

# CQ

JUNE, 1949

## The Radio Amateurs' Journal

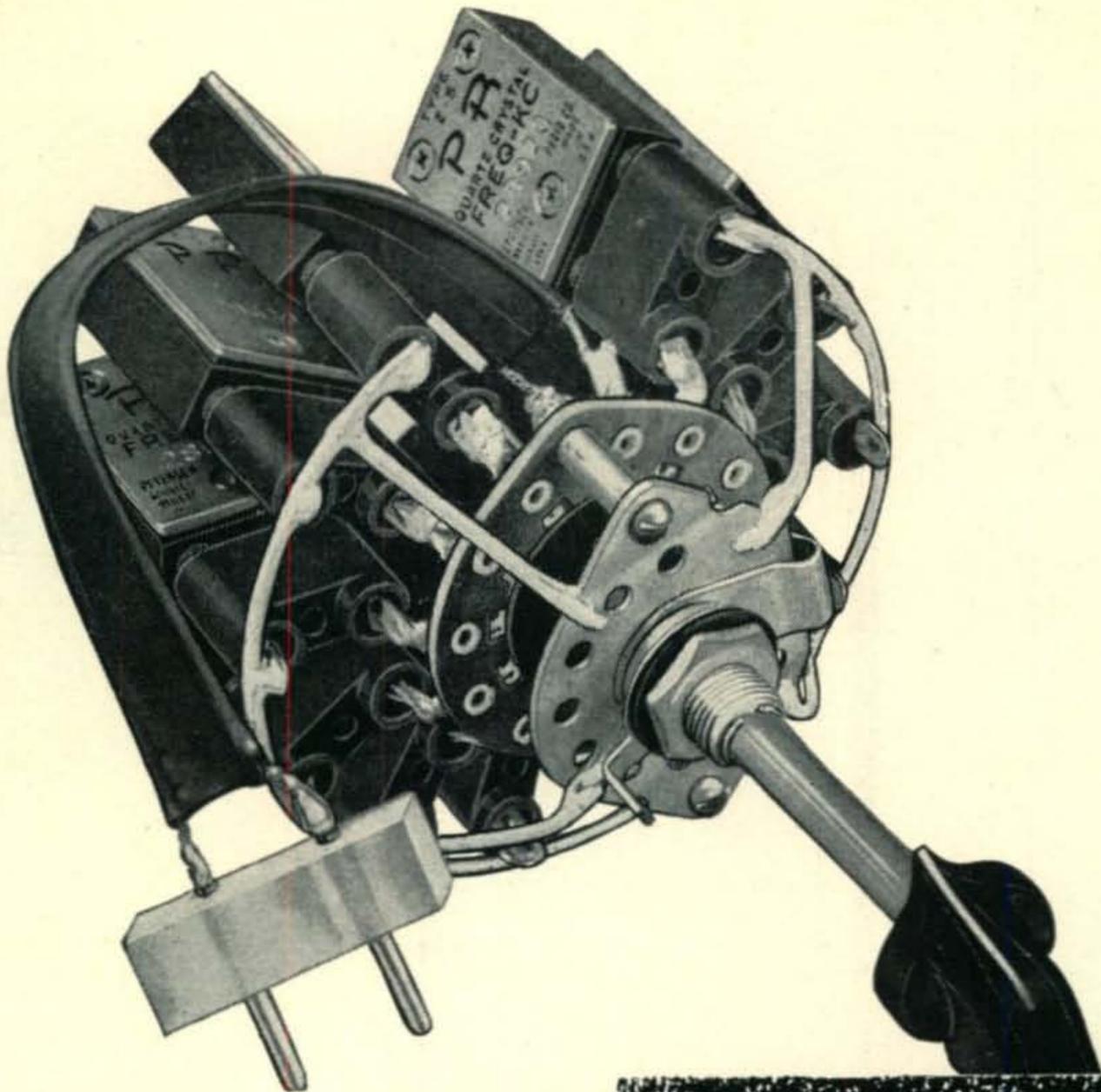
35¢



**THIS MONTH:**

The New Proposed FCC Regs  
Constructing the Quad  
Results CQ's DX Contest  
TVI Shielding Experiments

Published by RADIO MAGAZINES, INC. Subscription \$3.00 a year



## NOW YOU CAN GO PLACES!

QSY is as easy as pie! Yes, the Crystal Shifter illustrated above gives you INSTANT SELECTION of as many as eleven crystal controlled frequencies within a 100 kc. or so range on phone . . . without removing excitation, turning off plate current, or retuning of transmitter stages . . . without danger of getting out of the band . . . with positive knowledge of where you are ALL THE TIME! You can build this PR Crystal Shifter in a half hour or less with a soldering iron and a pair of pliers. You can follow the construction easily from the above photo. Components needed are: Centralab 11 position rotary switch assembly No. 1402;

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SINCE 1934

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**V-h-f beam power tube**

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Max plate input	40 w
Max plate dissipation	13.5 w

**T**OP 30 mc in ham discussions, and Type GL-2E26 takes a bow. This modernly engineered addition to the ham's tube list is ideal for work in 2- and 6-meter rigs. There's a reassuring record of hard commercial service in FM. And the price of the tube is low: *three* GL-2E26's, one for driver and a pair for push-pull final, cost less than one standard "50-watter!"

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(List as of Feb. 25, 1949)

GL-2E24	GL-2E26	GL-2E30	GL-4D21/4-125A	GL-35T	GL-100TH	GL-203-A	GL-211	GL-592		
GL-802	GL-803	GL-805	GL-806	GL-807	GL 810	GL-811	GL-812-A	GL-813	GL-814	GL-815
GL-826	GL-828	GL-829-B	GL-832-A	GL-837	GL-838	GL-1613	GL-1614	GL-1619	GL-1623	
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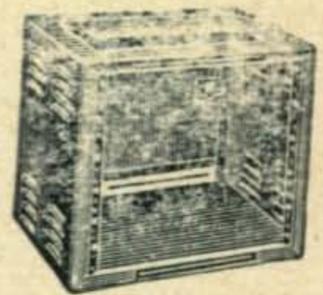
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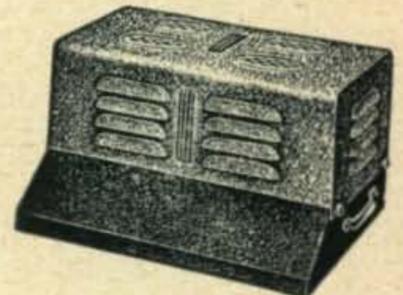
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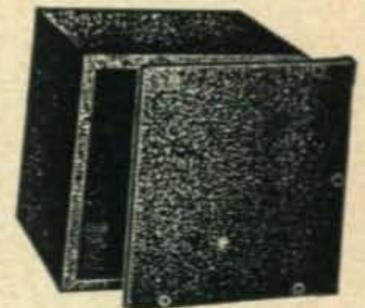
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Vol. 5

JUNE, 1949

No. 6

## In This Issue

COVER—One antenna capable of highly efficient performance from 6 to  $\frac{3}{4}$  meters! No tuning stubs or matching transformers needed and the s.w.r. is under 2:1 over the entire frequency range. That's the Discone. The cover photo shows a vertically polarized temporary test installation being inspected by Joe Boyer, W6UYH, who gives complete details in July CQ.

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★ ★ Letters ★ ★

It's Only A Hobby, OM

5023 So. Ferry St. Tacoma 8, Wash.

Editor, CQ:

Your March issue reveals a letter by my old pal, Bill Lippman, W6SN, that I believe should be answered.

Bill, frankly, I used to have DX "rabiditus" just like you, but calm reasoning finally came to me and I found there were other things in life besides chasing DX and souping up my rig. DX chasing is still my main pleasure when I do get on the air, which isn't too often; however, it has been a long time since "every dot looms as big as a house" to me. Heck, Bill, I've found that by relaxing and taking it easy I work more DX and work it easier. I sleep better, my food digests better and a whole lot of other nice things happen to me.

Now, honestly, OT, what is wrong in wishing a chap across the world, in, perhaps, a country where things are not too pleasant at the best, a little luck and, in season, a Merry Xmas and Happy New Year? Said once and not repeated (as I admit, some do), such an ending is, in my opinion, O. K.

As I get older I find that fewer and fewer things irritate me. A few still do, such as the super KW chaps who work each other across town, full power, with their beams aimed directly at me, and the lads with the beautiful and broad resonance filter notes! I've come to the opinion, however, that the vast majority are pretty swell guys and "puddingheads" that "should have their heads examined" are few and far between. Whenever I get to feeling a little off color I remember, Bill, "that everyone is a little queer but me and thee, and sometimes I have my doubts about thee."

What do you say, OM, that we have a martini, with two olives, and go out and have a duck dinner? I'll buy the dinner. And afterwards let's go out and "powder our faces with sunshine." Shall we, Bill, huh?

*Frank Pratt, W7DXZ*

**Pink Tickets to Civilians**

601 Main St., Taft, Calif.

Editor, CQ:

With the coming of television, automobile ignition interference being still with us, why is not something done about it? Those of us forced by circumstances to live on a busy street have always had this trouble with short-wave reception. Our receivers have a noise silencer which does not silence this interference.

Why are people allowed to broadcast this noise with their cars when anything else has to have a license? It is illegal to operate a car without a muffler, but not illegal to operate it with all the noisy spark they want.

Seems to me the manufacturers have been very weak on this point and this noise can be eliminated at the source if sufficient publicity would be given it. New cars should be equipped with filters. But how many owners would leave it on, unless it was illegal to remove? Cars run just as good, but

*(Continued on page 72)*

CQ

## To Amateurs who want Excellent Ham Performance at Moderate Prices!

**Here** is advance information on a new Hallicrafters Ham receiver, the SX-71. It will have top performance features in a price to please you—considerably under \$200.

Band width will be less than 14 kc, 1000 times down from resonance. The double superheterodyne design will give image rejection at 28 Mc of better than 300 to 1. And the sensitivity will be in the order of 1 microvolt.

Five bands will give continuous coverage from 538 kc to 56 Mc; also, there will be calibrated band-spread scales for 80, 40, 20, 10, and 6 meters. NBFM reception will be available, via *built-in* limiter and balanced detector stages.

Here is a receiver expressly designed for you, for superior Ham operation. It is coming soon.

Watch for it.

**P.S.** A New Portable receiver  
will be announced next month!

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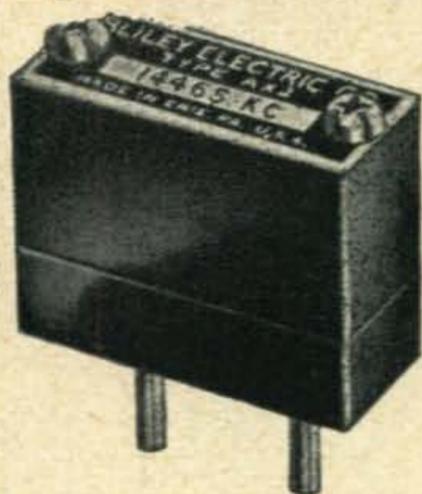
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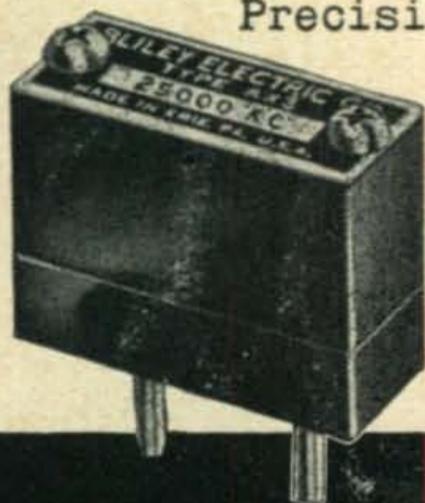
TYPES AX2 and AX3



The first plated  
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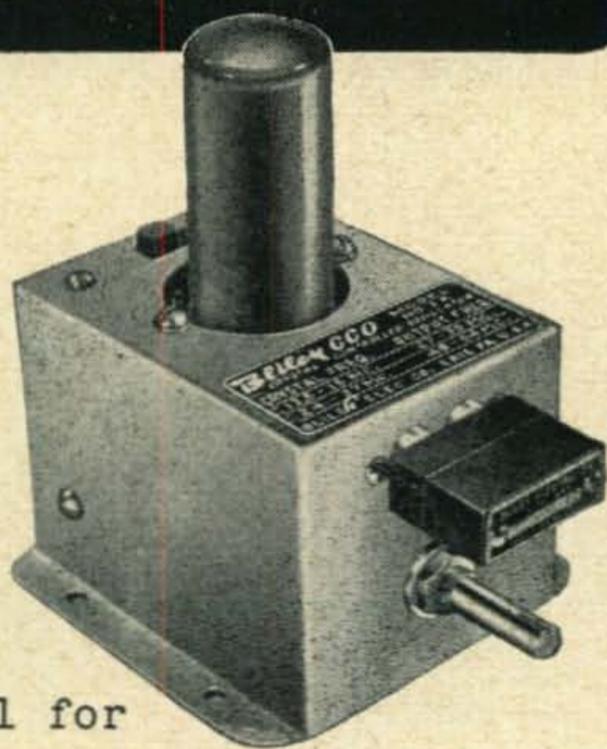
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Feenix, Ariz.

Dear Hon. Ed:

Gracious to goodness, why is it that sumtimes the simplest things are turning around backwards and being reel tuffies? If you are believing this are not true, you should be heering of recent predicament I are having.

Everything are starting when my xyl-to-be, Lil, are telling me that she are not liking to have to shout into microphone when using my rig. She are saying that I ought to fix rig so can leaning back in chair and talking in normal voice. This are sounding like reel easy thing to do, so Scratchi are getting to work.

Gain control are wide open, which meaning need more power from speech amp. So are using condenser input on power supply to raise plate voltages. After two rectifier toobs are getting bad case of curled-up toes Scratchi are deciding this scheme are not practical. Obvious answer at this point are to put more voltage on modulator toobs. Quick check with voltmeter are showing that modulator toobs already having a thousand more volts than rated, so Scratchi are quick-like deciding to use bigger toobs.

Brother Itchi are coming to rescue and driving into town and getting nice big pair of toobs for modulator. As a matter of factly, toobs are little too big. Won't fit into same sockets. Are fixing this and then finding that toobs are so tall that are hitting undersides of next-on-top chassis. This are looking like 1/c problem, until Itchi are suggesting that I move each unit up on relay rack and saw top of antenna tuner panel off about two inches. Hon. Ed., are you ever trying to saw through relay rack panel with hacksaw? If so, I are respectively suggesting that you are laying in big stock of hacksaw blades, and bandages. Having big vise are also handy. Not having same, panel are looking more like beaver with active thyroid are knawing at it. I are spending cupple of hours with a file, and finally it looking ok, except are having slite list to starbored.

New modulator toobs are now fitting in like peachy, and it are only taking Itchi and Scratchi another cupple of hours to putting rest of racks in panel. Are you knowing why they using so many screws to fasten on panels? And why are screws made so you are always dropping them twice before they starting in hole? This are particularly important when you are holding seventy-eleven pounds of equipment one-handedly.

New toobs, no luck. In fact, are now having to holler louder to getting even less outputs. So, I are doing what any able-bodied ham are doing—I are raising the plate voltage. This are very simple, as I are having autotransformer which are doubling voltage to modulator toobs. They are now drawing current like sixty. In fact, drawing current like

(Continued on page 72)

CQ



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*Bob Henry*  
W6ARA

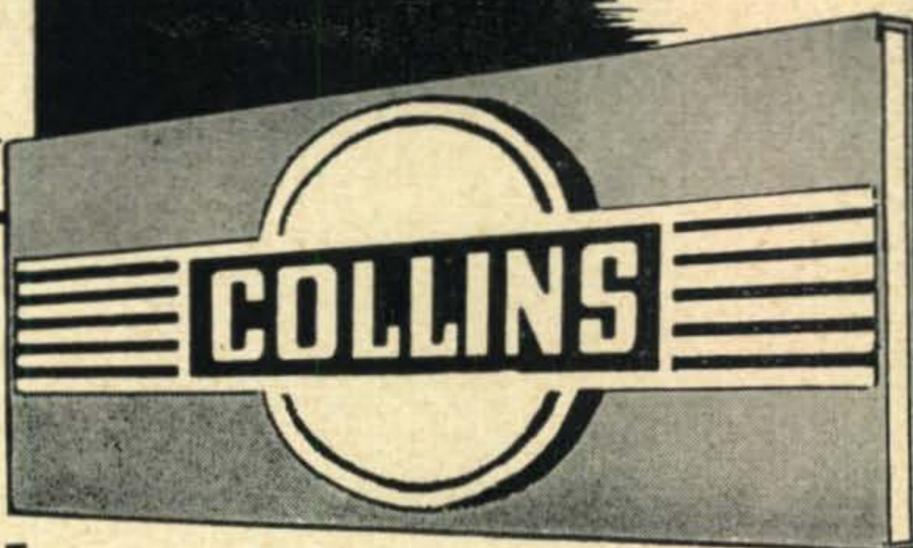
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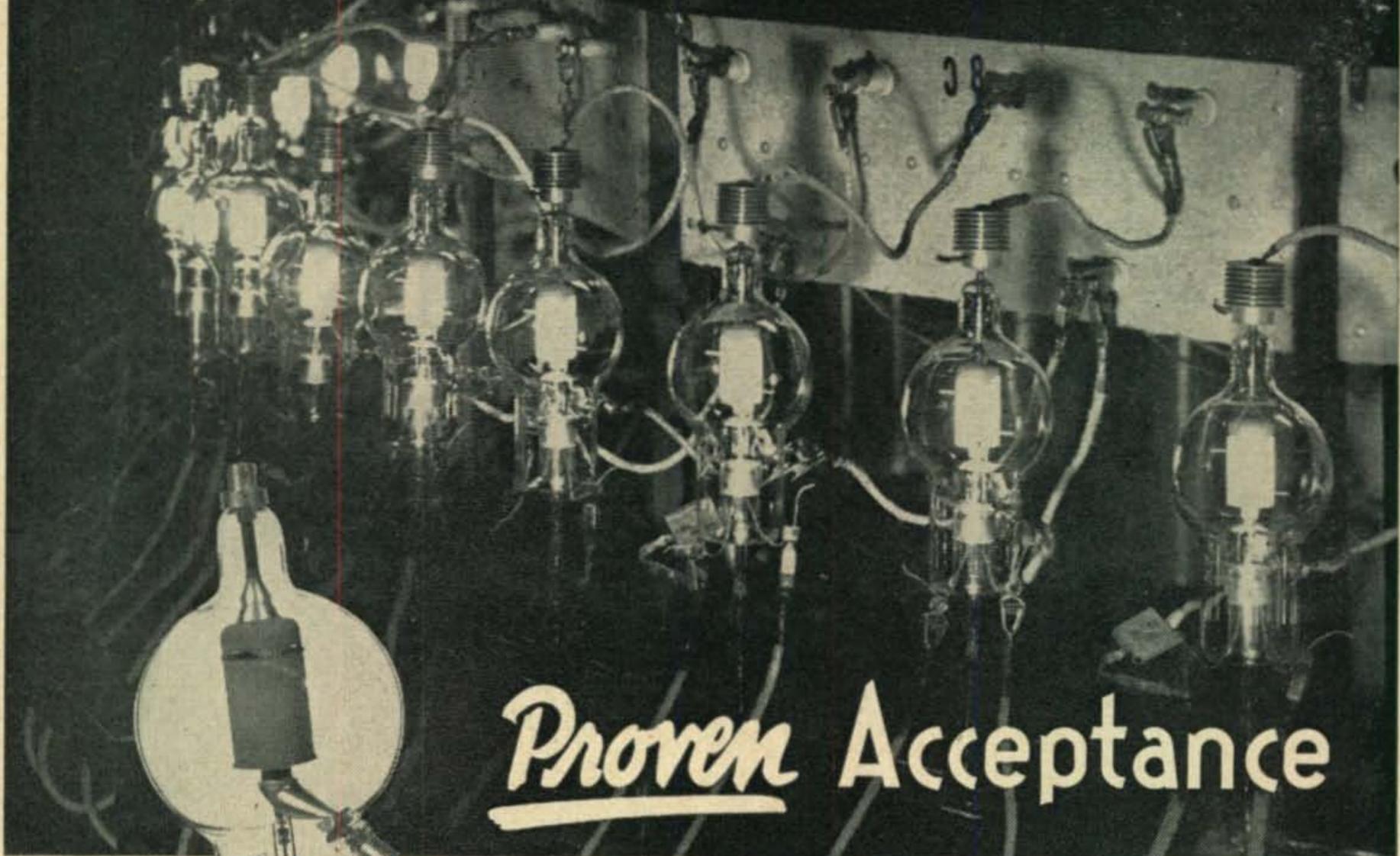
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Grid-plate	5.0 $\mu$ fd.
Grid-filament	8.8 $\mu$ fd.
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Transconductance ( $I_b = 500$ ma., $E_b = 4000$ v.)	6650 $\mu$ mhos

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Plate Dissipation	450 Max. Watts
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# ZERO BIAS

E D I T O R I A L

**O**N APRIL 21st the Federal Communications Commission released one of the most important documents ever placed before the radio amateurs of the United States. It is the notice of proposed changes, amendments, and additions to the Commission's rules governing the amateur radio service. The philosophy of this document marks the end of that era in amateur radio in which the very newness of amateur radio guaranteed its progress in an orderly and beneficial manner. It stands as the milestone of what may be even a greater period for amateur radio in which the maturity of the art is recognized, and in which means for new directions of growth are provided. The momentous proposals of the F.C.C. demand sober consideration by every amateur . . . but above all they ask that each ham put aside his personal prejudices and evaluate the proposals on the basis of their benefit to amateur radio on the whole, rather than as the personal tool of one individual or one group. If nothing else, this editorial is an appeal to thinking hams everywhere to read the proposals of the F.C.C. with an open mind.

Space precludes an item by item review of the proposals which are contained in their entirety beginning on this page. We have space to dwell upon what we consider the most controversial points. First of all, we believe that in essentials the proposals are sound and to the best interests of all amateurs.

No single proposal has aroused more of a storm than the Commission's suggestion that after January 1951, Class A license privileges be granted only to holders of the new Amateur Extra Class license. Existing Class A licenses, upon their normal expiration, would not be renewed except as Class B licenses. We do feel that any law which deprives an amateur of an already existing privilege is bad, if not contrary to every democratic principle. We are unequivocally opposed to the clause, but not to the raising of standards. Anyone holding a Class A license now valid should have this privilege automatically *extended*

not automatically cancelled, subject to the proviso that he may be asked to meet by some given date a code speed of *13 words per minute or less*. It might rightly be argued that if a novice is reasonably qualified to make his entrance into amateur radio at 5 w.p.m., then it would not be unreasonable to set a moderate speed of, say 10 w.p.m., for the non-code operator to maintain. Under no circumstances should a higher code speed than 13 w.p.m. for Class A be required.

The Commission's proposed new Amateur Extra Class licenses call for a 20 w.p.m. code examination. On the face of the available facts, this license will carry special radiophone privileges only. If this is the case we can see little justification again for a higher code speed. We do not want to seem like apologists for radiophone amateurs, but undue emphasis on code could prove a detriment to the hobby, which needs skilled radiophone operators and technicians as much as code operators.

The two most revolutionary proposals are without a doubt the creation of the technician's and novice's licenses. We believe after much discussion and thought that amateurs would do well to support both of these proposals. The purposes of these licenses have been clearly stated and we can see few, if any, valid objections to them. Minor modifications are quite in order. For instance, the novice might easily confine his 20-meter code operation to the little used 14,300-14,350 kc portion of the spectrum. Likewise, the novice licenses should be renewable after a lapse, even if only upon special application to the F.C.C. or after a six months' waiting period. There are too many extenuating circumstances that might arise within the course of a 12-month period to make one tenure the absolute limit.

The pros and cons of all the proposals are many. We reiterate that space does not permit a more detailed comment on all of them. We appeal again to every amateur to set aside his prejudices, to weigh all the ramifications of the proposals and then advise his representatives.

## Notice of Proposed Amendments of The Amateur Radio Service Rules

1. Notice is hereby given of proposed rule making in the above-entitled matter.
2. Heretofore the Commission has received from the American Radio Relay League, Inc., of Hartford, Connecticut, the National Amateur Radio Council, Inc., of Indianapolis, Indiana, and the Society of American Radio Amateurs of Washington, D. C., all national organizations of radio amateurs, various proposals in writing for certain changes in the Commission's Rules Governing Amateur Radio Service. The first proposals were submitted by the American Radio Relay League, followed by the others in the order named. Through channels outside of the Commission, publicity was given to the text or substance of one or more of these proposals. As a result, the Commission has received a number of comments from individual amateurs and groups of amateurs, dealing in one way or another with the subject matter covered by the proposals of the above organizations.
3. The receipt of the aforementioned items was not itself the occasion for the Commission to commence consideration of the fundamental and controversial issues

involved in the proposals that have been received. However, the receipt of these items did serve to point up the timeliness of a study of these matters and to provide the Commission with a number of very valuable suggestions and an indication of the variety of views held by various members and segments of the amateur body.

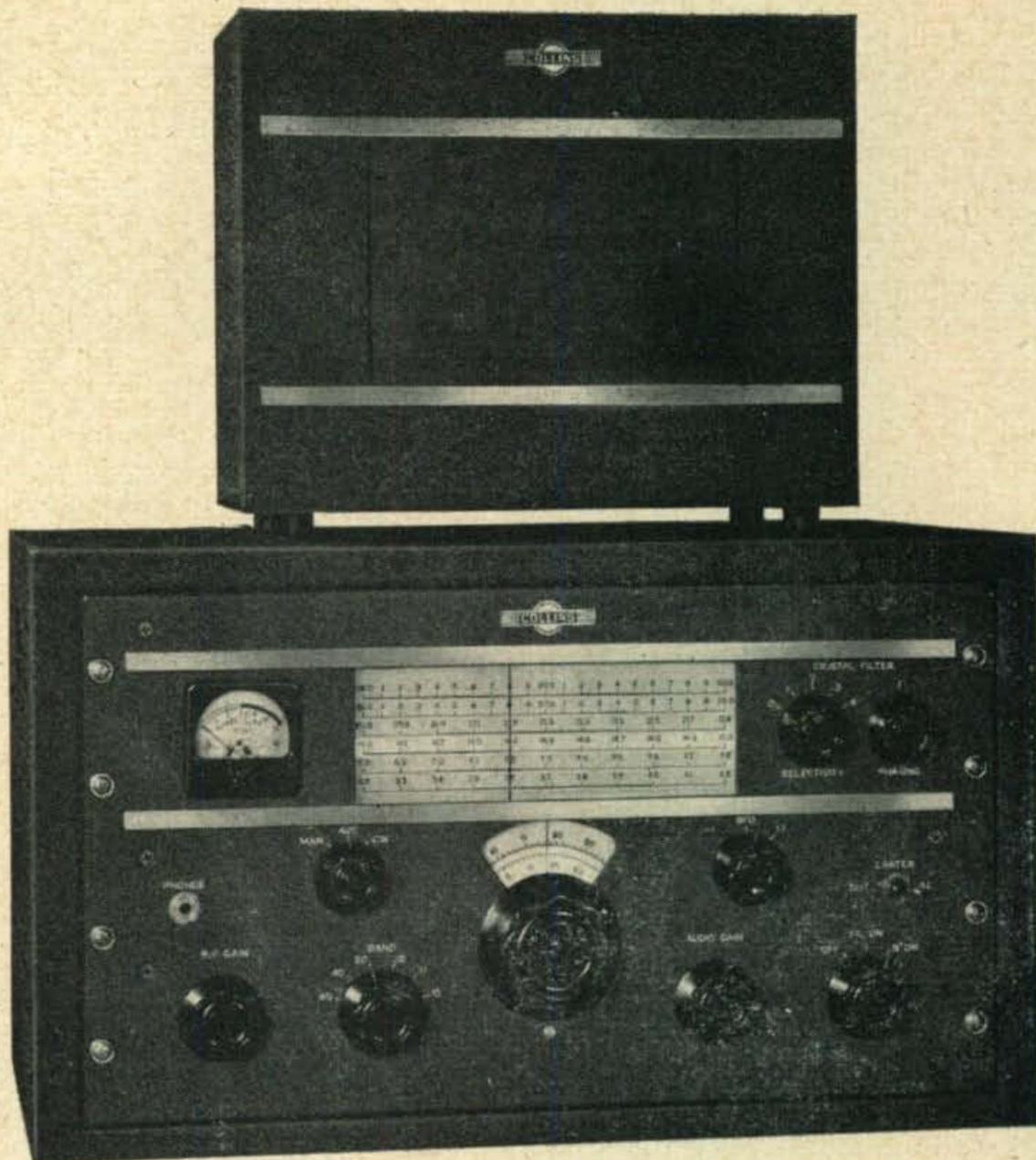
4. The Commission has considered all of the proposals received. Also, it has reflected upon the general situation in which the Amateur Radio Service finds itself today and the general course of events leading up to that situation. The resulting judgement of the Commission is that the Amateur Radio Service would very much benefit from, and needs, a new overall plan or blueprint to provide scope and direction for the immediate and long range development of the service.

5. In entering upon this course, the Commission has used freely of the many splendid suggestions received. The sincerity and thoughtfulness behind these suggestions, as well as behind those not actually used, are evident

(Continued on page 44)

# How does the 75A-1 do on SSSC?

RAYMOND F. HOFFMAN, W5NRP,  
HAS FOUND OUT "FROM THE  
OUTSIDE LOOKING IN."



**HE WRITES:** "I have been meaning to write this letter for about the last six months but have never quite gotten to it. During this time I have had my transmitter on SSSC and quite recently have put it on the twenty-eight megacycle band. As you may well imagine, I talk to myself on many of my contacts because of very bad receiver stability on ten—much more so than on twenty, and that was bad enough.

"I have kept a fairly accurate log of the receivers used on the other end and although I cannot say that Collins 75A-1's are in the majority, they certainly have

had the least amount of trouble by a very large margin. I have never yet had a Collins user who was not able to copy the SSSC signals and do a good job of it.

"Quite recently on ten I had a contact with a man using the 75A-1. We talked for about twenty minutes on SSSC and at the end of the contact he noted the fact that he **HAD NOT TOUCHED THE RECEIVER.**

"You know that your receiver is good; perhaps you might like to quote a satisfied user in a new sense of the word. I find a great deal of pleasure in 'using the other man's 75A-1'."

**NOTE:** If radio is also your business, look to Collins for very high performance in broadcast station equipment, and airborne and ground station radio communication gear.

FOR SUCCESS IN AMATEUR RADIO, ITS . . .

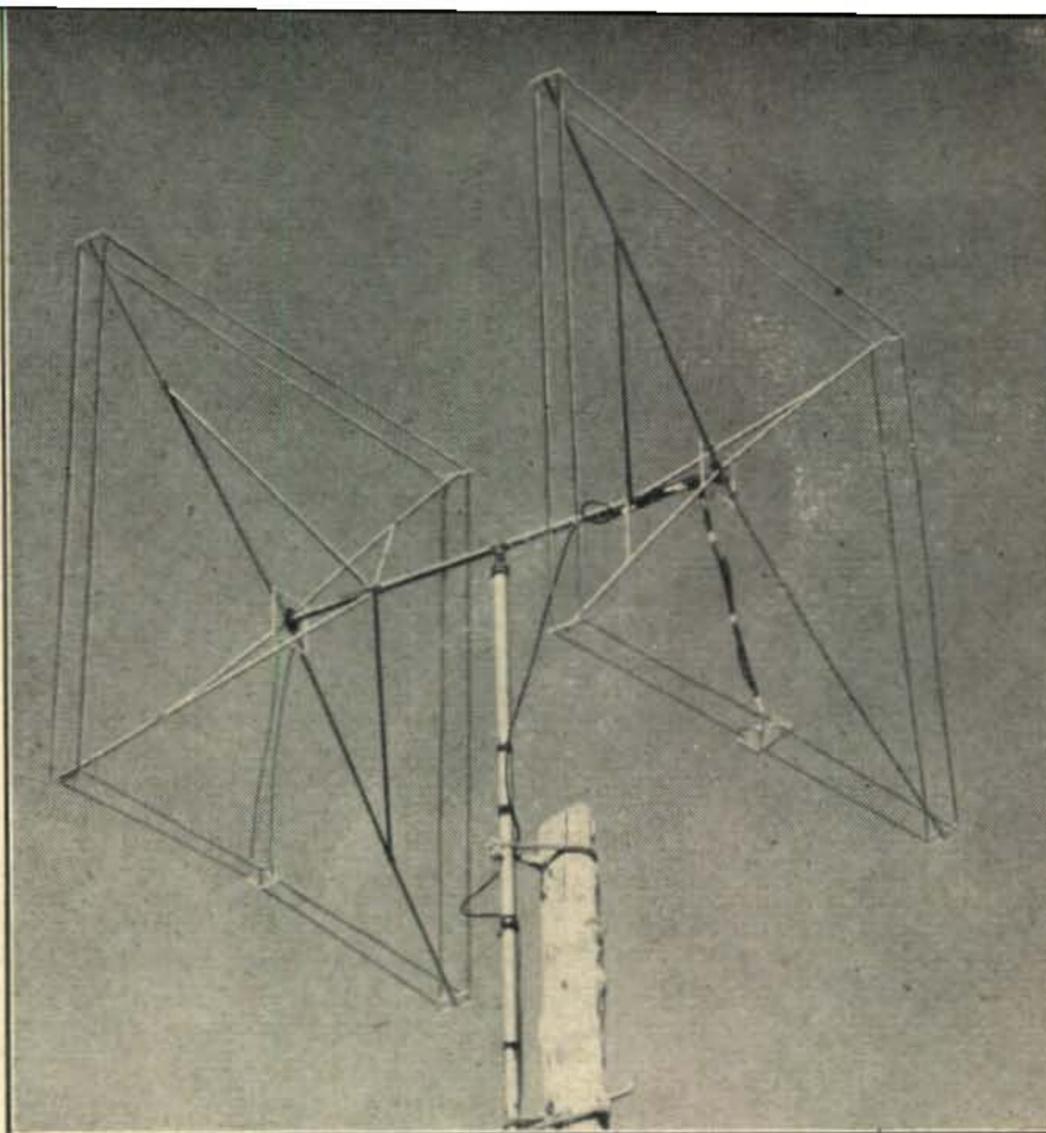


**COLLINS RADIO COMPANY, Cedar Rapids, Iowa**

11 West 42nd Street, New York 18, N. Y.

458 South Spring Street, Los Angeles 13, Calif.

The square quad at W5NRP, mounted on a rotatable steel pipe bracketed to a telephone pole. The coax feeder is lashed to the boom and then runs down the vertical support pipe. The one brace that is missing from the lower part of the radiator element was the only damage inflicted by three severe wind storms, one of 100 mph velocity. Directivity is along the line of the boom, from reflector toward radiator.



RAY HOFFMAN, W5NRP\*

and

A. DAVID MIDDLETON, W5CA\*

## Constructing the CUBICAL QUAD

*The most conclusive fact about the quad is that users have been getting excellent results.*

**A**FTER LISTENING to a lot of talk on both 10 and 20, it appears that there are several different constructional versions of the cubical quad. This article describes one particular design of the array that has withstood the onslaughts of high winds, has a well-balanced appearance, and is a good performer on DX. All materials are easily obtainable by the average ham and the total cost of erecting the cubical quad is about \$20.

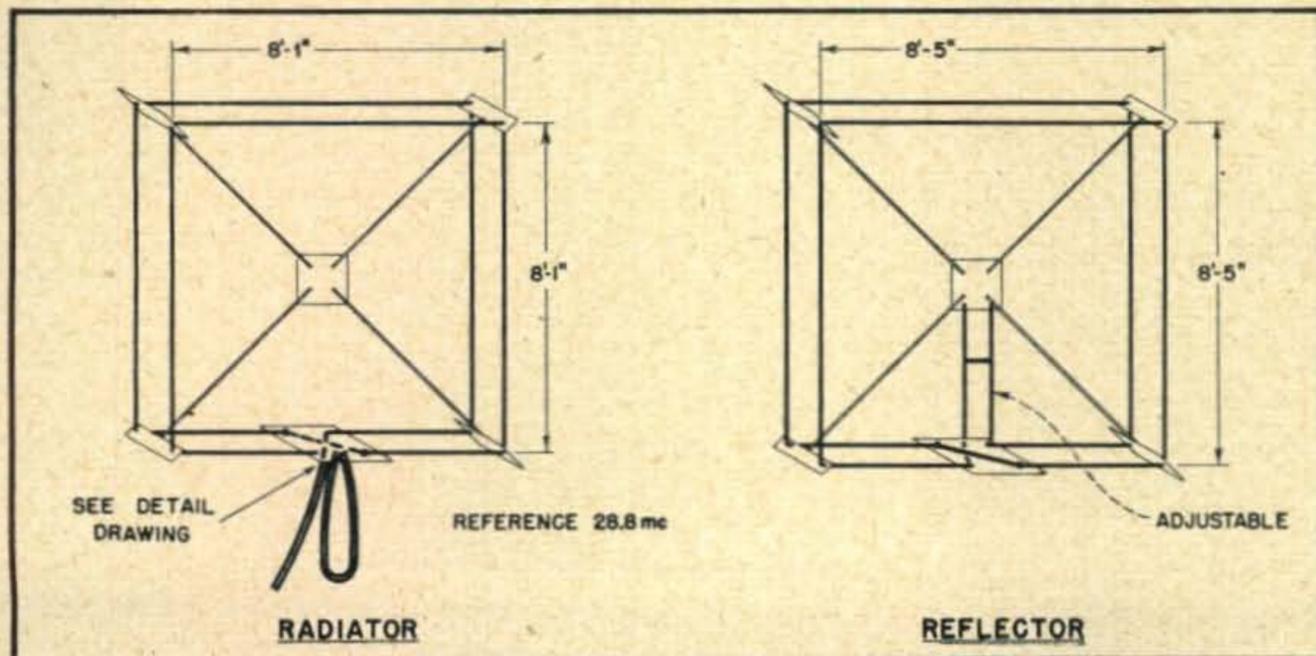
There has been some discussion concerning the use of metal in the frame of an array of this type. While the results are not conclusive, they do show

\*%W5MPZ, The Sandia Radio Club, Albuquerque, N. Mex.

that the effect, if any, is not detrimental. A local station, W5PAW, using only  $2\frac{1}{2}$  watts input to a single 6AK5 as a modulated doubler on 10 meters has worked 18 states and received reports as high as 40 db over S9. At W5NRP, running 900 watts to a class B linear final amplifier, the quad has worked everything heard with very good reports. Coupled to the W5NRP SSSC transmitter it has been many times reported as one of the loudest and most consistent signals from this area, both in and out of the United States.

### Overall Description

This cubical quad consists of two square elements spaced 0.2 wavelength apart. Both elements con-



Simplified diagram of the cubical quad radiator and reflector.

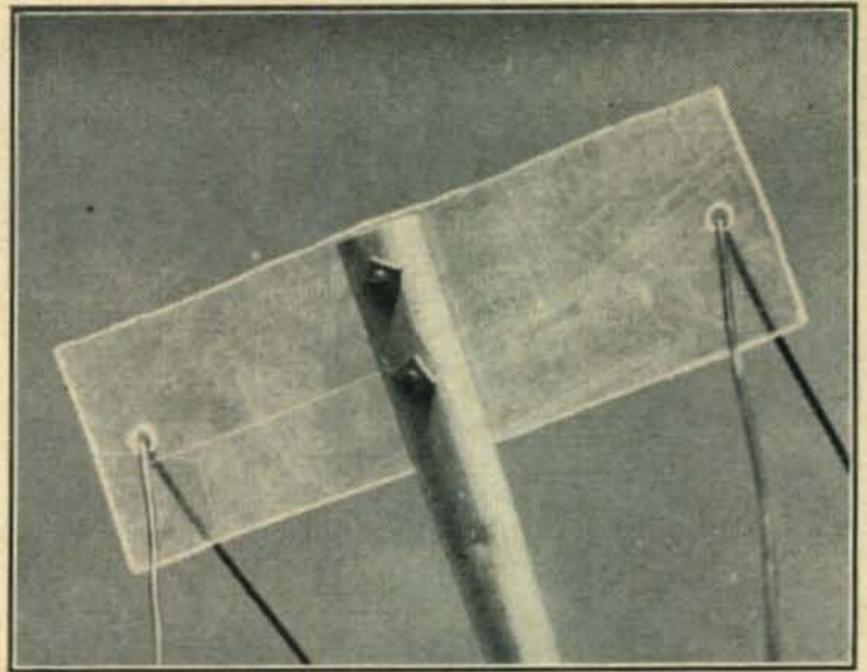
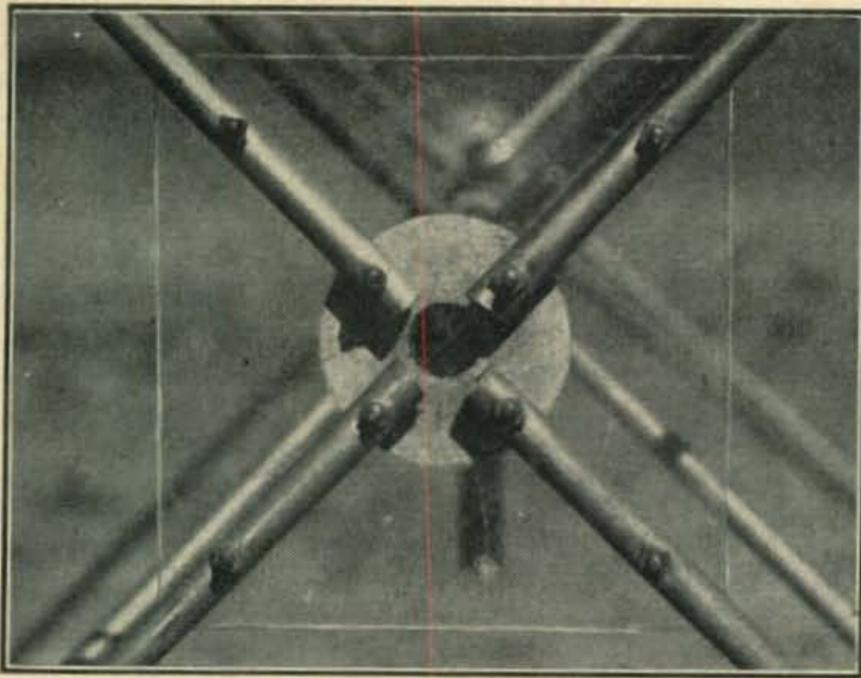


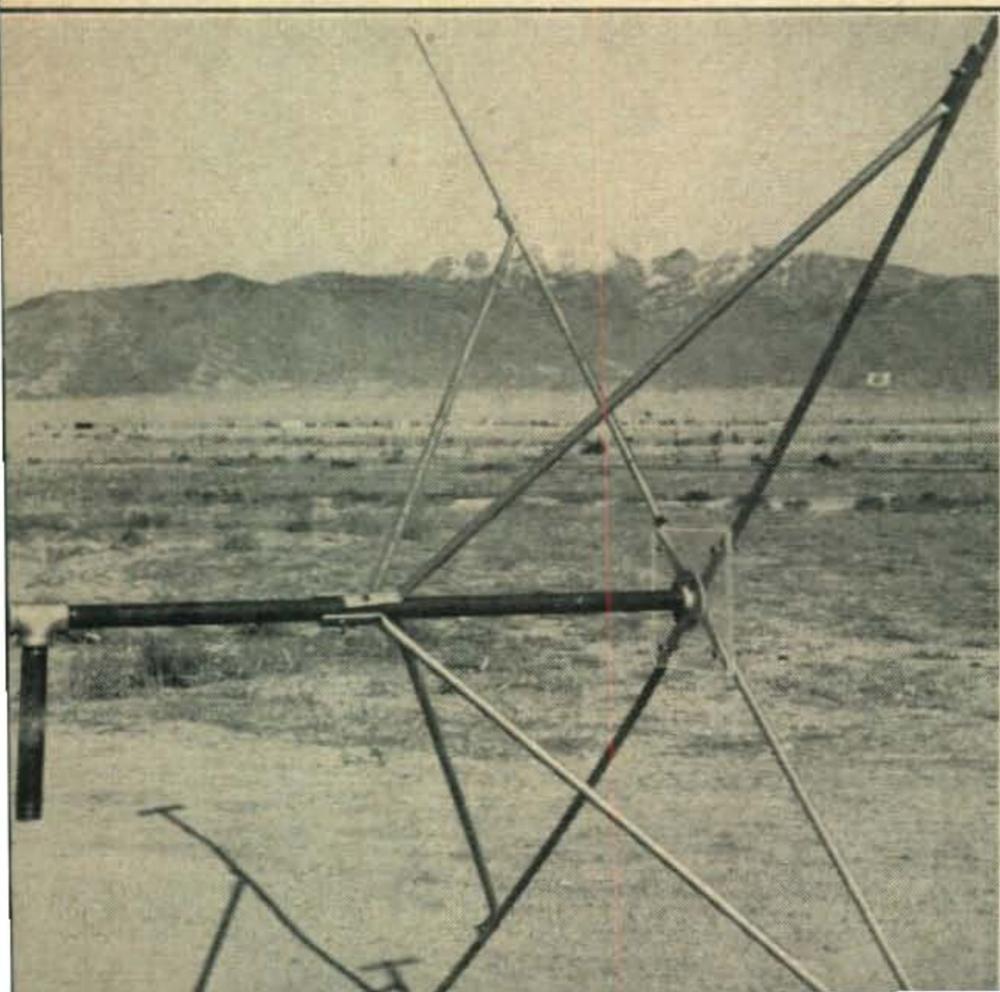
Fig. 1 (left). End on view of the center hub supporting the four arms of the radiator. The pipe flange was centered and the arms run out on diagonals to the corners of the nine inch square piece of Lucite. Fig. 2 (right). View of one of the Lucite spreaders—eight are required. After cutting off the arm to the correct length, the end is slightly flattened and two holes drilled to attach the spreader. The bolts are pulled up tight, cut off and flattened to prevent them from loosening.

sist of two turns of wire, spaced  $5\frac{1}{2}$  inches apart with the cross-over point in the middle of the lower side of the square. The impedance at the feed point is the result of a rather complex set of conditions, but with the wire size and spacing used in this array it will be about 200 to 300 ohms. Since it was highly desirable that we use RG8U coax line and maintain balance, a phase inverter type of impedance transformer matches the coax line to the quad radiator.<sup>1</sup> This transformer is simply an extra length of coax about eleven and one half feet long. How to determine the exact length is shown in Fig. 5. The reflector is tuned by a stub, permanently mounted inside the loop. Tuning up is very simple and is described later in the text.

