8AIA, Box 953, Hamilton, Ohio. ACT Now! Barry pays cash for tubes (unused) and equipment. Barry, 512 Broadway, NYC 12. Call 212-Walker-5-7000.

WILL Trade new or used ham parts and equipment for U.S. or Canada philatelic stamps. W9AU, P.O. Box 155, Barrington, Illinois.

FOR Sale: VHF rig used only four months; need money for school. Heathkit and VHF Gonset. xmttr wired and tested. \$150. Tanetron, Sky Sweep VHF rcvr with Hallcrafters spkr, \$200. Cost \$300; JT-30 mike, \$10; TR-4 rotor, \$20; 6-element Telrex 6-meter beam, \$25; Dow-Key. Also Globe 6-meter converter, in unopened box, \$15; S-3RE Hallcrafters rcvr, in exclnt condx, \$35. Will send all but beam. Carl Stewart, K2DVI, 48 Club Dr., Roslyn Hts., N.Y.

VIKING Challenger, in exclnt condx, \$85; Hallcrafters S-85 with external spkr, \$79. Trades? Want: SX-101, K9IPI, 4919 Walker Ave., Lincoln, Neb.

SELL SSB 20A transmitter matching Bandhopper VFO, LA-1 Globe final 400 watts, P.E.P. K1CNK, WE 3-5045, Norm Friedman, 76 Kase Rd., W. Haven, Conn.

FOR Sale: Johnson Valiant; Heath Comanche, Cheyenne, utility and mobile pwr. supplies, highest offer takes! Martin Manes, 72-72 112th St., Forest Hills, L.I., N.Y. Tel. 212-LI-4-3187.

FOR Sale: Mercury relays for keyer, \$1.50; many other surplus items. Send stamp for list. Lou Amstutz, W8YNL, RD #2, Box 367, Orrville, Ohio.

HEATHKIT OP1 oscilloscope, \$125; Calibrated time base and vertical amplifier, Sparc CRT included. Frank W. Adams, K2HCH/6, 1812 Cypress St., Imperial Beach, Calif.

HAMMARLUND HQ-170C with spkr, in exclnt condx, \$295; H. Grant Paul, 26 Langdon Ave., Watertown, Mass. Phone Watertown A-9046.

HALLCRAFTERS S-40, \$45; OF-1 multiplier, \$9 or both for \$50. Western Radio 10-40 M trap antenna, \$5. G. Black, R 1, Essexville, Mich.

HT-30, \$200; SX-100 and R-46B spkr, \$175; all f.o.b. Schenectady, N.Y. Graham Hunter, K2JJA, 573 Nott Street, Schenectady, N.Y. Tel. FR 4-8195.

HEATH HW10 "Shawnee" 6 meters VFO transceiver, brand new, factory aligned, with mic, cables for mobile or fixed operation. Price: \$174.00. Phone 301-WA-6-1305, W3OKB, D. L. Saunders, Washington Grove, Md. (near Washington, D.C.).

COLLINS: Late model 32S-1, 75S-1, 312B4, 516F-2, 30L1, \$1350.00; Johnson Invader 2000, brand new, \$875.00, complete; National NC-300, \$180. Will ship F.o.b. Dallas. Bill Rutherford, 10521 Brockbank, Dallas, Texas, W5VWF, Fleetwood 7-4428.

SELL SX-110 Viking Challenger; Mosley V-4-6 vertical. WA2SVL, Tel. CY 9-4839.

SELL D-104 crystal mike, less stand. Will ship. \$14.00. W2HHP.

WANTED: Heathkit Twoer or Gonset 2M Communicator. John L. Sullivan, 1593 Herkimer Rd., Box 67, Utica, N.Y.

FLUDIC SSB-100, \$250, matches 75A4; Hallcrafters SX-100, \$150; KW final; 60 ft. Apodco tower, 3-band 5-element W1DZZ beam; rotor, guys, etc. First \$30 takes all! W1GWD, 321 North Ave., Weston, Mass. Phone 8934676.

SELL: Collins KWS-1, \$800; 75A-4, \$475; KWM-1 with AC and DC pwr. supplies, noise blanker, \$675; all in mint condx Matt H. Klapp, W2EOV, 17 Kenosha St., Albany 9, N.Y. Tel. 518-4344-518.

ATTENTION! Receivers, transmitters, test equipment: repaired, aligned, calibrated. Kits wired. Estimates given. Taled Co., 266 Park St., Stratford, Conn.

CUSTOM Building ham gear. VHF specialists, converters, power supplies, etc. Free quotes. Frontier Electronics, Orr 1, Minn. WOHPS, Everett Hoard, W0/PYC, Franck Hoard.

W.A.S. 20 Dx with Globe Scout 680 es VF-1, in 5 months. First above \$70. WA9CFA, 26 West Fairview, Springfield, Ill.

WANTED: Information on old friend EX-W9MIM, Ralph Sloc of Maywood, Ill. Sell Drake 2A, \$190, C-E Slicer, \$15, W9KEZ, Austin Thompson, 1832 16th Ave., Broadview, Ill.

VALIANT, like-new, \$295; Gonset SSB, Edwin O'Brien, W2LJF, Mt 1-1298, 132-38-84 St., Ozone Park 17, N.Y.

HT-37, \$350; Drake JA, \$150. Write or phone Dr. Ralph Mores, 423 W. 118th St., New York City, UN 4-5349.

STILL Looking for old wireless gear before 1925. Will pay good money or trade and particularly want certain spark equipment, a C.R.L. Parason with amplifigon or matching tube panel; DeForest Type O radiotelephone with tubes, catalogs, government callbooks and other books. File of OSTs is almost complete but need a few issues of 1916, 1917, 1918 and 1923. If you are lucky enough to own any copies I need I will pay real money for them. I want them that badly. Also need quenched gap sections number SE-1001 for SE1075 ship transmitter. In writing please give complete information plus price or specify what you need. W5VA/W5AL, T. Frank Smith, P.O. Box 840, Corpus Christi, Texas.

WANTED: Centimeg or similar 432 gear. WA6GER, 3241 Eastwood, Sacramento.

SELL: Apache, HQ-145C, WA2ZVJ, 2115 East 27th St., Brooklyn, N.Y.