Each of the two elements is supported on a

1 H. M. Bach, Jr., "The Trombone T," CQ, March and April, 1947.

Fig. 3. Braces for each of the arms are cut from extra four foot lengths of conduit. The ends are flattened and one bolt attaches the brace to either the arm or the boom. The boom is cut from one inch pipe.



spider made of four pieces of thin-walled conduit. These are mounted on a center hub like spokes in a wheel. Insulating end pieces are attached to the spokes and support the wire making up the element. The two hubs are fastened to a single boom, which is in turn fastened by a tee to the supporting vertical pipe.

All of the highly desirable performance characteristics attributed to the cubical quad were noted. The front-to-back ratio is of the order of 30 db. The front-to-side ratios are much greater and are between 50 and 70 db. The forward gain over a dipole is about 10 db and the apparent vertical angle of radiations, for the height used, of the lowest major lobe maximizes about  $10^\circ$ . The frequency response is  $\pm 250$  kc.<sup>2</sup>

#### Construction

This quad is most easily constructed in sections and assembled later. The end plates shown in Fig. 1 were the first items to be made. These are two 9-inch squares of plywood, wood, lucite or metal according to the builder's preference. Draw diagonals on the end pieces, then lay the pipe flange on the piece so that the four holes in the flange cross the diagonals. Mark, center punch and drill these holes in the end piece. Drill four more holes, one on each diagonal, one inch or so from the end. Make sure that these holes just clear the bolts that will be used. The arms are the next items—eight standard 10-foot lengths of thin-walled conduit are needed. The spider is assembled before cutting the arms to length.

First, punch and drill a hole in each arm about one inch from the end. Take four of the arms, an end plate and a pipe flange, and run  $1\frac{1}{2}$ -inch bolts through each hole in the flange, end plate and arm. This will make a large X shaped frame with four

2 This is probably due to the use of the half-wave phase inverting transformer which exhibits optimum characteristics over a relatively small frequency range. A somewhat broader frequency response might result with the use of symmetrical transmission lines. —Ed.

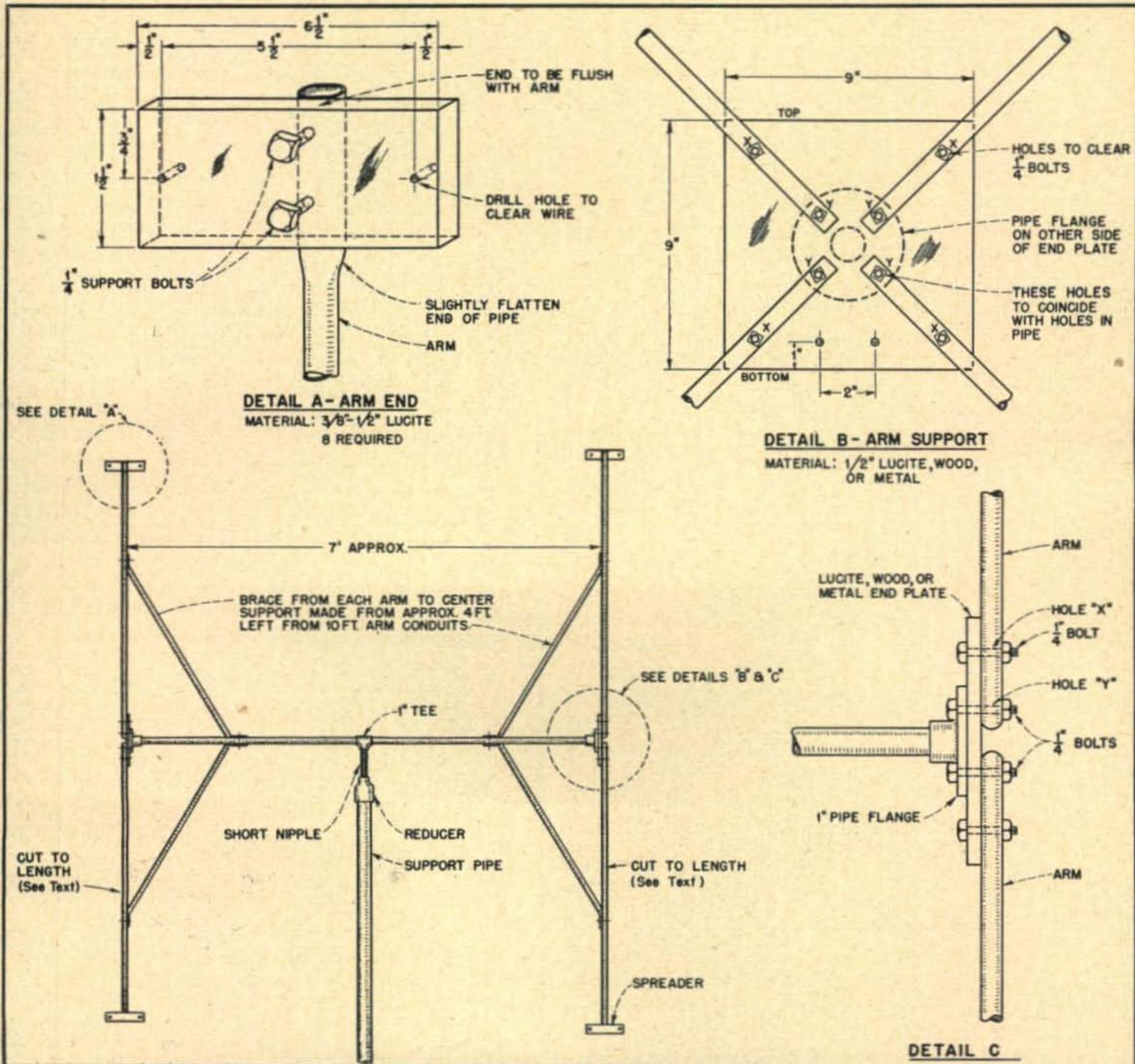
arms 10-feet long. Line up the arm with the diagonal line on the end piece and drill through the other hole and through the arm. Put a bolt through and then assemble the other X frame in the same fashion.

For a frequency of 28.8 mc the arms of the radiating element should be 70 inches from the center of the pipe flange to the end. The reflector arms are 72¼ inches from center to end. This length should be measured out on each arm, then remove the arm and cut off. It might also be best to mark the position of each arm on the end piece so that the pieces may be easily reassembled.

The spreaders are next prepared. These are shown in Fig. 2. We used Lucite 3/8-inch stock, 6½ x 1½-inches for the spreaders. Eight are needed—four for the radiator and four for the reflector. Holes for the #12 copper-clad wire are drilled ½-inch from each end. The holes for mounting the spreaders to the arms are then drilled 3¼-inches from either end. Remember that these blocks are

## BILL OF MATERIAL

Quantity	Specifications
2 Booms.....	1" pipe, 3' 4" long, threaded ends
8 Arms .....	10' lengths of electrical conduit
2 End pieces .....	1" floor flanges
1 Boom support .....	tee fitting, 1" each way
1 Support .....	nipple, "one by short" (plumbers supply)
8 Spreaders .....	Lucite, 6½" x 1¼" x 3/8"
2 End pieces .....	Lucite, 9" x 9" x 1/2"
2 Cross-over pieces..	Lucite, 6½" x 4" x 3/8"
16 Spreader bolts ....	1/4" x 1/4" bolts with nuts, lock washers
16 End piece bolts ....	1/2" x 1/4" bolts with nuts, lock washers
1 Support coupling..	reducer coupling, 1" to support pipe size
140' #12 or #14 copper or copper-clad steel wire.	



Construction details of the cubical quad. Note that it is mounted in a "square" position.

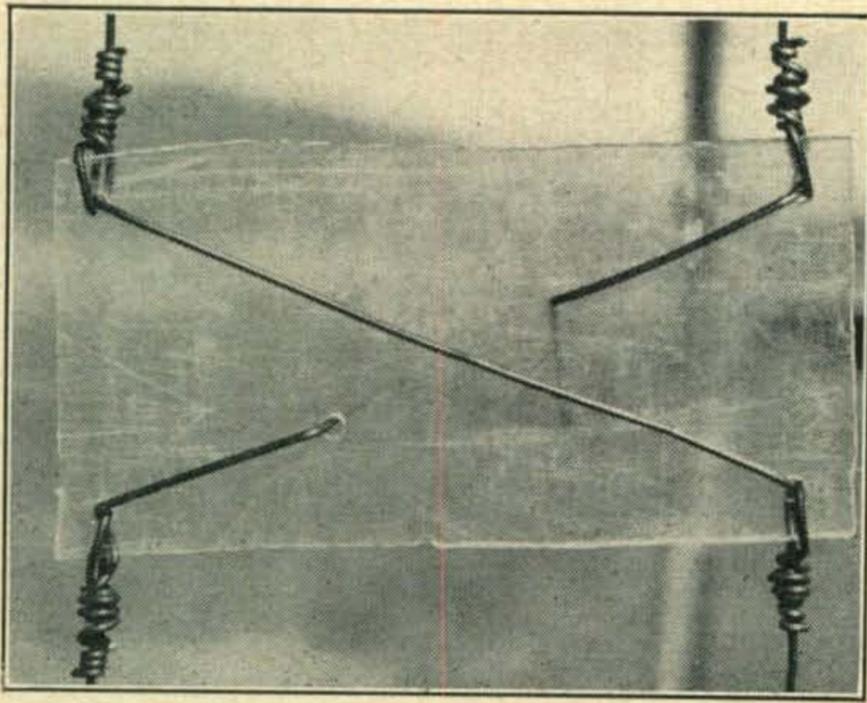


Fig. 4. One of the required two cross-over plates. Both loops are independent and are tightened down at this point. A short piece of wire is then used for the cross-over of one loop to the other. On the radiator, the broken cross-over lead goes to the coax feed. On the reflector it serves as the 2" spacer for the tuning stub.

to be placed at a right angle to the end plate at the hub. Marking the arms to mount the spreaders is best done with the X frame temporarily assembled. Slightly flatten the end of the conduit, then mark and drill through to mount the spreaders. Put the bolts through ( $\frac{1}{4}$ -inch is best) and pull up until the metal starts to flatten out again. Then whittle some small pieces of wood and fit them into the ends of the arm and pull up tight. Cut off the excess bolt and flatten it so that there is no chance of its coming apart. Assemble both frames, making sure all bolts are drawn tight.

A view of the completed end piece and X frame is shown in Fig. 3. The braces are not absolutely necessary, although if they are used they will considerably strengthen the array. Each brace arm is a piece of conduit about four feet long, left over from the 10-ft. conduit spider arms. About four inches is flattened down on each end, a single hole drilled and the flat section bent to conform with the frame and the boom.

Next cut out two additional pieces of Lucite to be used at the cross-over points. These should be at least  $6\frac{1}{2}$ -inches long and 4 to 6 inches wide. Fig. 4 shows the arrangement of the wires at the cross-over. The holes on either side are  $5\frac{1}{2}$ -inches apart corresponding to the spacing of both the radiator and the reflector. On a diagonal line bisecting the holes in opposite corners, two more holes are drilled. These holes are 1 inch either side of the intersection of the diagonals. On the reflector the tuning stub is drawn up from these holes—on the radiator the coax feed enters at this point.

Now the wire is strung on the framework. The two loops of each element are put on independently of each other. Run the wire through the spreaders making a large square. Put the second loop on and tie all four ends to the cross-over block by making one loop and a twist joint on each wire. Do the same for the other element. Measure the sides and make whatever minor adjustments are necessary to bring the radiator sides to 8 feet and 1 inch, and

the reflector sides to 8 feet and 5 inches (for 28.8 mc). When all measurements are made snub down each spreader with a short length of wire and solder for a very tight job.

On the reflector Lucite end piece drill two holes, 2 inches apart, about  $\frac{1}{2}$  inch from the edge facing the cross-over piece. These holes should be centered so that two wires may run from these holes directly to the cross-over piece, pass through the two holes on the diagonal and tie into opposite corners. This spaced line then serves as the reflector tuning stub.

#### Assembly

If the cubical quad uses the parts listed in the "Bill of Material" the array may now be assembled. Put the tee, the "one by short" nipple and the reducer together using a couple of pipe wrenches to pull them up tight. Screw the two one-inch pipe sections that are used as the boom into the tee and then into the element pipe flanges. Straighten and tighten the whole assembly. If all pipe connections are drilled and pinned this will prevent slipping.

Tie in the cross-over wires on both the reflector and the radiator and solder. Then attach the feed system as shown in Fig. 5. The phase inverting loop is not "hot," but the shield *should not* be grounded. The feed line as well as the phase loop may be taped to the support pipe with no ill effects.

Since each location presents a different problem, very little can be further said about the erection. The best and safest way seems to be to put the support pipe in place and then screw the antenna section on. In some cases a little guying may be necessary, but this type of beam is well balanced.

Tuning up is utter simplicity. Make a wire shorting bar for the reflector stub. Then ask a local to put on a low power signal near your operating frequency. Run an extension S-meter out to the quad and with the back of the beam on the local, slide the shorting bar up and down the stub until obtaining a minimum reading. This should be quite easy and, on completion, the cubical quad is tuned up to perfection.

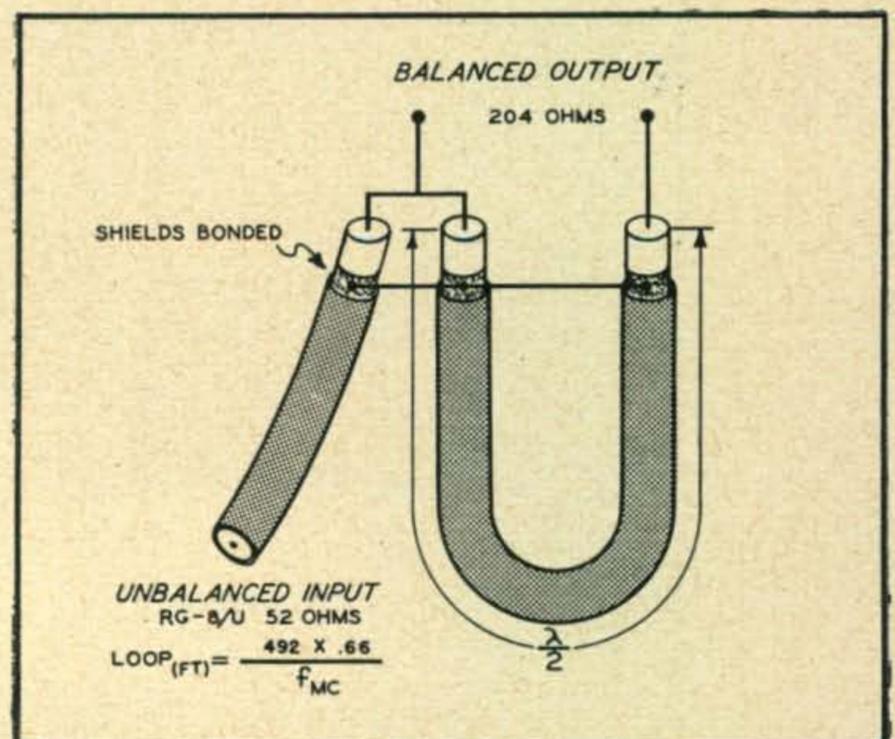


Fig. 5. Method of employing coax feed and the impedance matching transformer with a cubical quad radiator. At 28.8 mc the length of the RG-8/U loop is 11'  $5\frac{1}{2}$ ".

# Results . . . CQ's

## First World-Wide DX Contest

*Final compilations covering the phone contest on the weekend of October 29 to 31, and the c.w. contest on the weekend of November 5 to 7, 1948.*

**G**IVE A DX operator, who spends all his time chasing elusive ones, some rules and you have the makings of a DX contest. But to really get foreign participation and to make an event of interest to the casual operator who can take or leave his DX, as the fancy strikes him, you've got to offer more than a chance to sit hour after hour and knock off W contacts or search for a "quota QSO." The rules of CQ's first World-Wide DX competition were designed to appeal to the greatest number of stations on a world-wide basis. The enthusiastic response is ample testimony that it is just the kind of an operating event the average amateur wanted. From this year on it will be an annual operating event certain to grow in popularity.

As is bound to happen in any "first" there was a certain amount of confusion among stations not entirely familiar with the contest rules. In addition, a large number of stations, erroneously assuming that scoring was going to be on the basis of the leader in each zone instead of country, failed to submit logs. A cross check of the hundreds of logs

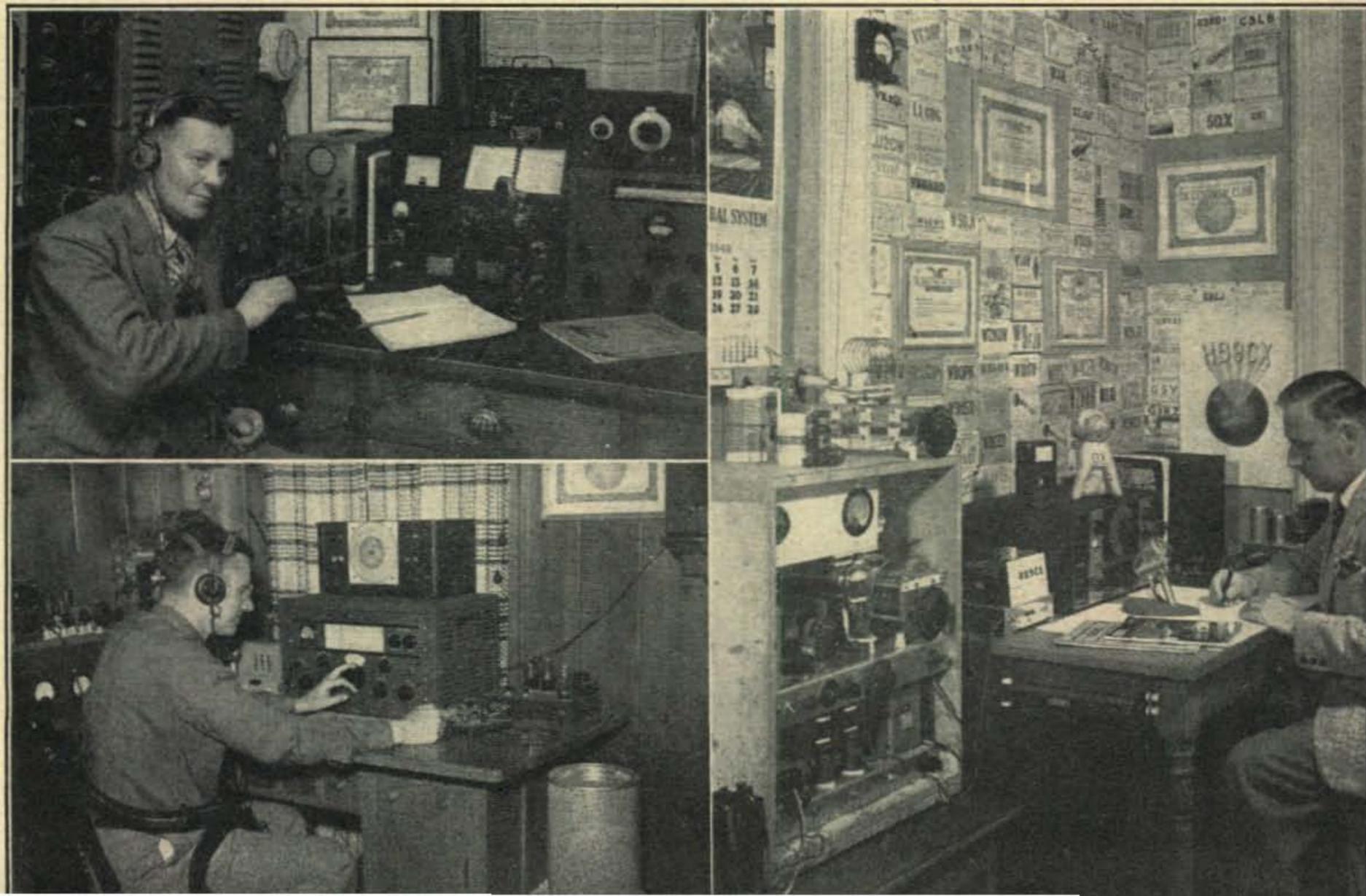
received indicate participation by stations in *all* 40 zones! Unfortunately, elusive Zone 23 was only operative on phone.

Nothing tells the story more emphatically than the remarks of the participants themselves. We've quoted as many of them as space permits. The high scorers throughout the world include calls familiar to DX men everywhere, but nothing could be more gratifying to the Committee working on the logs than to see hundreds of calls from the "work horses" of the DX frequencies, the Gs and OKs, the VKs, and PYs, the big and little stations that have provided the thrill of DX to the average amateurs in every country.

### Radiophone Scores

The phone DX men have progressed to a point where they seldom take a back seat to their code brethren. Performance of the top-notch phone DX-ers is generally as good as, and often surpasses, the c.w. DXer. But the microphone contingent didn't get started in CQ's first International DX Con-

Top left: Frank A. Robb, G16TK, highest individual score in the world. Lower left: H. E. "Doc" Striker, W8WZ, took time out from mending broken arms to pound brass right into top place in the eighth call area and tenth highest score in the world. Right: Ed von Ruthi, HB9CX, one of the outstanding European DX men and Swiss c.w. winner with eighth highest world score.





Left: Ed Hayes, W6SA, under whose call he and W6SZY walked off with Zone 3 phone honors. Ed is shown operating W6SZY where they collectively won the c.w. award also. Right: Dave Evans, W6SZY, partner in the multiple operator set-up with W6SA.

test. Conditions were extremely poor throughout the entire world and, as a result, scores are correspondingly lower than the code participants. For the lucky handful who worked C8KY in Zone 23, all other DX could be excused for the week-end.

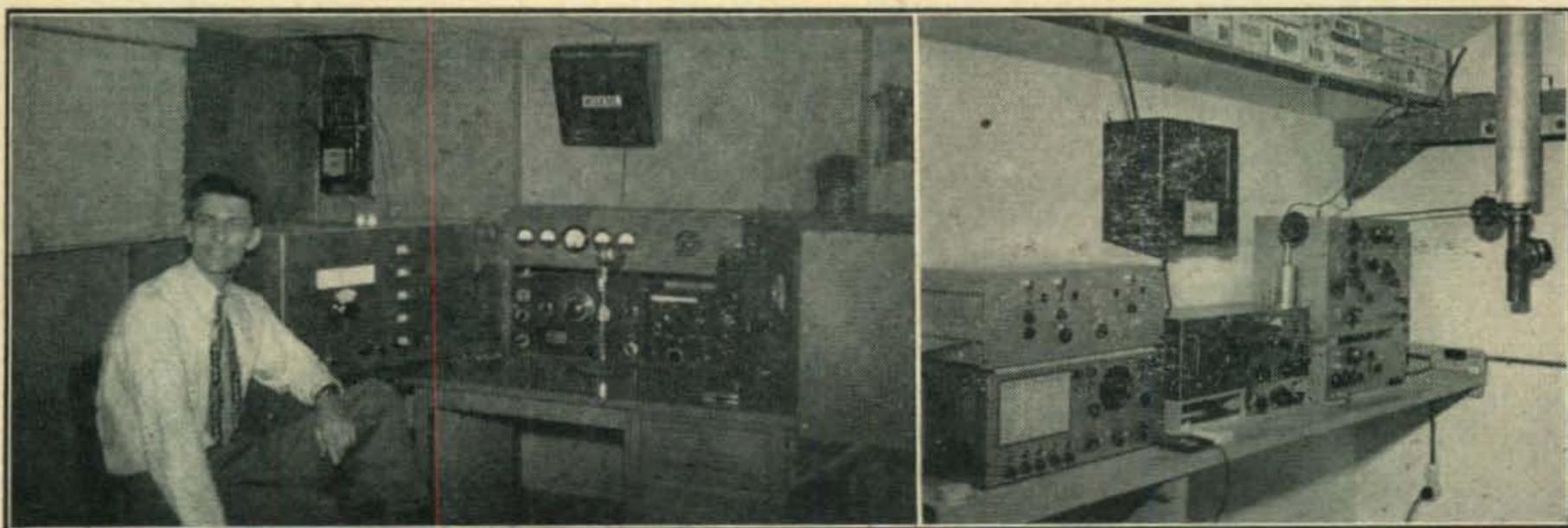
Having apologized for poor conditions, and they were foul, the scores of the leading phone contestants take on added significance. They were run up under conditions which called for the maximum operating skill! World leader (and also one of the top c-w scorers) is a South American, PY2AC of Sao Paulo, Brazil. Cardoso de Almeida Sobrinho, PY2AC, has thus become one of the first in his continent to emerge top in the international field in any DX contest since the war. PY2AC worked 58 countries in 28 zones, including coveted Zone 23, for a multiplier of 147 and a final score of 124,069 points.

Second world high was the well known English DX station G2PU of Cambridge, England. S.R. Kharbanda in totaling 90,628 points worked 256 stations in 53 countries and 25 zones for a total multiplier of 139. Running 150 watts on all bands with separate transmitters, the antenna layout helped G2PU overcome poor conditions. On 75 meters a 330-ft. loop 75 feet high was used. On 7 mc (17 countries in 3 zones), two half-waves in phase

stacked; on 20, three sterba curtains, and on 10, two rotaries. An AR77 with a DB 20 preselector served for receiving.

Most American amateurs have DX in their blood, so what could be more natural than to have one overseas Yank take full advantage of his location. Thus D4AXS, C. S. Dunning, Wiesbaden, Germany, was able to score 71,974 points with a multiplier of 106 and 258 QSOs. Still another European station, G2DPZ, John Ellery, with 61,976 points took honors as fourth world high. 56 different countries in 24 zones with a multiplier of 122 accumulated in 207 QSOs did the trick. For equipment G2DPZ used 150 watts on all bands, an HQ129-DB 20 combination, rotary on 20, Lazy-H on 10, and half-waves on 40 and 80. Fifth highest score was that of G8KP, W. "Bill" J. Pickard, who made 59,461 points. Bill worked 240 stations in 41 different countries and 18 zones with a multiplier of 97. He worked 27 countries in 8 zones on 7 mc! An 813 final running 150 watts, AR88 receiver, folded dipoles on 40 and 20, and a 2-element rotary on 10 did the trick.

Other prominent scores in the phone portion of the contest include: W8KML, 55,875; ZS2CI, 54,982; W8HUD, 52,682; HB9DS, 51,415; W6SA (W6SA and W6SZY operators), 47,790; C1-



Left: Fred Pichitino, W8KML, highest American phone score with 55,875 points. Right: The station of Kurt Wydler, HB9DS, high phone man for Switzerland.

CH, 47,320; VK6RU, 43,371; VQ2DH, 38,952; W6GRL, 38,752; KP4ES, 34,684; W7ESK, 32,712; ZS6CT, 31,284; VQ4ERR, 28,224; and LU3DH, 27,512.

The leading American scorer, W8KML, is no stranger to the ranks of phone DX men. Fred Pichitino ran up 55,875 points working 69 different countries in 31 zones with a multiplier of 119 and 155 different contacts. Fred's transmitter ran between 200 and 950 watts into a two-band rotary for 20 and 10, and a half-wave doublet on 75. Incidentally, he didn't report making any contacts on 7-mc phone!

An interesting analysis of phone logs shows that over 100 prefixes were logged by different contestants. Had conditions been any better there is little doubt that scores everywhere would have been substantial. To all the winners our heartiest congratulations!

### C.W. Scores

World high score is GI6TK, Frank Robb, of Belfast, Northern Ireland. 817 contacts in 31 different zones and 66 countries with a multiplier of 148 gave Frank 452,454 points! There was no magic used at GI6TK, just sound operating ability and maximum utilization of all bands. Three transmitters (maximum input 150 watts), two HRO's, an AR88, plus a 615-ft. long wire, and on 10 a 3-element rotary, did the work. The first c.w. winner has set a record that may be all but impossible for subsequent contestants to top.

Second highest score on c.w. went to a multiple operator U.S. station, W2IQG. John Bondy, with the assistance of W2AZL, W2OTC, and W2UEI, worked 67 different countries in 30 zones, 457 contacts and a multiplier of 160 for 289,680 points. A full gallon was used on all bands except 10, which

## PHONE SCORES

Zone 1	W8NSS 5,617	HK4DF 5,463	LA3K 1,225	
KL7DE 185	W8OBS 1,431	HK3CU	LA4R	
Zones 3, 4 & 5	W9FKH 10,981	Zone 10	EI8P 11,772	Zone 32
W1CJH 15,525	W9RBI 4,212	CP5FB 3,348	EI7M 6,222	ZL3HC 27,984
W1ZD 7,239	W9DUB 4,056	Zone 11	Zone 15	ZL1MQ 13,384
W1NCX 3,348	W9KXK 1,890	PY2AC 124,068	II1W 3,774	ZL4HP 11,040
W1QXE	W9NII 1,856	PY6AG 13,230	II1RC 2,033	ZL4GA 6,336
W2YOS 9,100	W9SES 989	PY2NX 9,620	II1ADX	ZL3LC 1,372
W2IYO 7,938	W9CZC 286	PY3OJ 1,767	OK1RW 1,536	ZL1HY
W2QKJ 7,830	W9BZB	PY1AU 24	OK1GA 45	VR2AP 2,775
W2IOP 2,501	W9WXT	Zone 13	OK1FF 6	VR2AQ 1,512
W2UTH 2,310	W9UAZ	LU3DH 27,512	OK1CZ	Zone 33
W2MA 2,046	W0ANF 7,011	LU5BM 11,396	OK2SO 8	CT3MN
W2NMC 1,364	W0AIW 4,455	CX3BH 4,920	OE7FR 665	Zone 34
W2SOY 133	W0GUV 2,378	CX4AB	Zone 20	ST2FU 2,068
W2NNB 35	W0RNK	Zone 14	ZL1CL 1,560	Zone 35
W2UWK	VE1QZ 1,802	G2PU 90,628	YR5C 722	ZD1BD 378
W2KZE	VE2IZ	G8KP 59,461	Zone 23	ZD3A 1,296
W3DHM 10,440	VE3AEU	G2DPZ 61,976	C8KY 4,309	ZD4AB 6,030
W3BES 5,865	VE4RO 2,345	G2MI 12,354	Zone 24	Zone 36
W3AOA 3,738	VE7ZM 18,060	GM2UU 9,620	C1CH 47,320	VQ2DH 38,952
W3AER 3,157	VE7MS 9,296	D4AXS 71,974	C7ST 3,575	OQ5AB
W3IL 782	VE7RP 1,560	DA2AT 880	VS6AE 4,165	Zone 37
W3EQK	VE7IM	F3WV 20,540	Zone 25	VQ4ERR 28,224
W4HA 6,426	Zone 6	F9BO 13,860	J2AAL 14,652	VQ4SC 10,290
W4CY 342	XE1KE 3,822	HB9DS 51,415	Zone 29	VQ4CUR 5,265
W4IWB 144	Zone 7	GW4CX 3,115	VK6RU 43,371	VQ5WCP 240
W4DXI 84	TG9JK 7,900	PA0RE 17,136	Zone 30	Zone 38
W4CTD	HP1BR 204	PA0CB	VK2WD 450	ZS2CI 54,982
W4HCQ	Zone 8	CT1NT 7,791	VK5NW	ZS6CT 31,284
W5HFQ 3,648	KP4ES 34,684	CT1SX 6,318	Zone 31	ZS5U 12,755
W6SA 1 47,790	KP4KD 72	Zone 32	Zone 33	ZS6BV 2 6,952
W6GRL 38,752	KP4EZ	KH6IJ 23,200	Zone 34	Zone 40
W6AM 22,659	VP2GB 11,448	KH6BA 4,214	OX3BC 588	
W6EPZ 16,796	CM2SM 1			
W6NIG 11,696	CM2SB 1			
W6CHV 10,325	Zone 9			
W6YI 8,840	HK1DZ 13,014	LA9T 8		
W6MI 1,128	HK4EB 8,400	LA3V 2		
W6WSI				
W7ESK 32,712				
W7GUI 13,120				
W7MBX 7,695				
W8KML 55,875				
W8HUD 52,682				
1 W6SA and W6SZY ops.				2 ZS6BV and ZS6QJ ops.

## C. W. SCORES

**Zone 1**

KL7PJ	31,920
KL7KV	17,280
KL7UM	13,746
KL7PB	13,344
KL7OL	5,436
KL7SF	

**Zone 2**

VE8NY	9,999
VO6J	23,045
VO6EP	19,368

**Zones 3, 4 & 5**

W1RY	84,785
W1BIH	64,416
W1CJH	59,220
W1JYH	42,959
W1ZD	24,720
W1MUN	18,200
W1ONK	17,920
W1HX	9,858
W1EOB	8,113
W1AB	6,069
W1QMJ	2,480
W1RBK	630
W1MD	540
W1QMI	399
W1PLJ	2
W1CDZ	
W1QAW	
W2IQG 1	289,680
W2FBA 2	192,072
W2BXA	177,840
W2PWP	133,942
W2IOP	108,120
W2QCF	53,680
W2AUH	44,800
W2IMU	42,456
W2HMJ	38,940
W2GMW	36,240
W2UFT	33,553
W2CYS	26,664
W2WC	25,016
W2AW	18,312
W2BJH	18,204
W2RWE	17,818
W2KIR	15,089
W2IYO	13,266
W2EWT	12,328
W2MA	10,557
W2GVZ	5,336
W2AJI	3,840
W2AGU	3,772
W2EYZ	3,444
W2TXB	2,724
W2HAZ	2,646
W2GUR	2,442
W2LTP	2,070
W2KVY	1,080
W2BF	1,026
W2DEW	1,025
W2QJM	616
W2JB	418
W2CKR	384
W2BT	340
W2RCF	322
W2WFU	252
W2ADP	208
W2NHH	168
W2OWX	
W2CDP	
W2EQS	
W2GT	
W2LRW	
W2SHZ	
W2ETT	

1 W2IQG, W2AZL, W2OTC and W2UEI ops.  
2 W2FBA and W2PUD ops.

W3JTC	49,770
W3JKO	49,248
W3GHD	42,552
W3BEN	39,312
W3ARK	30,400
W3FQB	27,030
W3BES	26,235
W3JYS	16,530
W3AFW	14,700
W3FYS	12,740
W3NOH	11,952
W3CTE	9,145
W3IBT	7,579
W3LVU	5,978
W3KQD	3,920
W3AOA	3,654
W3WU	3,362
W3HTK	2,850
W3DLI	
W3NCF	
W3NRE	

W4KFC	277,730
W4KXN	96,446
W4GXB	79,288
W4KUX	69,680
W4LZF	53,406
W4IWB	42,105
W4KQY	30,979
W4CS	29,664
W4CYC	26,910
W4PN	25,755
W4DXI	19,164
W4BYF	15,631
W4LVV	15,051
W4TO	12,900
W4NNJ	10,880
W4FIJ	7,722
W4MR	6,972
W4LOI	4,988
W4NLA	3,672
W4KE	2,196
W4NVV	2,187
W4IZR	2,145
W4HLQ	1,568
W4CY	1,280
W4BT	12
W4KXD	3

W5KC	57,794
W5GEL	48,650
W5BRR	24,735
W5FNA	7,215
W5CKY	6,888
W5KWY	5,841
W5PM	1,008
W5BK	850
W5HLK	208
W5FWA	180
W5ONL	36
W5EGX	

W6SZY 3	231,105
W6GRL	169,680
W6RM	132,854
W6LDJ 4	105,544
W6AM	73,580
W6EPZ	71,898
W6IBD	61,548
W6OMC	61,084
W6BPD	36,816
W6QD	32,996
W6SRF	30,305
W6RBQ	28,611
W6EFM	27,927
W6CTL	27,348
W6IFW	25,199
W6BAM	24,320
W6VAQ	22,696
W6MI	18,250
W6ATO	13,132
W6AMO	12,702
W6BJU	12,090

3 W6SZY and W6SA ops.  
4 W6LDJ and W6LHN ops.

W6NKR	8,970
W6ISQ	8,775
W6NNV	4,700
W6QDE	4,601
W6CTO	4,539
W6GTM	4,350
W6JFJ	4,284
W6MUF	4,046
W6EJA	3,382
W6HJ	1,782
W6WWQ	1,656
W6ID	1,575
W6BIL	1,530
W6PCP	1,160
W6UCX	1,054
W6SRU	910
W6ZZ	720
W6KUT	500
W6JWL	
W6NTR	
W6OJW	
W6MX	
W6LTM	

W7GUI	54,720
W7LEE	28,363
W7PK	4,142
W7MO	3,640
W7LNG	880
W7DIS	696

W8WZ	200,250
W8JIN	187,354
W8HFE	97,682
W8ZY	85,620
W8AZD	42,768
W8DAW	38,755
W8NSS	25,275
W8KPL	19,462
W8SYC	19,152
W8QHV	18,676
W8DAE	15,895
W8OBS	15,040
W8IQS	13,293
W8CED	10,492
W8LFE	9,638
W8NXF	9,179
W8ZCK	9,128
W8EWS	6,400
W8JJA	5,425
W8DQC	4,680
W8WWU	4,565
W8ICC	3,977
W8PM	3,948
W8ZJO	3,880
W8AVW	2,844
W8CKB	1,716
W8ADP	1,540
W8KC	1,276
W8YHE	546
W8YFJ	176
W8CCJ	

W9IU	137,175
W9LM	123,900
W9PSR	101,780
W9NII	78,923
W9LVR	49,875
W9CIA	37,248
W9CKP	21,886
W9APY	18,825
W9RBI	14,790
W9VW	14,476
W9KXK	13,166
W9UG	11,194
W9OAT	8,064
W9FNR	5,460
W9QIY	4,935
W9WEN	3,822
W9IML	2,736
W9BVV	2,730
W9EHS	1,540
W9STE	1,530
W9MDG	1,160
W9FKC	360
W9SJ	
W9QGR	

W0DAE	130,262
W0NUC	92,105
W0AIW 5	68,328
W0UOX	25,662
W0AZT	22,134
W0CFB	20,076
W0SO	19,095
W0BBS	8,844
W0VIP	8,821
W0ERI	5,830
W0HSM	3,780
W0FUH	1,400
W0DU	312
W0FID	300
W0ERI	62
W0KOW	
W0KGG	

VE1EA	32,012
VE1CU	12,672
VE1RP	4,719
VE1DB	2,200
VE1EK	1,537
VE1QZ	224
VE2BV	18,252
VE3QD	93,600
VE3BBR	18,648
VE3EK	12,662
VE3AGX	10,880
VE3IJ	9,515
VE3DT	6,916
VE3BBQ	1,780
VE3IR	1,690
VE3WY	
VE3QE	
VE4XO	41,184
VE4TJ	1,830
VE4RO	
VE5QZ	6,300
VE5UN	1,260

VE6MZ	35,482
VE6EE	24,510
VE6AO	8,784
VE7HC	111,338
VE7ZM	37,180
VE7ZZ	11,928
VE7WH	8,792
VE7KC	7,437
VE7EO	4,725
VO2RF	26,036
VP9CC	7,424

**Zone 6**

XE1KE	12,008
XE1TE	987

**Zone 7**

TI2KP	37,064
KZ5AY	17,485
TG9JK	11,008
HP1BR	4,192
HR1AT	320

**Zone 8**

KV4AA	73,587
KP4HU	36,162
KP4KD	8,640
HH2JD	1,258
CO2LN	6,264

5 W0AIW and W0UQV ops.

**Zone 9**

HK3CK	46,057
HK3CT	17,632
HK3FF	1,458

**Zone 10**

HC1JB 6	83,398
HC1AW	20,055
HC1KP	3

**Zone 11**

PY2AC	205,140
PY1DH	92,241
PY2NX	18,900
PY2OE	18,870
PY1GJ	17,388
PY3AL	8,064
PY1FM	3,276
PY1AJ	425
PY2ACT	
PY4FI	
PY6CO	

**Zone 12**

CE3AG	176,252
CE4AD	65,209

**Zone 13**

LU5BM	108,342
LU9EV	14,858

CX6AD

**Zone 14**

DA5FF	82,467
DA2AT	65,286
DA4HN	60,333
DK7AA	58,596
DA4NA	50,996
D2BK	30,167
DA1DA	20,746
DK7AV	13,530
DK7AZ	10,200
DK7AR	9,734
DA4ND	8,517
DA2AW	7,006
DA3AB	5,494
D2BK	4,465
DK8BC	3,393
DA2FB	2,407
DA6TX	2,150
DK7AQ	2,100
DA2CA	1,272
DA1AR	1,232
DA1HI	500
DA5DV	460
DK7AG	400
DA2AY	285
DA1AD	36
D4AAV	

G2VD	117,624
G5CW 7	95,438
G8IP	69,342
G6QB	69,300
G4CD	62,400
G2LB	55,144
G2DC	47,998
G3AZ	49,755
G2DLJ	43,491
G4AR	32,040
GW3JI	29,640

6 HC1JB and HC1OX ops.  
7 G5CW, G3DCU and G3CTP ops.





John Bondy, W2IQG, chief op. and owner of the station with the highest multiple-operator score in the world.

W9LM, 123,900; HB9EU, 120,100; ZC1CL, 118,020; G2VD, 117,624; KH6MI, 117,264; ZL1MB, 116,106; VE7HC, 111,338; LU5BM, 108,342; W2IOP, 108,120; W6LDJ (W6LDJ and W6LHN operators), 105,544; OK1HI, 102,116; W9PSR, 101,780; and FA3JY, 101,640.

#### Comments from the Phone Gang

*G8KP*—Trust this will be a yearly event now. Never enjoyed a contest as much before, and don't think there's ever been a contest so well supported; didn't hear anyone who wasn't in it. *ZL4HP*—Conditions very ordinary over the week-end, and the band going out early this year. Contest very good and some nice signals on the air. *VK2WD*—Conditions were extremely poor this end. Very few W stations were heard. *G2DPZ*—Very excellent contest and very well organized. This should be an annual event.

*ZS6BV*—A good system of scoring, but operating time should be applied as a factor in computing merit of scores. *VR2AP*—Conditions very bad. *WØAIW*—Excellent contest. Let's have another next year and keep it one week-end each for c.w.

and phone. *VQ4ERR*—Next year please!! Excellent contest. *W9KXK*—Promote contest for next year as soon as possible. Too many foreign stations did not know about contest and scoring. Send information to all radio magazines several months in advance.

*WØANF*—The contest is perfect as long as it is for one week-end only. *W2U1H*—Would be easier if the DX station would say on what frequencies he was listening. That would avoid QRM all over the band. *W6MI*—Please attempt to get foreign stations to indicate approximate receiving frequency.

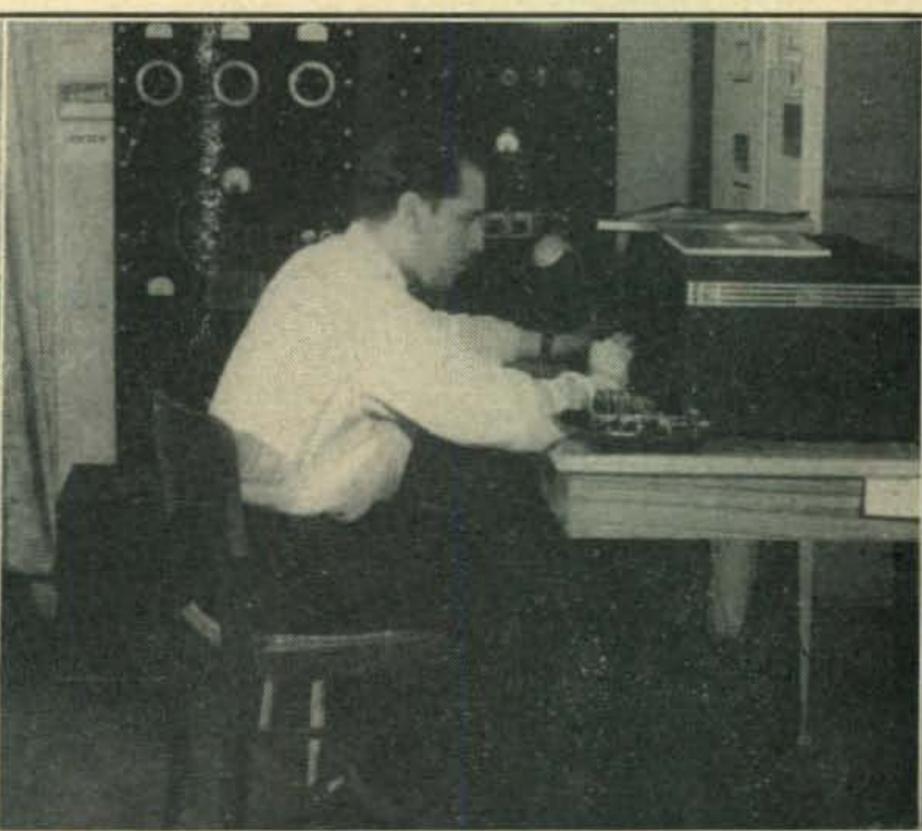
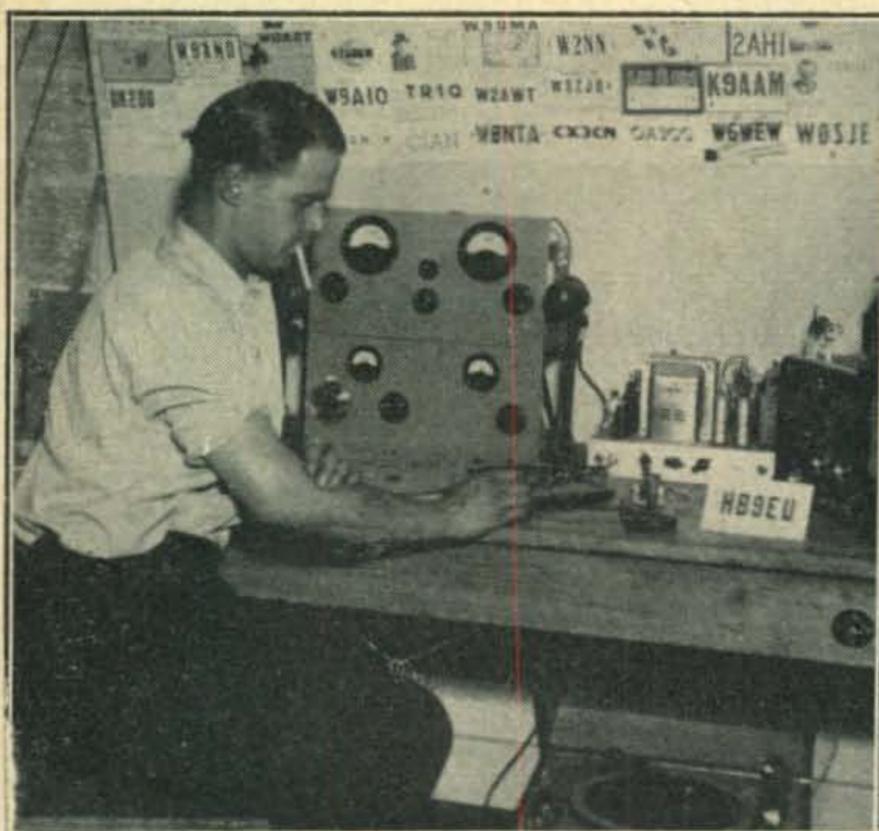
*W6YI*—Conditions very bad in this section. Suggest in future you allow choice of any two band multipliers on phone instead of calling for all three. A man must sleep. *W8KML*—Congratulations on a good start. Believe one week-end is sufficient considering other activities. Only criticism is that foreign stations should always specify "no Ws" when not covering our phone band and looking for other countries. Your clear definition of one operator limitations is very gratifying in view of much abused and condemned practices in other contests.

#### Remarks from the C.W. Gang

*ZC1CL*—Immensely popular contest. Less unsportsmanlike tactics noticed than on usual non-competitive periods. *DK7AA*—Suggest for further competitions to use another serial number consisting of the zone number and a number representing the quantity of QSOs since entering into the contest. Example: 579/14/062. *I1PL*—This is the most interesting contest of the world. Next year two week-ends operation (96 hours) . . . we hope!

*ZL1MB*—Think each call area in U.S.A. should in future be counted as separate countries; also Canada. *PAØEP*—This contest has been one of the best I ever worked in. Thank you so much for sending me the log sheets. *GY6YM*—Definitely the best contest yet. Let's have two week-ends next time. *G6HK*—A very enjoyable contest with generally clean and snappy operating, especially by "W" stations. Once a year is not enough. Suggest single-band contests would be interesting. *SM6UT*

(Continued on page 75)

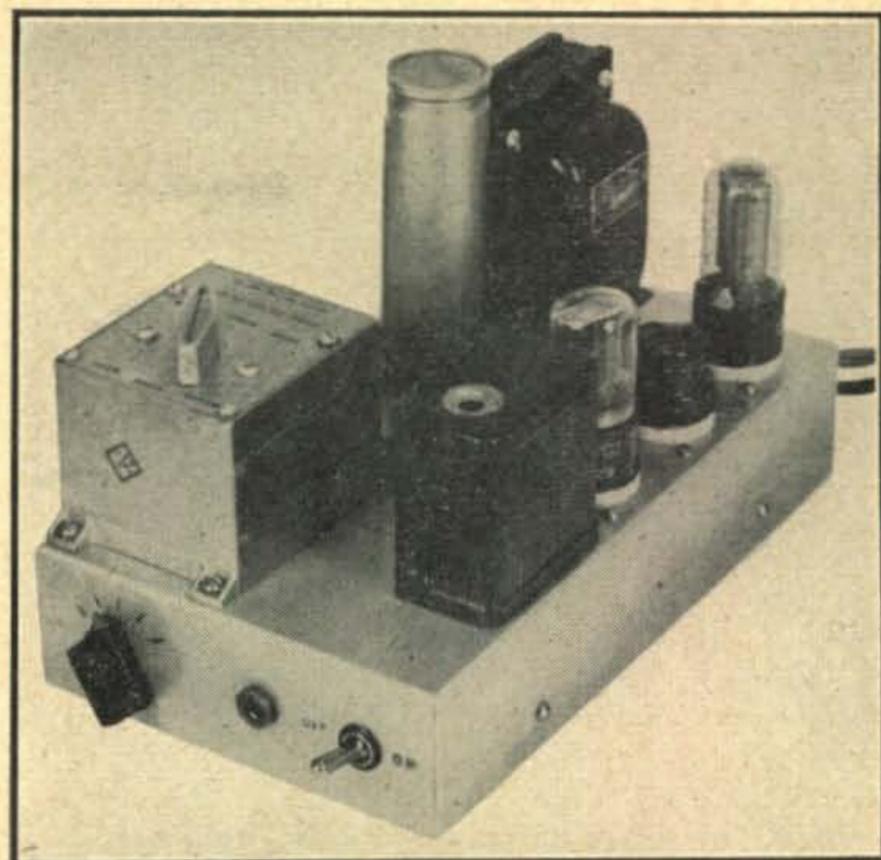


Left: Ruddy Faessler, HB9EU, with 120,000 points helped keep Switzerland on the air. Right: Giovanni Camauli, IIRC, photographed operating at the First International Fair of Trieste, had the high score from Trieste on phone.

Mechanical construction of the QRM Eliminator is so simple that a few hours work will complete the job.

# A QRM Eliminator

G. L. COUNTRYMAN, W3HH, W1RDK\*



*The only thing better than one audio filter is two. And the resulting super-selectivity pays off in QSOs impossible under normal receiving conditions.*

**D**URING THE PAST months there has been a tremendous revival of interest in tuned audio circuits for increasing receiver selectivity. Attracting considerable attention some twenty-five years ago, interest waned when receiver crystal filters were developed. During the ensuing years the audio filter practically dropped out of the general communications receiver field although in the Navy they are included in the standard receiver.

The QRM Eliminator, a modified audio filter, is really a boon for the c-w man. During CQ's recent DX contest, W1RDK could be on for only a couple of hours, but during that time there was not a single DX station that was not copied solid through the local QRM on his frequency, following the DX station's CQ. Short calls were made and invariably any trace of the DX station was buried in the QRM calling him. A quick flip of the switches on the QRM Eliminator and there was the DX station out in the clear. In many of the contacts made, our numbers had been exchanged and the QSO had been completed before some of the gang had finished calling.

While the QRM Eliminator is of greatest value on c.w., it also increases the selectivity on phone greatly, and interfering beat notes can be quickly knocked out of the picture.

Most of the recently published information<sup>1</sup> provides for the sharp peaking of a received signal at about 1000 cycles, combined with attenuation of interfering signals slightly removed in frequency. The resultant note is tiring to copy as it

is monotonous and devoid of harmonics. Also, many of the weaker DX c-w signals that are hard to pull through the QRM either lack sufficient stability to permit their being held at a sharp audio peak, or are inadequately filtered so that it is practically impossible to obtain a good 1000-cycle pitch on the receiver.

The QRM Eliminator is designed primarily to eliminate the interfering signal. In addition, the unit can also be used to peak any desired signal of sufficient stability as both band-pass and band-eliminator filters may be utilized. There is also a diode type "noise suppressor" which, in this application, will short circuit a loud interfering signal, permitting solid copy of the flea power job about three layers down.

#### Choice of Filters

The photographs and the wiring diagrams are self-explanatory. The FL8 (A, B or C) range filters are available from most surplus stores and are widely advertised. One of the less expensive range filters, the model without the two flexible leads terminating in a phone jack and phone plug respectively is acceptable as these leads are not used. The FL8 has a three-position switch on the top marked "Range," "Voice" and "Both." When set on "Range," the filter peaks sharply, passing only a small band of frequencies around 1020 cycles. On "Voice," 1020 cycles is eliminated, but other audio frequencies are passed, and on "Both," normal receiver output passes through the filter to the headset. Those of you who have tried the FL8 alone in your receiver output are due for a pleasant surprise when you incorporate it in the QRM Eliminator.

The other filter is scarcer, but is still obtainable from many surplus stores. There are several styles, 70472, 70473, etc., all functioning equally well in

\*Commander, USN, Electronics Officer,  
Boston Naval Shipyard, Boston, Mass.

<sup>1</sup> Bane, "Bandpass Filters," CQ June, 1948.

Black, "Peaked Audio," CQ June, 1948.

Hanchett, Jr., "A Peaked Audio Amplifier," QST Sept., 1948.

Talpey, "Low Cost Audio Selectivity," CQ, Sept., 1948.

Bane, "The Single-Sider," CQ, May, 1949.

the eliminator. The normal peak is around 800 cycles and on some types is adjustable within narrow limits using a No. 6 Allen wrench. The circuit of these filters is approximately as shown in Fig. 1, which is included in case the one you buy

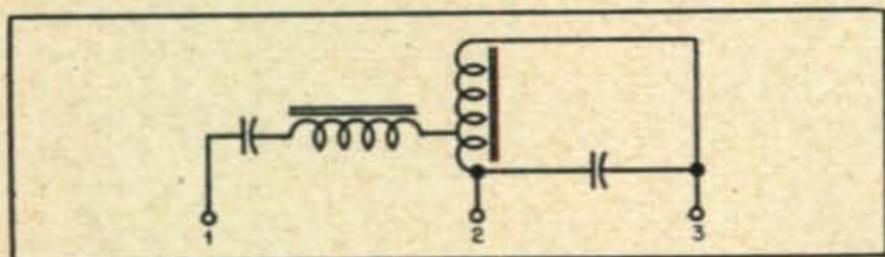


Fig. 1. Basic circuit for 70472-series audio filters.

does not have the terminals marked. The center terminal is always grounded in this application, and terminal 1 has a condenser in series with the grounded terminal so you can not get a continuity test between terminals 1 and 2.

In the wiring diagram, only the terminals as numbered on the filter are shown. Also, only connections to the FL8 terminal strip are shown, as the hook-up of the FL8 is unnecessary. The FL8 terminal strip is reached by removing the four screws on the top of the FL8 and then raising the top sufficiently to expose the terminal strip.

The 6H6 tube<sup>2</sup> and its two associated 1½-volt pen-light dry cells is a simple audio limiter which will short-circuit any signal greater than three volts, peak-to-peak, coming from the receiver. In this application it is used not to eliminate noise primarily but to limit an S9 signal on top of that S3 signal that you want to copy.

#### Switching Control

The switch *S2* has five positions and as wired

<sup>2</sup> Because of its lower forward resistance, the 6AL5 is to be preferred to the 6H6, particularly in applications wherein the generator resistance is low.—Ed.

will give the following results:

Position 1. Audio is cut off.

Position 2. Receiver output goes directly to the FL8. (With the FL8 switch on "Both," normal receiver output is obtained).

Position 3. Filter *L1* is cut into the circuit, peaking the receiver audio output sharply at about 800 cycles and with considerable apparent gain even though the coupling tube is connected as a cathode follower.

Position 4. Receiver output goes directly through the limiter tube, *L1* not being in the circuit.

Position 5. The circuit now includes both the peaked filter *L1* and the limiter.

In addition to the four operating positions of *S2* on the chassis front, each of these positions may be modified by use of the switch on the FL8 so that the output from the rest of the unit will go direct to the headphones (FL8 on "Both"); remove all 1020-cycle tone from the note (FL8 on "Voice"); or pass only 1020 cycles (FL8 on "Range"). This gives a total of twelve possible combinations that can be successively tried in a few seconds to eliminate a QRMing signal.

No constructional difficulties should be encountered as all wiring is straightforward. The two small dry cells will have shelf life as no current is drawn from them. They are secured to the underside of the chassis by small cable clamps and the connections are soldered directly to their terminals. A small piece of cardboard is slipped between the ungrounded negative terminal on one cell and the chassis to prevent possible short circuit.

The aluminum chassis is 6" x 10" x 2" although a smaller one will be adequate. The filter condenser is a three section electrolytic, 8 μf each section with the can negative. One section is used

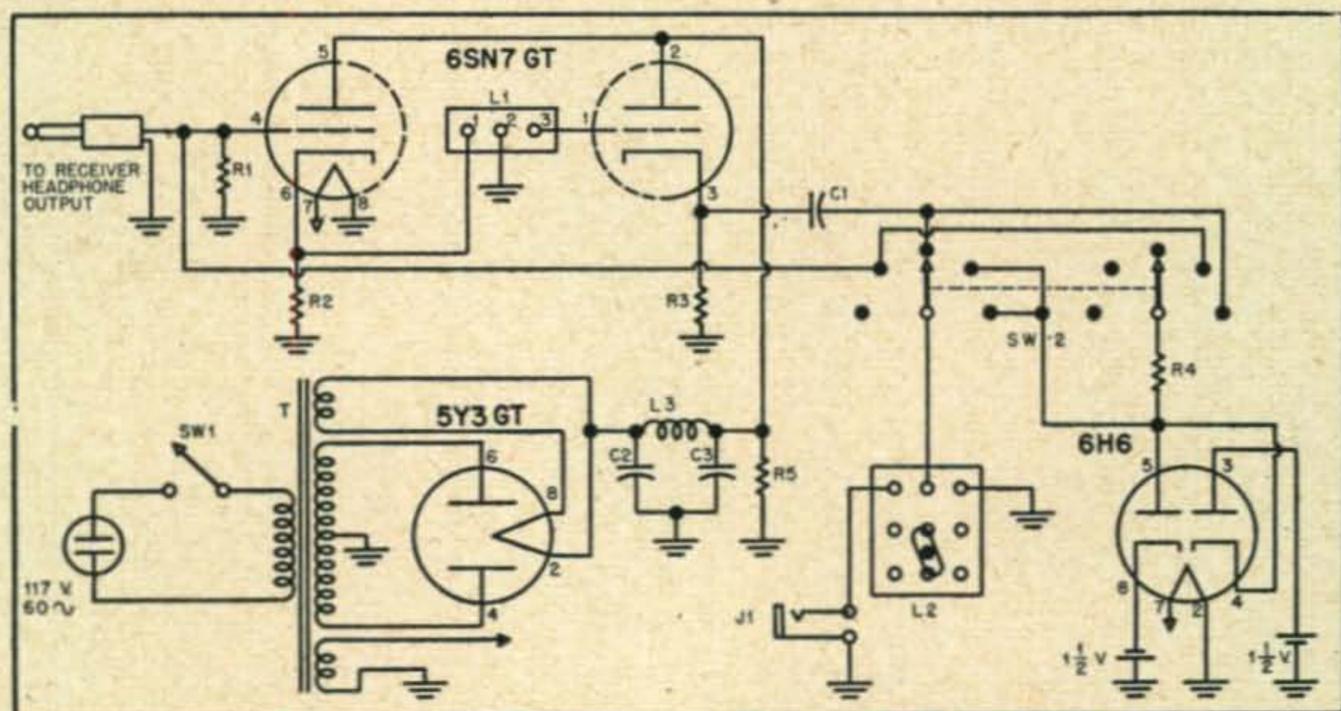


Fig. 2. Circuit diagram of the complete dual audio filter.

C1—.05 μmf, paper.

C2—8 μf, 450 v., electrolytic.

C3—16 μf, 450 v., electrolytic.

L1—Peaked audio choke (see text).

L2—FL8 A, B or C (see text).

L3—12-henry 60-ma. replacement choke.

R1—250,000 ohms, ½ watt.

R2, R3—2,000 ohms, ½ watt.

R4—10,000 ohms, ½ watt.

R5—50,000 ohms, 5 watts.

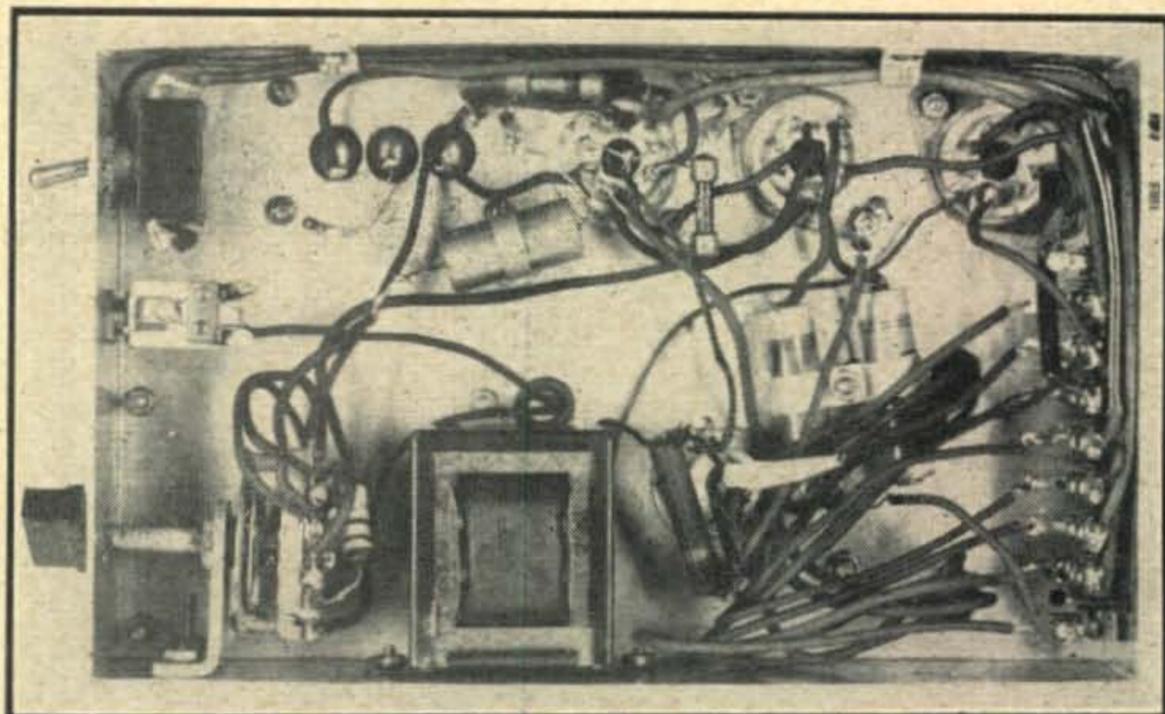
SW1—SPST toggle switch.

SW2—2-circuit 5-position rotary switch.

T—350-0-350 v. 50 ma.; 5 v. 2 amp.; 6.3 v. 2 amp. transformer (Stancor P-4077 or equal).

J1—Open circuit phone jack.

No special precautions need be taken with wiring the QRM Eliminator and the circuit has the added virtue of being practically bug-proof.



on the input side and the other two sections in parallel are used on the output side. The rectifier socket is wired with pins 2 and 7 connected together, pins 3 and 4 connected together and pins 5 and 6 connected together to permit the use of any of the usual octal base rectifier tubes.

It will be noted that one side of the input is grounded. Because of this, the eliminator can only be used when plugged into the headphone circuit of receivers that *do not* have a built-in speaker output transformer. The QRM Eliminator must be plugged into the phone jack of the receiver and the head-set plugged into the jack on the front of the eliminator. If conditions are bad enough to require the use of the eliminator headphones are normally used anyway.

#### More Gain For Less QRM

When you first operate the eliminator, it will be confusing when the limiter is cut in on the circuit (*S2* on position 4 or 5). To eliminate an unwanted signal, the receiver gain must be *increased*. When the interfering signal reaches a 3-volt level it disappears leaving only a click or thump which does not prevent solid copy of the desired signal. As it is instinctive to cut down the receiver gain when a loud interfering signal is heard, it is a little difficult to get used to increasing the receiver volume. It is like learning to step on the gas if you want to stop your car quickly!

It is, of course, unnecessary to use the terminal strip shown at the rear of the chassis, underneath. Several different transformers were tried out in the rig, so connections were made to a terminal strip to facilitate changing power transformers. All transformers tried worked equally well, including one with an untapped high voltage secondary winding with which half-wave rectification was used (rectifier plates connected together in parallel). It would make a neater job if the terminal strip was eliminated and the power transformer leads clipped to the correct length instead of being left at their original length and bunched together as shown in the photograph. The three components on the front chassis apron are easily identified. At the left is the five-pole double-throw rotary switch,

*S2*. In the center is the phone jack into which the headset is plugged and at the right is the a.c. on-off switch, *S1*. Two two-pair leads come out the rear of the chassis, through grommetted holes. One is the input from the receiver terminating in a phone plug and the other is the a-c line cord, terminating in a standard a-c plug.

Since the QRM Eliminator has been in use the crystal filter on the receiver is rarely used. After a few days' operation you can tell by the pitch of a desired signal and the type of interference which switch settings will cut out the unwanted signal. It will be found that the FL8 switch is most frequently used in the center ("Voice") position, and the chassis switch, *S2*, rotated to the position giving the desired results.

## Postscripts

#### Starved Rock Radio Club Hamfest

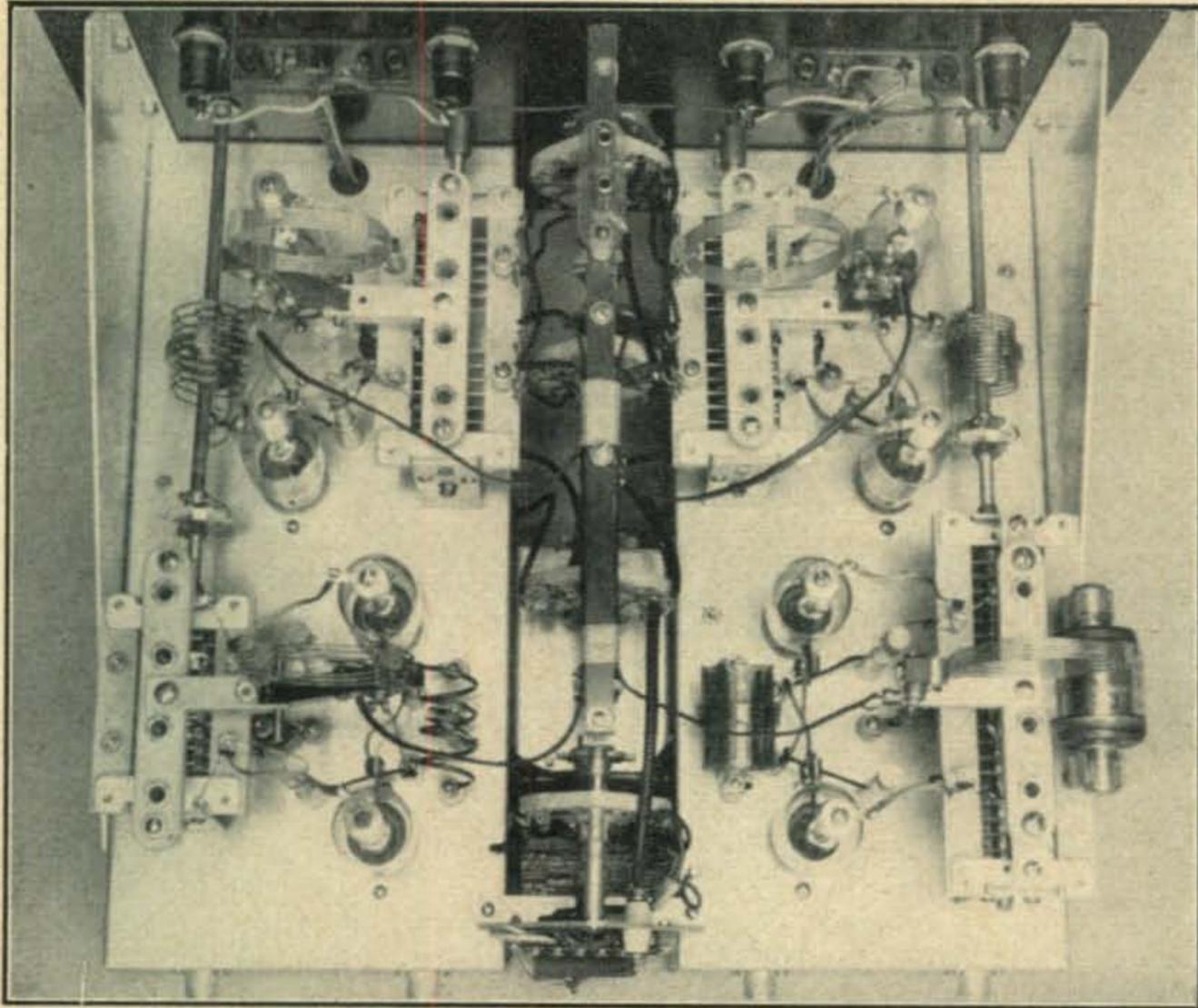
The Starved Rock Radio Club will hold a hamfest on June 5 at Boy Scout Camp Ki-Shau-Wau near Starved Rock State Park, Ill. There will be entertainment, speakers, exhibits and prizes, with lunch available on the grounds. Registration \$1 in advance, or \$1.50 at the gate.

#### Peoria Amateur Radio Assn. Hamfest

The Peoria Amateur Radio Assn. will hold its annual hamfest on June 12 at Woodland Knolls on Route 116 east of Peoria. The program includes contests, entertainment and prizes, but bring your own lunch. For details write H. E. Callander, Secy, 211 E. McClure, Peoria, Ill.

#### San Mateo County Hamfest

The third annual San Mateo County Hamfest will be held at Coyote Point, San Mateo, Calif., from 10 a.m. to 4:30 p.m. on June 12. Prizes galore, we hear, with 2-meter hidden transmitter hunt, brasspounder's contest, games of chance, children's games with prizes, auction, special events for the YLs and XYLs. Hot dogs, beer and soft drinks will be served after 10 a.m., or bring your own lunch and get your coffee free. Tickets \$1. Chairman is W6YGX, Box 751, San Mateo, Calif.



Four separate finals, carefully laid out for symmetry and maximum isolation of components in a small area give trouble-free operation. Separate coax input connectors bring in excitation. The amplifier selector switch is assembled from units as described in the text.

# The Four-In-One

CHARLES LEVINE, WIMOJ\*

*Multiple finals to cover four bands simplified to a point where they occupy no more space than the conventional one-band power amplifier.*

**E**VER SINCE THE amateur discarded single plug-in coils for bandswitching in receivers, it has been his desire to do the same with his transmitter.

While many successful bandswitching exciters have been designed, attempts to bandswitch the final amplifiers have been successful only with compromises.

The unit described in this article is the outcome of the author's attempt to overcome all the compromises and inherent losses in previous designs, some of which were:

1. Retuning of the final with each band change.
2. Final not normally completely neutralized on all bands.
3. High-power coil turrets unavailable. Coupling to turret with variable link difficult. Efficiency on high frequencies poor.

The final amplifier described is essentially four r-f amplifiers separately designed to give maximum efficiency at the operating frequency, assembled together, and provided with switching of filament and plate power and r-f output.

\*c/o Raytheon Mfg. Co., Equipment Engineering Div. Waltham 54, Mass.

The bands selected at this station were 75, 20, 10 and 6-meter phone. C-W operation may be used on these bands and 40 meters by adding fixed bias or primary keying.

A quick glance will leave the impression that the total price for the required parts is too costly. However, considering the efficiency and flexibility of the unit, the total cost is commensurate with the operating advantages.

## Circuit Design and Operation

The circuit design is straightforward and all sections are identical except for the L/C components. *Figure 1* shows the complete circuit.

For an easy understanding of operation, let us discuss the individual circuits; namely, filament, grid, plate and r-f output.

The filaments are supplied by *T1*. One side of each circuit is common. The other side of each filament is connected to the filament transformer through the bandswitch section, *S1*. The filaments of the respective final in operation light only as shown by the indicating lamp, such as *I1, I2, I3, I4*, across the circuit. *R2* is the plate current meter shunt.

Notice that every other contact of  $S1a$  is tied together and returned to one side of a filament transformer,  $T2$ , which is connected backwards. The detent of the bandswitch is such that the arm stops at every other contact. As the arm passes through the intermediate contact, a momentary circuit is completed and actuates a stepping switch in the exciter, thus changing the excitation and output stages simultaneously. This

feature is optional and may be accomplished with other switches by merely using another section.

Fixed-tuned grid circuits were contemplated at first, but since the author is still a professed "knob twister" conventional tuning was employed. Band-switching the grid excitation also was considered, but the companion exciter unit now in use did not warrant this. The variable 1500-ohm resistors  $R1$ ,  $R3$ ,  $R5$  and  $R6$ , are isolation resistors which pre-

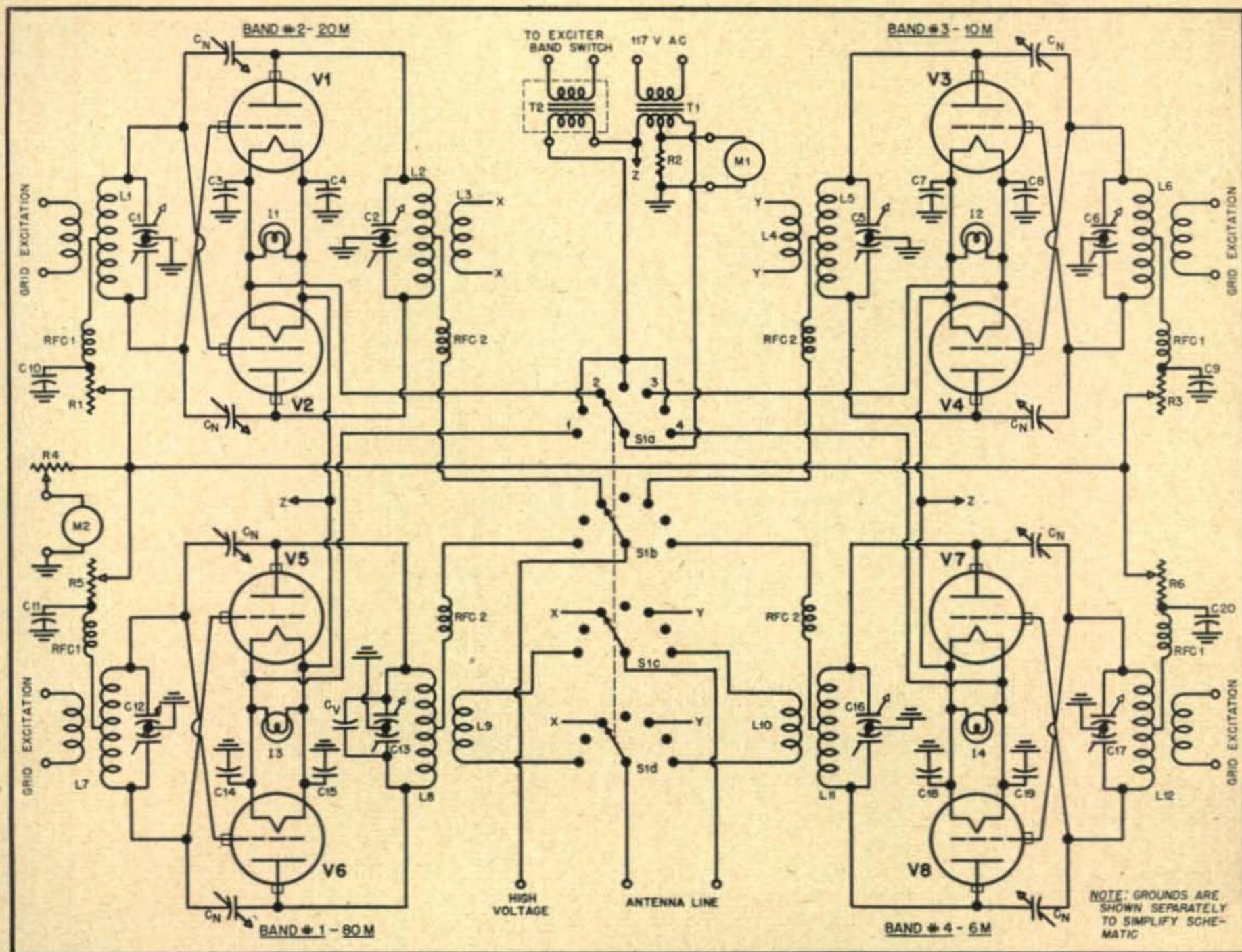


Fig. 1. Schematic diagram of the multiple bandswitching finals.

$C1$ ,  $C6$ —Split-stator variable, 50  $\mu\text{mf}$  per section (Hammarlund HFD-50).  
 $C2$ ,  $C5$ —Split-stator variable, 50  $\mu\text{mf}$  per section (National TMH-50D).  
 $C3$ ,  $C4$ ,  $C7$ ,  $C8$ ,  $C14$ ,  $C15$ ,  $C18$ ,  $C19$ —.01  $\mu\text{f}$ , tubular.  
 $C9$ ,  $C10$ ,  $C11$ ,  $C20$ —.01  $\mu\text{f}$ , mica.  
 $C12$ —Split-stator variable, 100  $\mu\text{mf}$  per section (Cardwell EU-100AD).  
 $C13$ —Split-stator variable, 75  $\mu\text{mf}$  per section (National TMH-75D).  
 $C16$ —Split-stator variable, 35  $\mu\text{mf}$  per section (National TMH-35D).  
 $C17$ —Split-stator variable, 15  $\mu\text{mf}$  per section (Hammarlund HFD-15X).  
 $C_N$ —.5-4  $\mu\text{mf}$ , neutralizing (National NC-600U).  
 $C_V$ —Vacuum capacitor, 50  $\mu\text{mf}$ , 5 kv working voltage (Western Electric 8047).  
 $I1$ ,  $I2$ ,  $I3$ ,  $I4$ —6.3 v. pilot lamp.  
 $L1$ —National AR16-20C grid coil.  
 $L2$ —B&W type 20 BVL plate coil.

$L3$ ,  $L4$ ,  $L9$ ,  $L10$ —R-F pick-up coil, 3 or 5 turns as required (part of swinging link assembly).  
 $L5$ —B&W type 10 BVL plate coil.  
 $L6$ —National AR16-10C grid coil.  
 $L7$ —National AR16-80C grid coil.  
 $L11$ —B&W type 5 BVL plate coil.  
 $L12$ —National AR16-6C grid coil.  
 $R1$ ,  $R3$ ,  $R5$ ,  $R6$ —1500 ohms, 10 watts, wire wound.  
 $R2$ —50 ohms, 10 watts, wire wound.  
 $R4$ —5000 ohms, 25 watts, wire wound.  
 $\text{RFC1}$ —2.5 mh, 125 ma, r-f choke (National R100).  
 $\text{RFC2}$ —1.0 mh, 300 ma, r-f choke (National R300).  
 $M1$ —0.200 ma.  
 $M2$ —0.50 ma.  
 $V1$ ,  $V2$ ,  $V3$ ,  $V4$ ,  $V5$ ,  $V6$ ,  $V7$ ,  $V8$ —3C24 (24G) or equivalent tubes.  
 $S1$ —As described in text.  
 $T1$ —6.3 v., 6 a., filament transformer, 5000-volt insulation.  
 $T2$ —6.3 v., 1 a., filament transformer (optional).

vent possible interaction of the different stages and allow adjustment of grid bias so that it is equal on all bands.

The plate and r-f output circuits also are conventional. It was not found necessary to by-pass the plate r-f chokes.

The front panel is a standard  $8\frac{3}{4}$ " x 19" x  $\frac{1}{8}$ " thick aluminum relay rack type. Grid and plate controls can be clearly seen in the photos. The pilot light over each dial is the band indicator. The bar knob in the center is the bandswitch control.

The difference in height between the top of the panel and the coils is made up with separate  $3\frac{1}{2}$  inch wide meter panel.

#### General Chassis Layout - Top View

A layout of the parts was made on a sheet of paper which was used as a drilling template. No

special tools are required. Incidentally, this unit was built on the kitchen table. The XYL did the holding and heavy looking on.

The chassis are standard 7" x 15" x 3" aluminum. (Drilling aluminum is easier on the nerves and hands). In our installation, the unit is mounted in a relay rack cabinet which is 16 inches deep. It may be necessary to use a shorter chassis in other applications. This can be done easily without cramming parts.

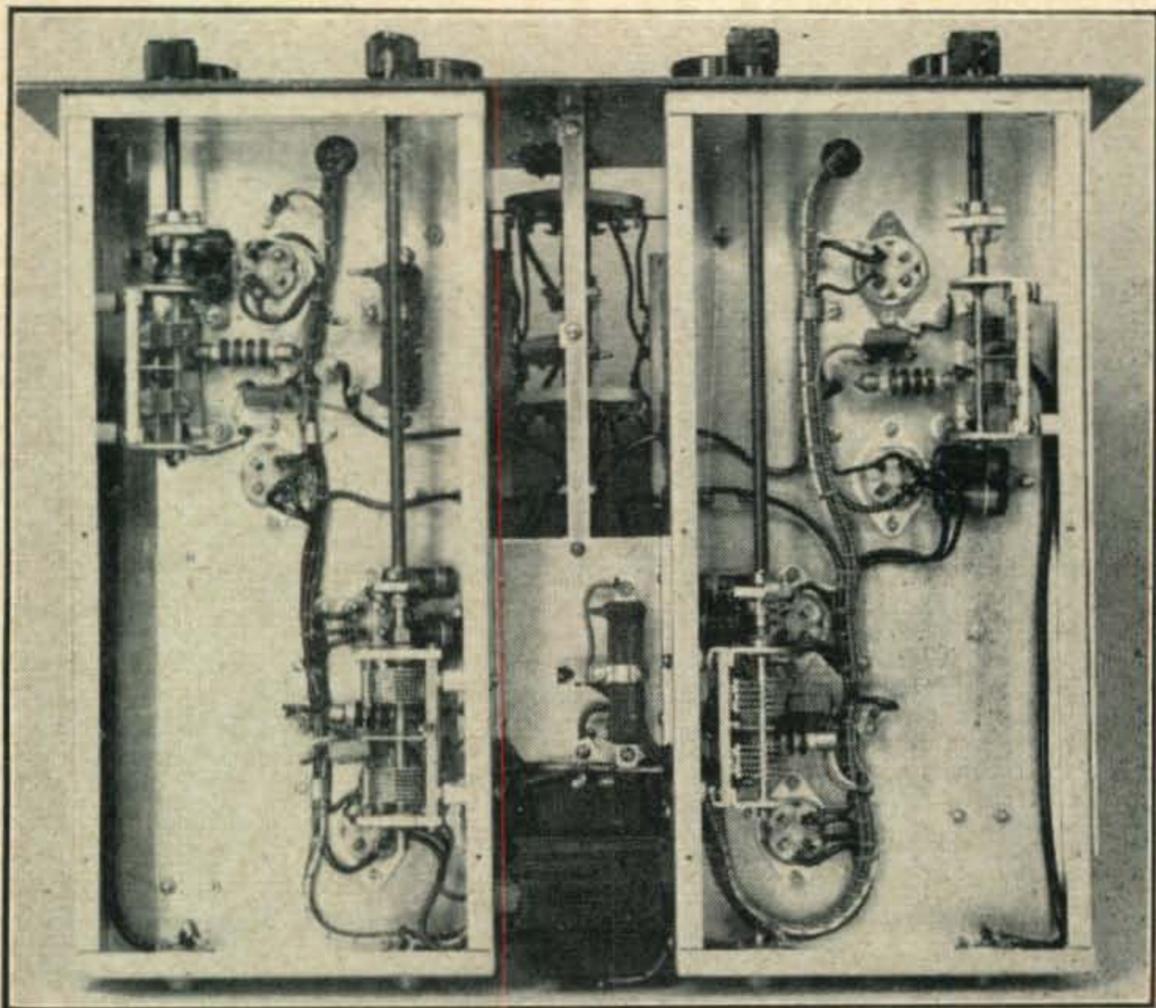
The parts used were those which were on hand, others may be substituted without any sacrifice of results. All plate circuit tuning condensers are National type TMH. Note that they are mounted with homemade brackets. All rotors are grounded.

The plate coils, which are Barker and Williamson type BVL, were removed before taking the

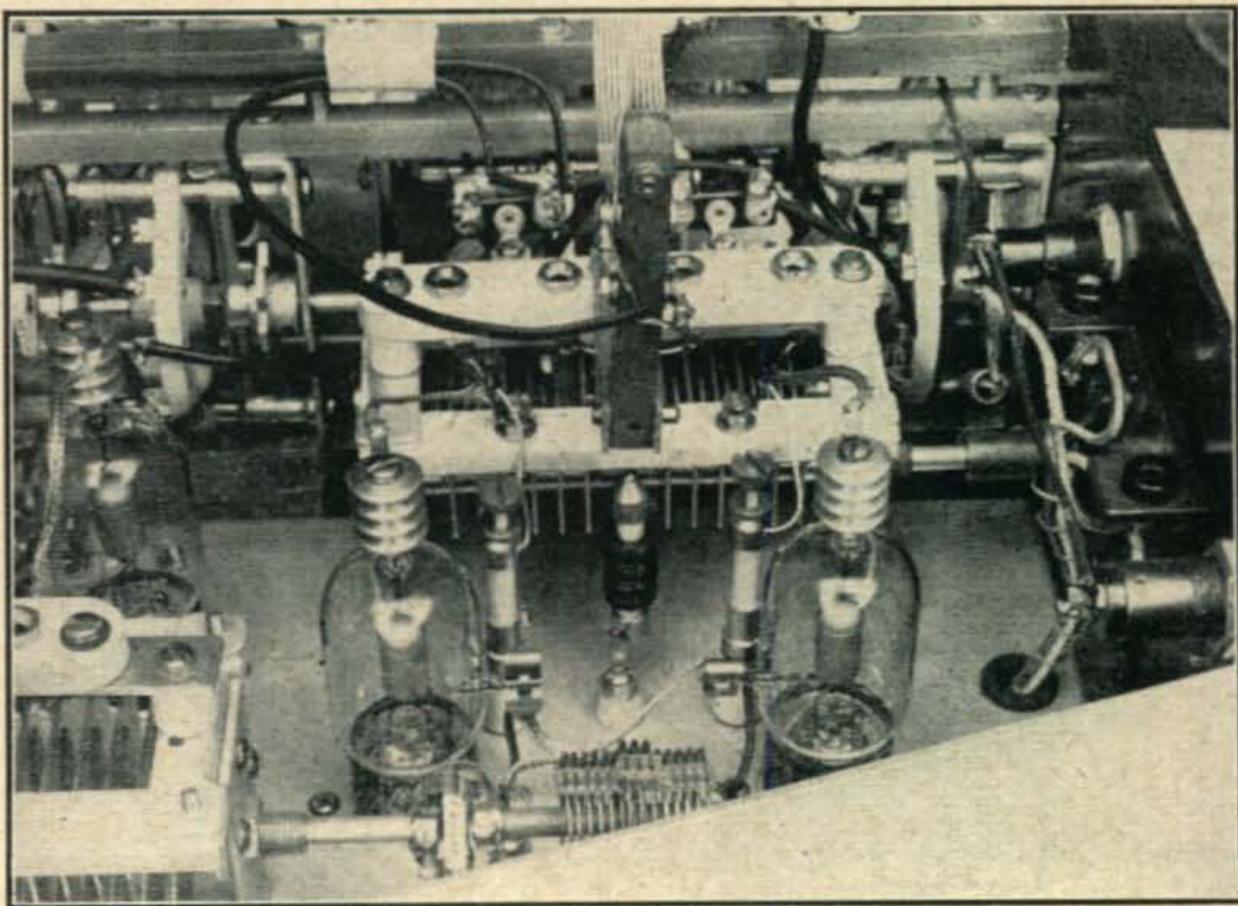
photograph in order to show other components. To reduce costs, the coil bases were purchased as insulators and banana jacks were added. The coils can be permanently soldered to the condensers, thus eliminating the coil bases, if you care to further cut costs. The link assemblies are homemade with the exception of the pick-up coils.