PREMIUM Quality reconditioned equipment! Terms! Terms! Terms! World's largest stock! Chief Deluxe, \$49.95; Scream modulator, \$11.50; Gonset Commander, \$49.95; Johnson Thunderbolt (80-10M), \$399.50; Collins 75A-4s, \$450 up; 75S-1, \$349; Gonset G-66, \$99.95; Hallcrafters SX-73A, \$449; S-76, \$109; SX-88, \$299.50; Hammarlund HQ-105TR (transceiver), \$159; HQ-110, \$169; National NC-190, \$169; TMC CTR-90 (late), \$399. Leo, W0GFQ, Box 109, Council Bluffs, Iowa.

A-1 Reconditioned equipment. On approval. Terms. Terms. Hallcrafters S-107, \$108; S-99, \$99; SX-100, \$119; SX-111, \$159; SX-101A, \$249; Hammarlund HQ-100, \$119; HQ-110, \$169; HQ-170, \$259; Valiant, \$269; NC-300, \$199; Collins 75S-1, \$359; 32S-1, \$499; National, Gonset, Elmac, Heath, Johnson RME, many others. Write us for lists. Henry Radio Co., Butler, Mo.

"K1FD From Texas" outwaps them all. Check with Bryan, W5KTF, for the best trades anywhere. Extra long trades on National and Swan Triban rcvrs. Send for trade-in quote. Special "hot-shot" sale on demonstrators. This month's "hot-shot": National NC-155, \$169.50. Edwards Electronics, 2430-33rd St., Lubbock, Texas. Tel. SW 5-6362.

FOR Sale: Multi-Elmac fixed or mobile station, AF-68 transceiver, PMR-8 rcvr, M-1070, 12V DC and 115V AC power supply. All in gud condx, \$200. Bill Bradford, W1FSZ, 1138 Furnace Brook Pkwy., Quincy, Mass.

TELEX 20M318 3-el. medium spaced 20-meter beam. New, never assembled. \$125 f.o.b. Richmond, Va. D. P. Shafer, K2GU, 60 Hudson St., New York City.

FOR Sale: Gonset Communicator II for 2 meters, \$120 or trade for a Clegg 99'er. K1RMB, Barry Maxwell, RFD 1, Woodbury, Conn.

SELL: DX-20, \$25 and Knight Span Master RVR, \$17. Want DX-40 in gud condx. K3RBN, 300 Orchard Ave., Schuylkill Haven, Penna.

COLLINS 30L-1, \$385. In exclnt condx. Used very little. Sorry, pick-up deal only. Phone W2PZS, Trenton, N.J. JU 7-3509.

WRITE: Information on new L.P. filter for channel 2, 3, 5, 6 TV. Sycromatic Instruments, Inc. Stamps, W5JFJ, and K5OOR, Box 12441, Houston 17, Texas.

SELL: NC-100, \$145; DX-20, \$30; OF-1, \$10, or make offer, K3TIZ, 3620 Cumberland St., N.W., Washington, D.C.

SELL: Valiant F/W, \$275; NC-300 w/spkr, \$225; TH-4 beam, \$40; 40 ft. duty tower, \$45; TR-2 rotor and 100 ft. cord, \$20; D-104 mike G-stand, \$25; 500 ft. coax, RG-8/RG-11, \$20. All items are in exclnt condx. Lloyd Boucherie, 611 Gaston Ave., Fairmont, West Virginia.

ELMAC AF-67, in gud condx, \$80. Don Hanson, 37 Lake Ave., Eatontown, N.J.

BINDERS. Pay \$1 each for used QST or CQ Binders. Sell Johnson Matchstick vertical antenna. Complete \$30. W3BBE, LaSalle Rd., Towson 4, Md.

WANTED: Commercial FM handie-talkies or parts and subminiature tubes: 1AD4, 1AG5, 2E31, 2E32, 2E36, 2E42, 5851, 5881, CK5672, CK5678, CK5678, CK5734A, CK6029. CK-556AX, 6050, 6147, 6397. K9PSX, 4353. Morris, Milwaukee 11, Wisconsin, Tel. WO 4-1415.

FOR SALE: Bandmaster Deluxe model TBS-50D with pwr. supply (transmitter). Also Hallicrafters Skybuddy and converter. \$125.00. Dr. Ralph Rapicot, 8 Elm St., Southbridge, Mass.

COLLINS 75A3, late model and in excnt condx with spkr, calibrator and 3100 and 800 cycle mechanical filters. Best offer over \$300. R. Creter, 44 Gregory St., New City, Rockland Co., N.Y.

APACHE: In excnt condx, new 61465. Satisfaction guaranteed. \$200. W7CJR, 662 N.E. Royal Ct., Portland 12, Oregon.

FOR SALE: SX-101-A Rcvr, \$305; Heath Cheyenne Xmt, And HP-20 PWR SUP, \$110; All in v. good condx. Will recalibrate when sold; Also Collins Xmt-Rcvr, ICOS 12, Mobile & Fixed Pwr. Sup., complete. All accessories. \$175. W4GZD, local Herbsman, 1510 Unionport Road, Bronx 62, N. Y. JA2-7215.

Sell QST in binders 1954 thru 1962. CO in binders 55 thru 62. Sell Collins in FRO Model 70A, A, B, C, D, E, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ.

ATTENTION! Buy, sell, swap equipment, components with other ham! Many interesting offers in "Equipment Exchange". Sample copy free! Write: Brand, Sycamore, Ill.

SALE: Collins 32V2 xmt, \$220; Globe King 400 xmt with an extra modulation circuit and tubes \$150; RME BD 22A tuneable Preselector, all bands, \$25; Collins 75A3 rcvr w/3.1 kc. mechanical filter, \$275; Central Electronics 20A exciter 458 VFO and 600 L linear amplifier, \$525. Sell as complete SSB package (on air daily on 75 meters 3.9 Mc. N.J. Phone net and 3.985K/c Inter State SSB Net). Sry, no shipping pick-up deal only. Equipment too large to ship. Harold W. Kutz, JGU, 223 Swarthmore Rd., Glassboro, N.J.

CLEANING OUT. Tubes and parts. Stamp for list of bargains. M. Marshall, 46 Lincoln Place, Waldwick, N.J.

SELL: Heathkit Pawnee, \$165. Needs alignment. Jim Wade, 47 Hubbard Way, Aurora, Ill. TWInoaks 6-8768.

FOR SALE: Teletype receiving converter and transmitting unit, \$60; Model 14 typing reper., 60WPM, rapid feed-out, sync. motor, holding magnet, keyboard, cover, reel, end-of-line indicator, \$90. Tom White, 867 Berkshire, Dallas 18, Texas.

MODEL 19 Teletype machine for sale. This machine is complete and is in v. gud condx. Sry, will not ship, but will crate. Contact Larry, K9BJM, Hoopeson, Ill.

CRYSTAL Etching kit, \$1.00. Deluxe, \$2.00. Catalog on request. Ham-Kits, Box 175, Cranford, N.J.

KWM-2 110 V supply, 8 months old. Not a scratch. Guaranteed perfect, original packing. No time for operation. First \$850 takes it! W8NYA, 2332 Yale Circle, Eureka, Calif.

FOR SALE: HQ-129X, \$55; SX-43, \$45; Ameco CN-50, 6-M converter, factory aligned, \$30. All above with manuals. BC-603 modified to 38 Mc. band, \$10. W8AWX, 4720 Highland Rd., Howell, Mich.

SX-111, in perf. condx, \$195; factory wired Eico 720 xmt, \$60; 730 plate modulator, \$35. Also Viking 6N2 converter and VFO. Alex Vance, K9ODJ, 147 Dempster, Evanston, Ill.

HX-50 new, factory sealed carton, \$360; Drake 2B, six weeks old \$235. Both for \$575. K1BXU, 216 Cottage Rd., South Portland, Me.

WANTED: SX-42 rcvr. Please state price and condition. K8NVI.

HAM Burgers-Used Equipment, Money Back Guarantee. B&W 5100 with 51SB, 399.95; Clegg Interceptor, 399.95; Collins 75A4 MINT with vernier dial, 595.00; Eico 720, 79.95; Globe 680A, 59.95; Gonset G28, 144.95; Comm 1 with VFO, 150.00; Comm 1w-2 M, 270.00; Hallicrafters SR-34, 274.95; HT-33, 325.00; HT-37, 189.00; FPM-200, 1375.00; Hammarlund HO-110 with speaker 189.95; HO-160, 265.00; Heath DX-40, 54.95; Mohawk, 249.95; Apache, 249.95; Johnson Pacemaker, 324.95; Lakeshore Phasemaster II with VFO, 269.00; National NC183D, 335.00; NC300, 244.95; NC303, 349.95. Trades Write for free list. New Collins equipment in stock. Write for information & prices. Ham Burgers, Wyncote, Pa. CA4-1740.

WANTED: Names, QTH's of ham members of Church of Christ for listing in free directory. Send stamps for next edition (May-June). J. E. Guin, Jr., W4RLS, Russellville, Alabama.

FOR SALE: Brand new Eimac 4CX300A tubes, only \$15 each, postpaid. One used Eimac 6C21 at \$15; postwar HT-9, \$50. Collins 30K1 at \$400; 70 ft. Rohm triangular fold-over tower, Hy-Gain Mod. 152TG3 one kilowatt size three element trap Tri-bander, 150 ft RG-11/U and a brand new AR22 rotor; plenty aircraft pwr cable, all for \$155. W1DBS, John Savonis, 11 Dwight Court, New Britain, Conn.

WANTED: New BC-454, W2PTI.

TOWERS for hams. Built of galvanized eighteen gauge steel tubing. Fourteen dollars per ten foot section. Information on request. 110 Top Towers, 309 Main St, Macon, Ga.

TRADE Clean gud condx little used DX-100 SB10 for HX-20 or \$218. K9LET, W172 N8917 Shady Lane, Menomonee Falls, Wis.

GENERATOR, Pioneer, 2400 W 60 cyc., 3600 RPM, single phase 110 V. Ball bearing with voltmeter, takes 5 HP engine, \$70 120 mfd., 3000 v. Pyranol capacitors, \$20; FC-15 filament choke, new, \$4.50; Pr. 110 v. 60 cy. solenons with radio compass indicator dial, lot \$8.00. All f.o.b. Don Hover, K8PKS, Columbiana, Ohio.

SELL: 75A4, ser. 5446, spkr, 2 fltrs. 1575—absolutely like new; 75A3, ser. 5446, AM, 10R tuner, \$100; stereo amp-pre, B&W Bell 3030, \$95 and TEC transistorized stereo amp, \$95; 2-6550 tubes each, \$4; 2 E 26 tube RCA, never used, \$2; E-V 600 D mike, as is condx, working, \$5; mobile pwr. supp. with relays, etc. ready to go, 6 volts inn., about 400 volts, 350 Ma. outp. \$25; Johnson 275 watt Matchbox, \$30; VFO-matic for transceive operation w/ 75A3 rcvr, \$90. All in excnt like new condx. F.o.h. Lamb, 1219 Yardley Rd., Morrisville, Penna.

KWS1 Vernier, \$785, 32V2, \$190, 75A3 accessories, \$325; NC240D extensively updated, \$100; NC101 excnt, B.S for Novice, \$50; Handbook 4-250S amplifier kilowatt plus, \$100. W2HAE, 85 Franklin St., Northport, L.I., N.Y. AN 1-8474.

SELL: 75A3 1 Kc filter, spkr, calibr., excnt condx, \$350; GSB-100, excnt also, \$250. Ken Wilkens, K1MID, Hillsboro, N.H. Phone Hillsboro Upper Village 478-3152 (code 603).

WANT HO Trains and track. Will trade Jones MicroMatch, Sylvania modulation meter, two HK354C, VC50 VAC cond. Three 5D21 four 832, W9IED, Ray Feigel, 2509 N. Leclair, Chi., Ill.

WANT either Hewlett-Packard Mod. 254C counter or earlier mod. or Beckman EPUT Mod. 7170. Sell Collins 30S1, W2ADD. FOR Sale: B&W 5100 with 51SB adapter, \$325; 51 SB adapter, \$100; Collins 32V2, \$250; Drake 1-Am \$125; 2-A, \$185; Gonset G-77 with 3-way P/S, \$175; Communicator 111 6 meter, \$155; Communicator 111 (new) GM, \$225; Harvey-Wells TBS 30, \$30; HRO-50T \$40; F-90 \$30; Heath Cheyenne, \$95; Apache, \$200; Johnson Viking I, \$75; II, \$125; 6N2, \$95; Pacemaker, \$275; National HRO-50-T with 3 coils, \$150; SP-400 w/spkr and P/S, \$125. Grice Electronics, Inc. P.O. Box 1911, Pensacola, Fla.

SELL Station for less than price of a transmitter, Viking 500, HRO 50 with extra coils, FM detector and spkr, KW Matchbox, TVI filter, bug, and 40 ft. self-supporting tower, two extra 4000As, all for \$900. Will consider offers on individual items. Also have miscellaneous test equipment for TV and radio. Write for particulars. Richard North, 18253 Swarthmore, Saratoga, Calif.