All grid coils are National type AR-16 with fixed center links. They plug into National type XB-16 coil sockets which are flush mounted. Do not get nervous because the axis of the plate and grid coils are in the same plane. Absolutely no trouble was encountered. Notice the crossed grid leads in the close-up view.

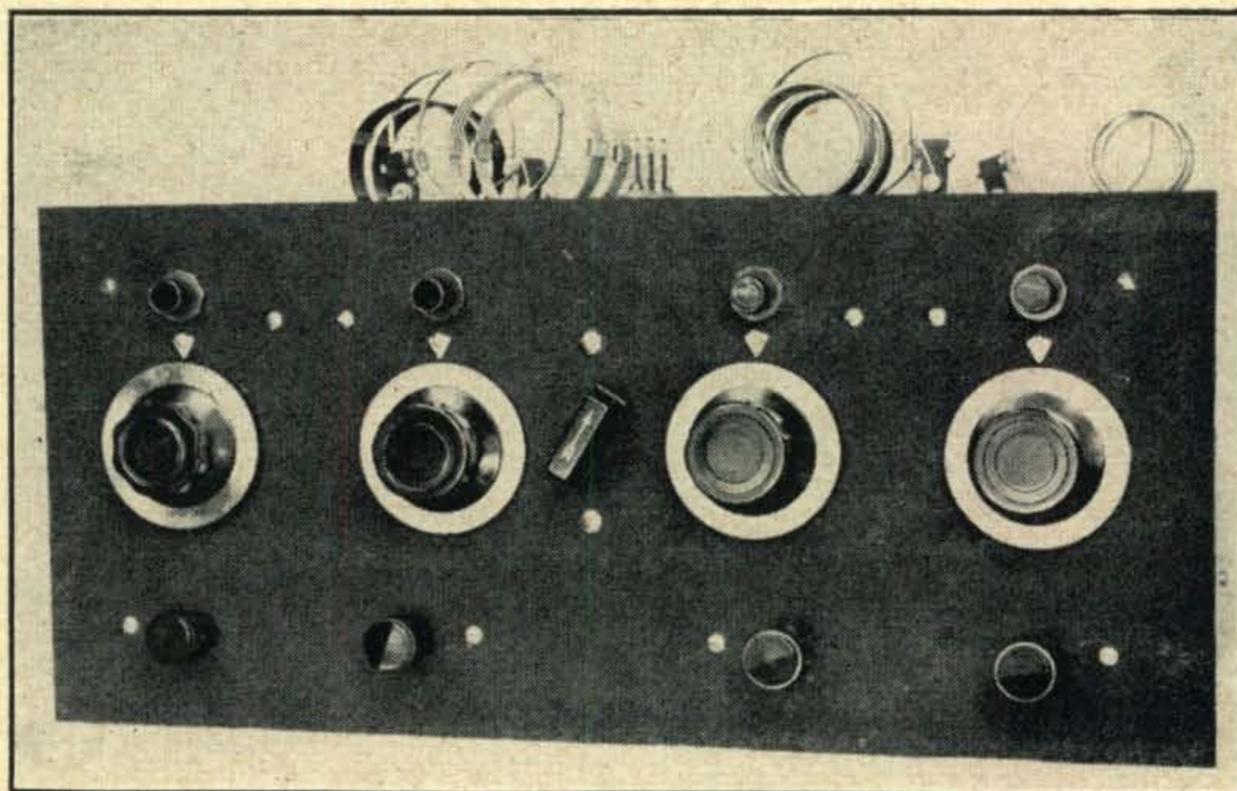
Neutralizing condensers are standard National Company type



Above: Grid tuning condensers for four amplifiers are mounted below deck. The front panel and a tie-strap three-quarters of the way back holds the individual chassis together. Right: Closeup of the 14-mc final amplifiers. Note the tank condenser shaft passing through adjacent PA grid coil.



On the front panel are grid and plate tuning controls for each of the finals. The output links, which are switched to a common connection, are preset and are not tuned from the front. The band selector also lights a pilot lamp for amplifier in operation. The space between the top of the front panel and the top of the plate coils is made up by a 3½-inch blank meter panel.



600U mounted on ceramic insulators. To avoid the danger of breakdown across the ceramic dielectric plate voltage in excess of 1500 volts should not be used with phone operation.

Viewing the top of the chassis from the front panel, the 80-meter final is located at the rear of the left-hand chassis. The plate tuning condenser has a maximum capacity of 75  $\mu\text{mf}$  per section. You will probably recognize the 50- $\mu\text{mf}$  vacuum capacitor shunted across the condenser as one from surplus equipment. A couple of fuse clips used for  $\frac{1}{8}$  diameter ferrule type fuses and  $\frac{3}{4}$  inch long metal spacers tapped 6-32 each end will make an excellent mounting for it when assembled to the studs of the TMH-75D condenser as shown. The plate coil jack bar assembly is mounted to the condenser with a couple of small pieces of strip aluminum and  $\frac{3}{8}$ " high by  $\frac{1}{2}$ " diameter ceramic spacers. Note that the plate condenser shaft is coupled to the tuning dial by a flexible coupling and bakelite shaft which extends through the center of the grid coil of the next stage.

The 20-meter final occupies the front section of the chassis. Layout is identical to the 80-meter final except the plate coil jack bar fits perfectly between the centers of ceramic insulators mounted on the plate tuning condenser which is a TMH-50D.

The 10-meter final occupies the front half of the right chassis and the 6-meter final is located at the rear. Layout is identical to the other stages.

The phenolic brackets with the jacks at the back of the front panel are for metering. The grid current meter plugs into the left one and the plate current meter into the right.

Do not let that band switch frighten you! It is homemade also. (The closeup view shows it in a little more detail.) The four sections were purchased as surplus for about 50 cents apiece and coupled together with flexible couplings and aluminum bar stock ( $\frac{3}{8} \times \frac{3}{8}$ ). Use Millen type 39006 couplings. They compensate for side play and misalignment better than any others. In almost all commercial switches the detent mechanism con-

sists of either a ball bearing or spring loaded roller. Remove the detent from all switch sections except the one nearest the front panel, or you will find that the last two sections won't track with the others due to multiplied torsion and backlash. The switch assembly is mounted to the front panel by 8-32 tapped holes at the ends of the aluminum tie bars. It is mounted to chassis by the bracket under the third switch section and the end plate. Note that the end plate also contains the terminal strip and high voltage tie point.

A Mallory "Ham Band" type 1656 or equivalent will be a good substitute if you are tired of chasing surplus parts.

#### General Chassis Layout - Bottom View

The variable condenser in the upper right corner of the chassis at the left is the 6-meter grid tuning condenser. It is a Hammarlund type HFD-15X. The grid r-f choke and bypass capacitor can be seen below it.

The 10-meter grid and filament circuit components can be seen in the lower left corner of the chassis. The grid tuning condenser is a Hammarlund HFD-50.

The 80-meter components are in the upper left corner of the chassis at the right. The grid tuning condenser is a Cardwell type EU-100AD.

The 20-meter grid circuit condenser is a Hammarlund HFD-50. The grid resistor can be seen under the extension shaft of the 80-meter condenser.

The plate current meter shunt and the filament transformer are located in the space between the two chassis.

#### Wiring

The usual care taken in wiring r-f circuits should be exercised. Leads should be kept as short and symmetrical as possible as shown in the close-up view.

Plate and grid leads are flat shield braid. Bud heat radiating connectors were used for plate cap connectors and Fahnestock clips for the grids. The grid leads connect to the coil socket by means

(Continued on page 77)

# LOWER THAT BEAM

CURTIS I. ANDERSON,\* and  
IVAN H. ANDERSON, WØHY\*

*If there's an easier way to do a job, the ham will find it.*

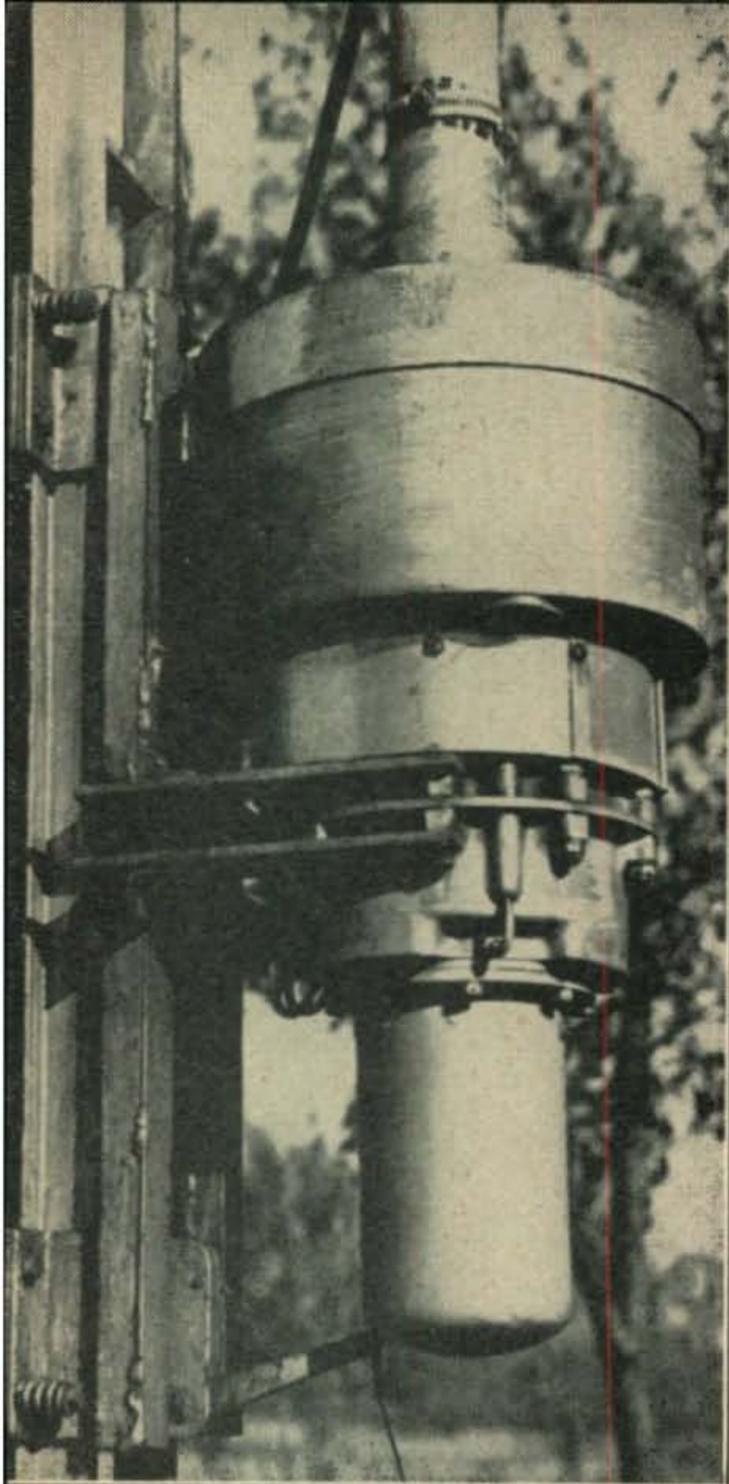


Fig. 1. The dolly and beam rotating motor. The track runs the entire length of the telephone pole. A cable winch on the other side of the pole is used to raise and lower the beam. The lever at the bottom is an optional stop mechanism.

ject, if the instructions below are carefully followed.

## The Track

The track should be first laid out to scale on paper so that the spacers, or ties, between the rails can be located throughout its length, which is determined by the height of the pole. The spacers (*D*, *E*, etc.) are then placed about every two feet and serve also as couplers for the two track sections, as well as supports to be lagged to the pole.

In the track layout plan, the rails, made of  $1\frac{3}{8}$ " x  $\frac{7}{8}$ " x  $\frac{1}{8}$ " angle iron, are positioned as shown in Fig. 2. The  $1\frac{3}{8}$ " sides are paralleled and spaced  $4\frac{1}{4}$ " apart. The spacers are cut from the same angle iron stock as the track with a cap piece *B* fitting over the top of the track.

The pulley, *C*, is welded between cap piece *B* and the next spacer, *D*, as shown in the drawing Fig. 2. A  $\frac{1}{2}$ -inch hole is drilled through the center of the  $1\frac{3}{8}$ " side of spacers *D* and *E*. The remainder of the spacers were drilled to clear a  $\frac{3}{8}$ " lag screw. To space the rails for electric welding, a gauge block  $4\frac{1}{4}$ " wide and about a foot long was used. This gauge was clamped between the positioned rails near the spacer being "tack" welded, and moved along as each spacer was tacked into place. By tacking first, excessive heat was avoided and the rails warped less. After all the spacers were in place, the joints were then fully welded and the pulley brazed in place.

## The Dolly

The dolly is the sliding frame on which the motor or rotating device of the beam antenna is mounted. The first step in making the dolly is to construct the upper and lower slide sections. The slides were made from pieces of  $1\frac{1}{2}$ " x  $1\frac{1}{2}$ " x  $\frac{1}{8}$ " angle iron stock 4" long. Four pieces are needed since the slides are spaced about 16" apart. Two holes for clearing  $\frac{1}{4}$ " bolts are drilled in the one leg of each of the shoes, *H*, and are positioned as shown in Fig. 3.

Before assembling the shoes, *H*, into the slide sections find the widest part of the track (despite the best efforts of the welder the track will, undoubtedly, not be perfectly true) and at this point place the shoes on the rails. In addition, space the shoes slightly away from the track using metal shims to positively assure clearance for the dolly over the entire length of the rails. An iron bar, *I*,

"I see you have one of those propeller pitch-changing motors on your beam, Andy. How did you hang the elements on it?"

"Oh, it wasn't much of a job. I'll lower the beam and let you see how I did it."

"What'd ya mean, lower it? I don't want you to take the whole thing down—I was just asking, that's all."

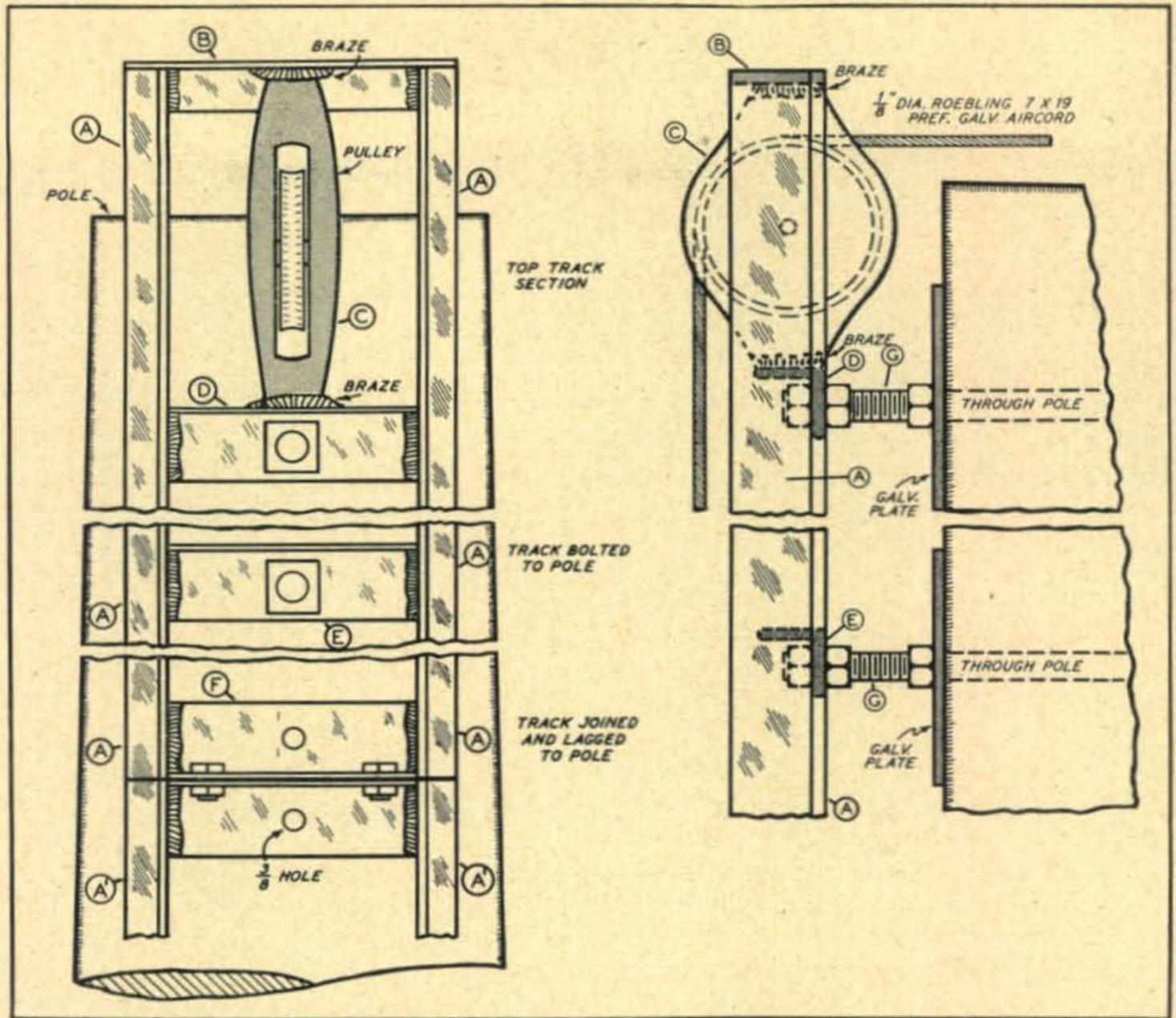
"But it isn't any trouble. Just wait a minute and I'll have the beam down here where we can see it."

**A**s a matter of fact, that is just what WØHY can do, for he has rigged a track on his antenna pole and mounted the beam and its motor on a small sliding dolly, so that he can raise and lower the whole antenna with the aid of a winch. Whenever retuning or repairs are called for, they can be done without climbing the pole. For the benefit of those who no longer feel like scampering up and down poles, this idea may be the answer to the antenna experimenting urge.

The dolly for the beam and a portion of the hand-made track mounted on a "surplus" telephone pole is shown in Fig. 1. The track is made of four lengths of angle iron. The entire construction is welded and is securely fastened to the pole with lag bolts in numerous places. Anyone having access to a metal working shop and the services of a welder will have little trouble repeating this pro-

\*1709 Third Ave. So., Anoka, Minn.

Fig. 2. Top-front view of the track, and (right) side view of the track.



is then welded across the top of the shoes. This completes one slide and the operation is repeated in making the second section.

The two slide sections are then placed about 16" apart on the rails and connected together with two hollow rectangular bars, *M*. These bars were made by welding face-to-face two pieces of  $1\frac{3}{8}$ " x  $\frac{7}{8}$ " x  $\frac{1}{8}$ " angle iron 24" long. It was thought that this construction would give the greatest strength with the least weight to an important part of the dolly. From this particular point, WØHY went further and made additional supports for his beam motor. But since this is a step depending entirely upon individual requirements, it has been omitted from the discussion. All welding is com-

pleted when an eye bolt for attaching the cable is fastened to the top of the dolly.

To secure the dolly to the track, it was first necessary to cut four pieces of  $\frac{3}{4}$ " x  $\frac{1}{8}$ " strap iron, 4" long. These were then drilled to clear  $\frac{1}{4}$ " bolts and to coincide with the holes already in piece *H*. Next four pieces of  $1\frac{1}{4}$ " x  $\frac{1}{8}$ " strap iron also 4" long, were tapped  $\frac{1}{4}$ -20 and positioned to fit beneath the holes in *H* and pieces made above, *J*. Pieces *H*, *J* and *K* keep the dolly on the rails.

Attach the dolly to the track with pieces *J* and *K*. Into one of the two holes of each shoe, *H*, a  $\frac{1}{4}$ -20 bolt long enough for a lock washer and lock nut, plus *H*, *J* and *K* was fitted. Into the remain-

(Continued on page 76)

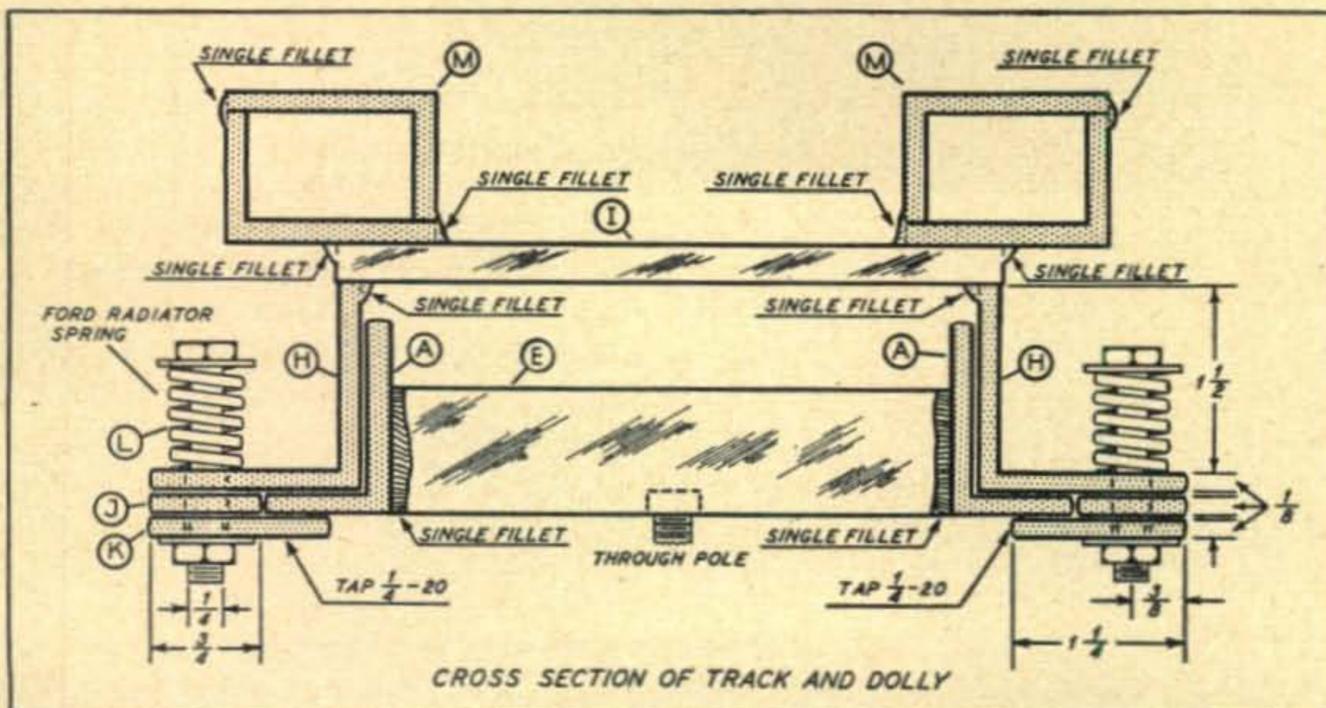


Fig. 3. Top view of track and dolly slides.

# Trends in Selectivity

DOUGLAS H. CARPENTER, W1KQD\*

*Reviewing a commercial approach to the demand for greater selectivity in communications receivers.*

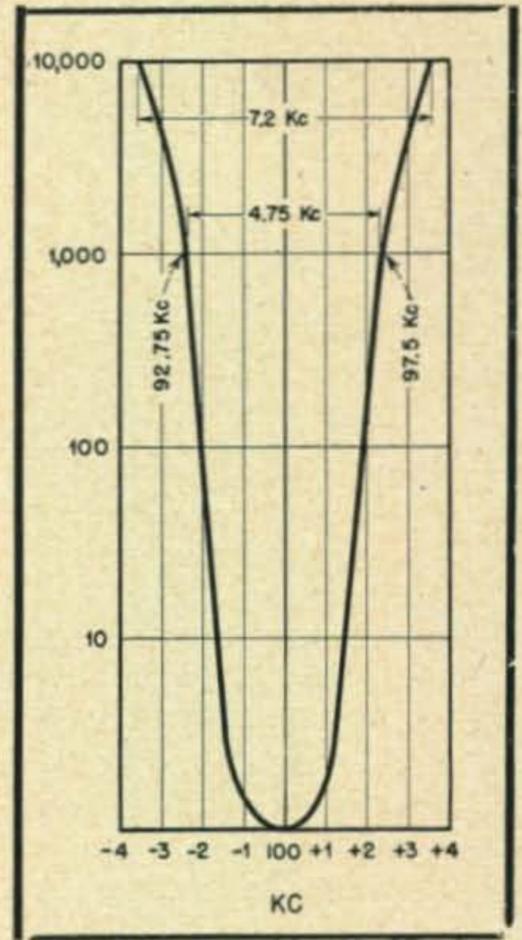
**Q**RM HAS ALWAYS been a major problem in ham radio, and if we trace the cause of receiver design, we find that up to the mid-1930's, receiver selectivity was improved at perhaps the same rate that our increasing numbers amplified the QRM problem. At about that period, however, the necessary economic compromises between adequate image protection and acceptable broadcast fidelity on the one hand and selectivity on the other, worked to freeze our communications receiver designs into the familiar standard pattern of an intermediate frequency system in the vicinity of 456 kilocycles, employing half a dozen tuned circuits at the i.f.

As we know, this does not afford adequate selectivity for consistent and satisfying operation during peak hours on any of our popular bands, and so we have had lately a renewed interest in audio filters for the c.w. man, and Q5'ers and the Lazy Man's Q5'er for both phone and c.w. We have also had improvements over these pioneer efforts, brought out by several manufacturers of commercial equipment.

One of the most effective of these, is the McMurdo Silver Model 805 100-kc amplifier. This is

\*Chief Engineer, McMurdo Silver Co., Inc., Hartford, Conn.

Fig. 2. Optimum selectivity curve for Silver 100-kc amplifier.



a direct outgrowth of the Q5'er series, and utilizes the full selectivity of the 450-460 kc i.f. of the companion receiver before converting the signal to a new intermediate frequency of 100 kc. A glance at the schematic, Fig. 1, shows that there are eight tuned circuits operating at 100 kc. Since gain is not a requirement (the overall gain of the unit is slightly less than 2 times), these tuned circuits can be, and are, very loosely coupled, to preserve circuit *Q* and retain selectivity. The *Q* of each slug-tuned i.f. winding is around 50, resulting in a selectivity characteristic as shown in Fig. 2. Power can be taken from the companion receiver in practically all cases, since the total heater drain is 0.75 amp. at 6.3 v. while the measured B supply current was

(Continued on page 74)

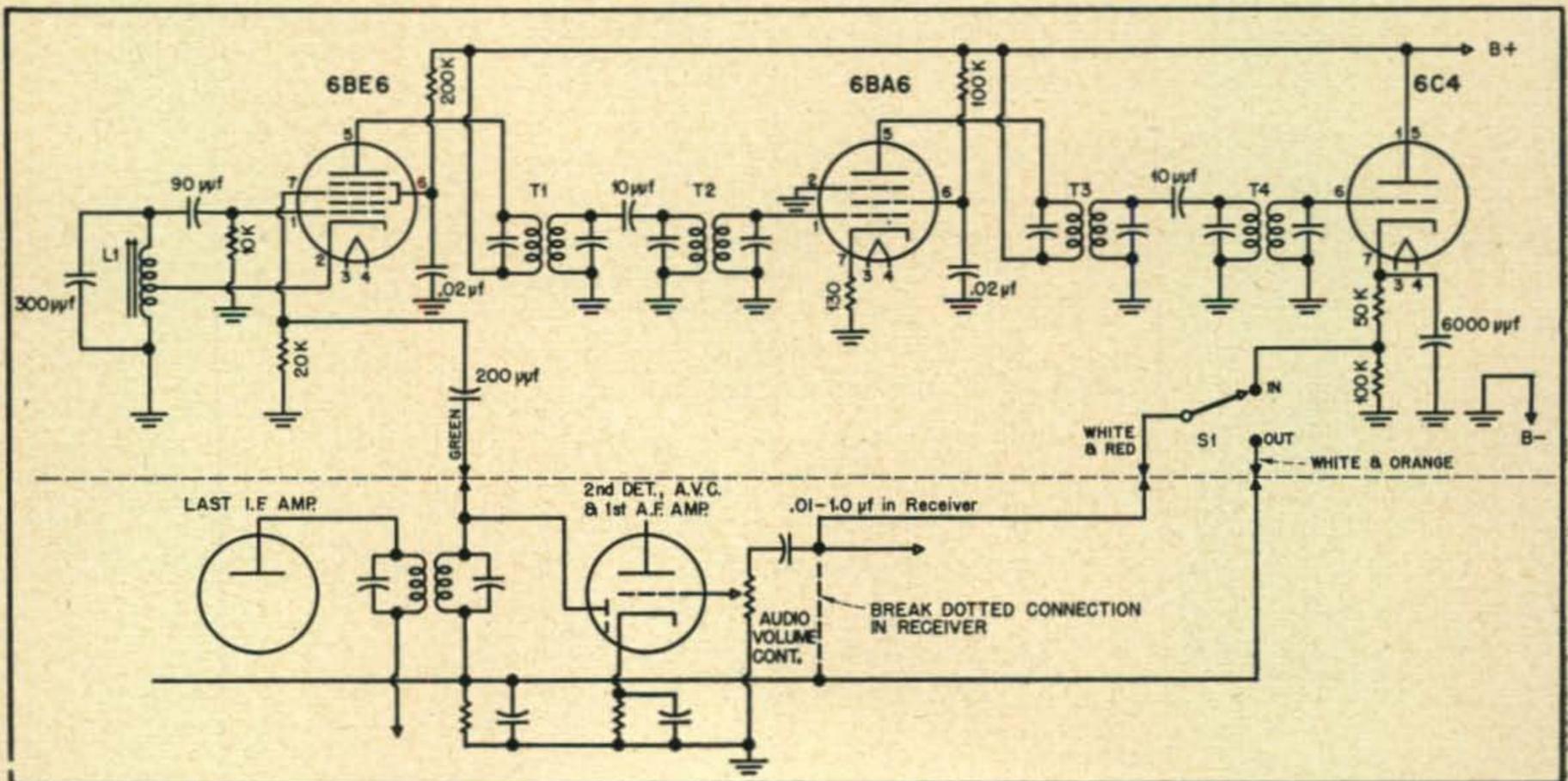


Fig. 1. Circuit diagram of the McMurdo Silver Model 805 100-kc i.f. amplifier.

# Shielding Experiments and TVI

MACK SEYBOLD, W2RYI\*

*No single approach to TVI has proved more effective than complete shielding of the transmitter. However, certain basic precautions must be taken to even approach 100% effectiveness.*

**F**OR MORE than twenty months, a major portion of my time available for amateur activities has been spent with the illusive ephemeral end of the business: harmonics. Progress has been made, but by degrees. My sphere of interference has shrunk, but is not infinitesimal. The harmonic problem will not be solved to my satisfaction until the unwanted fields about my transmitter approach zero. Then and only then, will I be satisfied.

At present, the second harmonic of my regular 10-meter transmitter is noticeable on television screens within a radius of 35 feet; beyond that distance there have been no complaints since August, 1947. To obtain this particular level of interfering radiation, the rig has been filtered, trapped, and shielded, but the effectiveness of each of these steps had not been determined. How good are the filters? Shall I try more traps? How complete is the shielding? These are questions that must be answered if harmonic suppression is ever to approach the simplicity desired. So, as a part of the degree-by-degree, step-by-step approach to the solution of the problem, I began a study of filters and shields.

## Test Equipment

A box eight inches on a side was built of aluminum. Inside the box was placed a battery-operated 1R5, oscillating at 53 mc. *Figure 1* shows the aluminum box, the oscillator, and the lid used for complete shielding. When the bolts that hold the box

*c/o Tube Department, Radio Corporation of America, Harrison, N.J.*

together were tight, no signal could be detected by either a superregenerative receiver, or by a Hallcrafters' S-27. When, however, one of the self-tapping steel screws that attached the lid was slightly loosened, a measurable signal leaked out of the box through the paper-thin slit. The box was no longer a complete shield. Not only that, when a four-foot piece of wire was connected to the outside of the box near the fine slit opening, it was a beautiful little transmitter. A meager slit opening becomes a potent coupling device to any wire connected to the outside of the box.

It is obvious that a triode-connected 1R5 drawing 3 milliamperes of plate current at 67½ volts is no California kilowatt, but when this little oscillator's frequency is set at 56 mc, the XYL can hear "We the People Speak" on our television set, but she can't see them! That's why I decided to run the tests at 53 mc.

To start our measurements, a reference level had to be established. When the lid was removed, and the uncovered box placed four feet from the S-27 receiver, we could obtain a good, reproducible S7 reading on the meter. This reading was used as our 0-db reference level.

## Initial Measurements

In order to find out what "openings" would not radiate or couple energy to external connectors, a series of tops were made for the box. *Figure 2* shows the box tops, and *Table 1* gives the results. The openings are listed, in order, from good to bad to worse. The last category includes most of our

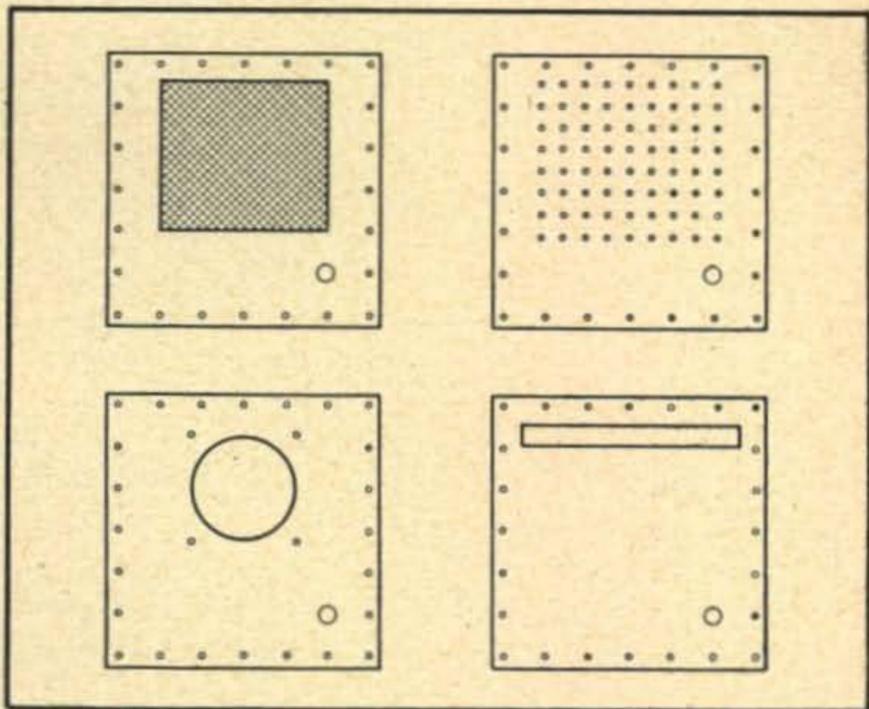
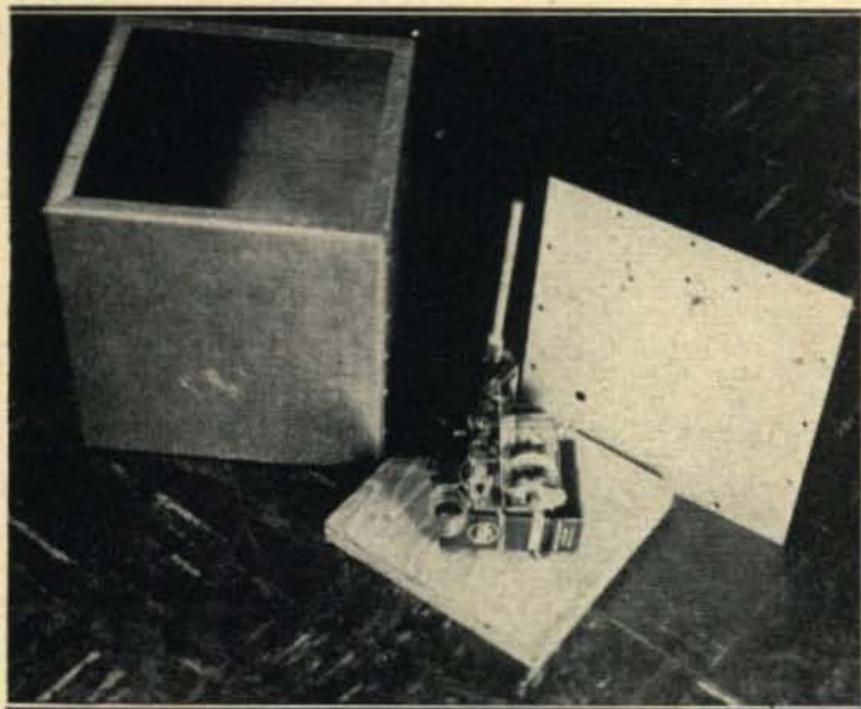


Fig. 1 (left). The r-f tight aluminum box used to house the 53-mc test oscillator. Fig. 2 (right). Four patterns representing the covers tried on the test oscillator. The amount of leakage in each case is given in Table I.

TABLE I

Signal level received from cubical box by S-27 receiver.

Box-top opening	db output	Levels of output with $\frac{1}{4} \lambda$ radiator
Solid — no opening	-40	-40
4 x 4" copper screen	-40	-40
4 x 4" grill of $\frac{1}{4}$ " holes	-39	-37 to -30
Meter in 2 $\frac{3}{4}$ " diam. hole	-35	-38 to +6
2 $\frac{3}{4}$ " diam. hole	-32	-38 to +12
Meter connected to		
B— of osc.	-24	-30 to +12
$\frac{1}{2}$ x 5" slot	-21	-36 to +22

amateur and commercial transmitters. Complete shielding means no louvres, slots, little vent holes, big vent holes, hinged lids, painted joints, meter holes, or Plexiglass windows. The 4 x 4 inch copper screen has been the only ventilation device thus far tested that shows any promise. The edges of the screen must be soldered tightly. What happens with a larger screened opening remains to be seen, but for the time being we'll keep the screened areas for ventilation as small as possible.<sup>1</sup>

Those exasperating standing waves at unwanted harmonic frequencies which have appeared from time to time on my regular transmitter are explained by the results of this test. The transmitter is shielded according to normal standards, but the quarter-inch holes, punched in groups over large areas of the "shield," and the four vertical slots ( $\frac{1}{2}$ " x 20") for ventilation, are now obvious highways for egress of the signals that should be kept at home. That metal plate bolted over the meter faces is about as tight as a derelict rowboat!

**What Is a Ground?**

Once, almost two years ago, in a burst of inspiration and energy, I drove a five-foot length of galvanized iron pipe through the basement floor and down into the damp ground below. The copper bus from the pipe connection to the transmitter is only four feet long, and no better ground connection could be imagined. One might just as well tie it with a ribbon and drop the whole thing in the ocean. Actually, the number of standing waves I've found on that short ground line is appalling.

Why? The openings in my "shielded" transmitter couple energy to that low-impedance ground line. Perhaps it might be possible to find a spot on the 10-meter transmitter where the coupling is at a minimum for all harmonics possible. Even if such a spot could be found, could it be kept there? What about the other wires that have to be connected to the rig?

The last column of *Table 1* shows the ranges of signal level available from the eight-inch box when a quarter-wave low-impedance wire is connected to various places on the box. *Figure 3A* is a three-dimensional view of the radiation characteristics of the box lid with the  $\frac{1}{2}$  x 5" slot. These data were obtained by placing the quarter-wave radiator

at sixty-four individual points on the box top, and recording the output for each of the sixty-four positions. *Figure 3B* shows a few of the points where the radiator was connected and will aid in visualizing where the slot is located with respect to the major lobe of the radiation pattern.

A quarter-wave radiator connected to various points on the other five faces of the box gives a variety of output signals, but the greatest range of radiation levels was found on the top.

**Shielding for TVI**

To get back to the TVI problem, let's consider the possibility of making the eight-inch box behave as a shield. Let's bolt down the seams and screen the vent holes. Now the question is: can we bring out a control shaft or two? The answer is "yes." A few odd quarter-inch holes punched for bakelite shaft extensions don't seem to spill any signal in the range from 50 to 100 megacycles. An ambitious ham probably can't fill up the front panel to make it look like the dashboard of a B-29, but sufficient controls should be available to tune a v.f.o. and the subsequent stages of a normal transmitter.

The next step in the study of the box was to find out how to get supply voltages into the box without letting unwanted signals get out of the box on the supply lines. A battery-operated transmitter would eliminate the need for such a procedure, but the boys who use the batteries are parked out on hills where the nearby squirrels are not likely to worry about TVI. Most of us "use the mains," so our concern is with power supply lines and other wires that must enter the rig.

When a 10-inch length of wire was stuck through

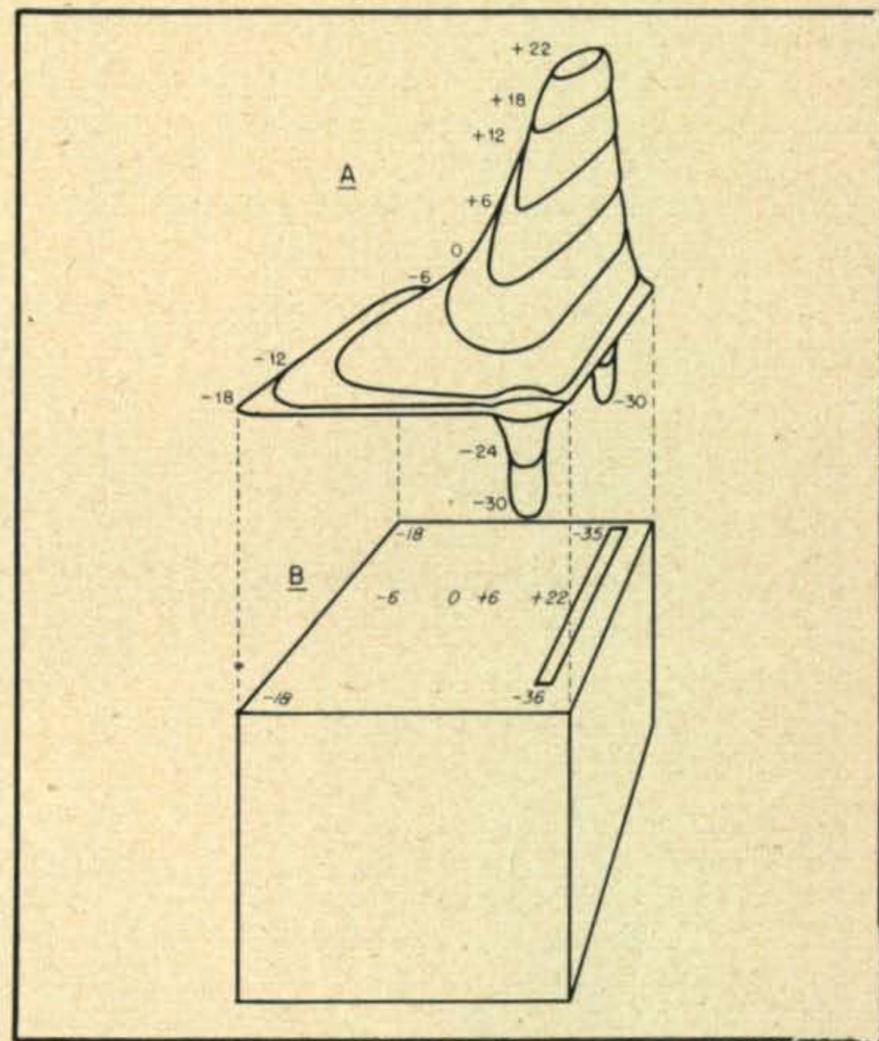


Fig. 3. (A) Graph of radiation measured when using cover on test oscillator with ventilation slot  $\frac{1}{2}$ " x 5". (B) Slotted lid showing some of the 64 points used to assemble the three-dimensional graph.

<sup>1</sup> Philip Rand, W1DBM, in QST for May, 1948, describes copper screen used to shield large portions of an r-f amplifier, and W. M. Sherer, W2AEF, recommends such covering in CQ for June, 1948.

a small hole in the box, an appreciable signal was radiated from the system. The wire was not connected to anything, either inside or outside of the box. Longer lengths of wire were tried, and the field strength was found to increase as the wire outside the box was lengthened. Particularly strong radiation was obtained with a quarter-wave length of wire.

When the wire was connected to the box at the hole where it passed through, no signal was available, but when it was insulated at that point, our small transmitter was really "on the air." Connecting the wire to the inside of the box, but still keeping it away from the oscillator, gave a husky output, but the biggest signal was obtained when a tuned circuit was placed in the box and the radiator was connected to it for low impedance drive. That tuned circuit was *not* coupled to the oscillator; it was placed at right angles to the  $\frac{1}{4}$ -inch diameter tank coil, and was located three inches away. There was no perceptible rise in oscillator plate current, but I think I got just as much of a thrill from the way this system was radiating as I did years ago when my first pair of 210s loaded into the 80-meter Zepp.

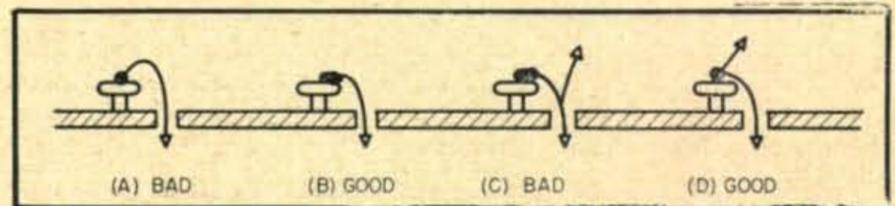
#### Line-Filter Requirements

The reason for connecting this resonant circuit to the quarter-wave radiator was to simulate a condition that might be found in attempting to pass supply lines into the box. Previously we have shown that a line connected to the box at the point of egress will not radiate, providing the rest of the system is enclosed by a perfect shield. Obviously, you can't have all the supply lines connected to the shield directly, so bypass capacitors were tried in order to short out the r.f. and let the proposed d.c. or 60-cycle lines function properly. Unfortunately, bypass capacitors are limited in their ability to behave as short circuits in the 50- to 100-megacycle range. At 53 megacycles, 500  $\mu\mu\text{f}$  represents 6 ohms of reactance, and at the same frequency, 5000  $\mu\mu\text{f}$  is 0.6 ohm. The impedance of a line at the point where it emerges from the shield may approach anything from zero to infinity, depending upon its length and what it is connected to, but the worst condition is when zero is approached.

For instance, a line somewhere near a quarter wavelength might have an impedance of 0.1 ohm where it emerges. A capacitance of 5000  $\mu\mu\text{f}$  would shunt it with 0.6 ohm, so the maximum possible attenuation would be about 14%, or 2 db on your S-meter. That's a mighty small movement when we're looking for a device that will pull the S-meter down to the noise level and attenuate the signal beyond detection with the beat-frequency oscillator operating.

In addition, bypass capacitors have a certain amount of inductance due to their internal construction as well as their external connectors. The best commercial capacitors I have found for this job are the button types with the threaded base connector and the short "hot" lead. Even these became ineffectual if the connection made to the "hot" lead is allowed to become too long. *Figure 4*

shows "good" and "bad" methods of wiring these capacitors. *Figure 4 A* and *B* illustrate the difference between a long bypassing path and a short one. Method *B* will reduce the amount of inductive coupling available to adjacent circuits. Although *C* and *D* (*Fig. 4*) have identical, short, inductive paths, *C* is bad because the external connection is made by "tapping it up the line" from



**Fig. 4. Recommended bypassing is only effective if properly handled. Correct mounting is important.**

the lowest ground point, and, in some low-impedance circuits, this point might be the optimum connection for maximum power transfer. Where bypassing is required, *D* is the best arrangement for the button capacitors.

In studying *Fig. 4*, one comes to the conclusion that the best bypassing arrangement is obvious and that it has been described countless times in the literature, over the air, at club meetings, and in bull sessions. I had to learn the hard way, though, and fooled around for a whole week of evenings with molded bakelite capacitors, postage-stamp micas, pig-tailed ceramics, low-capacitance lead-through capacitors, and 10,000-volt ceramics taken from the high-voltage supply of my television set. For lines operating at 600 volts or lower, the 500- $\mu\mu\text{f}$  buttons are excellent. What compromises would be necessary for bypassing lines requiring higher-voltage capacitors remained unanswered, but I had to proceed with the experiment using 600-volt capacitors in order to determine the most effective, simple way of filtering the supply lines.

#### Supply-Line Impedance

If the line that is going to be bypassed as it leaves the shield happens to be a high-impedance affair, both inside and outside of the box, then the simple bypassing arrangement of *Fig. 4D* should suffice. The next series of tests with the cubical box were to determine what chances there were of encountering a high-impedance supply line, and what would be the most effective filter for those low-impedance lines for which even perfect bypassing could produce a maximum attenuation of only 2 db.

The tests concerning lines with a natural high impedance were conducted rather quickly. No matter how I connected or "disconnected" a line within the box, simple bypassing at the lead-through hole was effective only when the external line length was less than 10 inches long. Not much can be done with a 10-inch supply line, especially when the line begins to look longer when another piece of equipment is hung on the end of it.

It seemed to me that the general case, and probably the worst case, of supply line use would be in the low-impedance category. If we assumed all lines to be of this nature, then solving the filter problem for the worst case and treating all the

**TABLE II**  
Quarter-Wave Length Radiator

Connection	db output
1) To any part of the closed box	-40
2) 3 inch extension into box, no internal connection	+18
3) 1 inch extension into box, no internal connection	+6
4) 1/2 inch diam. loop connected to top, inside	+18

lines as though they were equally bad, would take care of the entire supply problem. If the low impedance of the line inside and outside of the box can be made to look like a high impedance as it passes through the hole where good bypassing can be made to work effectively, then our problem is solved.

The tests were designed to study this method of attack, but before compiling too much data, I went over the supply-line filters in my own transmitter and also reviewed the available literature on similar devices. The bypass capacitors in the line filters that I had so carefully installed months before on the 10- and 20-meter transmitter were found to be too large dimensionally and the connecting leads too long. The chokes in the filters had adequate inductance, but there were no high-impedance terminations on the outside of the transmitter case. The braided-copper cables which contained the external leads had been installed with the idea of shielding the lines. At the time of installation, a marked improvement was made, but under certain conditions of transmitter adjustment, standing waves at the harmonic frequencies could be detected on these cables.

The practical aspects of line filtering have been described nicely by Philip Rand.<sup>1</sup> Under operating conditions, certain levels of attenuation have been attained, and even in my transmitter the filters were evidently doing some work. A measured evaluation of such systems, however, was my aim in the cubical box tests, so I began to collect data with tools that are not accurate to the nth degree, but which are adequate for purposes of comparison and design.

#### Supply-Line Radiation

Out of a mass of figures compiled, the following discussion gives an idea of the effects of capacitors and choke on supply-line radiation. Again, a 0-db reference level represents the box radiation when the top is off. The notation "-40 db" indicates that the signal level is more than 40 db below the box output, and that it can not be detected with the

**TABLE III**  
The effect of each filter component

Item	db output
1) C <sub>1</sub> , L <sub>1</sub> , C <sub>2</sub> only	+27
2) Series choke at X	-12
3) Series choke at Z	-27
4) Choke at Z, and C <sub>3</sub> connected to Y	-38
5) Choke at X, and C <sub>3</sub> connected to Y	-36
6) Chokes at X, Z, and C <sub>3</sub> connected to Y	-40

b.f.o. in the S-27, nor can it be found in a super-regenerative receiver placed three feet away.

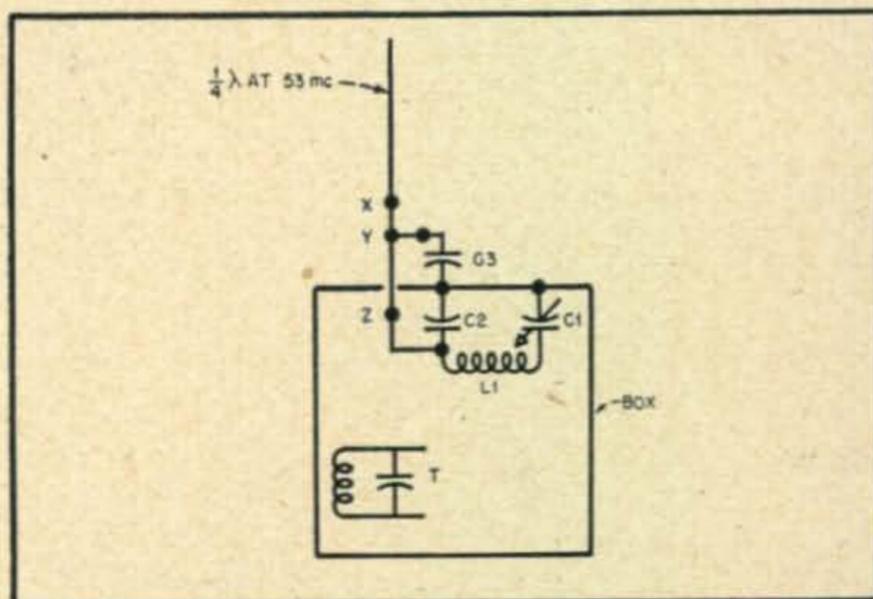
The amount of signal getting out of the box by being radiated from a line that might ostensibly be used for keying or supplying bias is clearly shown in *Table II*. Item 4 in the table can be modified by making the connection to the inside of the box through a 1000- $\mu\text{mf}$  button capacitor. This part, if mounted near the small exit hole, can permit a total loop length, including the capacitor, of not much more than half an inch. Even this small loop will couple energy to the quarter-wave wire. The level of such a signal is about 10 db above the radiation level of the open box.

When the 1000- $\mu\text{mf}$  capacitor is put in series with a coil and tuning capacitor that will resonate at 53 megacycles, a +27-db signal is available.

The strongest signal I could get out of the box without actually coupling the oscillator tank to the resonant pickup circuit was obtained by connecting the end of the quarter-wave radiator to the stator of the tuning capacitor in the pickup circuit. This signal was a +32 db slugger and indicated the optimum point to which our filter connections should be made for test. Devices connected to this point, however, would change the tuning of the series resonant circuit. Capacitance to the box of greater than 15  $\mu\text{mf}$  would not permit the circuit to resonate without changing the coil, so the 1000- $\mu\text{mf}$  capacitor was chosen as the stable point from which to operate. The signal from that point was only 5 db lower than the maximum available, and the tuning was almost independent of filter connections.

#### Behavior of Line-Filter Components

*Figure 5* shows the layout for the supply-line filter tests. Points X and Z are where 25-micro-



**Fig. 5.** Circuit employed for supply-line filter tests.

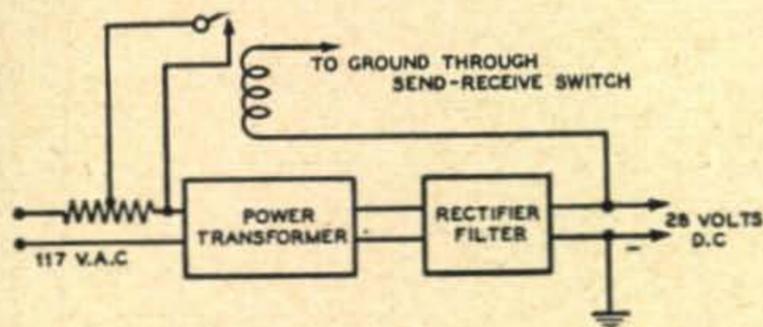
C<sub>1</sub>—25  $\mu\text{mf}$ , variable. L<sub>1</sub>—Antenna coil.  
C<sub>2</sub>—1000  $\mu\text{mf}$ , button. T—53-mc oscillator.  
C<sub>3</sub>—500  $\mu\text{mf}$ , button.

henry chokes were introduced as indicated in *Table III*. Point Y is the connection point for the 500- $\mu\text{mf}$  bypass capacitor, C<sub>3</sub>. Both C<sub>2</sub> and C<sub>3</sub> were mounted at the lead-through hole so that lead lengths and coupling characteristics were kept to

(Continued on page 73)

## Voltage Regulator for Command Sets

When using the command sets as v-f-o exciter the send-receive switching reflects a large load variation back to the low-voltage power supply, the load being much greater when transmitting. This results in a change of the heater voltages and subsequent drifting as the oscillator cathode changes temperature. In time, it will also damage the tubes.



Since the power supply transformer has a slightly higher output voltage than is required, my solution has been to insert a resistance in the power transformer primary circuit with a relay arranged to short out a portion of that resistance when transmitting. In this way the heater voltage can be easily maintained at the correct value. The proper resistance value depends on the load and your particular power supply regulation characteristics. Using the extra relay is quite feasible in view of the availability of low-priced surplus 28-volt relays of all kinds.

F. C. Breeden, W2SIJ

## Measuring Lengths with GDO

The grid dip oscillator may be used to ascertain the approximate length of rolls of coax, Twin Lead, or other two-wire cable without going through the misery of unrolling and measuring it by hand. Make sure that the lead is open at one end, while at the other end short the conductors to form a small loop, or simply attach a small one-turn coil. Couple the GDO to the loop and ascertain the lowest resonant frequency of the cable. Knowing the lowest resonant frequency, the length is equal to

$$L_{(loop)} = \frac{245 VP}{f_{(mc)}}$$

where VP is the velocity factor of the type of cable (0.66 for RG-8/U, etc.)

William L. Smith, W3GKP

## Coax Cutting Tool

If you have ever wanted a tool to make a quick and clean cut in RG-8/U cable, or any other similar shears are the answer. Diagonals or side-cutters solid dielectric cable, the WISS hi-power pruning usually compress the center dielectric before cutting it on the braid. The pruning shears—the type where the blade cuts against an anvil of soft metal—will slice off clean pieces less than one-eighth of an inch thick. This is a marvelous tool when making open coax stubs, etc.<sup>1</sup>

Gordon W. Schmitt, W7UK

<sup>1</sup> Television Interference Handbook, Radio Magazines, Inc., pages 18 and 23.

## Ready-made 274N Tuning Knob

After reading several articles about the 274N series receivers, all of which required tuning knobs, I would like to offer this foolproof suggestion. An ordinary plastic push-on type knob that fits a one-quarter inch shaft and has a one-half inch sub-panel extension will work very nicely. This type of knob is in common use on many popular portable broadcast sets. The depth and diameter of the extension is just right and looks like it was made for the job.

David H. Schick, W4KPH

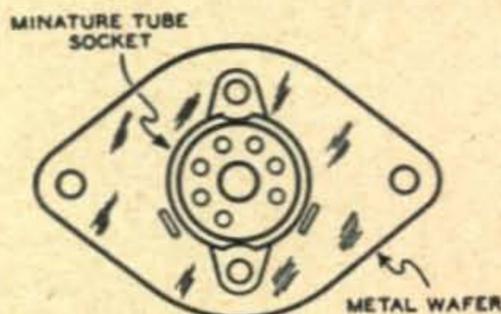
## Coupling the 453 as a Q-fiver

In most receivers a comparatively large amount of i-f voltage is fed to the second detector. Because of the proximity of the wiring, etc. it is usually possible to obtain sufficient signal to operate the BC-453 by connecting its antenna post through a shielded line to the tip of a phone plug. Insert this plug in the phone jack of the receiver and pick the i-f signal while at the same time cutting off the main receiver audio. Of course, it is necessary to tune the BC-453 to the intermediate frequency of the communications receiver.

Herbert S. Brier, W9EGQ

## Small Socket Holes for Large

Those large socket holes in metal chassis can be used for mounting miniature tube sockets. The expedient is to buy some of those metal or bakelite wafers that are used to mount multiple-unit filter condensers. Put the wafer over the old hole, and



quite likely the mounting holes will coincide. Then cut out the center of the wafer to the desired size of the miniature tube socket. The wafers can be purchased without the condensers and provide an economical, neat and sturdy socket mount.

Joseph B. Forman, W2BUU

## Embossed Call Letters

A very cheap, but effective way to make your own embossed call letters or emblems is to use some of the XYL's heavy red nail polish. Cut the desired emblem or letters out of a good grade of cardboard or two-ply drawing paper. Then give each letter about four coats of nail polish. Allow each coat to dry thoroughly before applying the next. The results will look like a stamped metal letter or emblem with just the right amount of gloss and sheen. Naturally, the letters should be mounted on their background before giving them the nail polish treatment.

Antonio Gelineau, KP4FN

# Monthly DX Predictions-June

OLIVER PERRY FERRELL\*

**T**HE DX PREDICTIONS are based upon the following parameters:

- A. 1000 watts effective radiated power.
- B. Antenna gain factor is equal to 1.
- C. Noise discrimination factor is equal to 1.
- D. Service gain factor is 14 db.
- E. Propagation over the shortest, or the direct route.

Values of maximum usable frequencies were obtained from "Basic Radio Propagation Predictions for June, 1949" (CRPL Series D-55)<sup>1</sup>. Calculation of the optimum working frequencies (FOT) was according to methods described in "Ionospheric Radio Propagation" (NBS Circular 462)<sup>1</sup>. Additional material shown in the November, 1948 issue of *CQ* was also used<sup>2</sup>.

## West Coast to Europe

*40 meters*: Very high absorption across polar region during this month. No openings predicted, although a few weak signals may break through once or twice around 2000 PST. *20 meters*: C.w. signals audible after 1530 PST. They hear phones after 1630 PST, but the high local atmospheric noise level on the west coast should prohibit hearing their phones until about 2000 PST. Possible peak conditions, compromising noise and signal strength, between 2200 PST and 0030 PST the following morning. C.w. finally fades out after 0215 PST. *10 meters*: No openings, MUF is too low.

## West Coast to South Africa

*40 meters*: Band opens gradually between 1700 and 1745 PST. Very high noise levels on both ends of the path, although there should be a good peak between 1930 and 2115 PST with signals about 10 db above noise. *20 meters*: A few c.w. signals will be audible between 1445 and about 1630 PST. Band suddenly reopens with fair signals around 2130 PST. Phones not too good, but c.w. will last until about midnight. *10 meters*: No openings, MUF is too low.

## West Coast to Australasia

*40 meters*: Slow buildup of signals out of the noise between 2130 and 2300 PST. Peak conditions 0300 to about 0415 PST. Band then slowly fades back into noise, going completely out around 0600 PST. *20 meters*: C.w. audible after 2030 PST, then phones come in around 2115 PST. Peak conditions just after midnight with band fading out suddenly around 0245 PST the following morning. *10 meters*: First signals break through shortly before noon. Conditions should be fair until about 2000 PST with possible peak from 1800 to 1930 PST. Should be a regular opening day in and day out.

## West Coast to Southeast Asia

*40 meters*: Short opening with fair signals from 0245 to 0515 PST. Atmospheric noise level is very

high on far end of path, but signals peak around 0400 PST. *20 meters*: Their c.w. and phones audible around 0030 PST. Conditions peak from 0230 to 0530 PST with c.w. fading out after 0900 PST. Doubtful if they will be able to hear many phones because of their extremely high noise level. Try after 0600 PST if a compromise of conditions will work. *10 meters*: No openings, MUF is too low.

## West Coast to South America

*40 meters*: Sudden opening between 1730 and 1800 PST with signals about 8-10 db above atmospheric noise. Band fades out shortly after 0315 PST. *20 meters*: C.w. comes in slowly after 1500 PST then phones after 1615 PST. Peak conditions just before midnight, although on good days, the band may stay open until 0230 PST with strong signals. C.w. goes back out after 0515 PST. *10 meters*: Improving conditions from slow opening around 1100 PST. Peak just before closing, or from 1415 to 1530 PST.

## East Coast to Japan

*40 meters*: Absorption level is too high. No signals should be expected to break through on this band during this month. *20 meters*: C.w. may be audible on quiet days from 0200 to about 0830 EST. Phones possibly from 0500 to 0630 EST, although their noise level is extremely high. Peak conditions around 0600 EST. *10 meters*: No openings, MUF is too low.

## East Coast to South Africa

*40 meters*: Band opens with weak signals just above the noise level around 1830 EST. Peak conditions from 2100 to 2330 PST. Band fades out after 0030 EST the following morning. *20 meters*: C.w. opening from 1500 to about 2030 EST. Phones may be readable, although the atmospheric noise level at this time of day is quite high. Another opening with possibility of phone contacts from about 0045 to 0215 EST. However, peak conditions should be 1845 to 1945 EST. *10 meters*: No openings, MUF is too low.

## East Coast to Middle East

*40 meters*: Short openings with weak to fair signals from 1845 to 2215 EST. Peak conditions around 2000 EST although noise level is very high. *20 meters*: On ionospherically quiet days, c.w. will break through just after 1430 EST. Phones audible after 1600 EST. Peak conditions 1830 to 2115 EST. Band may fade out just before midnight, although on some days it may hold until 0300 EST with weak c.w. signals. Phones not too good over this path at any time. *10 meters*: No openings, MUF is too low.

## East Coast to Australasia

*40 meters*: First c.w. signals around 0100 EST. Peak conditions 0145 to 0315 EST. Fade out after 0600 EST. *20 meters*: C.w. audible after 2245 EST. Phones audible after 0015 EST. Signals peak 0130 till fade out after 0315 EST. Phones during peak. *10 meters*: No openings, MUF is too low.

## East Coast to South America

*40 meters*: Signals slowly build up after 1730

(Continued on page 71)

\*Assistant Editor, *CQ*

<sup>1</sup> Obtainable from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

<sup>2</sup> O. P. Ferrell, "A New Method of Predicting Band Conditions", *CQ*, November, 1948, page 26.



Conducted by LOUISA DRESSER DeSOTO, W2OOH\*

**S**OUTH OF THE BORDER, "down Mexico way," will be first stop on the "tour" of YLs this month. There, in the city of Articulo, is the QTH of Helen Whittlesey, XE1SE, the first and only foreign (non-Mexican) YL, according to her OM, to have been granted an XE license.

Born in Palo Alto, Calif., Helen has spent most of the last twelve years in Mexico. She first visited there with her uncle, Al Espinosa, of golfing fame.

When he went to Mexico as a golf pro, Helen went along for the trip. On the fourth such visit she met Horace Whittlesey, who soon became the OM, and they now have three jr. ops—Kathleen, 8 years, and Horace, Jr. and James, twins, aged 6.

It was through her OM that Helen became licensed, for, as she wisely decided, "It would be much more fun to be a ham than a ham widow!" Horace, who is ex-X1HH and ex-XE1HH, of course had to go off the air during the war along with all the other XEs. He was brushing up on the requirements to renew his license following the war when Helen became interested, so they readied her for the exam. Now *she* has the license—while the OM is "still procrastinating"! But even so, he never gets far from radio, for he is a factory representative for some sixty-odd U. S. radio and electronic companies.

"Radio is truly an absorbing and wonderful



Helen Whittlesey  
XE1SE

hobby," Helen exclaims, "and I just wish I could spend more time on the air. With three small fry and the constant problem of chauffeuring them to and from school, riding lessons, swimming lessons, parties, and doing the marketing keep me pretty well tied down. And I have two other hobbies—bridge and golf—either one of which I am loath to give up." In between times, though, she does get on. Look for Helen on 28,350 phone, where she operates with a choice of three setups—25 watts to an 807, or 275 watts into a pair of V-70s, or 180 watts to a 4D32, phase-modulated—all working into a Workshop 3-element rotary beam.

#### Hamming De Luxe

From "south of the border," next "stop" is with a YL who was born in Mexico City but is now a "W", with one of the grandest QTHs we can imagine—a ranch high in the snow-tipped Teton Mountain country of western Wyoming. This is the home of Louise Turner, W7HFE, and as you can see by the photo, the jumping-off place for her signals is truly breath-taking country. Here, on Triangle X ranch in Jackson Hole, Wyo., she and her OM and two sons live, and in the summertime operate a guest ranch. During the summer season Louise is too busy helping supervise the activities (horseback riding, swimming, sailing and boating on the Snake River, picnics, etc.) of their thirty-five guests to have any time for radio. In the wintertime, however, when the guests have returned to city life and the ranch is deep in snow, Louise keeps daily skeds with her Dad, W7DXV, and rag-chews and DXes with the 40-watt transmitter her Dad built for her and her Sky Buddy receiver.

W7HFE's introduction to ham radio came many years ago and included this most interesting ex-  
(Continued on page 79)

\*Assistant Editor, CQ. Send all contributions c/o CQ, 342 Madison Ave., New York 17, N. Y.

Inset: Louise Turner, W7HFE, pictured in the corner of the judge's stand at the Jackson Hole Dude Ranch Rodeo, 1947. The background photo shows the gateway into Triangle X and the main ranch house, home of W7HFE in Jackson Hole, Wyoming.

Photos by W5CA.



# DX



AND OVERSEAS NEWS

Conducted by HERB BECKER, W6QD\*

IF YOU HAVEN'T already read old man LeKashman's discourse on *CQ's* first World-Wide DX Contest, you had better take time out right now and digest it. Practically everyone I have talked with about the contest seemed to have liked it very much. So much so, in fact, they would like another contest this year with practically no changes in the rules. The fact that we had approximately 900 entries, I believe, speaks quite well for our first endeavor. Next month, we will give you the low down on this year's contest.

Once again, we are happy to congratulate the following DX men for having achieved W.A.Z. Certificates have been awarded as follows:

114	VK2QL	Frank T. Hine	40—151
115	VK3BZ	G. I. Morris	40—197
116	WØUOX	W. K. Carroll	40—160
117	VK2ACX	Arthur W. Stowar	40—180
118	CE3AG	Luis M. Desmaras	40—164
119	W6PH	Dan G. Bardin	40—137
120	G8IP	George F. Barrett	40—127
121	OK1WX	Ladislav Zalusky	40—112

From the looks of the above list, it looks like the boys overseas really poured it to us this month. For example, old-timers like VK2QL and VK3BZ were separated only by a matter of a few days. Close on their heels was VK2ACX preceded by a few days with WØUOX. It looks like the VK's have really been putting on the heat to get that one last card. We know CE3AG is now going to rest easier . . . his missing link was a card from Zone 19. Then, there's W6PH, another old-timer. Since he is an attorney, I suppose we should begin his certificate with a "Whereas." G8IP and OK1WX complete this month's contingent of W.A.Z.ers, and all these fellows, I am sure, are

\*Send all contributions to Herb Becker, 1406 South Grand Ave., Los Angeles 15, Calif.



SM5WZ smiles happily while working HL1BA.

well known to you.

From across the pond, G8VB is still working any and all 75 meter phone DX that bumps into his antenna. Harold says he is most anxious to work stations like *TAFAS*, *SV5UN*, *HZ1AB*, and *CN8EQ*. OK1AW is now working 10 phone and seems to be doing very well at it.

It seems like we are getting a number of new entries in the phone section of the Honor Roll, and we are glad to see them. One of the latest is W7MBX who has operated 10 meter phone only, however, he is now going to spread out a bit, using 20 phone, and is serving notice that he expects to be among those near the top. A few other new ones to the A3 section of the Honor Roll are WØSQQ, WØBFB, and W6TT.

W9VND has been off the air for quite a while except for a short time around the latter part of January when his Jr. Op. was born. Apparently, Ozzie sneaked in a few QSO's while the XYL was in the hospital . . . W4RBQ has upped his power to 145 watts, and so far has worked around 123 countries . . . W3LVJ, still running his 60 watts, is up to 38Z and 141C. He is going to make W.A.Z. before he goes QRO.

VE3QD is still working the good ones like *MD4GC*, *ZC4AC*, *EA6AZ*, and *SV5UN*. W4LVV says that we can expect *VP5AT*, 3510 kc., to be on every now and then. Oh yes, he is on South Caicos Island. You can QSL via LVV. Chuck also says that *HP1PL* is back in the States and will QSL as soon as he can get cards printed . . . W4FPK should be back on the air pretty soon with a new rig. By the way, this rig has separate finals for 10, 20, 40, and 80, and according to W4LVV, it contains 462½ relays. Don't quite understand where the ½ comes in.

### Israel a New Country

It's now official, and we are glad to announce the following as a new country, so please add it to your list:

Israel . . . . . 4X4

Now that Israel is officially added to the country list, you fellows can send in your claims for credit.

Another strong possibility for a new one is Macquarrie Island. *VK1ADS* has worked a few of the boys, but, as yet, it hasn't been decided to officially add it to the list. I wouldn't pass up working him if you have the chance.

W3JKO has received his first log from *SP8XA*. Practically all of the contacts in the log were made during the recent A.R.R.L. DX Contest, and they total 234. W3JKO will handle the QSL situation for *SP8XA*. Bob says *SP5AB* is apparently another good one in Poland and is a pal of *SP8XA*. He is also handling the cards for *SP5AB*. W3JKO

(Continued on page 66)

# W. A. Z. HONOR ROLL

C. W.-PHONE		C. W.-PHONE		C. W.-PHONE		C. W.-PHONE		PHONE ONLY	
W6VFR	40 216	W6PZ	40 156	W9VND	39 151	G8BI	38 75	W6VFR	39 153
W6EBG	40 213	W6UZX	40 155	W6EPZ	39 148	W2ZA	37 160	W7HTB	39 143
W6ENV	40 212	G3AAM	40 154	W9YNB	39 148	W3JKO	37 154	VE7ZM	39 121
W6ITA	40 210	W6TI	40 154	G2WW	39 147	W1KFV	37 158	W6DI	38 172
W6PFD	40 210	W6BPD	40 152	DL2KW	39 147	W3OCU	37 151	W4CYU	38 163
W2AQW	40 208	VK2QL	40 151	W2COK	39 146	W2CNT	37 142	W2BXA	38 155
W8HGW	40 208	W6LEE	40 150	W2GUR	39 146	GM2UU	37 133	W1JCX	37 158
W2BXA	40 208	W6FHE	40 150	W2MEL	39 145	W3WU	37 133	W8REU	37 149
W6ADP	40 207	OK1FF	40 148	W6JZP	39 141	W4ML	37 133	W8BF	37 146
W6SAI	40 206	W6DLY	40 148	W9DUY	39 140	W0AZT	37 129	W6WNH	37 139
G2PL	40 204	W6TS	40 147	G6BQ	39 140	W2WZ	37 127	W3JNN	37 136
W3BES	40 204	W7DXZ	40 146	SM5WI	39 139	G4CP	37 117	G3DO	37 136
W3GHD	40 204	W6AYZ	40 146	G3FJ	39 139	VE1EA	37 116	W1HKK	37 136
W6SN	40 204	W9NRB	40 145	W0EYR	39 137	W6CTL	37 111	G6LX	37 124
G6ZO	40 200	W6MUC	40 145	OK1CX	39 133	G4AR	37 108	G2AJ	37 121
W6MEK	40 200	W6QD	40 145	G5RV	39 132	W7BTH	37 105	F8VC	37 115
W0YXO	40 199	W6LER	40 145	G2VD	39 132	W8HSW	37 104	C1CH	37 83
W6GRL	40 198	ON4TA	40 144	W8VLK	39 132	G5MR	37 100	XE1AC	36 155
VK3BZ	40 197	IIIR	40 144	W9FKC	39 131	W2BLS	37 99	W1NWO	36 150
VE7ZM	40 195	JA2KG	40 143	VK4RC	39 131	G3AAE	37 99	W1MCW	36 147
W3LOE	40 194	W6LRU	40 141	W2BJ	39 131	W2SGK	37 95	W9RBI	36 146
W4CYU	40 194	OK1LM	40 141	W0OUH	39 131	KL7KV	37 88	W6PXH	36 137
ZL1HY	40 194	W6PH	40 137	G2FSR	39 130	W4LVV	36 147	W9HB	36 136
W6FSJ	40 193	W6CEM	40 136	OK1AW	39 129	W2RGV	36 136	W2DYS	36 135
W6TT	40 192	G3AZ	40 133	W6RLQ	39 128	OA4AK	36 128	W4ESP	36 130
W6MJB	40 192	W6RDR	40 133	W6ID	39 127	W3AYS	36 124	W1FJN	36 128
W6MX	40 191	W6YZU	40 129	W6LGD	39 125	W4DIA	36 121	G2PL	36 128
W9KOK	40 191	W7GBW	40 127	G5VU	39 124	W2WC	36 119	GM2UU	36 127
VK2DI	40 191	G8IP	40 127	VR5PL	39 124	SV1RX	36 119	G6BU	36 127
W3EVW	40 190	G5BJ	40 126	KH6PY	39 123	MD5AK	36 118	W4INL	36 125
W4BPD	40 189	PK6HA	40 124	G3AAK	39 122	W2BF	36 115	W6TT	36 122
W7GUI	40 189	W6NRO	40 123	G5WM	39 120	G2CNN	36 114	G5YV	36 106
LU6DJX	40 188	W6MLY	40 123	G8RL	39 120	G2AKQ	36 112	G6WX	36 105
W6DI	40 188	W6LN	40 117	W6BUD	39 118	W3FYS	36 110	VE3BNQ	36 101
W6MVQ	40 187	OK1WX	40 112	G6BS	39 117	W5CD	36 108	W3DHM	36 96
W6AMA	40 186	W6BIL	40 101	W6NRZ	39 117	GM3CSM	36 107	W6SA	36 92
W2CZO	40 185			G3QD	39 116	W2JA	36 102	F8DC	36 87
W2IOP	40 185	W2PEO	39 202	W7ETK	39 115	G2AO	36 100	W6PCK	35 126
W6RM	40 185	W9IU	39 202	G3TK	39 114	W5BK	36 99	W9BZB	35 125
W6PKO	40 185	W2HHF	39 199	W6MI	39 113	W0RBA	36 99	W9CKP	35 114
W6SA	40 184	W2NSZ	39 196	W6MUF	39 112	G6WX	36 95	G3FU	35 115
W6AM	40 183	W3KT	39 194	W7GXA	39 105	W7PK	36 91	W6CHV	35 113
W9VW	40 183	W0NUC	39 194	KG6AL	39 104	GM2AAT	36 75	W4OM	35 106
W6NNV	40 182	PY1DH	39 194	W6LEV	39 103	W4IWO	35 142	W3PA	35 102
W6KRI	40 181	W2GWE	39 193	W7ENW	39 101	W4DHZ	35 132	W6AM	35 102
ZS2X	40 181	W2HZY	39 191	W6WJX	39 101	W8ZMC	35 131	G8QX	35 100
W6ZCY	40 180	W3JNN	39 191	W6AX	39 98	W4HA	35 131	W4HA	34 120
W6SC	40 180	W3DPA	39 191	G6PJ	39 76	W2GVZ	35 129	W8ZMC	34 113
W6AVM	40 180	W4AIT	39 191			W9WCE	35 127	W8BIQ	34 111
VK2ACX	40 180	W8NBK	39 190	VE3QD	38 179	VE3AAZ	35 123	W2RGV	34 110
W6OMC	40 179	F8BS	39 189	W1JYH	38 173	W2AYJ	35 122	W2GHV	34 103
W6RW	40 179	W9ANT	39 185	W2PUD	38 172	W9CKP	35 122	W8UIG	34 100
W7DL	40 177	W8RDZ	39 184	CM2SW	38 167	VE3ACS	35 117	W8QBF	34 92
W7AMX	40 177	W1ENE	39 184	W1ZL	38 160	W8AVB	35 113	W0BFR	34 70
VE7HC	40 176	W2CWE	39 181	W3IYE	38 160	W9LI	35 112	W2NXX	34 65
W6DZZ	40 176	W9RRI	39 181	KP4KD	38 159	VE1PQ	35 111	W5ASC	33 119
ZL2GX	40 176	W1RIH	39 180	W2EMW	38 158	W6ZZ	35 109	W9RNX	33 118
W6PB	40 175	W3EPV	39 178	W3DKT	38 157	G8VR	35 100	W2ZWW	33 115
W6PCS	40 174	W4INL	39 177	W8FJN	38 153	W2HAZ	35 99	W5ATA	33 107
W6WKU	40 174	W5ASG	39 177	VO6EP	38 151	W6EHV	35 98	W0HX	33 103
W7FZA	40 174	W3JTC	39 176	W0DIJ	38 151	G2AVP	35 89	VE3ZM	33 100
W6RBQ	40 174	W3DRD	39 175	W4OM	38 149	W8JM	35 86	W5LWV	33 100
W0NTA	40 174	W6OEG	39 173	W8CVU	38 141	G8RC	35 78	W2POJ	33 100
VE4RO	40 171	W6SYG	39 173	W3KDP	38 141	G3BDQ	35 74	W4LZM	33 100
W6BAM	40 170	W0SQQ	39 171	W3LVJ	38 141	W7FNK	35 71	W2DRH	33 60
W5AFX	40 169	W4GG	39 170	W4VE	38 140	W4IYT	34 127	W9MIR	32 110
ON4JW	40 169	W9LNM	39 170	TF3EA	38 135	W9FNR	34 109	W9WCE	32 107
W6ANN	40 167	W1NMP	39 169	W9FKH	38 134	G8QX	34 99	W0EYR	32 100
W6GDJ	40 167	W2CYS	39 167	W4FPK	38 131	W0FET	34 99	W0SQQ	32 95
W6PQT	40 166	W8LEC	39 166	G8IL	38 131	VE5JV	34 98	W0AIW	32 93
W6DUC	40 166	W4DKA	39 165	G5CI	38 130	G8KU	34 96	W6UZX	32 92
W1AB	40 166	W4RRR	39 162	W2POJ	38 130	W0FWW	34 93	W2HY	32 85
W6AOA	40 165	W6IFW	39 161	W3ZN	38 129	W9ABA	34 92	W2SVK	32 84
CE3AG	40 164	IIKN	39 160	G6LX	38 126	G6XX	34 89	W9GZK	32 72
W6UCX	40 163	G5DQ	39 160	W9MZP	38 126	W9WEN	34 83	W7MBX	31 101
W6SRU	40 162	W9LM	39 159	GW3AX	38 123	W8PCS	34 80	W4BA	31 97
W6KUT	40 161	W0GKS	39 158	W8WWU	38 125	W6WUD	34 68	W0PUE	31 95
KH6LJ	40 161	W6EAK	39 158	W9TB	38 122	W4QN	33 110		
W6IBD	40 161	W0AIW	39 157	GW4CX	38 120	W0GBJ	33 89		
W6RLN	40 160	W8SDR	39 157	W8KPL	38 117	W8QUS	33 85		
W0UOX	40 160	G8KP	39 156	W5CPI	38 113	G8VG	33 78		
LA7Y	40 159	G6QB	39 152	W7EYS	38 107	G3BFC	33 77		
G3DO	40 157	W2RDK	39 152	G3ZI	38 107				
W7BD	40 157	G5YV	39 151	G8IP	38 105				
W7BE	40 156	G2AJ	39 151	C1CH	38 84				

# VHF

# UHF

Conducted by VINCE DAWSON, JR., WØZJB\*

**A**NOTHER ADDITION to the top of the 50-mc Honor Roll is WØBJV, Stan Burghardt, of Watertown, S. Dakota, who completed his 6-meter W.A.S., during the auroral type opening of April 7, at 1942 CST, when WØDNW in North Platte, Neb., was contacted, to make it all 48 states for WØBJV. On March 20, during the Es opening, Stan, at WØBJV, contacted South Carolina for state 47. He then lacked only Nebraska, which seemed to be far from possible, as the distances involved were too great for bending and too close for Es skip. But the auroral opening provided that in-between compromise to gladden the heart of WØBJV. The rig used by WØBJV was 100 watts to an 829B, all the way, and a 4-element beam 50' high. Nothing unusual Stan says, the big thing was being patient!

The auroral skin densities of April 7 were thick enough to provide a flurry of excitement for the 144-mc lads also. WØKYF, near St. Louis, heard W8WSE in Cleveland, Ohio, at 2027, for the longest haul reported, with numerous other northern Illinois and Iowa stations all coming into WØKYF with the typical auroral buzz. W9ALU, near Peoria, also heard auroral signals on 144 mc, identifying only W9FVJ.

#### That South American Path

The South American path continues to be open, although not as hot as in previous months, according to HC2OT. March 26 was a good day to W5s for Steve, when some ten stations were worked. HC2OT also heard KZ5NB working the LUs. XE2FC in Tampico, Mexico, is another new station for HC2OT, and which should make some nice DX for us here in the States on Es this summer. On April 7, W4IUJ was the loudest signal ever heard at HC2OT. With a new stacked array W4IUJ really knocked the pin off Steve's meter, yet he was the only W4 on the band. It will be interesting to see if HC2OT is worked by the Stateside gang when our Es season commences.

XE2C, in Monterrey, Mexico, now has 500 watts

*\*Send all contributions to Vince Dawson, Box 837, Gashland, Mo.*

on c.w. to a 4-250A. The modulator is available, but Gilberto prefers c.w., although he is thinking of trying phone the next time conditions are right. XE2C works for a BC station whose studios are next door to his shack. Phone raises heck in their amplifiers so it looks as if XE2C will always be found on c.w. with the same situation that XE1KE encountered. March 21, XE2C worked HC2OT at 1945, and shortly thereafter heard W5LKP in El Paso, the first time he has been able to hear south and north at the same time. The first XE1-XE2 contact was made between XE1GE and XE2C on April 1, at 2100 CST, evidently scatter rebound, for the LUs were rolling into Monterrey at the same time. XE1GE was also heard on April 4 at 2015 CST, in contact with Ws, but faded out before XE2C could call him. Again the LUs were coming into XE2C. The setup at XE2C is one that will make many a W sit up and take notice. We have pictures of his station which will be used in this column as soon as possible—watch for them as he has one of the best DX station setups that we have seen.

In between trips around Mexico, Jeff Lord, XE1GE, manages to catch 50-mc openings. Jeff mentions that he hopes to build up his score this year. All of his Stateside contacts were in one opening which included Texas, Fla., Ill., Iowa, Miss., La.; with LU, CX, OA, HC and W for his countries worked. The XE1s in Mexico City had a going-away party for XE1KE, who left on April 2 for Santa Barbara. Jeff promises us pictures of this hamfest, which I am sure will be welcomed by the 6-meter fraternity. It's interesting to see what you fellows look like after hearing so much of you on the air and reading about you in these pages.

XE1FU in Mexico City bought XE1KE's rig and is now quite active on the band, running 100 watts to an 829B, feeding a 4-element closed-spaced beam 75' high. The receiver is a Gonset ahead of an HQ-129X or RME 45. So far XE1FU has worked into LU, CX, OA and HC. Several states have been worked, the majority of his U.S. contacts being in the great State of Texas.

VE5NC is still trying hard for an auroral opening, although he appears to be either right in the dead zone, or else north of the auroral curtain, for only some good c.w. practice has been his reward. On March 21, he heard a W7 with fluttery signals, and April 7 he heard a badly garbled 50-mc phone signal. 'Tis worse than being behind the iron cur-

Houston, Texas, v.h.f. gang hamfest for WØZJB at W5FSC. Left to right: W5OCB, W5EAL, W5FKY, W5FSC, W5LTH and W5EEX.

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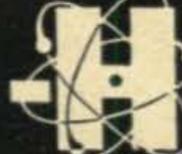
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The 50-mc Honor Roll has been omitted this month to permit extensive revisions and corrections.

tain, says Basil, but he is looking forward to some Es, for he did have some nice contacts last summer.

#### 50-mc Gang

W5GNQ, Shawnee, Okla., near Oklahoma City, worked LU6DO on March 30 at 2020 CST, running 15 watts into a 4-element beam 18' off the ground, receiving an S5 report over the 4800-mile path. Yes, it surely takes high power for some real DX. Perhaps some of the lower frequency gang should be advised of this.

During March and April, W7QLZ found the MUF at 40 mc almost daily, except on April 6 when W6ERE was worked on 50 mc. On March 11, Clyde took his beams down, but to play safe put a folded dipole up. Of course this would be the night conditions were right to South America! Between 1950-2045, W7QLZ heard lots of Spanish speaking stations, identifying CX1AK and LU9AX, both calling W5VY. The W5s were heard around S4, evidently scatter rebound. No one was worked though—just a sad spook, caught with his antennas down.