WANTED: Electronics instructor First Class Commercial 19 plus theory and workshops. Co-ed science camp. Call NYC MO 3-4808.

FOR Sale: Collins 32S1 and 75S1 with Waters Q, \$825; Bycraft Hydrodyner for 6 meters, \$125; 6 meter KW final, with pwr. supply, \$300; Hallicrafters S-39, \$15; Eico 5 in. scope, \$20. Delivered 400 miles of NYC. Thomas Burnside, 167 State St., Brooklyn 1, N.Y.

HAWAII: Collins 75A4 serial 4054. In mint condx. Matching spkr, original carton. Extra filters. Some trade considered. Make offer. KH6EVG, Honolulu, 286045.

FOR Sale: HT-37, \$375; SX-101A, \$295. Both in perf. condx. Will discuss a package deal. Prices F.o.b. Pookip, N.Y. H. Lacey, W0CEJ/2, Entry Rd., Hopewell Jet., N.Y.

S.S.B. Complete station: HQ-110C and Pacemaker. Both are absolutely perfect. Johnson T-R switch, new, \$399. Complete deal or will sell separately. F.o.b. Rockford, Ill. K9VJE, 1219 Garrison Ave., Rockford, Ill.

SOUTHERN California: KWM-2 with AC supply and extra stals, \$910. W6BLZ, 528 Colima St., La Jolla, Calif.

TRADE Entire station for light airplane or sell. Worked 275 countries. Write for particulars. Jaeger, 5753 SW Burma, Oswego, Oregon.

SELL: HT-37, \$335; SX101A, \$265. K5MWU, QTR8 1831B, Blytheville AFB, Arkansas.

SALE: Meissner sigr. shifter, plug in coils, \$10; Heath VF1 VFO, \$10; Heath WA12 Hi-Fi w/amp, \$10; B&W \$20 0-pass fltr, \$7; VOM, bit, pwr., \$5; Collins TCS xmt & pwr. supp. \$35; Hammarlund HQ-129X w/spkr, \$125; Heath 0-6 ncr. spec, 5, \$30; 2 mtr. rcvr. Abbott TR4 regen \$5; pwr. supp. 250V-100 Ma, 6V-3A, \$5; Heath DX-35 xmt, \$25; Heath 6'er, \$30; g mtr, halo, \$1; 6V balun coil (2), bxd, \$5; hand keys (2), \$8 ea.; bug, \$5; Arconne R-5 (new), \$5; 10 m. mobile vibrator, \$7; carbon mics (2), \$1 ea.; 10 m. rcvr xmt built-in 6v dyn. xtal. conl. 30 wts, \$25; ant. coup, \$2; 4 mtd. @ 7500VDC, dual (2), \$2 ea.; BVI elec. jig saw & sander, \$2 (swap). Gaul. K2GMV, c/o US Army Pro. Ctr., AP 757, N.Y., N.Y.

TENER And 12 volt pwr. supply, \$40. K8AMN.

SELLING: HQ-110C, \$140; Viking Adventurer, \$35; Heathkit xtal calibr., \$9; all in excnt condx. K. A. Berberian, 448 Old Cedar Rd., Orange, Conn.

SWAN SW-175 transceiver wanted. Sell Heath HX-20 SSB xmt. Guaranteed A-1 condx, not a scratch. Builder holds first phone ticket. \$225. K5GRV, Box 202, Filton, Miss.

WANT National SW3 rcvr, \$886AB supply and coils. Must be gud shape w/manual. Needed by 21er Scout. Clark, W0UDZ, 2317 Vine, West Des Moines, Iowa.

WANT Ham-M rotor. Will pay cash or trade 21 in. Dumont table model VHF TV and/or Redfield 4X rifle scope. Both in excnt condx. C. Malinowski, So. Deerfield, Mass.

MOBILE Gear Gonset G66B with 3-way power supply and G77A with modulator pwr supply. Some extras, \$225. Prefer local deal. WA6NXL, 1559 Roscreans, San Diego 6, Calif.

WANTED: Schematic for Supreme Signal Gen., Mod. 561. Swap: Philco (JHF free meter, antique Bdest rcvr, etc. Want A54H or mobile xmt. W4GEV, Shepardsville, Ky.

SALE: Collins 75A4 rcvr in excnt condx. Included is 3.1 kc mechanical filter, vernier knob and original Collins spkr. High serial number. Only \$450. Walter Key, W9POK, 216 Dec Rd., Apt. D, North Aurora, Ill.

SB10, Well constructed, \$60. Drake 2B with 2B0 and xtal calibr., \$330. Like new condx. Joe McCaffrey, K2KOS, 260 Monticello Ave., Jersey City, N.J.

SELL E-Z way tower galvanized heavy duty tilt-over crank-up RNX4G, \$200; Telrex 175RS rotor and indicator \$100. Mosley TA33 Tri-bander, \$50. All excnt condx. F.o.b. W5DA, 4524 Druid Lane, Dallas, Texas. Phone Lakeside 8-3694.

KWS-1, perfect, \$835; 32S-1, #11,820, \$495; 100V excnt, \$495; late 75S1, \$375; Drake 1A, ser. 80, No. 1043, \$175; new \$16F-2, \$90. W8WGA.

GONSET Communicator II. Two meter model. Excellent condition except for a few minor paint blemishes. With cables for 110 VAC and 6 VDC. \$110. Drake 1A latest model with WVW, crystal calibrator and AM. New condition \$150. Pierson KE93. Immaculate condition, the best mobile SSB, AM, CW receiver ever built. 7 bands broadcast thru 10 meters, stable as a rock with Pierson mobile 6 or 12 supply \$100. Will throw in homebrew AC supply. Four new Eimac 4C X 50B \$12.50. T-10. \$89. \$10.00 each. Factory sealed cartons. W7M01, 4901 E. Cooper, Tucson, Arizona.

CRYSTALS Air mailed; SSB, MARS, Commercial, Net, Novice, CAP, etc.—Custom finished FT-243, .01% any kilocycle 3700 to 8600 \$1.49. (10 or more FT-243, same frequency, 95%). 1707 to 20,000 Kilocycles \$1.95. Overtones supplied above 10 megacycles. Fundamentals 10,000 to 13,500 \$2.95. Add .60 each for .005%. Add .65 each for HC-6V hermetics. OST Crystal Kits (FT-243). "SSB Package" five mixer \$9.95, seven matched filter (FT241-A) \$9.95; "DCS-500," "IMP," "Phasing" \$9.95/set. Write regarding circuit needs. Airmailing 10¢/crystal. Surface 5¢. Crystals since 1933. C-W Crystals, Box 2065-Q, El Monte, California.

PHASING SSB Xmttr. Nov. 1959 QST. \$85; RME 4350 w/xtal calibr., \$135; Lakeshore SSB Slicer, \$20; Exclnt SX-28, \$75; Globe 6N2 Hibander, \$65; speech booster, \$12.00 National 6N2 VFO, \$25, speech amp, and mod. 300W audio, \$25; 16WVDC 400 Ma supply, \$20. F.o.b. John Gibes, W8RHD, 1317 Emmet, Petoskey, Mich.

COLLINS Owners Work AM! S/Line KWM 1-21. No drilling! Soldering, Chassis removal! Instant switching! Easy installation! Wired Kit, \$5.00. Foreten, \$6.00. Spin-type tuning knob, \$12.00. Scope receiver adapter kit, \$3.00, foreign \$3.50. Kit Kraft, Box 763, Harlan, Ky.

SALE: (4) Jan. UCS Vac. var. 300 mmf. 10,000V, new, \$21 ea.; Gonset Tri-band conv., exclnt, \$12; pair BC-611 Walkie-talkie 3885KC batt., manual, exclnt, best offer; Vibroplex bug "Original" w/case, \$17; ARC-4, 28V/12VDC dyn., \$10; Heathkit QF-1 multiplier, \$8; (3) 4-125s, new, \$20; TCS12VDC 400V 200 Ma dyn., new, \$10; DM-35 12VDC, new, \$10. T. Ray, Rt #2, Oxford, Miss.

FOR Sale: S-85/QF-1, like new condx, K1KND, 5 Grimes Rd., Lexington, Mass.

IN College, must sell: Heath HX-20 exciter, Morrow Twins, kilowatt linear, Hallicrafters S40B. Best offer. K6GUW, 111 Newtonhall, Angwin, Calif.

SSB Combination HT-30 exciter 50 w., \$225; HT-31 linear, 500 w., \$175; both together, \$375. On air now 80-40-20, R. C. Long, W8GUS, 1688 Guilford Road, Columbus 21, Ohio.

SELL Hy-Gain TH-2, KW beam, year old, \$35. K2KGU, MO 6-8513.

SELL: Zenith Transoceanic Communications receiver, \$40; Masco 2-station intercom, \$10; Kodak 8mm Brownie movie camera, F1.9 lens, case, light bar with 4 new bulbs, \$20. (swap?) V. R. Hein, 418 Gregory, Rockford Ill.

WANTED Mobile Mount and carrying case for KWM-2. Johnson KW attachment with SWR meter, Collins 310-B exciter; 7533 receiver. Parts for grounded grid W final. K3BHB 903 Western Ave., Jeannette, Penna. IA 3-5936.

SELL: Globe DSB-100 and IA-1. Both in mint condx. \$75 each. QF-1, \$8. 13518 Hartland St., Van Nuys, Calif. ST 0-6619.

12V Link mobile 2 meter 50 w. FM. Spare trans. and cables: \$35. W5BLZ.

4/1000A GG linear, completely shielded, low-pass filter, vacuum variable, B&W coil, Eimac socket, blower, 19" high panel, spare tube, no pwr. supply, \$360.00. W2CFT.

HEATH Marauder two months old. Works perfectly, \$350. Gonset Communicator III, 2M, exclnt, \$175; Eldico EE-3A kever, \$40. K2MVR, 33 Laurel Place, Montclair, N.J.

CAPACITORS: 250 mfd, 450 volts 1 3/8" x 4", 95¢. Barrett, 2970 Lawrence, Wantagh, N.Y.

DX-100 for sale. Local deal preferred. Modulator needs some work. \$90. W3MWC, James C. Berger, 6615 Silverwood St., Phila 28, Penna.

MODULATION Transformer, brand new, 425 watts, resp 1 db 100-5000. Made for Collins KW-Thordarson T 45550. Best offer over \$25. W5WMR, 2132 Cherry, Vicksburg, Miss.

WANTED: Morse Wheatstone (Creed) tape perforator, 12 mm. Also transmitter. K0JRU, Box 246, Savannah, Ga.

WANTED Teletype in gud condx. WA6AWD/6, Alan Burgstahler, 5337 Remington Rd., San Diego 15, Calif. Tel. JU 2-3194.

POLY-COMM 62B. In exclnt condx, wired with Ameco 6-2 meter Nuvistor pre-amps and pwr. supply. \$295. John, WA2PBN, 1035 Summit Ave., Westfield, N.J.

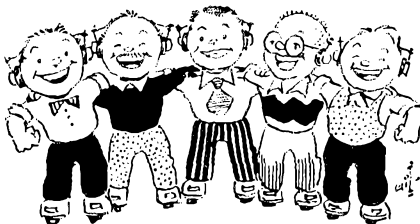
ELMAC AF-67 with PS-2V AC pwr. supply, \$100. F.o.b. Redwood City, Calif. Tom Clements, W8JGD/6, 111 Skylanda.

COLLINS 75A4 receiver, clean condx. \$500. Ser. No. 1684. Heathkit Warrior amplifier, \$200, output meter and spkr, \$75; Eimac 450TL new, best offer. F.o.b. Eatontown, N.J. W2JMH, 23 Locust Ave.

SALE: 1—Hallicrafters HT-41 demonstrator, new condition, \$295.00; 1—T21F20 \$5.00; 1—6.3V 12.5A (new) \$5.00; 2—6320V C.T. 500 ma (Collins 30S1 New) \$45.00 each; 2—8 hy 500ma (Collins 30S1 New) \$10.00 each; 4—872A \$3.50 each; 2—4x150A \$5.00 each; 2—4x250B \$15.00 each; 2—5894 (New) \$1.50 each; 2—8x1A (New) \$1.50 each; 2—3B28 (New) \$4.00 each; 1—B & W Model 380B \$15.00; 1—B & W 10HDA \$3.00; 1—R & W 40HDA \$5.00; 1—Johnson 1000HC/S10 \$3.00; 1—Johnson 100HC/S20 \$3.00; 1—Johnson 1000HCS40 \$3.00; 1—Johnson 1000HCS80 \$4.00; 1—Jackbar & Links \$3.00; 2—Johnson N375 \$5.00 each; 1—Johnson 75DP90 \$7.50; 2—Johnson 124-213 sockets \$1.00 each; 1—Vibroplex Original Deluxe 2—Eimac VC 125 \$15.00 each; 1—Amperex VC 25 \$15.00; 1—EV 641 mike (New) \$21.00; 1—EV 950 mike \$10.00. (New) \$15.00; 1—Heath QF-1 (New) \$8.00, R. Bellew, 1005 W. 4th, El Dorado, Arkansas.