W7HEA passes along the information that those of us who bought the ARC-5 v.h.f. transmitters, less tubes and the 832A tube socket assemblies, may get said assemblies for 89¢ from Columbia Electronics in Los Angeles. Bish is using his ARC-5 unit as an exciter, setting the 4 channels up on 11-10-6-2 meters, to drive his 4-125A final, which should be a good bet for those desiring quick band change. The earthquake shook things up a bit for W7HEA, and his XYL thought her prediction that the mess of steel and aluminum (meaning W7HEA's very FB beams, he sez here) would upset their house, was coming true. But being an old sea dog (Navy) W7HEA's battleship arrays pitched around a lot, but are still intact. At his radio shop, the shaking nearly pitched a neon sign through his shop window. While the damage was small from the earthquake itself, Bish says plenty of destruction was done by those who didn't realize what was going on, and threw away their bottles, which crashed through some rather large plate glass windows, for it was an eerie feeling to even the sober ones.

The Brownsville, Texas, gang have been enjoying QSOs with the South American gang, according to W5KSW. W5BAJ has 25 watts and a 4-element beam; W5CXS runs 25 watts into a 3-element beam; W5KSW has 40 watts into an 807 doubler and a 4-element beam; W5PKX runs 120

Organizer of the Oklahoma 50-mc net, Bill Braden, W5LEI of Tulsa. Bills uses an 829B.

watts and a folded-dipole antenna. During the opening of March 20, during a QSO between W5KSW and HC1JW, the power failed at W5KSW, so a quick change to emergency power from a 2 kva generator was made, and the QSO was finished, as well as all others during the rest of the opening. This is one time that having emergency power available really paid off, says W5KSW, for the rest of the Brownsville gang had to call him on the phone to find out when the band died out. PZ1A was overheard to say during one of the openings that he had heard W5VY, but as yet no W contact for him or YV5AC, although YV5AC has been heard by the Texas lads. HC2OT told W5KSW that 6 meters had been open 17 days in March to Mexico, 10 days to Venezuela, 3 days to LU and 3 openings to W.

WØBJV, now calmed down somewhat after his 50-mc W.A.S., says that WØUSI is in California, on duty with the Army as a Lt. Colonel. WØCJS now has 47 states, needing only Rhode Island, which seems to be all the local news from South Dakota.

Out in Pampa, Texas, with no local activity, W5HVP had a nice time of it on March 20 when he was able to work HC2OT, XE2C, and many W3-8-9, adding W2RLV for a new state. VE3BYZ also was worked, along with W6AMD. What with the band opening in all directions for W5HVP, it appears that the 6-meter band was doing St. Vitus's dance, or something related thereto.

VE3AET is an old-timer who has been through all the various phases of traffic handling and DX chasing on the lower frequencies. Now he has come to rest on 6 meters, his score to date being 16 States and VE1-3-4. Reg suggests that to promote Canadian activity we sponsor a contest to work all Canadian districts, from VE1 to VE8, for it would give the boys north of the border something to shoot at, now that there have been 3 W.A.S.s.

W5LEI of Tulsa went visiting to Houston, and on March 30 was in the shack of W5EEX when the latter made his first LU contact with LU6BH, then worked HC2OT and LU9AA. W5LEI says he was having a fine time of it until he heard the LUs start calling the Tulsa gang, upon which he turned green with envy. Later in the evening W5LEI and W5EEX went visiting to W5FSC's shack, where they listened all evening to the South Americans, but were too busy to call any of them. (Course it's old stuff to the Texans, this here 50-mc DX.) Two weeks later your scribe, WØZJB, also was in Houston and visited the v.h.f. gang, but, as luck would have it, no DX of any sort was heard, even though there was a total eclipse of the moon. Mightily fine fellows the Houston gang.

The Oklahoma 50-mc net is now handling traffic from the 75-meter boys, for activity is that great. For a State that had little or no activity several years ago this is a remarkable gain. Almost nightly from the Tulsa area contacts can be made up to 150 miles, with anywhere from 5 to 20 stations active. No doubt you fellows reading this will hear great things from the Oklahoma boys during this summer's DX spree. New additions to the net include W5ATJ, Hammon, Okla., in the far western section, and W5H XK in Watonga, near the middle of the great plains.

(Continued on page 60)



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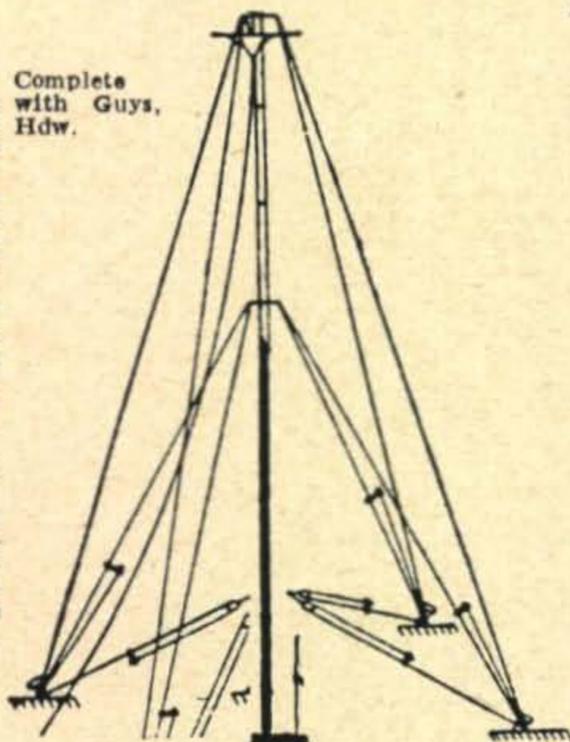
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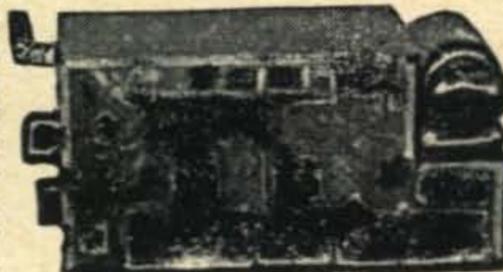
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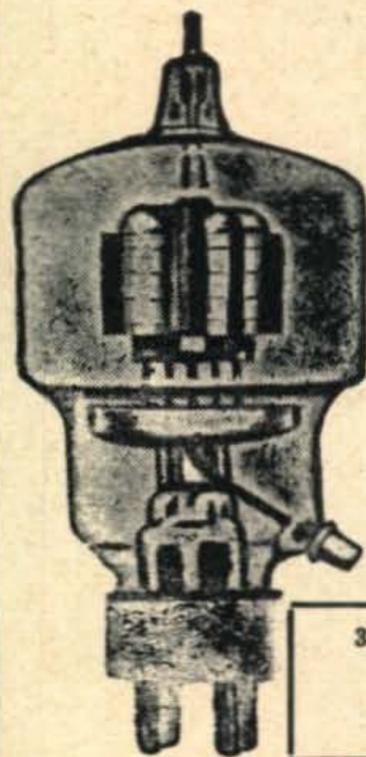
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and recognized. Great appreciation, therefore, is expressed for all of these suggestions, as well as for the spirit of cooperation demonstrated by those interested.

6. It will be noted upon examination that the proposals herein made, while numerous, are interrelated and constitute an overall plan. The purpose of this plan is as follows:

- (a) To provide for the continued and directed enhancement of the Amateur Service in its value to the public as a voluntary, non-commercial, communications service, particularly with respect to providing emergency communications;
- (b) To provide for the continued extension of the amateur's proven ability to contribute to the advancement of the radio art;
- (c) The continued improvement in the Amateur service through a program which provides for encouragement for advancing skills in both the communication and technical phases of the art;
- (d) To provide a reservoir of trained operators, technicians and electronics experts for:
  - (1) The growing radio industry in peacetime; and
  - (2) The vastly increased demands of both the radio industry and the military services in times of natural emergency.

7. The foregoing purposes are herein, or will later be, encompassed in proposed rules along the following general lines:

- (a) Recognition of the communications system aspect of the service by specific encouragement of the establishment and use of traffic nets and of handling on a voluntary impartial basis, non-commercial third party messages, emphasizing at all times the importance of emergency operations. Examinations and license requirements would be geared to this phase of amateur activity.
- (b) Establishment of an integrated and continuously reviewed and revitalized plan for improving operations and techniques and providing more efficient frequency utilization through the adoption of progressively higher performance standards, such as:
  - (1) Immediate designation of certain portions of the amateur bands for narrow bandwidth techniques; and
  - (2) Immediate establishment of realistic limits on bandwidth of emissions in all heavily-occupied bands.
- (c) Creation of initial interest on the part of the novice, particularly youth, through the establishment of a short term, non-renewable beginner's license of comparatively easy attainment. Also the encouragement of continued interest on the part of all amateurs through the progressive raising of standards at the highest level of license. As a companion measure, and particularly to promote developments on the higher frequencies, licensing at the first level above the beginner would permit alternate routes. One route would be for the communicator who would substantially resemble today's Class B\* and C\* amateur. The other would be for the experimenter or technician who today has no precise counterpart and who would be permitted to operate only on the higher frequency bands. Class A\*, B\*, and C\* licenses would be continued as at present, except that commencing with January 1, 1951, Class A\* licenses would no longer be issued and would be renewed only as Class B\*. The special privileges associated with Class A\* licenses would be absorbed in a new special top grade of license of diploma form which would be called the Amateur Extra Class\* license. Eligible applicants could qualify for the Extra Class license as soon as it was established, but there would be no compulsion, based on the desire for Class A\* special privileges, to qualify for it until it was no longer possible to obtain or to renew a Class A\* license. Qualifications for the Extra Class license would include a minimum number of hours operating experience as a Class A\*, B\*, or C\* amateur, a higher speed telegraphic code test and other advanced requirements of knowledge in both technical and communications fields as well as all the knowledge usually required for a Class A\* license. This license would have practical value in that it would constitute evidence of exceptional proficiency for such consideration as this factor might warrant, and, in addition, would constitute a very real target for those among the amateurs in whom pride of superior ability and accomplishment would constitute a spur to special endeavor.

\*See paragraph (d), below.

- (d) In paragraph (c), above, reference is made to Class A, B, and C operator licenses (which exist today), and also to three new classes of operator

licenses (which do not exist today). The latter are proposed to provide for the beginner or novice, the experimenter or technician, and for the amateur who has extraordinary qualifications. As hereafter shown, it is proposed to call these new classes of operator licenses, respectively, the Amateur Novice Class, Amateur Technician Class, and Amateur Extra Class, (the last one for extra qualifications and extra privileges). These are descriptive titles. In order to be consistent and logical, it is proposed to change the nondescriptive titles of existing classes of operator licenses (A, B, and C) to titles of descriptive character. Thus, A is proposed to be changed to Amateur Advanced Class, B to Amateur General Class, and C to Amateur Conditional Class (the last one conditioned on geographical location with respect to quarterly examination points).

8. From the standpoint of the problem whether to provide a different sharing arrangement of frequencies between those used for telephony and for other types of emission, the present Commission proposals provide for an additional 50 kc (3800-3850 kc) for telephony in the 3500-4000 kc band with a permitted total bandwidth of emissions of 3 kc. The band 50.0-50.1 Mc would be designated exclusively for radiotelegraphy with A1 omission. The proposed beginner's class of license would permit telephony only in the band 145-147 Mc. Permanent provision is made for the use of NBFM and other narrow band techniques throughout all the bands available for telephony. Limitations on the bandwidth of emissions for telephony, ranging from 3 kc to 20 kc, are proposed for all bands except the new 27 Mc band and the bands above 54 Mc for which no bandwidth limitations are immediately proposed. The bands so limited are 3800-3850 kc, 3 kc; 3850-4000 kc, 6 kc; 14200-14300 kc, 6 kc; 28.5-29.65 Mc, 10 kc; 29.65-29.7 Mc, 6 kc; and 50.1-54.0 Mc, 20 kc. Wide band frequency modulation would be no longer permitted in the sub-bands 29.0-29.7 Mc and 52.5-54.0 Mc. Additional provision for AØ emission is not proposed.

9. As part of the plan described in paragraphs 7 and 8 above, it is proposed to revise the renewal service requirements for existing classes of amateur operator licenses (Classes A, B, and C proposed to be called Advanced, General, and Conditional respectively) in order that such requirements will be consistent with those which are being proposed for the new classes of licenses herein described (Amateur Extra Class and Technician Class). It has been thought for some time that the present renewal service requirements (three separate radiotelegraph contacts with other amateur stations in the United States during the last six months preceding the date of filing application for renewal) have little or no practical value as proof of qualification for renewal without examination. Accordingly, the attached Notice of Proposed Rule Making sets forth renewal service requirements for the existing and proposed (excluding Novice Class license which is not renewable) classes of amateur operator licenses. The one year grace period set forth in the recently published Notice of Proposed Rule Making (Docket 9240) has been incorporated in this proposal.

10. The proposed amendments, authority for which is contained in Sections 4(i), 303(b), (c), (e), (f), (g), (l), and (r) of the Communications Act of 1934, as amended, are set forth in an appendix attached to this notice.

11. Any interested party who is of the opinion that the proposed amendments should not be adopted, or should not be adopted in the form set forth may file with the Commission, on or before July 20, 1949, a written statement or brief setting forth his comments. At the same time, persons favoring the amendments as proposed may file statements in support thereof. The Commission will consider any such comments that are received before taking any final action regarding the proposed amendments, and if any comments are received which appear to warrant the holding of a hearing or oral argument before final action is taken, notice of the time and place of such hearing or oral argument will be given.

12. In accordance with Section 1.764 of the Commission's Rules and Regulations, an original and at least fourteen copies of all statements, briefs or comments shall be furnished the Commission.

FEDERAL COMMUNICATIONS COMMISSION

Adopted: April 20, 1949

Released: April 21, 1949

T. J. Slowie,  
Secretary

PART 12—RULES GOVERNING AMATEUR RADIO SERVICE, is amended as follows:

Directions for altering text:

Insert the following text of new Sections 12.0, Basis and Purposes:

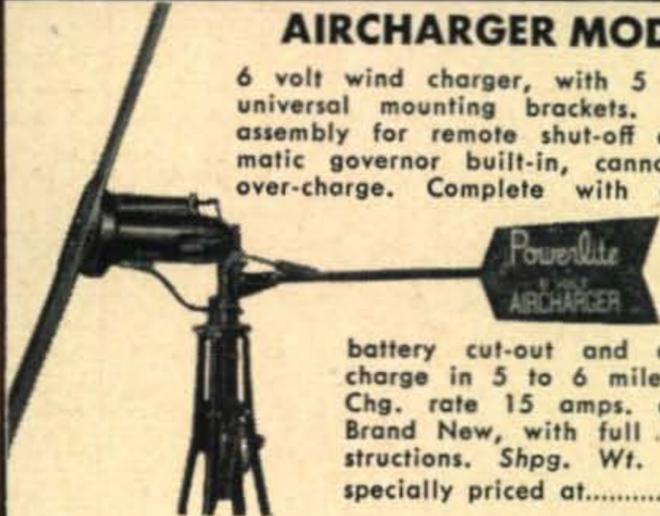
# HARVEY for variety for bargains

VARIETY-BARGAINS



## AIRCHARGER MODEL 616

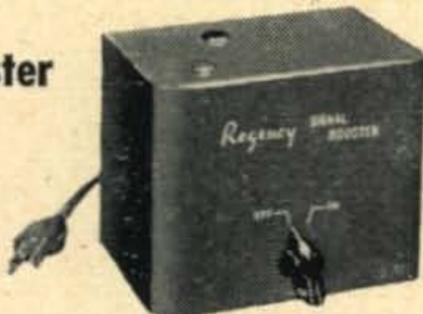
6 volt wind charger, with 5 ft. tower and universal mounting brackets. Built-in brake assembly for remote shut-off of unit. Automatic governor built-in, cannot over-run or over-charge. Complete with control panel,



battery cut-out and ammeter. Will charge in 5 to 6 mile breeze. Max. Chg. rate 15 amps. at 1100 RPM. Brand New, with full installation instructions. Shpg. Wt. 85 lbs. Very specially priced at.....**\$34.95**

## Regency Signal Booster

Extremely stable, high-gain, wide band pre-amps using push-pull RF, self-powered. Either 300-ohm line or coaxial cable may be used on either input or output. Proper impedance match and push-pull performance maintained under all conditions. Amazing improvement in signal to noise ratio under all receiving conditions. Models: SB-29, 27-30 mc; SB-52, 50-54 mc; SB-69, 44-48 mc; SB-98, 88-108 mc; SB-146, 144-148 mc; SB-157, 152-162 mc; SB-189, 174-216 mc (SB-69 for TV channels 2-6; SB-189 for TV channels 7-13). Any model, each.....**\$11.95**  
**NEW SB 2-13** all TV channels, 2 thru 13.....**\$17.95**



## GENERAL ELECTRIC 1 MFD CONDENSER

15,000 working volts DC. Pyranol filled. Brand New. Shpg. Wt. 35 lbs.....**\$14.95**  
1/2 MFD. Condenser, 25,000 working v. D.C. Pyranol. Brand New. Shpg. Wt. 35 lbs.....**\$18.95**  
Cornell-Dubilier TJ-20040 oil-filled condenser. Rated 4 mfd. at 2000 V. D.C. working. Shpg. Wt. 3 lbs.....**\$3.75**

## XTALS

20 meter xtals for a buck! Mounted in holder with 1/2" pin spacing. Also 40 and 80 meter and 6 and 13 mc bands at the same low price. Specify your frequency.....**\$1.00**  
5 mc precision xtal, as shown, many uses.....**\$1.95**  
Special 8 mc xtals for 2 meter xtal control..... **1.50**  
Lucite adapter for 1/2" xtal holders..... **.35**  
Include 10¢ postage with your crystal order.



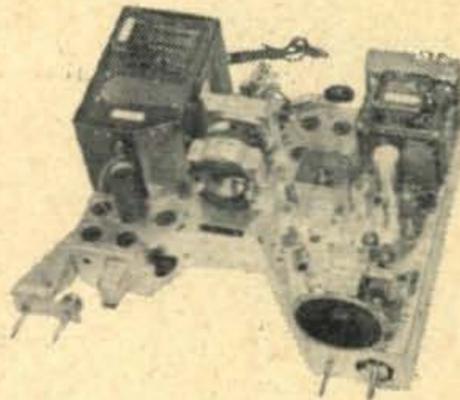
## 160 METERS NOW OPEN

Harvey has in stock a complete assortment of B&W coils in all types and ratings. Also 160 meter xtals made by Bliley, Petersen, etc.

In stock—the new **NATIONAL MODEL TVB-1** all-band television preselector, booster amplifier. We highly recommend this unit as one of the best. Shpg. Wt. 5 lbs. ....**\$28.00**

## NEW 1949 TECHMASTER TV KIT

Don't confuse this with cheaper kits! This kit has all RCA parts, including pre-wired and aligned genuine RCA front end, punched chassis with all major components mounted as shown; all RCA tubes including kine, complete manual with service notes all RCA. New simplified instructions. (Free circuit and parts list on request.) Shpg. Wt. 85 lbs.....

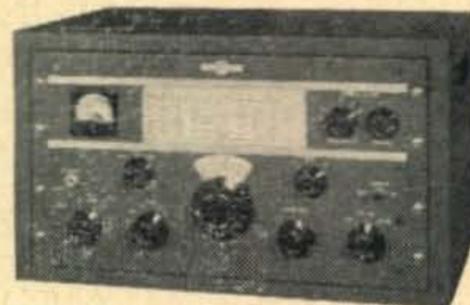


**\$198.50**

Less kine ..... **168.50**  
10BP4 ..... **29.50**  
12LP4 ..... **49.50**  
15AP4 ..... **89.50**  
16AP4 ..... **79.50**

## Collins 75-A \$375.00

80, 40, 20, 15, 11 and 10 meter ham receiver. Automatic noise limiter, high sensitivity, double conversion. With speaker in matched cabinet. Shpg. Wt. 93 lbs.



## GE FM TUNER

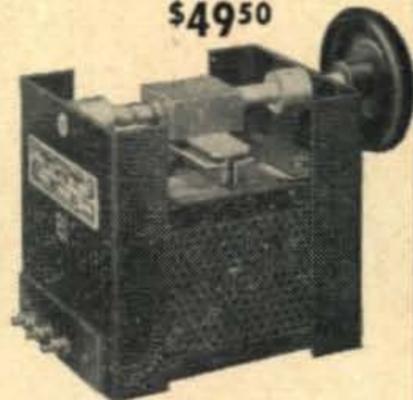
Only a few left of this unusual buy. Covers 88-108 mc range, uses guilotine tuning. Designed for export and tropicalized, has power inputs for 110 to 250 volts 60 cyc. Shpg. Wt. 30 lbs. **HARVEY SPECIAL PRICE**

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## AMERTRAN TRANSTAT

250 watts. Input 115 volts, 60 cy; commutator range 103-126 volts. Shpg. Wt. 15 lbs.....**\$5.95**



## MILLEN 90651 GRID DIPPER

Versatile test and design unit. 1.5 to 270 mc. Transformer power supply plus battery operation. Frequency calibrated drum dial. Measures only 3 1/8" x 3 1/2" x 7" plus inductor length. Complete with tube and inductors. Shpg. Wt. 5 lbs.....

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without notice.

12.0 Basis and Purpose.—These rules and regulations are designed to provide an Amateur Radio Service having a fundamental purpose as expressed by the following principles:

(a) The continued and directed enhancement of the amateur service in its value to the public as a voluntary non-commercial communication service, particularly with respect to providing emergency communications.

(b) The continued extension of the amateur's proven ability to contribute to the advancement of the radio art.

(c) The continued improvement in the Amateur service through a program which provides for encouragement for advancing skills in both the communication and technical phases of the art.

(d) The providing of a reservoir of trained operators, technicians and electronics experts for:

(1) The growing radio industry in peacetime; and

(2) The vastly increased demands of both the radio industry and the military services in times of national emergency.

Substitute the following text for the present text of subparagraph (2) of paragraph (a) of Section 12.111, Frequencies and types of emission for use of amateur stations:

(2) 3500 to 4000 kc. Use of this band is restricted to amateur radio stations as follows:

(i) 3500-4000 kc, radiotelegraphy using type A-1 emission only, to those stations located within the continental limits of the United States; the Territories of Alaska and Hawaii, Puerto Rico, the Virgin Islands and all United States possessions lying west of the Territory of Hawaii to 170° west longitude.

(ii) 3800 to 3850 kc, radiotelephony using any type of modulation, except pulse, provided that the total bandwidth of emissions does not exceed 3 kilocycles, to those stations located within the continental limits of the United States, the Territories of Alaska and Hawaii, Puerto Rico, the Virgin Islands and all United States possessions lying west of the Territory of Hawaii to 170° west longitude subject to the further restriction that radiotelephone types of emission may be used only by an amateur station which is licensed to an amateur operator holding an Amateur Extra Class or Advanced Class (Class A) operator license and then only when operated and controlled by an amateur operator holding an Amateur Extra Class or Advanced Class (Class A) operator license.

(iii) 3850 to 4000 kc, radiotelephony using any type of modulation except pulse provided that the total bandwidth of emissions does not exceed 6 kilocycles, to those stations located within the continental limits of the United States, the Territories of Alaska and Hawaii, Puerto Rico, the Virgin Islands and all United States possessions lying west of the Territory of Hawaii to 170° west longitude, subject to the further restriction that radiotelephone types of emission may be used only by an amateur station which is licensed to an amateur operator holding an Amateur Extra Class or Advanced Class (Class A) operator license and then only when operated and controlled by an amateur operator holding an Amateur Extra Class or Advanced Class (Class A) operator license.

Substitute the following text of subparagraph (4) of paragraph (a) of Section 12.111, Frequencies and types of emission for use of amateur stations:

(4) 14000 to 14400 kc, radiotelegraphy using type A-1 emission only; 14200 to 14300 kc, radiotelephony using any type of modulation except pulse, provided that the total bandwidth of emissions does not exceed 6 kilocycles, subject to the restriction that radiotelephone types of emission may be used only by an amateur station which is licensed to an amateur operator holding an Amateur Extra Class or Advanced Class (Class A) operator license and then only when operated and controlled by an amateur operator holding an Amateur Extra Class or Advanced Class (Class A) operator license.

Substitute the following text for the present text of subparagraph (6) and (7) of paragraph (a) of Section 12.111, Frequencies and Types of Emission of Use of Amateur Stations:

(6) 28.0 to 29.7 Mc, radiotelegraphy using type A-1 emission only; 29.0 to 29.7 Mc, radiotelegraphy using carrier shift techniques, provided that the maximum shift does not exceed 1 kilocycle; 28.5 to 29.65 Mc, radiotelephony using any type of modulation except pulse, provided that the total bandwidth of emissions does not exceed 10 kilocycles; 29.65 to 29.7 Mc, radiotelephony, using any type of modulation, except pulse, provided that the total bandwidth of emissions does not exceed 6 kilocycles.

(7) 50.0 to 54.0 Mc: 50.0 to 50.1 Mc, radiotelegraphy using type A-1 emission only; 50.1 to 54.0 Mc, radiotelephony using any type of modulation, except pulse, pro-

vided the total bandwidth of emissions does not exceed 20 modulation or facsimile using amplitude modulation.

Substitute the following text for the present text of Section 12.21, Eligibility for license.

12.21 Eligibility for license.—Persons are eligible to apply for the various classes of amateur operator licenses as follows:

Amateur Extra Class.—Any citizen of the United States whose application shows that while operating under a valid amateur operator license, Advanced Class, General Class, or Conditional Class (or Class A, B, or C) issued by the Federal Communications Commission, the applicant has accumulated a minimum of 26 hours of operating experience during the last 12 months immediately preceding the date of his application.

Advanced Class (Class A).—Any citizen of the United States who at any time prior to receipt of his application by the Commission has held, for a period of a year or more an amateur radio operator license, General Class or Conditional Class (or Class B or C) issued by the Federal Communications Commission. New Advanced Class amateur operator licenses will not be issued after December 31, 1950. Commencing with January 1, 1951, valid Advanced Class (or Class A) licenses will be renewed only as General Class, although holders of expiring Advanced Class (or Class A) licenses may, if eligible, apply for Amateur Extra Class licenses.

General Class.—Any citizen of the United States.

Conditional Class.—Any citizen of the United States whose actual residence, address, and proposed amateur station are more than 125 miles air line distance from the nearest location at which examinations are held at intervals of not more than 3 months for amateur operator licenses; or who is shown by physician's certificate to be unable to appear for examination because of protracted disability; or who is shown by certificate of the commanding officer to be in the armed forces of the United States at an Army, Air Forces, Navy or Coast Guard station, and, for that reason, unable to appear for examination at the time and place designated by the Commission.

Technician Class.—Any citizen of the United States.

Novice Class.—Same eligibility requirements as Conditional Class except that the following classes of persons are not eligible for the Novice Class license:

(a) Former holders of Novice Class license, and  
(b) Present or former holders of any class of commercial operator license issued upon the basis of a technical examination.

Substitute the following text for the present text of Section 12.23, Classification of operating privileges:

12.23 Classes and privileges of amateur operator licenses.

Amateur Extra Class.—All authorized amateur privileges and also any special privileges that the Commission might grant from time to time.

Advanced Class (Class A).—All authorized amateur privileges except those reserved for holders of the Amateur Extra Class license.

General Class or Conditional Class (Class B or C).—All authorized amateur privileges except those reserved for holders of the Amateur Extra Class or Advanced Class (Class A) licenses.

Technician Class.—All authorized amateur privileges in the amateur frequency bands above 220 megacycles.

Novice Class.—Those amateur privileges as designated and limited as follows:

(a) The d.c. plate power input to the vacuum tube or tubes supplying power to the antenna shall not exceed 75 watts.

(b) Only the following frequency bands and types of emission may be used, and the emissions of the transmitter must be crystal controlled, except in the 145-147 Mc band:

(1) 3700 to 3750 kc, radiotelegraphy using only type A-1 emission, in accordance with the geographical restrictions set forth in Section 12.111 (a) (2) (i).

(2) 14100 to 14150 kc, radiotelegraphy using only type A-1 emission.

(3) 28.0 to 28.5 Mc, radiotelegraphy using only type A-1 emission.

(4) 145 to 147 Mc, radiotelegraphy or radiotelephony using any type of emission except pulsed emissions and type B emission.

Substitute the following text for the present text of Section 12.27, Renewal of amateur operator license:

12.27 Renewal of amateur operator license.—Application for renewal without examination of an amateur operator license, except the Novice Class, shall be filed not more than 120 days prior to the date of expiration of

(Continued on page 56)



## GET ON THE AIR FOR LESS THAN \$90 WITH THIS COMPLETE ALLIED STATION

Now—ALLIED makes it easy for the beginning Amateur to get on the air at amazing low cost! Here's the complete station setup—absolutely tops for quality and dependability: Hallicrafters S-38 all-wave receiver (4 continuous bands, 540 kc to 32 mc); Hallicrafters HT-17 transmitter complete with coils for 80, 40, 20, 15 and 10 meters; good quality handkey; 2000 ohm double headset; Bliley 40-meter crystal; 2 antenna insulators; 200 ft. coil No. 14 antenna wire; ARRL station logbook; Amateur Radio Callbook. This equipment—and your Amateur License—is all you need to start your two-way radio contacts! 97-636. Complete Beginner's Station. **\$87<sup>50</sup>**  
**SPECIAL AT ONLY.....**  
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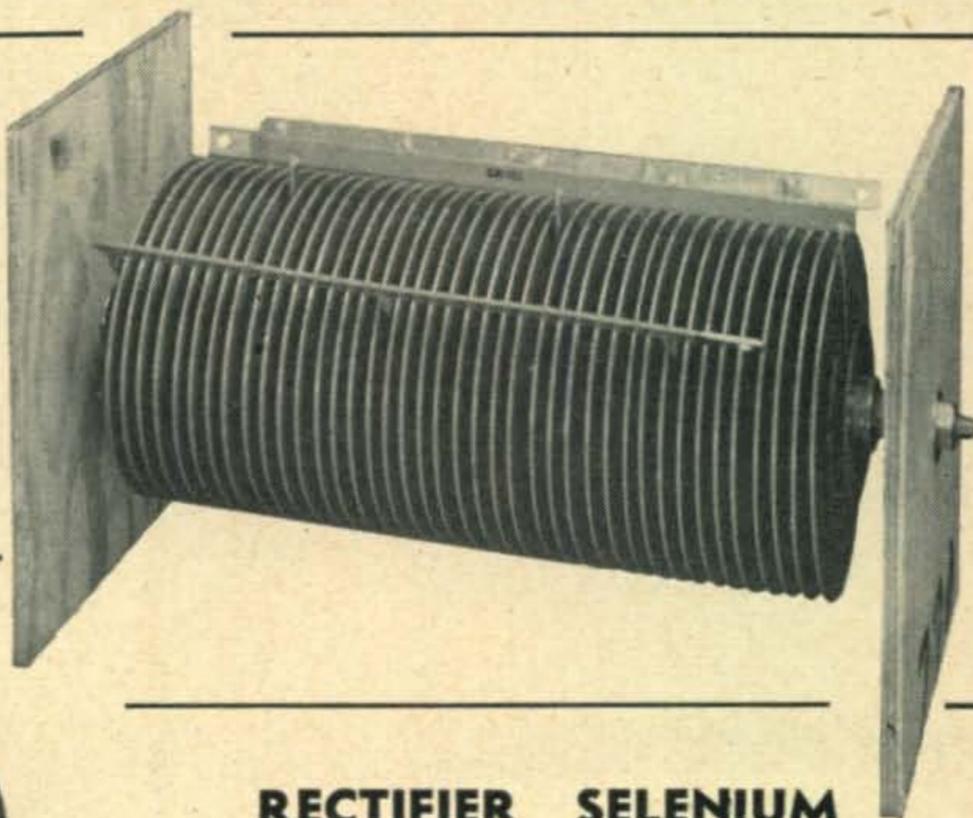
# ESSE Specials!

*Do not fail to closely examine this list of bargains. We believe that every item listed below is a sensational value that soon can never be repeated. All equipment advertised herein is unconditionally guaranteed to the customer's satisfaction to this extent: Return any item advertised within five days after delivery for full refund except transportation charges (both ways).*

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Selenium 15 amps. maximum continuous DC current inductive load for continuous duty. Maximum AC input 46 V. RMS single phase. DC output maximum 34.9 Volts. These rectifiers were used in Navy type CLG-20341 rectifier power unit which delivered 6-12-24 Volts DC current at 15 amps. Maximum dimensions 4 $\frac{3}{8}$ " dia. x 12  $\frac{3}{4}$ " long.

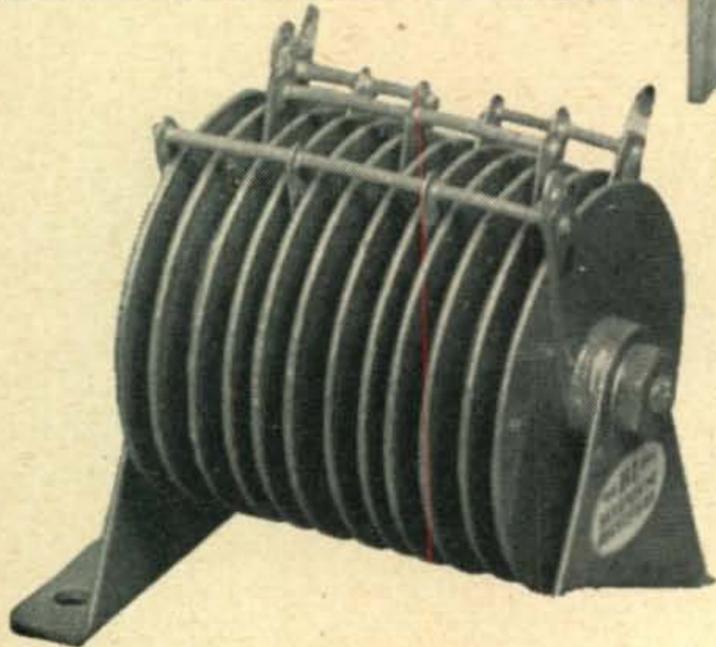
Price New.....**\$17.50**



## RECTIFIER SELENIUM

Maximum AC 60 cycle sine-wave. Input 13 Volts; output 9 Volts. Continuous current rating 2 amps. with inductive or resistive load. Maximum dimensions 3 $\frac{1}{8}$ " x 1 $\frac{11}{16}$ " x 1 $\frac{11}{16}$ ". 12 square plates bridge circuit. (New).

Price.....**\$4.00** ea.



ESSE RADIO CO.

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ATTENTION! PROSPECTORS, MINERS, OIL COMPANIES PLUMBERS, etc. Below is the finest metal detecting mine detector ever constructed . . .

## SCR-625 MINE DETECTOR

Brand New

Metallic Objects Only

Used by the Army to detect buried metallic mines. Its private use suggests the location of underground or underwater pipes, cables and ore bearing rock, the location of metallic fragments in scrap materials, logs, etc., and the screening of personnel in plants for carrying of metallic objects.

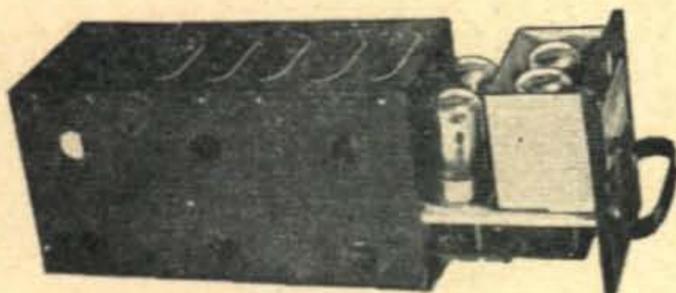
The unit consists of a balanced inductance bridge, a two-tube amp. and a 1,000 cycle oscillator. The presence of metal disturbs the bridge balance, resulting in a volume change of the 1,000 cycle tone. The tubes used are low-battery drain types such as 1G6 and 1N5. The circuit may be modified for control of warning signals, stopping of machinery, etc., when metal is detected. Operates from two flashlight batteries and 103 V. "B". However, a power supply operating from 110 V. may be used. Comes complete with spare tubes, spare resonator and instruction manual—in wooden chest 8 1/4" x 28 1/4" x 16". Weight in operation is 15 lbs. New, complete in original overseas packing container. Originally sold by War Assets for \$166.00.

The U. S. Forestry Service has recommended procedure for using the SCR-625 Mine Detector to find concealed metal in tree logs and other timber products.

PRICE .....\$45.00

BATTERIES .....\$4.00 EXTRA

## TURBO AMPLIFIERS



Used for parts—shipped complete with the following tubes: 2—7C5's 1—7Y4 1—7F7

PRICE — Carton of 10.....\$7.50

## NAVY CRV-46151 AIRCRAFT RADIO RECEIVER

Four bands including broadcast (195-9,050 KC). Circuit is six-tube super-heterodyne with mechanical band change or remote operated electrical band change. Remote band change and tuning controls included, making this set readily adaptable to mobile ham use. Powered from self-contained 24 V. DC dynamotor.

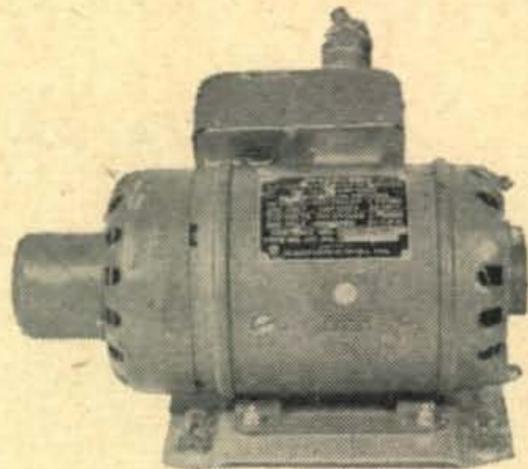
The sets are complete with tubes and remote controls. No cable or plugs. **\$24.50**  
Including case. ....



## MG-149F INVERTER

(Holtzer-Cabot Elect. Co.)  
Input 24 V. DC  
36 amps. Output 115 V. 400 cy. AC. 500 V. A. Output at 90% P.F.

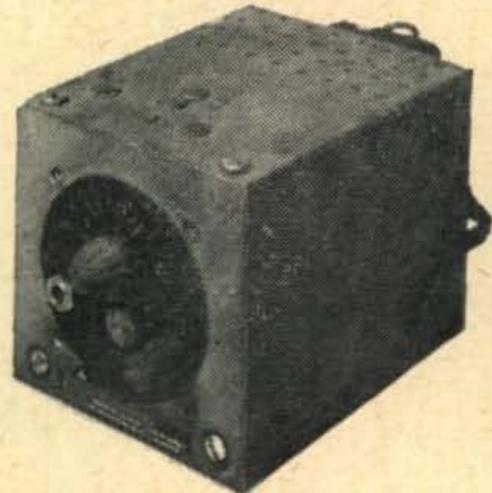
**\$12.50**



## DETROLA AIRCRAFT RECEIVER

28 V. DC operated  
200-400 Kc. Good condition.

**\$3.75**

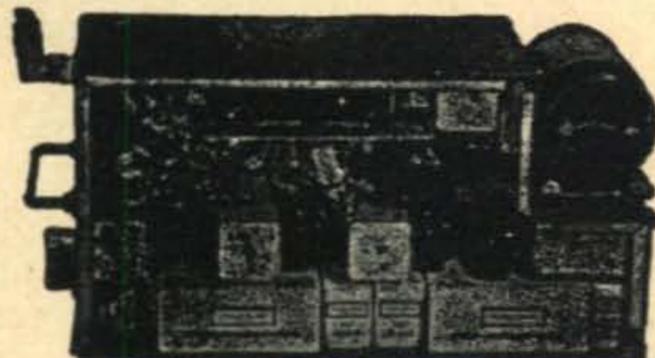


## BC-733D LOCALIZER RECEIVER

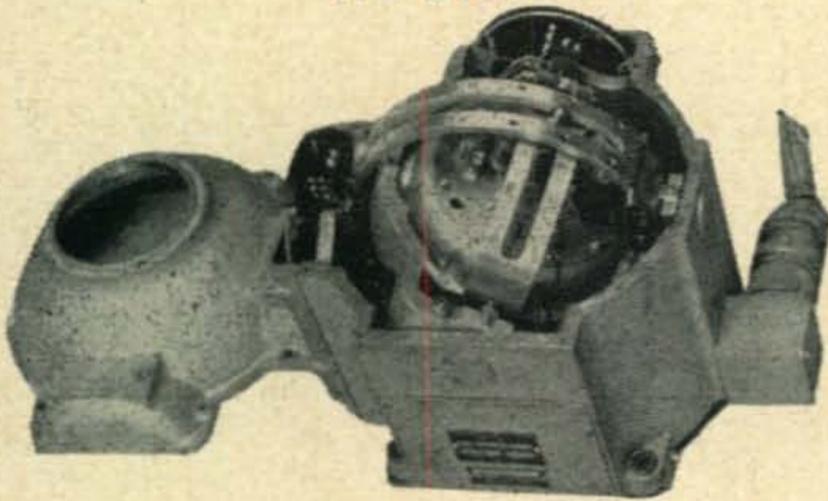
A part of aircraft blind landing equipment. Operates on any six of its predetermined crystal controlled frequencies in the range of 108120 mc. Contains 10 tubes, three of which are WE-717-A's—and crystals. Ideal receiver for conversion to 144 mc. ham band or mobile telephone bands. For 24 V. DC operation. **\$5.95**

Size 14 1/2" x 7" x 4 5/8". Price with dynamotor

Price without dynamotor..... **4.95**

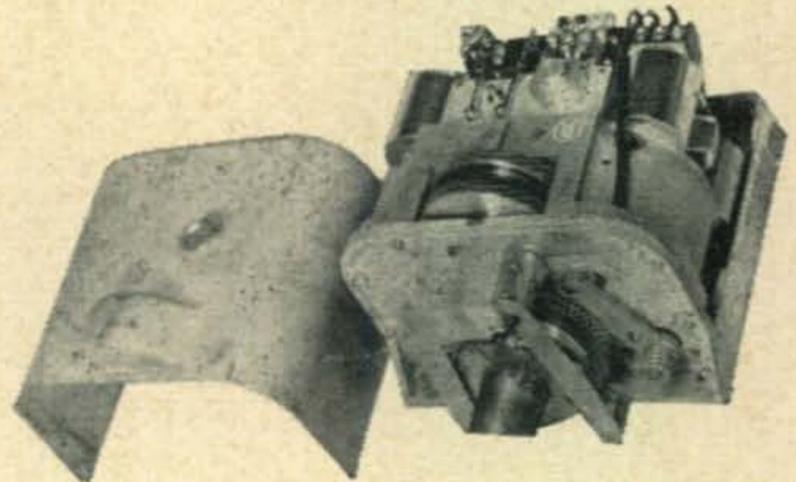


**C-1 GYRO**



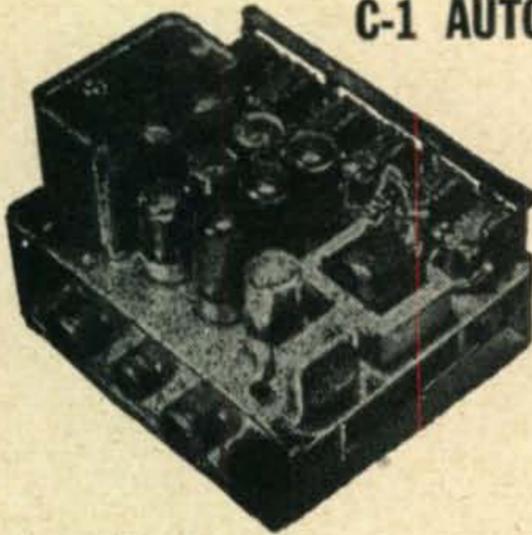
Part of the C-1 Auto Pilot which is sold separate and may be used to conduct many interesting and amusing experiments. Operates from 24 V. DC or may be operated for short periods on 110 V. AC. Gyro will run for approx. 15 minutes after actuating.  
Size—approx. 8" x 8½" x 8½"..... **\$6.95**

**C-1 SERVO UNIT**



Use to rotate beam antenna, actuate boat rudder control, etc. Contains 24 V. motor, clutch, relays, etc. Reversible. Size overall approx. 10½" x 8½" x 6½"..... **\$4.50**

**C-1 AUTO PILOT AMPLIFIER**



Used to control operation of servo unit in response to signals received from gyro unit and control unit. The complete amplifier includes one rect. 7Y4, 3—7F7's for amplification and control, 3—7N7's for signal discrimination, 1

power transformer, 6 relays, 4 control pots, chokes, condensers, etc. Convert for use on radio controlled models, doors, etc. Operates from 24 V. DC. Size, 9¼" x 6¼" x 7⅝". **\$3.50**

**C-1 AUTO PILOT CONTROL BOX**



Used for aligning control of C-1 Auto Pilot or use for parts, etc. Contains many useful pots., toggle switches, plugs, etc. Size, 11"x6"x4½"

PRICE

**\$2.00**

**ULTRA-VIOLET FLUORESCENT COCKPIT LIGHT ASSEMBLY**

Air corps type C-5, 28 V. DC operated. Black plastic case about 1½" dia. x 3" long. Has adjustable mounting flange, 3 foot two conductor shielded cord and plug. Includes bulb.

Brand new. Each..... **\$1.00**

**SCR 274N COMMAND SET OR BC-348 POWER SUPPLY**

To convert the BC-348 receiver for 110 V. AC operation. Constructed especially for the Esse Radio Company by a leading transformer company.

These power supplies have gained great popularity due to quality, price and simplicity in conversion. Filament supply 24 V. Rectifier tube used: 6x5 (not included). Price..... **\$5.95**

**RECEIVER TUNING HEAD CRV-23253**

Used with CRV-46151 Receiver for vernier tuning. Has beveled dial with hairline cursor. Bands are 200-560, 560-1600, 1600-4450, 4450-9050 Kcs. Each band spread over about 280 degrees of dial edge. Has provision for flexible tuning shaft or can be adapted for direct drive on any tuning shaft. Black crackle finish. Size 5" x 3" x 2" over-all. Brand new. Price..... **\$1.50** ea.

**PILOT'S CONTROL BOX, TYPE CRV-23254**

Used with CRV-46151 Receiver for remote control of volume, selection of any one of six frequency bands, has off/on switch or selection of C.W. and M.C.W. and M.V.C. or A.V.C. Black crackle finish. Size, 2" x 2½" x 5" high. Brand new. Price..... **\$1.50** ea.

**OXYGEN TANKS 500-LB. PRESSURE**

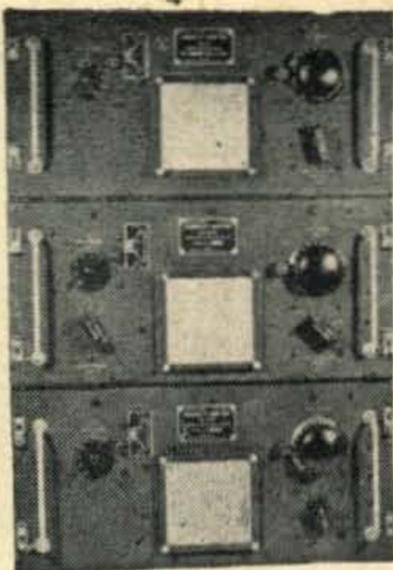
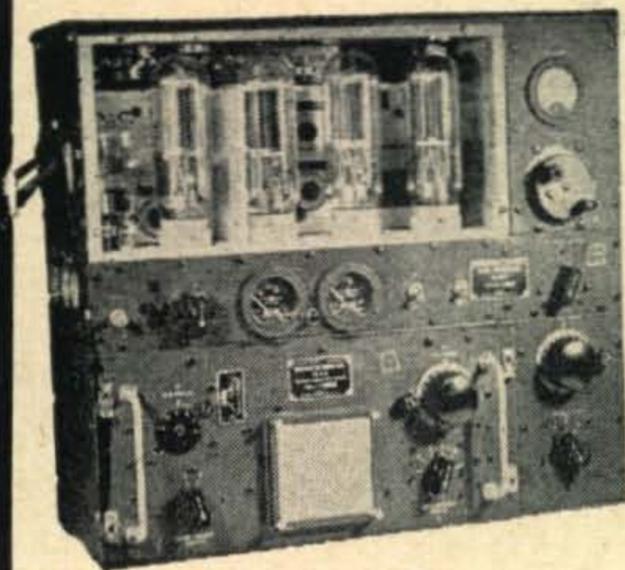
Aviators oxygen breathing bottles. Non-shatterable. Ideal to use for air tank on air horns, paint sprayers pneumatic tools. Excellent condition. **\$2.50**

**ARMY PHONES, LOW IMPEDANCE**

Used. With short cord and plug PL-354 and cushions. Price ..... **\$2.50**

**JACK BOX BC631-B.**

Aluminum case size 2½"x4"x2". With 10,000 ohm potentiometer, 1,000 ohm resistor, 3 grommets in cable holes and Jones barrier connector strip with six wire connections. Brand new. Price ..... **\$ .50**



**BC-375 GE MOPA TRANSMITTER**

The most famous of all surplus transmitters. Was used by the Army bombers and ground stations during the War. Frequency range is covered by means of plug-in tuning units as shown below. Each tuning unit has its own oscillator and power amplifier coils and condensers, and antenna tuning circuits all designed to operate at top efficiency within its particular frequency range. Transmitter and accessories are finished in black crackle, and the milliammeter, voltmeter, and RF ammeter are mounted on the front panel. Frequency Range: 200 500 Kc and 1500-12,500 Kc. (Will operate on 10 and 20 meter band with slight modification). Oscillator self-excited, thermo-compensated, and Hand Calibrated. Power Amplifier: neutralized class "C" stage, using 211 tube, and equipped with antenna coupling circuit which matches practically any length antenna. Modulator: Class "B"—uses two 211 tubes. Power Supply: Dynamotor which furnishes 1000 V. at 350 Ma. instructions and diagram for 110 V. AC furnished upon request for .....\$1.00

**PRICES: As follows—**

- Transmitter only with all tubes.....**\$9.00**
- Tuning units TU-6B, TU-7B, TU-8B, TU-9B,  
TU-10B, TU-26B, choice..... **1.50**
- Dynamotor PE-73C ..... **2.95**
- Antenna tuning unit (BC-306A)..... **3.00**

**CABLE CONNECTORS AND PLUGS**

Choice .25 — All Brand New

Manufacturer	Type	Price
Amphenol	AN3101-16-10P	25c each
Amphenol	AN3101-18-18S	25c each
Amphenol	AN3101-22-5S	25c each
Amphenol	AN3102-22-15P	25c each
Amphenol	AN3102-28-10P	25c each
Amphenol	AN3102-32-5P	25c each
Amphenol	AN3106-18-11S	25c each
Amphenol	AN3106-18-18P	25c each
Amphenol	AN3106-24-6S	25c each
Amphenol	AN3106-24-7P	25c each
Amphenol	AN3106-32-5S	25c each
Harwood	AN3108-14S-	25c each
Aero	AN3108-14S-2S	25c each
Cannon	AN3108-14S-2S	25c each
Amphenol	AN3108-14S-2S	25c each
Amphenol	AN3108-18-12P	25c each
Amphenol	AN3108-22-5S	25c each
Cannon	AN3108-22-5S	25c each
Amphenol	AN3108-24-6P	25c each
Amphenol	AN3108-24-16S	25c each
Cannon	AN3108-24-16S	25c each
Amphenol	AN3108-32-5P	25c each
Amphenol	AN3108-28-10P	25c each

\*Assortment of 100.....**PRICE \$12.00**



**ATTENTION AIRLINES!  
BC-348 COMMUNICATIONS  
RECEIVER**

6 bands, 200-500 Kc and 1.5-18 Mc. 2 stages RF, 3 stages IF, BFO, crystal filter, manual or AVC. Complete with tubes and 24 V. dynamotor. These receivers have been thoroughly checked in our work-shop and found in excellent condition. ....**\$100.00**



**AN/PRS-1 MINE DETECTOR**

The detector is designed to detect metals, non-uniformities (rocks, tree-roots) and may be used to detect metal buried in logs, to locate cables, pipes, sewer tile and etc. It is widely used by lumber camps, miners, prospectors, plumbers, treasure hunters and explorers.

A portable device used in the detection of both metallic and non-metallic by oral (ear) and visual (eye) means. These are brand new outfits, complete with instruction book and spare tubes. Shipped in original overseas moisture-proof container.

The set consists of the detector head with antenna and reflector meter, a meter housing and lower section of exploring rod, amplifier assembly, exploring rod extension, bag designed to carry equipment while operating, and wooden case for storing or transporting the complete unit when not in use.

Shipping weight, 125 lbs. Weight in operation only 22 lbs.

Batteries are not included but we can supply them for \$8.25 per set. **\$14.95**  
PRICE, BRAND NEW .....

**ARGON BULBS**

2 watt, 110 V., Edison base. Ideal for R.F. indication, night light. Brand new. Box of ten.

Price, per box..... **\$1.25**

**WESTINGHOUSE RECTIGON  
BATTERY CHARGER BULB**

Style 289416, 6 ampere rating. For replacement in most chargers or for building power supply to use on D.C. operated equipment. Brand new.

Price ..... **\$1.00** ea.

**ATTENTION ALL HAMS AND SERVICEMEN**

HEWLETT-PACKARD MODEL 100-B Low Frequency Standard. Supplies standard frequencies of 100, 1000, 10,000, or 100,000 CPS, available simultaneously. Has temperature control. Accuracy .01%. Output 5 V. to an impedance of 500 ohms. 110 V. 60 cycle operated. Size 19" x 10½" x 12". Gray crackle finish panel and oak cabinet. Complete with instruction manual. Although this unit is the same as brand new and net price is **\$295.00** approximately \$500.00. Price—

WESTON DECIBEL METER — Range (minus 6 to plus 46 Db.; output volts to 1200, 4,000 ohms per volt). Rectifier type 3½" meter. Metal case. 8" x 10" x 10". **\$50.00** Like new condition. A steal.....

BC-338A RADIO TRANSMITTER. Four crystal controlled channels, 3000-8000 Kc. Uses 5 type 807 tubes and 1 type 837 tube. Made by Westinghouse. Voice and CW transmission. Size 14" x 11" x 20". **\$50.00** Excellent condition. Price—

TYPE H-690BR DAVEN ATTENUATION NETWORK. This beautiful instrument has plug-in networks for 500/500, 300/500, 600/3000 ohms furnished. Input attenuation up to 100 times — output to 10 times. Size 3" x 19" rack mountings x 6" deep with dust cover. With manual and like new. **\$49.50** Price—

MODEL 530 REINER SQUARE WAVE GENERATOR. Size 8" x 16" x 8". 110 V. 60 cycle. Frequency range 10 to 100, 100 to 1000, 1 Kc. to 10 Kc., 10 Kc. to 100 Kc. Output voltage variable zero to 20 V. Output impedance zero—2000 and 100—2000 ohms. Another like new instrument **\$42.50** with manual. Price—

BC-342N RECEIVER. A Farnsworth surplus special. Covers 1500 to 18,000 Kc. Crystal filter. 110 V. 60 cycle operated. Complete with 9 tubes with 2 RF stages, mounting rack, manual. With matching LS-3 speaker. **\$80.00** Cannot be told from new. Price—

OP-961 DAVEN POWER OUTPUT METER. Meter has 1 Mw reference. Range minus 10 to plus 30 decibels and 40 different impedance ranges. Size 6" x 7" x 12". Net price anywhere \$110. Instruction manual.

Cannot be told from new. **\$50.00**  
Our Price—

MEISSNER SIGNAL SHIFTER, MODEL E-X. Factory wired for 80 and 40 meter output. In cabinet with all tubes, power supply and manual. Like new. Regular **\$60.00** net price \$99.50. Our Price—

STROMBERG-CARLSON AMPLIFIER MODEL AU-34. Probably is new. 25 watts of audio power output. Microphone and phonograph inputs. Variable treble control. Multiple output transformer taps. Tubes included are 6SJ7, 6SF5, 6N7, two 6L6G and 5U4G. Complete with manual. Size 9"x9"x13½". Weight 20 lbs. 110 V. 60 cycle input. Frequency response 50—10,000 CPS. **\$50.00**

Esse's bargain—

McMURDO SILVER MODEL 905-A "Sparx" SIGNAL TRACER and Universal speaker. 110 V. 60 cycle operated. Net price anywhere in country \$44.50. Like **\$32.50** New. With manual. Our Price—

DAVEN OUTPUT METER. Type D-180, Rectifier type, 10,000 or 20,000 ohms per volt. Range 2, 10, 20, 40, 100 and 200 volts. Size 3" x 4" x 9". Complete with manual. **\$25.00** A beauty at.....

BC-610-E HALLICRAFTERS HT-4 TRANSMITTER. 110 V. 60 cycle input. Factory converted for 10 meters. With tubes and BC-614-E speech amplifier unit. Has tuning units TU-49 (3.2-4 Mc.), TU-52 (6.35-8 Mc.) and TU-54 (12-18 Mc.); also plug-in coils 2-3.5 Mc., 3.5-4.5 Mc., 5.7-8 Mc., 14-18 Mc. and 27.5-30 Mc. Complete with calibration chart. A beautiful unit that appears the same as new. **\$550.00**

Extra special price—

MODEL 805 McMURDO SILVER 100 Kc. I.F. AMPLIFIER, "Q5'er". With **\$20.00** tubes. Slightly used. Price—

**ATTENTION ALL HAMS AND SERVICEMEN**

MODEL 3256 TRIPLET FREQUENCY METER. Covers amateur bands 80, 40, 20, 15 and 10 meters and frequencies between amateur bands. Visual check of harmonics, parasitic, R.F. amplifier neutralizing, standing wave ratio, etc., plus phone monitor features. Net price elsewhere \$15.92.

Our Price— **\$10.00**

SUPERIOR MODEL CA-11 SIGNAL TRACER, with probe. Wooden case and lid. 5" x 6½" x 7". Net price elsewhere \$18.35.

Our Price— **\$12.50**

INDUCTANCE BRIDGE TYPE 667-A, made by General Radio Company. A very splendid new instrument that covers a range from one-tenth microhenry to one henry. Accuracy of plus or minus .2%. In walnut case size 16" x 18" x 7½". Complete with manual. Never been used. Priced elsewhere at \$525.00.

Our Price— **\$300.00**

ATR DC to AC CONVERTER, TYPE 110B. Model 1HO. Input 110 V. DC, output 110 V. AC, 50-60 cycle, capacity 500 watts. Size 8" x 6" x 10". Brand new.

At our store— **\$29.00**

ELECTRONIC LABORATORIES CONVERTER MODEL 907. Input 115 V. AC, Output 115 V. DC, wattage 200 maximum. Size 6½" x 7" x 12". Brand new.

Our Price— **\$29.00**

SPECIAL ATTENTION ALL HAMS BC-348 CONVERTED TO 110 V. 60 cycle AC operated. Almost all models such as Q, J, R, P, etc. available, (very little difference, one from the other). Complete ready to go except for speaker.

Our Price— **\$90.00**

POWER SUPPLY RA87. For telegraph printer unit and motors. Input 95-125 V. or 190-250 V. 60 cycle AC., 600 watts rating. Output is 115 V. DC 400 Ma. and also 115 V. AC at 4.35 amps. Weight 39 lbs. Size 8" x 14" x 8".

Price— **\$29.50**

ADAPT TO 160 METERS.

Command set type transmitter/VFO. Covering 2.1 to 3 Mc. Easily adapted to 160 meter band. With tubes and crystal.

Price— **\$15.00**

HOUSEPAINT

GOVERNMENT SURPLUS PAINT that cost the Government \$2.90 per gallon in million gallon lots. Use on any surface. Quality is excellent. Pails are rusty. A tremendous bargain. 5 gal.

price, field drab color..... **\$7.50**

AC LINE CORD. Underwriters Laboratories approved. Standard rubber male plug on one end. Cord is 6 ft. long. Suitable for extensions, appliances, etc.

Price— **25c** ea.

VT127A TUBES, made by Eimac. 100 watts plate dissipation, 3,000 maximum plate volts, 15.5 amplification factor, 6 watts grid drive. Maximum frequency at full rating 150 Mc. Similar tube to 100TL characteristics. See "QST" November 1946, page 33, for data. Brand new and cartoned.

Price— **\$1.75** ea.

DYNAMOTOR PE-101-C

For use with BC-645 Transceiver. Delivers a required 400 V. at .135 amps. and 800 V. at .02 amps. DC and 9 V. at 1.12 amps. 80 cycles for either mobile or fixed station use. Brand New.

Price— **\$5.95** ea.

RANGE FILTER FL-5C. Size 3½" x 2¾" x 4". Less plugs and switch. Easily installed in receiver, speaker case, table top or wall. Accepts 1020 CPS rejecting unwanted signals, or accepts voice and rejects other signals. Brand new.

Price— **\$1.60** ea.

ANTENNA CONTROL BC-1285

Size 3" x 6" x 9". Contains potentiometer, 28 V. DC relay, sensitive relay, DPDT toggle switch, condenser and resistor, shock mounts, and is enclosed in black crackle case.

Price— **\$1.25** ea.

**BATTERIES** Government Surplus, Unused but Outdated

BA-39	Size 3½" x 6½" x 7½"	6 V. and 150 V.	\$1.75
BA-70	" 4½" x 10¼" x 8"	4½ V. and 60 V. and 90 V.	2.50
BA-40	" 4" x 5" x 7½"	90 V. and 1½ V.	1.25
BA-36	" 2½" x 4" x 5½"	22½ V. and 45 V.	1.25
BA-80	" 4½" x 10½" x 5"	4½ V., 60 V., and 90 V.	2.50
BA-203U	" 2¾" x 4" x 5¼"	6 V.	.75
BA-200U	" 2¾" x 2¾" x 4"	6 V.	.75
BA-220U	" 2¼" x 8" x 5"	1½ V. and 90 V.	1.25

**GRINDING WHEELS**

or Emery Wheels  
Kit of 6 grinding wheels. Brand new. Various types of abrasives to attach to drill press, hand drill or bench grinder. Diameters from 2 inches to 4 inches with flat and bevelled edges. Standard thread shaft holes. At retail price, \$15.00. at our surplus price ..... **\$2.00**

**KIT of 25 TERMINAL STRIPS**

Heavy duty type. Bakelite insulation with hardware attached. For radio, electrical and intercom power supply application. 1, 2, 3, 5, 7, 9 and 11 lugs. Brand new. Price **\$1.75**

**PANEL-KNOB ASSORTMENT**

30 panel knobs of various sizes and colors. Standard shafts. Packaged in wooden parts tray. Size 6½" x 7½" x 2¼", having 5 dividing compartments. Price— **\$1.50**

**RELAY ASSORTMENT**

Assortment of 16 relays, many varieties, operating on 110 V. 60 cycle and 24 V. DC. Contact ratings up to 10 amps. Pole arrangements are SPST, SPDT, DPST, DPDT. Also normally open and normally closed types. Price— **\$7.50**

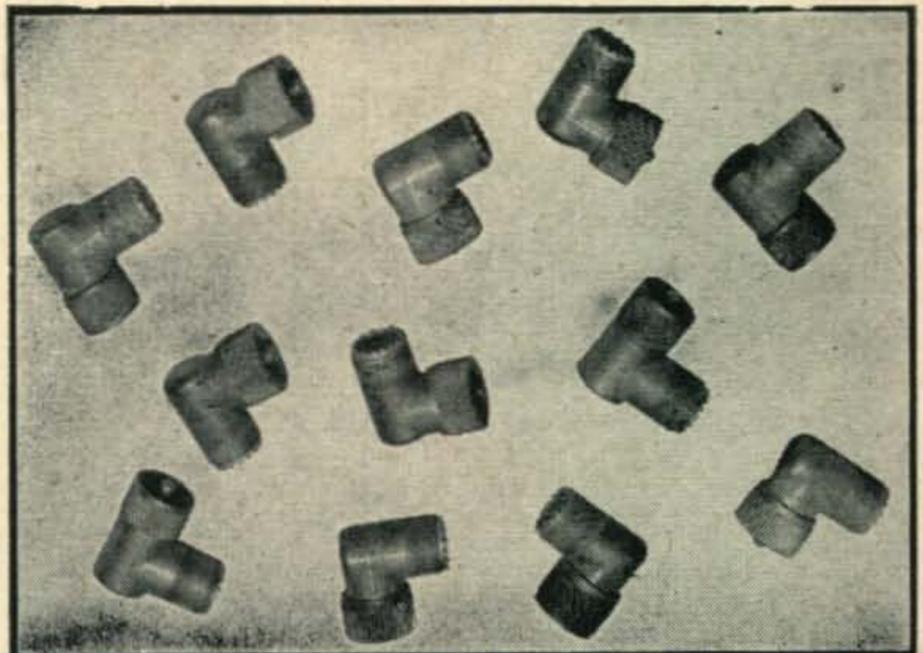
If after receiving this assortment, you are not satisfied, return them and only be out the postage. We know this is a magnificent buy.

**PORCELAIN INSULATOR ASSORTMENT**

30 Porcelain insulator units such as threaded, square, tubular and oblong shapes, stand-off insulators, antenna purposes, feed-through types, for transformers, and a variety of uses. Packed in handy wooden parts tray **\$1.25**  
5 compartments. per box—

**HI-IMPEDANCE ARMY HEADPHONES**  
With 5 ft. cord and phone tips. Used. Price— **\$1.50**

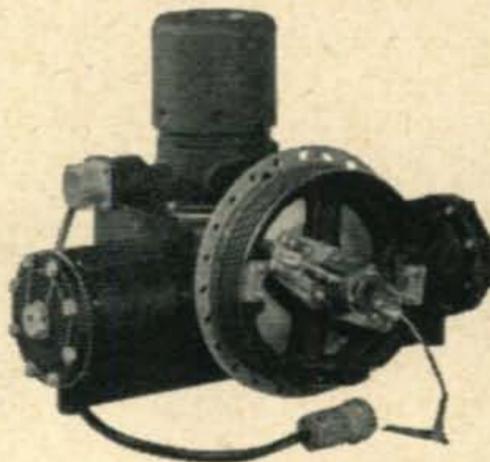
**HEADPHONE EXTENSION CORDS**  
With PL-55 and JK-26. Average length 5 ft. Used. Price— **\$.50**



**AMPHENOL LOW-LOSS UHF CONNECTOR for RG TYPE CABLE.**

AMPHENOL LOW-LOSS UHF CONNECTOR for RG type cable. Rugged construction, heavily silver plated, provides easy assembly and positive connection. Type 83-1AP Angle Plug Adapter polystyrene insert, pin and socket — very special..... **\$12.00** per 100  
PHILLIPS type cross point screwdriver. Total length 6¾" with 3" blade and wooden handle. Price— **\$12.00** per 100

**A-5 AUTOMATIC PILOT SERVO M1**



Made by Delco-Remy  
Has ¼ horsepower shunt type DC motor, 27.5 V. 11 amps. input, speed 6000 rpm. Has hydraulic lift— (Intended use—Hydraulic lift actuates Ailerons on airplane). Overall length 16", width 12", height 11". Net weight 28 lbs. Shipping weight 35 lbs. Hardware for cable drum included. Brand new in original packing boxes. **\$7.00**

**AUTOMATIC DIRECTION FINDER RADIO COMPASS SCR-269-G**

Brand New in Original Crates Made by Bendix  
Complete, a truly magnificent buy for airplane owners or boat owners. **\$100.00**

ESSE RADIO CO.

**ESSE WILL BUY**

INDIANAPOLIS,  
INDIANA

**AGAIN ESSE REPEATS THIS ADVERTISEMENT  
ATTENTION FACTORIES, HAMS, DEALERS,  
INDIVIDUALS — JUST ANYBODY . . .**

Some of the equipment listed below is urgently needed by our company to meet the demands of customers and we will pay the highest cash prices.

Send letter with full description describing condition and quote price. We will immediately answer and if we can use your equipment, we will authorize you to send it to us COD.

Our prices will amaze you. We will perhaps pay you quite a bit more for some of the below listed equipment than what you paid for it. Please don't hesitate to write us immediately.

**WE NEED AT ONCE**

BC-348 Receivers, AC or DC models  
BC-312 Receivers  
BC-221 Frequency Meters  
Telrad Frequency Standards  
SCR-522 transmitters & receivers  
APN-4 Radar Scopes  
Hallicrafters BC-610 Transmitters  
Any factory built transmitters and receivers such as Hallicrafters, National, Temco, Collins, RCA, RME, Hammerlund, Millen, Meck, Harvey-Wells, Meissner, Sonar, McMurdo-Silver, Gonset, Stancor, Bud, etc.

Amateur or commercial sets  
Public address systems & equipment  
Large stocks of tubes  
Large stocks of transformers  
Large stocks of condensers  
Large stocks of resistors  
Large stocks of speakers

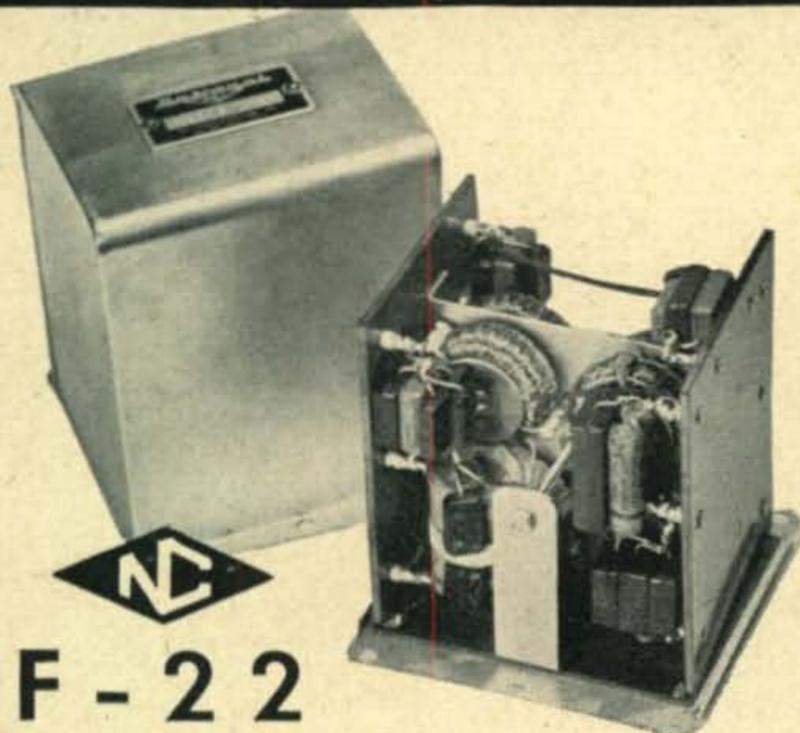
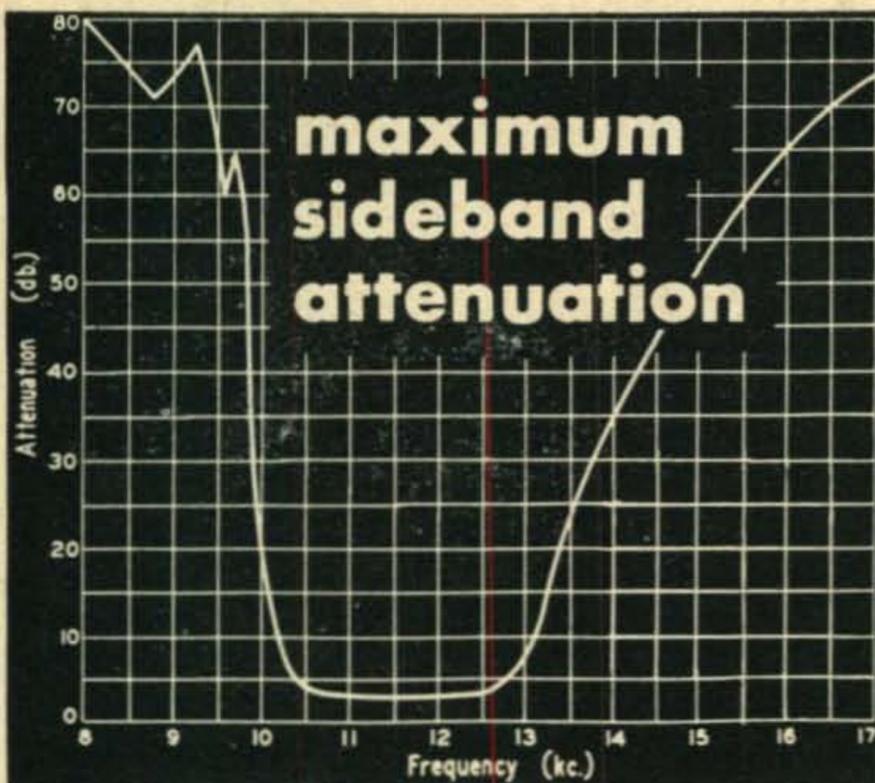
**We are especially interested in any factories, dealers or other outlets giving us a list of surplus electronic equipment that is for sale so that we may submit our bid.**

BC-224 Receivers  
BC-342 Receivers  
BC-412 Radar Oscilloscopes  
BC-645 Transmitter-receivers  
Command Set Transmitters & Receivers  
TBY Transceivers  
PE-103A dynamotors  
BC-1068A Receivers  
Police type VHF transmitters and receivers for mobile application  
Propellor pitch motors  
Collins ART-13 Transmitters  
APS-13's  
SCR-269F or G Fairchild or Bendix ADF's  
Headphones in quantity lots  
Microphones in quantity lots  
Field telephones  
Sound-powered telephones



*Radio Co*  
130 W. New York St.  
Indianapolis 4, Ind.

Unless Otherwise Stated. All of  
This Equipment Is Sold As Used  
**CASH REQUIRED**  
WITH ALL ORDERS  
Orders Shipped F O B Collect



**F - 2 2  
F I L T E R**

The F-22 filter has been especially designed for maximum sideband attenuation. Careful selection of capacitors and coil adjustment make the F-22 filter ideal for use in The Single Sider unit as described by C. F. Bane, W6WB, in the May issue of CQ (p. 13).

**\$59.40**

(See your National dealer or write to)



such license and not later than one year from the date of expiration, and the following renewal requirements shall be fulfilled as appropriate for the class of license:

**Amateur Extra Class.**—The application shall include a statement, subject to proof upon request, that the applicant has accumulated a minimum of 50 hours of lawful operation during the entire term of and under the license being renewed or a minimum of 10 hours of such operation during the last 6 months immediately preceding the date of application, and that he can send by hand key and receive by ear, in plain language, messages in the International Morse Code at a speed of not less than 20 words-per-minute in the manner described in Section 12.42, Element 1 (E) of the rules.

**Advanced Class (Class A).**—After December 31, 1950 may not be renewed, as Advanced Class (or Class A), but may be renewed as General Class upon application which includes a statement, subject to proof upon request, that the applicant has accumulated a minimum of 50 hours of lawful operation during the entire term of and under the license being renewed, or a minimum of 10 hours of such operation during the last 6 months immediately preceding the date of application, and that he can send by hand key and receive by ear, in plain language, messages in the International Morse Code at a speed of not less than 13 words-per-minute in the manner described in Section 12.42, Element 1 of these rules.

**General Class (Class B).**—The application shall include a statement, subject to proof upon request, that the applicant has accumulated a minimum of 50 hours of lawful operation during the entire term of and under the license being renewed, or a minimum of 10 hours of such operation during the last 6 months immediately preceding the date of application, and that he can send by hand key and receive by ear, in plain language, messages in the International Morse Code at a speed of not less than 13 words-per-minute in the manner described in Section 12.42, Element 1 of these rules.

**Conditional Class (Class C).**—The application shall include a statement, subject to proof upon request, that the applicant has accumulated a minimum of 50 hours of lawful operation during the entire term of and under the license being renewed, or a minimum of 10 hours of such operation during the last 6 months immediately preceding the date of application, and that he can send by hand key and receive by ear, in plain language, messages in the International Morse Code at a speed of not less than 13 words-per-minute in the manner described in Section 12.42, Element 1 of these rules.

**Technician Class.**—The application shall include a statement, subject to proof upon request, that the applicant has accumulated a minimum of 50 hours of lawful operation during the entire term of and under the license being renewed, or minimum of 10 hours of lawful operation during the last 6 months immediately preceding the date of application, and that he can send by hand key and receive by ear in plain language, messages in the International Morse Code at a speed of not less than 5 words-per-minute in the manner described in Section 12.42, Element 1 (NT).

**Novice Class.**—This class of operator license may not be renewed.

Substitute the following text for the present text of Section 12.29, License term:

12.29 License term.—Amateur operator licenses are normally valid for a period of 5 years from the date of issuance of a new or renewed license, except the Novice Class which is normally valid for a period of 1 year from the date of issuance. Modified and duplicate licenses shall bear the same date of expiration as the licenses for which they are modifications or duplicates.

Substitute the following text for the present text of Section 12.42, Elements of examination:

12.42 Elements of examination.—The examinations for the various classes of amateur operating privileges comprise combinations of various of the following elements:

**Element 1, Code test.**—Ability to send by hand key and receive by ear, in plain language, messages in the International Morse Code at a speed of not less than 13 words-per-minute, free of omission or other error for a continuous period of at least 1 minute, during a test period of 5 minutes, counting five characters to the word, each numeral or punctuation mark counting as two characters. (Advanced Class, General Class and Conditional Class (Classes A, B, and C).)

**Element 1 (E), Code test.**—Ability to send by hand key and receive by ear, in plain language, messages in the International Morse Code at a speed of not less than 20 words-per-minute, free of omission or other error for a continuous period of at least 1 minute, during a test period of 5 minutes, counting five characters to the word, each numeral or punctuation mark counting as two charac-

# YOUR DOLLAR IS WORTH MORE AT WRL!

Deal With "The World's Most Personalized Radio Supply House"

## SPECIALS

WRITE FOR OUR BIG LIST OF SPECIALS!

New 5.3 — 7 MC Arc 5 (BC458A) XMTR. . . . . 6.95  
 New BC-456 Modulator (for phone) . . . . . 2.95

### OIL FILLED CONDENSERS

1MFD — 1500V — 49c	1MFD — 5000V — 2.95
.5 — 2000V — 95c	1MFD — 2000V — 1.55
.25 — 2500V — 95c	2 x 1MFD — 3000V — 3.95
4MFD — 600V — 59c	8MFD — 1500V — 1.95

### TRANSFORMERS

Completely Shielded

6.3 @ 6 amp. 2.49      6.3 @ 3 amp. 1.75  
 24V @ 10 amp. 4.95

### TRANSMITTING TUBES

All TUBES Listed Below Brand New In Cartons

810 — 6.95	815 — 2.95	872A — 1.95
VT-127A — 2.95	807 — 1.35	1625 — 59c
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### WRL BEAM TUBING

Comes in 12' Lengths

Seamless ALUMINUM 24 St. Tubing

1" O.D. — 3.90	7/8" O.D. — 3.57	3/4" O.D. — 3.29
5/8" O.D. — 2.98	1/2" O.D. — 2.40	3/8" O.D. — 1.62

Above tubing will telescope into the next size

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Save up to 75% In FT-234 Holders — you name the frequency — we will hit it or come darn close!

#### FREQUENCY RANGES

3500 to 4000 KC - 79c ea.	14.0 to 14.4 MC - 1.19 ea.
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New 160 Meter Crystals in FT-243 Holders.

All Frequencies . . . . . 98c each



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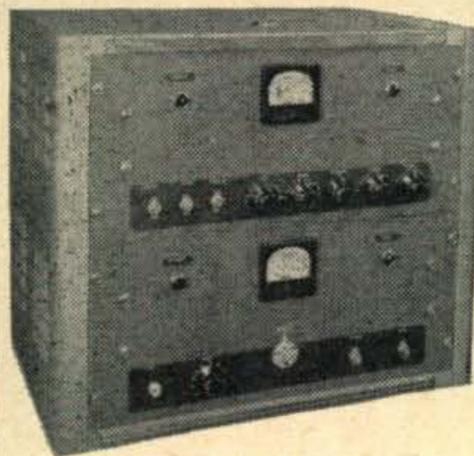


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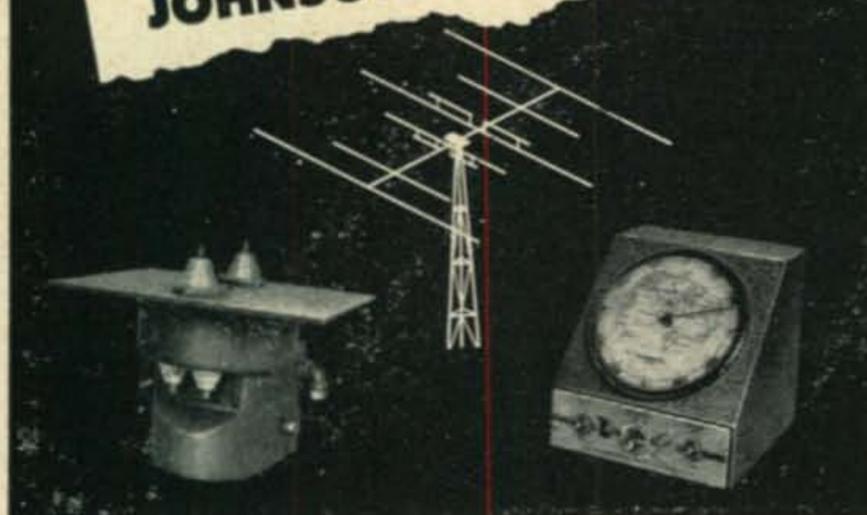
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# The ULTIMATE in BEAMS

the new *universal*  
**JOHNSON ROTOMATIC**



Every desirable feature has been incorporated in the new JOHNSON Rotomatic plus the new JOHNSON Phased Array, a unidirectional beam employing driven elements. Elements are also available for conventional parasitic beams. Both arrays are furnished in two and three element beams for 10, 14 or 20 meter bands.

## DUAL BAND OPERATION

DeLuxe Models of the above arrays are available for two band operation, employing two separate sets of elements but only one transmission line.

## NEW JOHNSON PHASED ARRAY

The new JOHNSON Phased Array is the result of a search for an antenna with gain and front to back ratio equal or better than the conventional parasitic array, which could be erected and tuned without the usual laborious adjusting required by past beams. Due to symmetrical construction, the tuning is simple, the performance is excellent.

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When you see it you will realize it's in a class by itself! New, unique design allows an infinite variety of element lengths and spacing. Perfect impedance matching on two bands—any impedance from 50 to 600 ohms—with the same transmission line.

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The elements, rotator, direction indicator, etc., may all be purchased separately.

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# JOHNSON

E. F. JOHNSON CO.

WASECA, MINN.

ters. (Amateur Extra Class).

Element 1(NT). Code test.—Ability to send by hand key and receive by ear, messages in plain language in the International Morse Code at a speed of not less than 5 words-per-minute (each character formed at a speed of 7.8 words-per-minute, but with increased spacing between character and words so as to result in an overall speed of 5 words-per-minute). (Novice and Technician Classes.)

Element 2. Amateur radio operation and apparatus including telephone and telegraph. (Amateur Extra Class, Conditional Class (Classes A, B, and C), and Technician Class).

Element 3. Provisions of treaties, statutes and regulations affecting amateurs. (Amateur Extra Class, Advanced Class, General Class, Conditional Class (Classes A, B, and C), and Technician Class).

Element 3(N). Rules and regulations essential to beginners' operation including sufficient elementary radio theory for the understanding of these rules. (Novice Class)

Element 4. Advanced amateur telephony. (Amateur Extra Class and Advanced Class (Class A)).

Element 4(E). Advanced amateur radio theory including techniques for operating within bands designated for narrow bandwidths of emissions. (Amateur Extra Class)

Substitute the following text for the present text of Section 12.43, Elements required for various privileges:

12.43 Elements required for amateur operator license examinations:

Amateur Extra Class.—Examination consists of elements 1(E), 2, 3, 4, and 4(E).

Advanced Class (Class A).—Examination consists of elements 1, 2, 3, and 4.

General Class and Conditional Class (Classes B and C).—Examination consists of elements 1, 2, and 3.

Technician Class.—Examination consists of elements 1(NT), 2, and 3.

Novice Class.—Examination consists of elements 1(NT), and 3(N).

Substitute the following text for the present text of the first paragraph of Section 12.44, Manner of conducting examinations:

12.44 Manner of conducting examinations.—The examinations for all amateur classes of operator licenses except the Conditional and Novice Classes will be conducted by an authorized Commission employee or representative at locations and times specified by the Commission.

Substitute the following text for the present text of the first paragraph of Section 12.46, Examination credit:

12.46 Examination credit.—An applicant holding a valid amateur operator license, other than the Conditional Class (Class C) or Novice Class, applying for a higher class of amateur operator license will be required to pass only those elements of the examination that were not included in the examination for the presently-held amateur license.

An applicant for Amateur Advanced Class (Class A) operator license will be given credit for examination element 4 if within 2 years prior to the receipt of his application by the Commission he held Class A privileges.

An applicant for any class of amateur operator license, except the Novice Class and the Extra Class, will be given credit for examination element 1 or 1(NT) if within 5 years prior to the receipt of his application by the Commission he held a radiotelegraph first or second class operator license. An applicant for the Amateur Extra Class operator license will be given credit for examination element 1(E) if within 5 years prior to the receipt of his application by the Commission he held a radiotelegraph first class operator license.

No examination credit, except as above provided, shall be allowed on the basis of holding or having held any amateur or commercial operator license.

A holder of an amateur Conditional (Class C) or Novice operator license will not thereby be accorded an abridged examination for any other class of amateur operator license.

Substitute the following text for the present text of Section 12.65, License period:

12.65 License period.—The license for an amateur station is normally valid for a period of 5 years from the date of issuance of a new or renewed license, except that an amateur station license issued to the holder of a Novice Class amateur operator license is normally valid for a period of 1 year from date of issuance. Modified or duplicate licenses shall bear the same issue date and expiration date as the licenses for which they are modifications or duplicates.

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Suitable for 400 mc citizen band, ideal for UHF experimenters. With director and reflector elements mounted. BRAND NEW. 2 for ..... \$1.49

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FM transmitter-receiver, crystal controlled, two channels, freq. range 20-27.9 mc. 13 tubes, dual meter for testing filament and plate circuits. Used, good..... \$9.95

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Ideal substitute for SCR-522, freq. range 140-144 mc, crystal controlled, 10 watts. The receiver section has two individual RF sections, feeding a common 3 stage 10mc IF amplifier. Both RF sections may be operated simultaneously, or either one individually. The receiver unit has 13 tubes. The transmitter is of straightforward design. Transmitter unit has 7 tubes, one No. 832 as final modulated by a pair of 6L6 and push-pull. Complete unit in case with tubes, crystals and diagram less dynamotor. EXCELLENT CONDITION..... \$14.95

New Phantom Antenna for above unit: 3 lamps in parallel with sockets, complete for..... 95c

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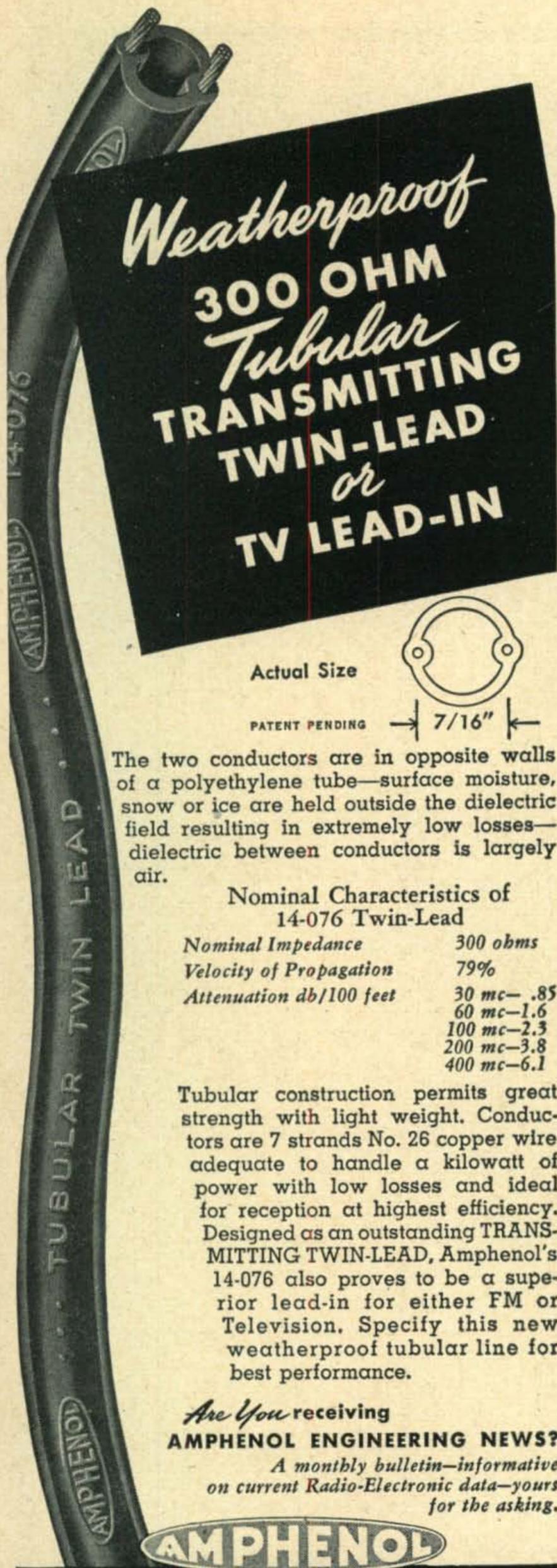
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**TWIN-LEAD**  
*or*  
**TV LEAD-IN**

Actual Size



PATENT PENDING

7/16"

The two conductors are in opposite walls of a polyethylene tube—surface moisture, snow or ice are held outside the dielectric field resulting in extremely low losses—dielectric between conductors is largely air.