\*\*\*\*\*

# United We Stand...



Have You Signed Up  
Any New Members  
Lately?

As the old greeting-song goes, "The more we stick together, the happier we will be." The more members your League has, the more prestige it enjoys; the more prestige it has, the better it can protect our privileges; the better it protects our privileges, the more fun you and I get out of ham radio. Start your own membership campaign soon.

P.S. Don't forget that additional licensed amateurs residing in the same household with a full member may join the League for only \$1—without having to obtain a subscription to QST.

QST and ARRL Membership \$5  
\$5.25 in Canada, \$6 elsewhere

THE AMERICAN RADIO  
RELAY LEAGUE, INC.

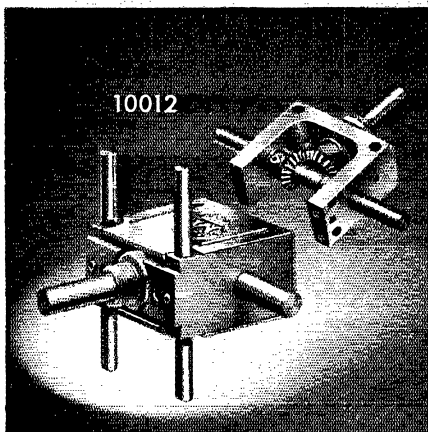
West Hartford 7, Connecticut

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# Designed for



# Application



10012

## The No. 10012 RIGHT ANGLE DRIVE

"Designed for Application." Extremely compact. Case size is only 1 1/2" x 1 1/2" x 3/4". Uses bevel gears. Mounts on adjustable "standoff rods," single hole panel bushing or tapped holes in frame. Ideal for operating switches, potentiometers, etc., that must be located, for short leads, in remote parts of chassis.

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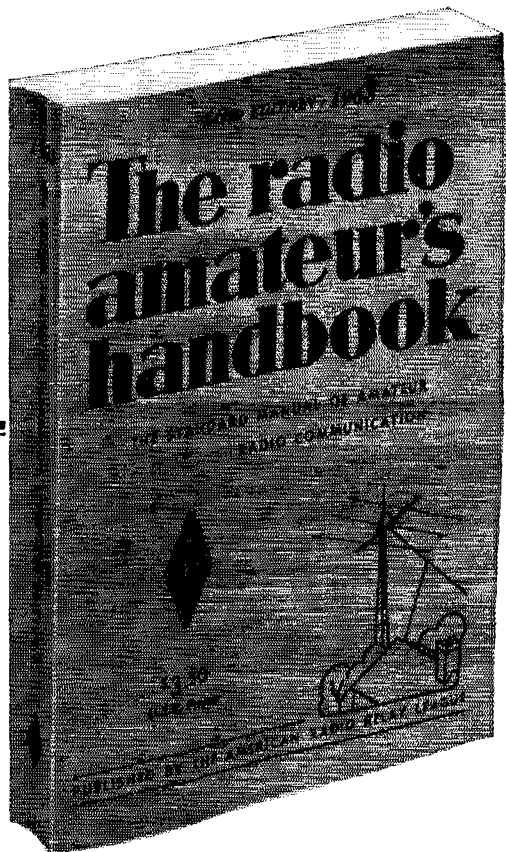


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# 1963 EDITION



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AVAILABLE**

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*A*N INVALUABLE reference work and text for everyone—radio amateurs, engineers, lab men, technicians, experimenters, students, purchasing agents.

*A*nnual revision is a feature of the *Handbook*, always with the objective of presenting the soundest and best aspects of current practice. The big, 1963 Edition contains many new descriptions of equipment. Semiconductor and vacuum tube tables are brought up to date. Every important aspect of amateur radio is covered: transmitting, c.w., a.m., sideband, radioteletype; receiving; mobile; v.h.f.; propagation; antennas; construction; theory; charts; diagrams; transistors; vacuum tubes; station assembly and operation. The complete handbook!

\$3.50 USA proper    \$4.00 US Possessions and Canada    \$5.00 Elsewhere  
Clothbound Edition \$6.00 USA, Possessions and Canada, \$6.50 Elsewhere

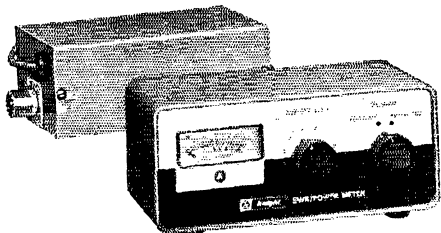
The **AMERICAN RADIO RELAY LEAGUE, Inc.**  
WEST HARTFORD 7, CONN.



# Punch Out a Great Signal with this *knight-kit*® 150-Watt AM-CW Transmitter

## MOST "WATTS-PER-DOLLAR"!

- 150-Watt Input 80-10 Meters; 100-Watt on 6 Meters
- Controlled-Carrier Screen Modulation for Max Power
- Stable Built-in VFO with Planetary Drive Tuning
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- Adjustable Pi-Network Output Matches 40-600 Ohm Antenna



## New P-2 SWR/Power Meter Kit

ONLY  
**\$14<sup>95</sup>**

Now! Get the most from your transmitter and antenna! This new "in-line" SWR/power meter measures relative power being fed to antenna and standing wave ratio reflected from it; lets you make your own matching adjustment between line and driven element for maximum RF. Features flexible two unit design (coupler and indicator units) with 4-foot shielded connecting cable; has coax connectors, full KW capacity; can be left in line as constant monitor; reads SWR from 1:1 to 20:1; accuracy better than 10%; negligible insertion loss; for unbalanced 50-72 ohm lines, Amateur and CB; range from 1.8 to 432 mc; has sensitivity adjustments; no AC power or batteries required. Coupler, 2 x 5 x 2 1/4"; indicator, 2 1/2 x 6 1/4 x 3". Complete with all parts and instructions. Shpg. wt., 2 lbs. **\$14<sup>95</sup>**  
83 YX 627 EF. P-2 Kit, only.....

## New T-150 Transmitter Kit

ONLY  
**\$119<sup>95</sup>**

only \$6 monthly  
on Allied's  
Credit Power Plan

Packed with features to put out a solid signal that really punches thru the QRM! 150 watts AM/CW input on 80 thru 10 meters, 100 watts on 6 meters. Highlights: Highly stable VFO has illuminated dial and planetary drive; socket for optional switch-selected crystal operation; efficient controlled-carrier screen modulation; adjustable pi-network matches 40 to

600 ohm antennas; buffer stage isolates oscillator from final; parallel 6146's in output stage; silicon diodes for reliable high-voltage and low heat; voltage regulator in B+; single knob bandswitching; TVI suppressed with all leads in and out of case by-passed for RF; switched meter reads buffer, final grid and final plate currents and relative power output; mode switch provides for VFO spotting and tuning without placing a signal on-the-air; clean chirpless keying—no high voltage at key terminals; plus a host of other fine features. With all parts, tubes, plugs, wire, solder and step-by-step instructions and handsome gray satin metal case, 8 1/2 x 17 x 10 1/2". Less mike, key, crystals. For 110-125 v. 60 cycle AC. 28 lbs.

**83 YU 403 EF. T-150 Transmitter Kit, only..... \$119<sup>95</sup>**

YOU GET MORE FOR YOUR MONEY  
IN THESE QUALITY KNIGHT-KITS



**satisfaction guaranteed  
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Now! More Buying Power with  
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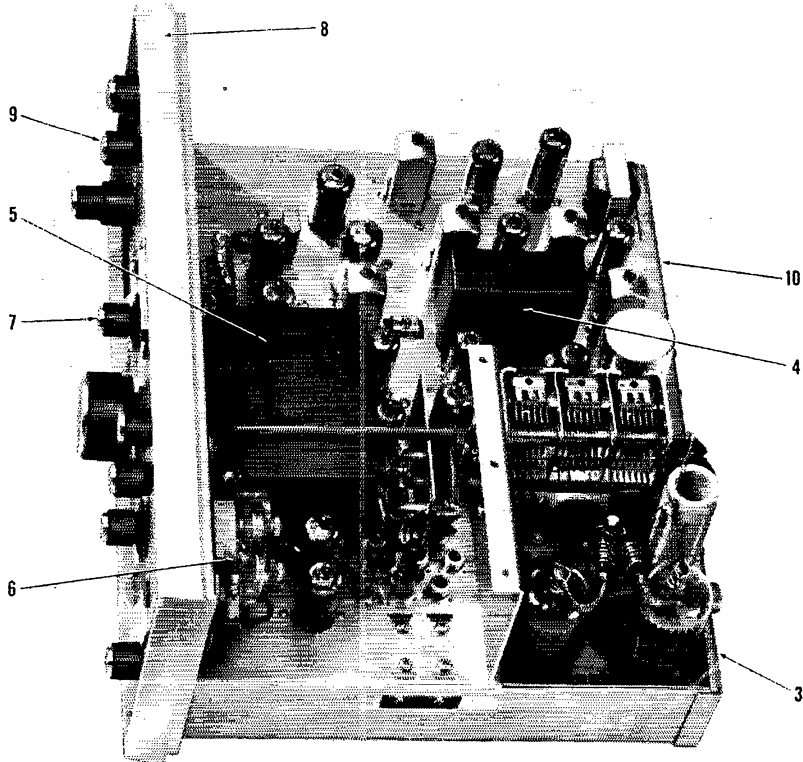
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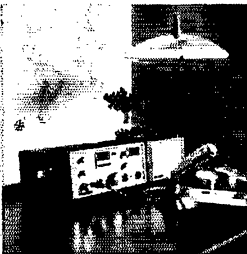
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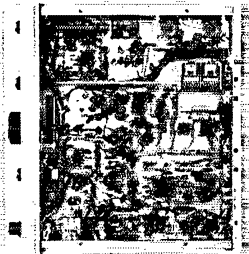


## 12 inside reasons why your next rig should be the NCX-3 SSB transceiver

1. Complete coverage of the 80, 40 and 20 meter phone and CW bands.
2. All desirable operating features including built-in VOX/PTT, SSB/CW AGC, AM detection in the AM mode, and break-in CW with adjustable release time.
3. Variable pi-network final amplifier uses parallel 6GJ5 pentodes for conservative 200 watts PEP on SSB, 200 watts DC input on CW and 100 watts input on AM. Note: Protective shield removed for photo.
4. High frequency 2.5 kc crystal lattice filter for both transmit and receive, together with RCA 7360 balanced modulator provides 50 db carrier suppression and 40 db unwanted sideband suppression.
5. National "high-zero" VFO for maximum mechanical and electrical stability provide simultaneous transmit and receive frequency adjustment.
6. Combination illuminated D'Arsonval meter automatically switches between signal strength and PA cathode current.
7. Function switch automatically sets NCX-3 up for operation in any mode.
8. Extruded aluminum front panel for maximum solidity, anodized instead of painted for resistance to wear and scratches.
9. Front panel carrier balance control for AM or CW operation.
10. External relay control for use with high power linear amplifier.
11. The NCX-3 is backed by National's exclusive One Year Guarantee . . . your assurance of superb engineering and trouble-free operation.
12. Amateur Net \$369 — need we say more?



The NCX-3 shown with matching NCXA AC Supply/Speaker Console (\$110), is a complete — and compact — 80, 40 and 20 meter amateur station. NCXD Transistorized DC Supply (\$119.95) for use in mobile operation. Mobile mounting bracket is included with NCX-3.



The NCX-3 is wired to conform with National's stringent quality standards. Note cable harnessing and neat "right-angle" component placement to make all parts readily accessible.

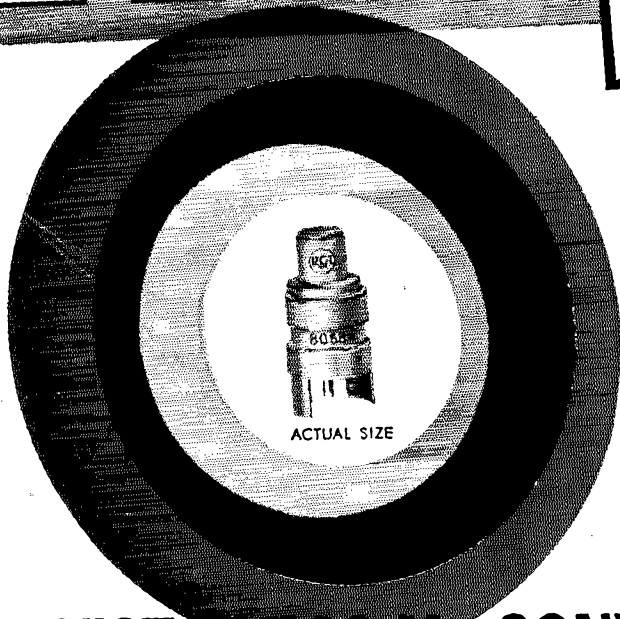
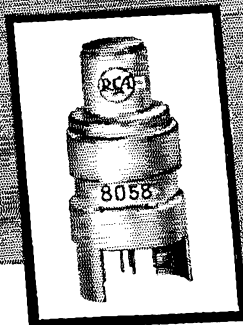


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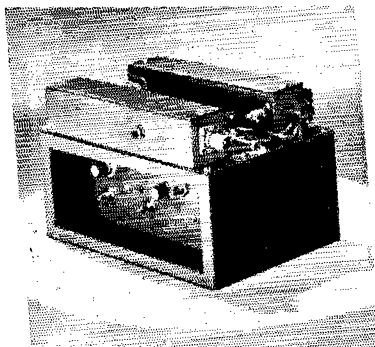


# HAM TIPS



ACTUAL SIZE

## ALL-NUVISTOR 432 Mc CONVERTER



RCA Nuvistors have already been successfully used in the 144 and 220-Mc bands. Now, the advantages of Nuvistor can be put to practical use in a new converter for 432 Mc. Noise figure and gain of the first rf stage in this unit is so favorable, for example, that signals which are generally hidden in the noise level of other converters are easily detected with this nuvistORIZED converter.

How it works...how to build it...how to operate it...is all covered in detail in Fall 1962 Ham Tips. Get a copy from your RCA Industrial Tube Distributor, or write: Section C-37-M, Commercial Engineering, RCA Electron Tube Division, Harrison, N. J.

RCA's complete line of nuvistors—7586, 7587, 7895, 8056 and 8058—are available through your local RCA Industrial Tube Distributor.

The Ham Tips 432-Mc Converter, using six RCA Nuvistors, including the RCA-8058 double-ended, high-mu triode which is used in 2 rf amplifier stages.



The Most Trusted Name in Electronics

# 160-Meter Privileges Expanded!

*ARRL Request Granted — More Frequencies Available*

*Some Power Restrictions Added — Geographical Areas Revised*

The Federal Communications Commission, responsive to a petition of the American Radio Relay League, has announced a revision of the Loran-amateur sharing arrangement in the 1800-2000-kc. band. The new setup was worked out after extensive engineering analysis by the U.S. Coast Guard, which has the responsibility for Loran operations. Check the chart on the reverse of this page for specific details, but the broad highlights are:

1. Every state has additional frequency privileges, including the Gulf area, Alaska and the possessions, heretofore barred from 160-meter operation.
2. The U.S. is divided into more specific areas, including county boundary lines in several instances, to provide maximum amateur use. Some areas, because of their remoteness from Loran sites, can now use all frequency segments available.
3. The expanded frequency privileges require, in a few areas, reductions in presently-permitted power input. This is in consonance with the League's statement of principle that lower power on wider frequencies is more useful to the amateur service than higher power on limited frequency assignments. Check your area to see if you are affected.
4. Single sideband operation is prohibited, on the old as well as the new segments. We hope that further studies will later permit resumption of such emission, but it's no s.s.b. for a while at least.
5. Operation on the newly-available frequencies is authorized effective February 21. The power reductions and single-sideband prohibition are effective April 15, 1963.
6. This new allocation is subject to the same conditions which have always existed—i.e., no interference to the Loran service, and the sharing arrangement for amateurs is subject to revision or cancellation at any time without notice.

While the over-all setup looks complex, for any one state or smaller area the applicable frequency and power privileges are simple. Tack a note in front of your operating position showing local privileges. This is particularly important in areas where both pairs of frequency segments are available, but with different powers.

**The League urges meticulous care in observance of the new rules!**

# 160-Meter Privileges

(A-1, A-3 only; no s.s.b.)

Area	Permitted input power, watts			
	1800-1825 kc.		1900-1925 kc.	
	Day	Night	Day	Night
Alabama, Louisiana, Mississippi, Puerto Rico, Virgin Ids., other possessions in Caribbean	No operation		100	25
Alaska	200	50	No operation	
Arkansas, Illinois, Kansas, Missouri, Oklahoma, and Texas east of 105° W.	100	25	200	50
Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming, and Texas west of 105° W.	200	50	500	200
California, Hawaii, Oregon, Washington, and Baker, Canton, Enderbury, Guam, Howland, Jarvis, Johnston, Midway, Palmyra Islands	No operation		500	200
Connecticut, D.C., Delaware, Massachusetts, Maine, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Wake Island plus, in Virginia, Arlington and Fairfax counties and city of Alexandria	500	200	No operation	
Indiana, Kentucky, Ohio, Tennessee	100	25	100	25
Iowa, Minnesota, Wisconsin, northern peninsula of Michigan	500	200	200	50
Nebraska, North and South Dakota, American Samoa	500	200	500	200
North and South Carolina, West Virginia, plus Virginia except as above	100	25	No operation	
Michigan, southern peninsula	500	200	100	25
Florida: counties of Columbia, Union, Bradford, Putnam, Lake, Osceola, Okcechobee, Martin, Palm Beach, Broward, Dade, and counties to the east.				
Georgia: counties of Union, Lumpkin, Hall, Jackson, Barrow, Walton, Morgan, Putnam, Baldwin, Wilkinson, Laurens, Wheeler, Telfair, Coffee, Atkinson, Clinch, Echols and counties to the east	25	25	No operation	
Florida: counties of Hamilton, Suwannee, Gilchrist, Alachua, Marion, Sumter, Polk, Highlands, Glades, Hendry, Collier, Monroe, and counties to the west.				
Georgia: counties of Fannin, Gilmer, Dawson, Forsyth, Gwinnett, Rockdale, Newton, Jasper, Jones, Twiggs, Bleckley, Dodge, Wilcox, Ben Hill, Irwin, Berrien, Lanier, Lowndes and counties to the west	No operation		25	25