**Nominal Characteristics of 14-076 Twin-Lead**

Nominal Impedance	300 ohms
Velocity of Propagation	79%
Attenuation db/100 feet	30 mc— .85 60 mc—1.6 100 mc—2.3 200 mc—3.8 400 mc—6.1

Tubular construction permits great strength with light weight. Conductors are 7 strands No. 26 copper wire adequate to handle a kilowatt of power with low losses and ideal for reception at highest efficiency. Designed as an outstanding TRANSMITTING TWIN-LEAD, Amphenol's 14-076 also proves to be a superior lead-in for either FM or Television. Specify this new weatherproof tubular line for best performance.

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Insert the following text of new Section 12.107, Round table operations:

12.107 Round table operations.—Whenever more than two amateur stations are in communication with each other one of them shall act as control station in the interest of orderly communication procedure.

**V.H.F. — U.H.F.**

(from page 42)

WØTKX in Minneapolis says that an ingenious inspiration is for all the 50-mc W.A.S. stations to work above 51 mc, which would open a new spectrum and give the other lads a chance to pick up a new State. While this may seem funny to some, it actually is pathetic how few of the gang ever tune above 50.5 mc. So how about this summer calling a few CQs, tuning from the high end down? Someone could be made happy by your doing this.

In Wyoming W7JRG says that his old cholera shots must be bothering him—or is it his dog chains rattling—for he is plenty teed off at these guys of the 6-meter band who always say "I QSL 100%," but no card is ever received, the majority of the offenders being well-known v.h.f. operators. Keep calm, Ken, maybe some day—.

W4IUJ worked OA4AE on March 26 for the third year in a row. Yes, just think that three years ago a 50-mc contact outside of the U.S. was unheard of, and seemed an unlikely possibility. Glenn, W4IUJ, has a new 16-element 50-mc beam. It is an H with a set of directors and reflectors on each half-wave element stacked one-half wave apart. It seems to really pack a wallop, for only 15 watts was used during his contact with OA4AE, yet W4IUJ was over an S9.

In Columbus, Ohio, W8UZ is still plugging away on 50 mc. He now has a new cascade pre-amp ahead of his VHF-152A, which raises the signal 3 S units and lowers the noise compared to the old 6J6 cathode follower.

A "Virginia ham," W4LVA has had his ticket but two years and is on 50-144 mc exclusively. The rig is an 832A with 15 watts and a 4-element beam, which at present is only 10' off the ground but will soon be raised to the top of the house to take advantage of his 370' elevation. (W4HVV take notice, all is not lost.) Local activity includes W4HVV, W3OJU, W3PCB and W3IUN.

Ed Ladd, W2IDZ, writes he is in a hurry, so just sends us a quickie that he finally worked a VE3 on aurora, probably the last W2 to work into VE3.

W8NQG says that in many areas where there are fewer hams there is more 50-mc activity than around him, although W3BGT in Pittsburgh, Pa., has put in an appearance, the distance being around 100 miles. TVI in his area does not seem to hinder operation on 50 mc; however, they do have an SWL audience of TV'ers who listens to the 6-meter gang on channel 1.

W3OJU finally got Maine on the April 7 auroral-type opening, when W1PWW was contacted, to bring Rick's total up to 39 States.

W9ALU reports that he has been hearing W9QUV pioneer operation on the newly opened 160-meter band, now that Ivan has conquered 50 mc. Hod, W9ALU, intends to put a rig there also. This might be a good band to meet on and discuss v.h.f. How about it here in the middle-west?

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**GREENLEE PUNCHES—**

- Cuts to 1/8" thick metal.
- 1/2" \$1.94
- 5/8" \$1.94
- 1" \$2.12
- 1 1/8" \$2.25
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- 1 1/2" \$2.88

We carry a complete line of all sizes of punches up to 3 1/2" diameter.

**ALUMINUM CHASSIS—**

- Heavy Duty
- 7 x 7 x 2.....94c
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1 Mfd 15000 V.D.C. Brand New. Shipping Weight 35 lbs. A Terrific Value **\$10.95**

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Completely shielded, Insulator Terminals. Primary: 115 Volts 60 cycle @ 500 Ma. Secondaries

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Special **\$1.95**

**SELSYN MOTORS**

115 V.A.C. 60 cycle #C-78248. Can be used to turn small antennas or as indicators. Size 3 1/2" x 5 1/2". Price per pair **\$6.95**



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- 4 x 17 x 3 Black Crackle \$1.05
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  - 10 x 14 x 3 Black Crackle 1.44
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- Complete stock of steel & aluminum chassis & panels on hand.

**GRID DIP METER  
LYSCO "DIPMASTER"**



3 Mc to 150 Mc frequency range; calibrated dial. Ideal for Signal generator, 3.4 to 300 Mc range phone monitor, F.S. meter, or absorption wavemeter. Complete power supply and tubes. Really a **\$33.50** good buy at.

**CONVERTERS**

Mobile or Fixed. RF Gain control. Simple installation. Size 2" x 6" x 5".

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Mobile or Emergency, 8 watt output crystal control, push to talk. Power requirements 6.3V. at 2 Amp; 350V. at 110 Ma. without dynamotor.

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- 3750 to 4000 Kc (75 meters) 23.95
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All 117 Volts to 117 Volts 60 Cy.

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Dual coil with armature pivoted normally open. Operates 220-250 Volts. 8000 ohms each coil, contacts S.P.D.T. Controls rated 2 amps. at 110 VAC. Ideally suited for balanced or bridge type circuits where limited current or power is available... **88c**



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**TRANSFORMER SPECIAL**

870 volt CT @ 250Ma with 80V bias tap

- 5 volts @ 3 amps
- 2 1/2 volts CT @ 10 amps
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- 6.3 volts @ 1.5 amps
- 115V. 60 cycle primary

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Positive Stabilization ± 1/2%  
Input 95-130 volts, 60 cycles single phase; output 115 volts stabilized to ± 1/2%. \*Output 6.0 or 7.5 volts stabilized ± 1/2%.



Catalog No.	Output Watts	Net Cap. lbs.	Net Price
VR-6110	15	4	\$15.00
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VR-6112	60	8	\$24.00
VR-6113	120	14	\$31.00
VR-6114	250	25	\$48.00
VR-6115	500	45	\$75.00
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**FILAMENT TRANSFORMERS**

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- Type 961 Dual 6.3VCT @ 3 Amps 2500V Ins \$3.38
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Also available for 230 volt input. Write for descriptive literature.



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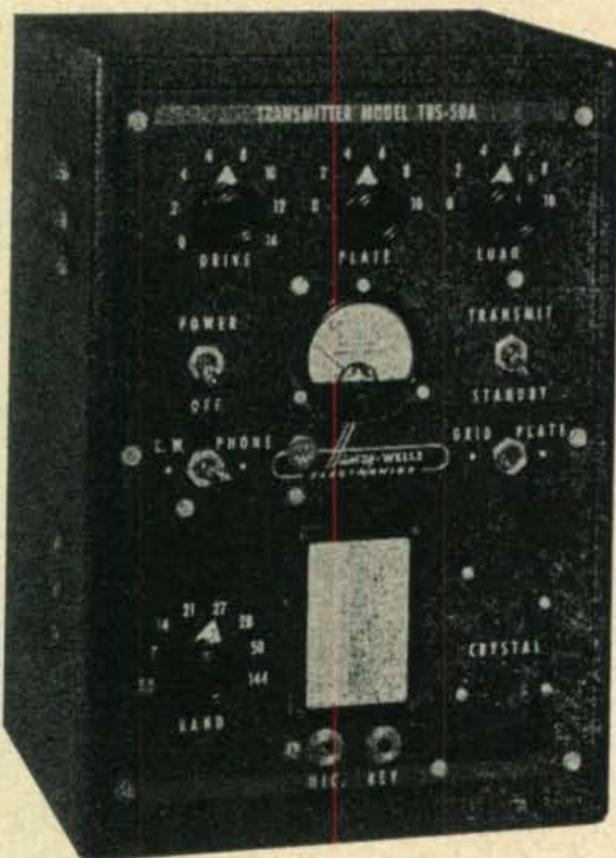
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# Harvey-WELLS

SOUTHBRIDGE, MASSACHUSETTS

In Leavenworth, Kans., WØIJK heard the April 7 auroral opening with just a 6-foot vertical in his room, which has made the v.h.f. rash break out on him again. No doubt we will see him before long.

#### 144-mc Gang

W2QNZ and W2PV have been holding schedules almost nightly on 144 mc, a distance of 120 miles. So far they have contacted four times. Now W1RFU in Springfield, Mass., has been invited to join the schedules. W2QNZ runs 150 watts to a 16-element beam, whereas W2PV runs 15 watts into a similar 16-element beam, both sides vertical. They would like to have others join them in their 0630 early morn skeds.

WØIJK works for the weather sonde region in Kansas City and advises that inversions which could be used to good advantage by the 144-mc gang are recorded and available from any first order weather station in the U. S.

XE2C in Monterrey, Mexico, has a 522 and a 6-element beam headed north, with an HFS receiver. So far XE2C has had only local QSOs, and those by lending his portable 144-mc rig to other stations. A 16-element array is contemplated, but Gilberto is undecided on the polarization, no doubt slightly confused by the stand taken in different parts of the U.S. Why don't each of you die-hards write XE2C and give him your sales talk, or would it be more confusing?

#### 144-Mc Honor Roll

	States Dist.			States Dist.	
W8UKS	15	6	W8PYY	7	4
W8WJC	14	6	W9PK	7	4
W8WXV	13	5	W1CTW	7	2
WØNFM	12	4	W8RDZ	6	4
W9TKL	12	6	W8EP	6	4
W3KUX	12	5	WØBZE	6	3
W1JFF	12	4	WØGOK	6	3
W1IZY	12	4	WØWG	5	4
W1PIV	12	4	WØHXY	4	2
W3RUE	11	5	WØJHS	4	2
W9BBU	11	5	WØRNC	4	2
W3GKP	10	5	WØKPQ	3	2
WØIFB	9	6	WØDDX	3	2
W9AB	9	5	WØMZH	3	2
W9ZHB	9	4	W8YEG	3	2
W2JPA	9	4	W4LNG	3	1
W1CTW	9	3	W9UIA	2	2
W9LWE	8	5	WØSV	2	1
W9IPO	8	5	W2RPZ	2	1
W3GV	8	5	W5FSC	2	1
W4FBJ	7	3	WØZJB	1	2

WØSKA in Columbia, Mo., is now active on 144 mc, which is a good spot to be in—half way between Kansas City and St. Louis. Bill, WØSKA, would like skeds with any of the 144-mc gang in either of the two larger cities.

W7GBI in Great Falls, Mont., and W7JRG in Sheridan, Wyo., both have stacked arrays, and have tried the 175 mile hop, but the mountains have them stopped. Looks as if you fellows will have to resort to billiard tactics to make it. Great Falls sports eight stations with 24-element beams that are of the flop-over variety, so keep an ear peeled for them.

During the auroral opening of April 7, WØKYF shifted from 6 to 2 meters to find an auroral effect on 144 mc. Between 2030-2132 EST, Bill, WØKYF, heard W9JMS, W8FVJ, W9ECP, W8WSE, and WØNFM. No contacts were made but the c.w. practice was good anyhow, he sez. All signals were fuzzy and it appeared that the

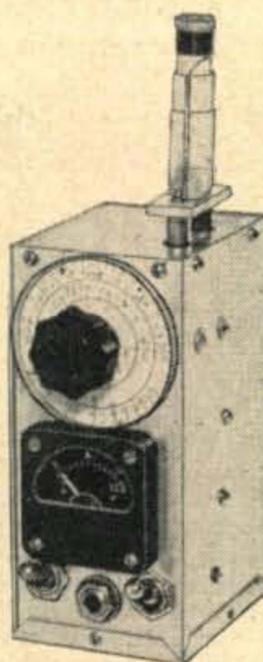
# HERE IT IS!

## THE "ORIGINAL GRIP-DIPPER"

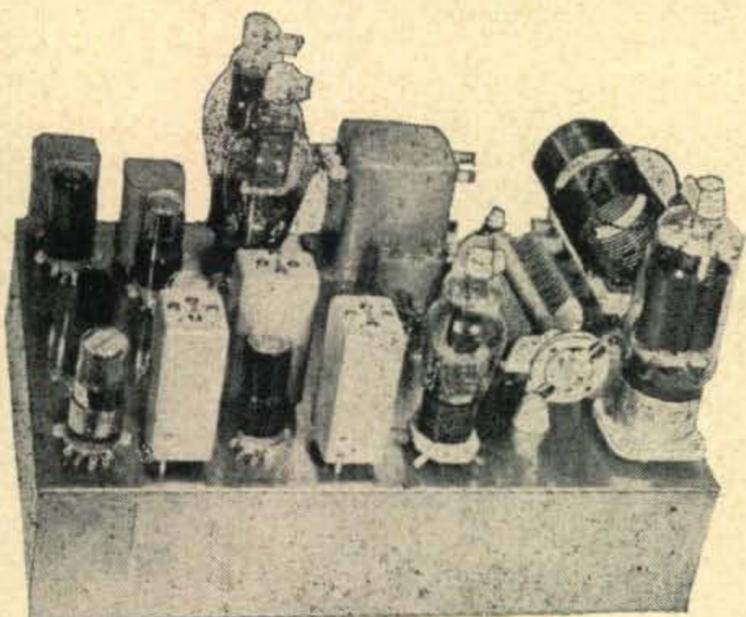
As designed by W. M. Scherer, W2AEF.

Now available in kit form, just as described in Feb. CQ. Its application includes signal generator, field strength meter, r-f voltmeter, Q checker, measures resonant frequencies of antennas, stubs, tuned circuits, capacity, parasitics, TVI, harmonics and many others. A complete laboratory in itself and the most useful instrument to be had. The kit is complete—only assembly and wiring required—a matter of a couple of hours. Includes all instructions and application booklet. Complete with tube and internal power supply. Size 5¼x2¾x3. PRICE.....

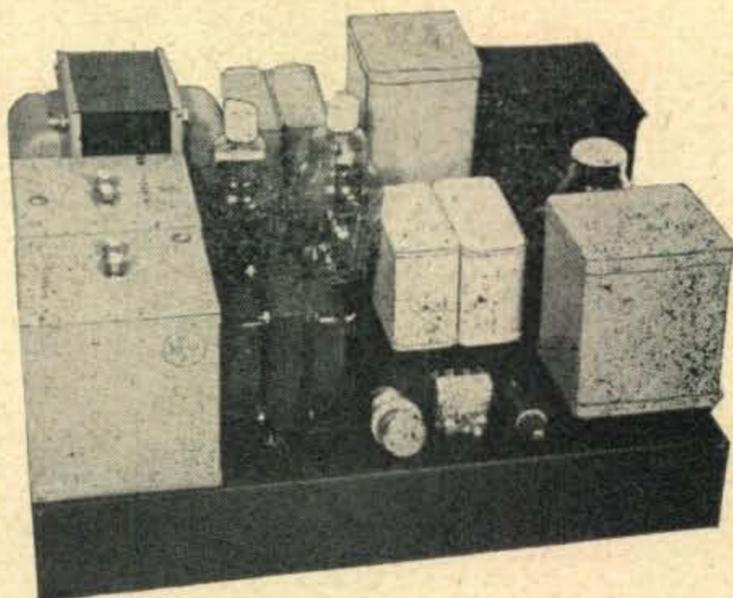
**\$21.50**



## MODEL TR-1 300W TRANSMITTER

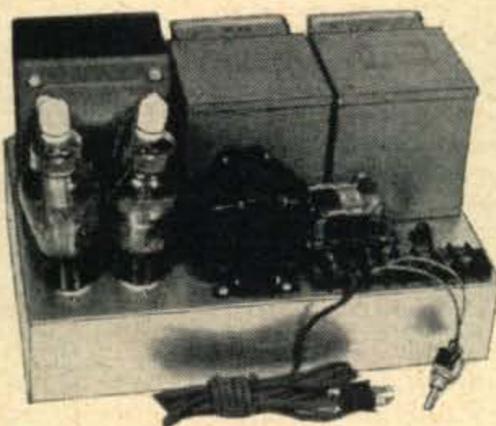


- 300 Watt Input, Class B Modulated.
- All Bands 80-40-20-15-10 meters.
- 813 Final, 2-811 Modulators.
- Crystal Control With Provision For VFO Input. Watch For Our Low Cost VFO Companion Kit!
- Complete Transmitter Kit In All Respects, Including Everything From A Mike And Key To The Ant. Changeover Relay.
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- HV—1500 vdc @ 350 ma.
- MV— 500 vdc @ 220 ma.
- BV—Negative 100 vdc.
- 10v @ 6A, 6.3v @ 11A, 2.5v @ 10A.
- Complete Instructions, Pictorial And Schematic.
- Aluminum Chassis For Easy Cut-outs.
- Small Drill, Chassis Punch And Iron Only Tools Required.
- Absolutely No Other Parts Needed—Wire, Hwd, Meters, Fuses, Tubes, Everything Included.

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144-mc gang knew that something should happen and were there to take advantage of it.

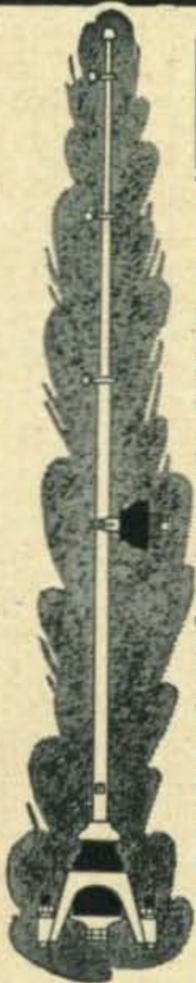
Leroy, W5AJG, in Dallas, says that 144 mc is now open for the spring season. On April 8 he worked W5SM at Beaumont, about 300 miles distant. At any rate this has given W5AJG the shot in the arm to get going again on 144 mc. Of course every time your columnist goes through Dallas we call W5AJG, but always find the guy in bed asleep. Could all this DX you work be in your dreams, Leroy, ole chappie?

Down "Jawja" way, Atlanta to be exact, we find that W4LMF has worked into Tenn., N. C., S. C., and has been heard in Alabama, for a total of four States. The rig is a 522 running 12 watts and a 3-element beam, with 152A converter. Nothing startling, says W4LMF, but to us it is some-

thing to bounce off those mountains for four of the harder-to-get States on the 6-meter band.

W4LVA, in Arlington, Va., has worked 7 States and 4 districts on 144 mc, using 100 watts to an 829 outboard and a 4-element vertical for working north, and a 4-element horizontal for working into the west. The converter is a 6J6 r.f., 6J6 mixer, 6J6 osc., which feeds into an SX-24. The last opening was on March 29, when W2QED and K2AZ were worked on vertical, and W3VVS, W3AED, and W4JFU to the east on horizontal. Does this mean there is a splitting of the ways in the solid vertical east, or just some experimenting going on?

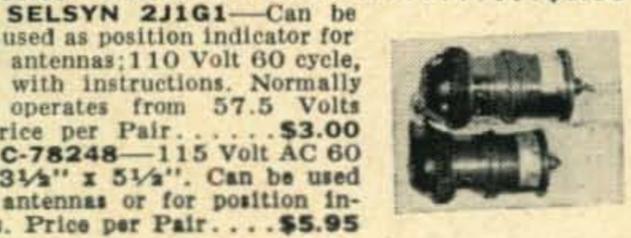
Around the Shreveport-Vivian, La., areas we find W5DXB, W5NXM, W5KXO and W5ML active on both 144 and 50 mc. Vertical coax dipoles



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Plugs for LP-21 Loop, PL-112, or PL108.....1.00  
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up 50', along with 8-16 element horizontal arrays are used. W5ML often heard the TV station in Houston, KLEE, on channel 7, the distance being 220 miles, as well as the taxicab stations in Shreveport, 30 miles south, on vertical. This gang is looking out for some of that DX they have read about in Texas, and from the looks of their equipment should be joining in on it soon.

W2BAV has his 48-element 144-mc beam on a pinwheel, and is looking out west on horizontal polarization for contacts, using his kilowatt rig.

Again thanks for the reports, but please when using the reporting forms, jot down local activity or any other news on a separate sheet of paper or on the back of the reporting blank. By doing this we can present more of a newsy picture of what is going on, instead of just who worked who.

**March 25**—XE2C heard OA4AE working into W5 at 1540 EST, and YV5AC at 2045 EST. XE1GE worked from 2012-2115 EST; OA4AE, HC2OT, LU9DJH, LU1DO, LU9MA all with fair signals.

**March 26**—W4IUJ heard OCZ4 on about 49 mc, at 1345 EST. At 1350 OA4AE broke in S9. By 1415 Buz was out, but OCZ4 stayed in for another half hour. HC2OT had a W5 field day working between 1502-2347 EST W5VY, CXS, BAJ, OKR, KSW, FSC, UW, EEX, XE1GE, YV5AC, and heard XE2FC and KZ5NB. XE1FU made it with HC2OT at 2100 EST, fair signals. XE2C worked OA4AE at 1450 EST, LU9MA at 2010, and heard HC2OT at 2115 EST, S9 both ways. Between 1400-1530 EST OA4AE worked W4IUJ, W5KSW, CXS, FSC, BAJ, XE2C. W5KSW heard W5VY and XE2FC. Between 2130-0008 EST W5KSW hooked HC1JW, HC2OT and heard YV5AC on 50.2 mc. Many other phone stations speaking Spanish were heard, but not readable.

**March 27**—XE1FU worked LU9MA and HC2OT, between 2115-2145 EST. XE2C hooked LU9MA at 2110 EST, S9. W5KSW heard HC2OT, LU9EV, LU9MA, and YV5AC. Other weak carriers were heard on 50 mc, but unreadable. HC2OT had QSOs with XE2FC, XE1FU, XE1GE, XE1QE, YV5AC, between 2028-2302 EST.

**March 29**—HC2OT worked CE1AJ at 2145 EST fading fast with a weak signal.

**March 30**—At 0740 EST, ZS1P announced that the F2-layer MUF to Europe was over 50 mc. A crossband 28/50 mc contact with G6DH resulted. At 0809 EST G6DH worked ZS1AX. Contact with ZS1P was maintained continuously until 1120 EST. HC2OT heard LU6DO with OA4AE at the mike at 2028 EST, then went on to work LU9MA, W5VY and W5JLY until 2150 EST. XE2C worked LU6DO at 2150, heard LU9MA at 2110 EST. XE1FU made it with HC1JW at 2210 EST. W5GNQ worked LU6DO at 2120 EST. W5ML heard LU6DO and LU9MA from 2130 to 2140 EST.

**March 31**—G6DH heard ZS1P at 0709 EST. Signal held until 0832 EST, then reappeared at 0937 EST, finally fading out at 1045 EST. ZS1AX was worked crossband between 0810 and 0825 EST. From 2105 to 2235 EST, XE1FU worked W5FSC, LU9AX, LU8DJI and LU9MA with strong signals. XE2C worked LU9MA at 2110 EST, very weak. HC2OT heard XE1GE at 2055 EST, then worked XE1FU, CE1AH, and XE1GE between 2058 and 2200 EST. W5ML heard XE1GE at 2105 EST working another W5.

**April 1**—W5ML heard XE1QE at 2200 EST. XE2C worked LU6DO at 2100 EST, very weak.

**April 2**—XE1FU made it with W5LBG, W5JLY and W5OKR from 2110-2135 EST. XE2C worked from 2120-2140 EST, LU9MA and HC2OT. HC2OT worked XE2C and heard KZ5NB from 2130-2150 EST.

**April 3**—Between 2200-2359, XE2C hooked XE1GE, LU9MA, LU1BV, OA4AN. HC2OT worked W5ONS, W5JKB, W5OKR, between 2110-2208 EST.

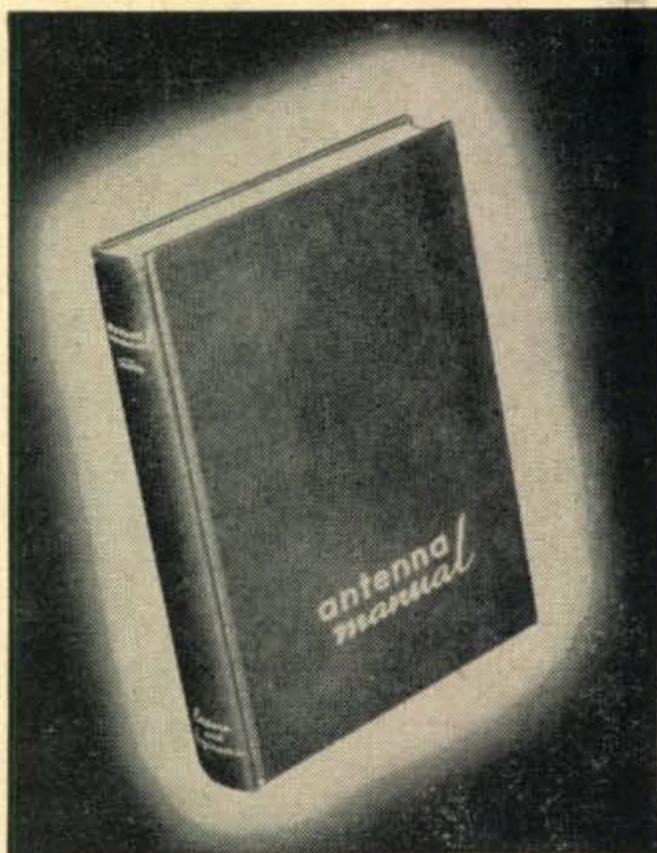
**April 4**—XE1FU, between 2100-2300 EST, worked LU9AX, LU1AM, LU1BV, LU4DI and LU4MA. HC2OT heard LU9EV and worked LU6DO between 2015-2055 EST. XE2C, between 2015-2120, worked LU6DO, LU9AX, LU4DI, and heard XE1GE and LU9MA.

**April 5**—G6DH heard erratic fading signals from ZS1P between 0809-0810 and 0920-0935 EST. HC2OT heard LU9MA and then worked LU9EV at 2030 EST. XE2C hooked from 2010 to 2130 EST, LU3BD, LU9EV and LU9MA.

**April 6**—G6DH again heard bursting signals on 50.07 mc from ZS1P around 0915 EST. The north-south paths

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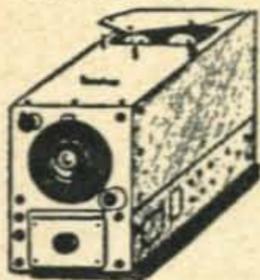
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were quiet, although W7QLZ worked W6ERE and heard W6VDG around 2205 EST.

April 7—From 2102-2144 EST, HC2OT worked W5PKX, W5OTU, W4IYJ, W5UW and XE1GE, with loud signals. In the States aurora was on with W9ALU getting W9IZQ, TIO, QKM, VZP, hearing W9FVJ, WØKYF, WØQIN, between 2015-2357 EST. W7HEA had QSOs with VE7ALL, W3CIR/7, W7FLQ, from 2238-0048 EST. W8NQG heard WØNFM and W1HDQ. W2IDZ worked VE3ANY, W2RLV, W1GJO, W4HVV, W1ZE, hearing W1CGX, W1HDQ, W3MQU, W8LBH, W3RUE, WØNFM, from 1928-2125 EST. VE3AET worked W1CGY, hearing W3MQU, W8LBH, W2IDZ, W4HVV, W1HDQ, W3RUE, W1AEP, W2AMJ and WØNFM, from 1830-2310 EST. WØLJK and WØZJB both heard W9QKM, WØCJS, W9QUV, WØNFM, WØTIO from 2005-2127 EST. VE3ANY worked W1CGY, W2IDZ, W1HDQ, W9RLM, W9JMS, hearing W1DA, CGX, ON, AEP, W2LAL, W3OJU, W8NLB, W9QUV, QKM with average S-6.

April 9—HC2OT worked XE1GE at 2208 EST. W5AJG worked W6AMD at 2245 EST.

April 10—HC2OT heard LU6DO at 1950 EST.

April 11—G6DH heard ZS1P from 0915 to 0920 and 1015 to 1020 EST. W7QLZ heard CX1AK at 2150 EST and LU9AX at 2205 EST. Also heard some W5 signals weak in the background.

April 12—Some aurora noted with W9ALU working W9VZP at 2332 EST.

April 13—G6DH reports hearing ZS1P from 1045 to 1049 EST.

## DX

(from page 38)

will send the cards direct to each of you who send him postage, otherwise, they will go through the respective bureau.

If any of you fellows receive any kind of a confirmation from an FP8, I would sure like to hear about it so we can wise up the rest of the boys. For some reason or another, the last few months, there have been a terrific number of stations signing FP8 calls, and it certainly doesn't make sense that there should be all this sudden activity. This is especially true because certain pilots flying there insist that there is nothing resembling an amateur station on the island. Personally, I wouldn't know, but in the meantime, until better evidence is offered, "We aint a'countin' no FP8s!" The same deal goes for FG8s.

W2GVZ would like to have us tell the guys out in the Pacific that there is a place called New Jersey, and that the U.S.A. does not consist only of W6s. Pat, you had better take over the graveyard watch and snag some of these Pacific boys. I will be glad to fix it up with your XYL.

WØNFA operates 10 mobile from a snappy looking Chrysler coupe. To date, he has worked 18 zones and 32 countries, and NFA says all contacts were made while the car was in motion. I think you boys would be interested to know that WØNFA's son is WØEYR who is quite a DX man in his own right with 39 zones and 137 countries.

W9WEN has just joined the gang in the Honor Roll and relates that one of his biggest thrills was when one morning in a period of just one hour, he worked W3CHH/Iwo, C1JH, VU2LJ, and JA3AA.

F8BS is continually doing a good job, some of his latest include EA6AZ, WØMCF/C3, SP5BA, and FD8RG . . . W6ZY has recovered his equilibrium after the arrival of their daughter, and he kicks through with a bunch of QTHs which will be found in their proper spot. Some of the new and better ones for George are VK9WL, VK9PJ,

EA3JA, FO8AC, and VP8AJ . . . It's good to see W4AIT in the Honor Roll with 39Z and 191 countries. Homer actually has worked all the zones, and is now waiting for cards from 18 and 19.

From the F.E.A.R.L. News, we see where two of the more active men in Japan have shoved off for home. They are J3AAD, who was on c.w., and JA4AA, who was a tip-top phone operator.

W0AZT stayed home long enough to revise his country list. Clif travels out of Denver through the Rocky Mountain states, and I guess the guy does get home once in a while . . . Here's another new one we are glad to see in the Phone section of the Honor Roll . . . W8UIG. It is good to see this new batch of phone entries.

Although Yours Truly is hardly what you would call a dyed-in-the-wool phone operator, my committee does have one of the most active in the country in W6DL. W6SA is sort of ambidextrous, he works c.w. most of the time, but when contests roll around, he grabs the miks and rattles off call and serial numbers like you would expect from any "off-key" tenor. I can't overlook the phone activities of W6ENV, as he pulls a few sneakers on me every once in a while. The only reason for my spouting off on this subject, I guess, is to tell you that I think the DX committee is pretty well versed in both phone and c.w. DX.

A new club has been formed . . . "The DX Club" . . . Officers are as follows: Prexy W3IMV, Vice-President W3NA, Activity Manager W3NC, Secretary-Treasurer W3LTU. The temporary address is North Washington Avenue, Sellersville, Pennsylvania.

W7BTH still needs Zones 22, 34, and 39, but I imagine with his new 4-element rotary, which he has just put up, it won't be too long before he will have them . . . W4IWO is a new one to the Honor Roll with 35Z and 142C . . . W6RM is still digging them out, the latest count making him 184C—zones stuck at 40 . . . VE3BNQ has added a few, boosting him to 36Z and 101C. These are on phone, and the new zone was UA1BE.

Some of the boys have been asking whether or not KH6VP is still on in the Soloman Islands. This was brought out by the fact that he was on during the recent A.R.R.L. DX contest, but signing only KH6VP. The only time he was on in VR4 was the latter part of January and operated for about 85 hours.

G6QX has finally obtained a motor driven rotating unit for his 28 and 14-mc rotary dipole. In the past, Bob has had to sprint 50 yards up the garden to turn the antenna by hand. It looks like he is getting lazy! In any event, he has added 10 new ones . . . KL7KV says he has never heard a station in Zone 9 and can't figure out the reason why. He needs Zones 9, 36, and 21. The reason for my mentioning this is because Bill shoves off from Alaska in June, heading for Tinker Field, Oklahoma.

W2BJ appears to be off the dime since he has added two new zones and 14 new countries. Don't worry, Ray, I won't tell your boss that you worked VQ5JTW in the middle of the afternoon.

From the Northern California DX Club's "DX'er," I am lifting the following. The QSL cards from ZP3AW are now arriving, and this will, no doubt, make a lot of you fellows happy, since ZPs that QSL are very rare. VU4AA, 14-

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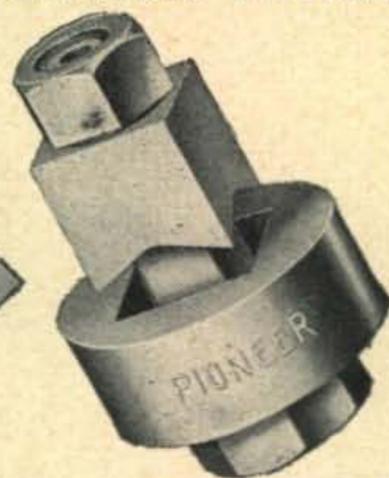
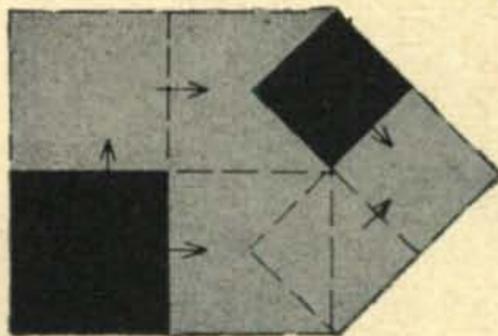
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100, Nicobar Island, is on once in a while. Since this is counted the same as Andaman, this will not be a new one for those who previously worked *VU2PB*. If you need Canary Islands, you might take a look for *EA8MC*. He has a T7 note, and can be found somewhere between 14,055 and 14,095.

W6TT passes along this bit of news about *VK4SI/VR1*. In talking to this fellow on phone, he said he was going to leave VR1, shortly, and visit some of the other rare islands, so don't be surprised if you hear *VK4SI* from some other spots . . . I mentioned this before, but believe a lot of you would like to know that our old friend *SV1RX* is G3FNJ.

Don't forget that my deadline for copy is the 15th of each month.

Dave Brown, ZL1HY, gives with a little DX lowdown. He has heard *MD4GC* quite a few times, but, as yet, hasn't connected. He operates v.f.o. 14 to 14.1. Dave worked *F18ZZ* for the third time, and this time instead of saying he didn't QSL, he told him to QSL "R.E.F. 2, Cuniac, Saigon," and he said he would reply with an SWL card. Well, that's at least 50% in the right direction, as it does confirm a one way transmission. ZL1HY raised our eyebrows when he mentioned that he worked VT1RF in Kuwait. However, the eyebrows were lowered when he pops up with a QSL card from the guy. Well, to go on, it seems that *ZL1FT* is now in Samoa and has been on 40 once or twice using a ZM6 call.

It isn't often I get a chance to lay my hands on a letter such as the one I am quoting below. It is

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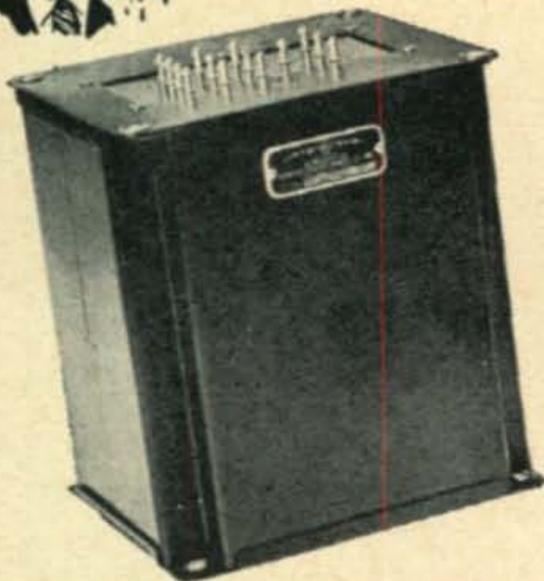
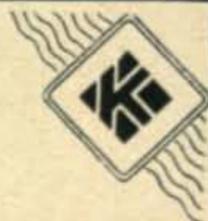
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written by *HB9GP*, the Swiss QSL manager. You draw your own conclusions . . . I won't print mine.

St. Gallen, 1st of February, 1949

It is necessary to discover the mystery about CZ2AC. I can tell you with exactitude that the whole story about CZ2AC is a work from a very bad kind of pirate: With this call operated a long time Mr. Ernest Knecht, Neugasse 20 at St. Gall in Switzerland. The Italien Lady, Miss Monsinis, is working here in Switzerland, and her home-address in Italy served only for QSP the cards of QSL. All the delivered cards are wrong: the QTH is SWITZERLAND and the operator is not a lady, it is a pirate.

The Swiss Radio Service discovered CZ2AC and punished him. For all that he was since again identified. May this letter be an orientation to you.

Yours truly,  
Ernest TH. Wuentrich, HB9GP  
Swiss QSL-Manager

Here's a little information about *PK4DA* which should interest all of you. Please read it carefully. In the first place, *PK4DA* is operating under a very great handicap and many hazards in order to give you fellows about the only possible PK4 contact these days. Even today, a PK4 is a new country for many. Now then, the next question is regarding the way to get your cards to him and *PK4DA* getting his QSL cards to you. *PK4DA* has made arrangements with his friend *W6UZX* to handle all his cards, and here's how it will work. On weekly schedule, *W6UZX* will give *PK4DA* the call letters of the stations whose cards he has received up to that time. Then *PK4DA* will *Airmail* direct his own QSL card from Sumatra to the fellows who have sent cards to *W6UZX*. There is one more thing you must do, however. Since airmail is about the only sure way *PK4DA* can get cards out of there, and each one will cost 25¢, he is asking everyone who sends a card to *UZX* to enclose 25¢ in stamps. One of these days, *PK4DA* will visit the States, and at that time, *W6UZX* will have exchanged the stamps into cash, which *PK4DA* will, without a doubt, have plenty of use for while here. I believe this is a very fair proposition, as *PK4DA* certainly is having no picnic over there, and with the scarcity of cash, the guy could go broke if he had to pay 25¢ for every QSL card he sent out. So, fellows, if you have worked our old friend, *PK4DA*, send your card along with 25¢ in stamps to *W6UZX*, 20921 Haviland Street, Hayward, California. I think *PK4DA*, working under the hazards that he is, deserves a great deal of credit for not only making a chance to work Sumatra, but to see that his QSL cards get out and into your hands. *W6UZX* also should be commended for his end of the deal, and I can see right now that this will take some of Jim's normal DX operating time.

A lot of the boys have been asking me lately if I know how they can get in touch with *C8YR*. Apparently, some of you haven't received a card confirming your QSO and want to get word to him. This is a good spot to make a dirty crack. No, I won't say it! . . . Yes, I think I will!! . . . and, so, with a leer and sinister smile . . . "Hmmm, maybe you just *thought* you worked him!" By the way, what the heck is a sinister smile? Seriously, I don't know where *C8YR* is now.

*KH6PY* has been a *KH6* for a year and has sent 600 cards and received 357. Jack said he received a nice surprise the other day . . . an A-1 operator's certificate. He says he went right in and

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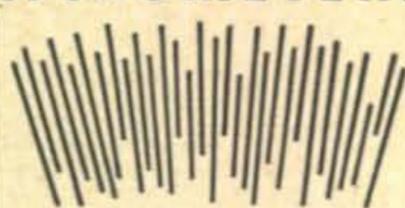
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Didja hear about the gal that got a new refrigerator, and the second day she had it, she found a live rabbit inside? "What you doing here?" she said. "Isn't this a Westinghouse?" asked the bunny. "Yes," said the gal. "Well, then," said the rabbit, "it's O.K., because I'm just Westing." Don't blame me, this was pulled out of the Northern California DX Club's "The DXer," edited by W6PB. Sounds like some of O'Brien's humor.

Here is something that some of us got a bang out of. As you know, ZL1HY was the first ZL to make a postwar W.A.Z., while VK2DI was the first VK. Again, Dave was the first ZL for DXCC and 2DI the first VK. Next, when the N.Z.A.R.T. announced their Worked All Pacific awards, ZL1HY was the first ZL and again 2DI the first VK. Then the R.S.G.B. Empire DX certificate is only slightly different. Of course ZL1HY was the first ZL, but at the moment, VK2DI's cards are now in England, and if approved, he will be the first VK. As it stands now, Dave has 195 countries, While Gordon has 193. These two fellows, along with ZL2GX and VK2ACX, are having a private DX contest of their own. All four of them are W.A.Z. with VK2ACX having his announced in this issue. Sounds like a good "friendly" DX melee to me.

While we are speaking of the boys down under, VK3BZ, whose W.A.Z. is also being announced in this issue, tells me that PK4KS told him that his country is counted separately from Sumatra. He gives the name as Banka Island. That's a new one on me, and, of course, we can't count it with what meagre information we have. I want to count Catalina Island . . . at least there are things happening there! Morrie also says that SV5UN is closing down, or, probably I should say, by the time you read this, he will be closed down.

Another station causing some of you boys to have a few heart murmurs is YM4AW. The other day, W6AM plopped a card in front of me that he had just received from YM4AW, and the information it contained was very interesting. In the first place, it was a very colorful and well-

printed QSL card. On the left side of the card, there was a coat of arms design in which was contained this lettering, "Ex-Danzig." The operator also mentioned on the card that he was in the portion of western Germany which before the war was known as "Free City of Danzig." From the way things stack up, it's Germany, although the man still has a nice imposing looking card.

WIENE has been trying to enclose his back porch so he can use it as his new shack. All this activity was inspired after his XYL had served notice that the cellar play room must be vacated so the kids could use it next winter. Well, that's that!

CM2SW writes to say he is still active, and on the end of the letter adds this little note to W6ENV. "Haven't heard you on lately, Andy. What happened? Have you worked all countries already? Hi!"

W9RNX passes the word along that VP1SJC is now sending QSL cards . . . W2PEO wants more dope on AC5CS. I guess you fellows better kiss this one goodbye. It doesn't look so hot to us now . . . To those who want to know about YQ5B and the like, we must say that he is in Roumania and counts the same as a YR.

W0YXO got a letter from VQ4CUR who says he is going to try to get back to operate from VQ1 later this year. Shucks, I would even sacrifice working a couple of 9s for that one, since I missed out on the last VQ1 excursion. YXO also says that VQ4SC was on the air briefly from ZD6 and plans to be on again later in the summer. We also understand he is not too hot about working Ws.

W9BZB has been in a rut. At least, I guess he has, because he said he got out of one when he hooked two new zones which now gives him a total of 35, all worked with 300 watts on 10-meter phone. The antenna is a wide-spaced 4-element beam. Some of his newer stuff include PK4KS, DU1VVS, XZ2KN, AP2F, and VS7PS. We mustn't forget VQ8AE either, as this accounted for one of his zones.

W9RBI also did a little 10 phone work and caught up with VR3A 28,120, TI9BR, SV5UN

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28,400, and ZC1CL 28,200 . . . WIAB who has been under the weather for a while is now up and at them again. He says one of his ambitions is to visit the West Coast someday and try the West Coast Martinis.

A lot of you fellows will be sorry to hear that W6RBQ was suddenly taken ill, and is still pretty much laid up but is getting better. We hope we can hear Bill on the air soon. You might drop him a line to say, "Hello."

The biggest news at W6QDs during the past month was working W1SZ. Many of you will remember Roddy, who, in "his prime," worked DX with the best of them. However, something happened, and his postwar activity has been concentrated on the kind of DX that would make Vince Dawson happy. It was good to see W1SZ back in the ham bands again.

Now I gotta go . . . see you on the low end. 73.

### DX QTHS

EA8MC	Manuel Cenolmar, Sol y Ortega 23, Laguna, Tercife, Canary Islands
FO8AC	George Vincent, c/o Radio Papeete, Tahiti, South Pacific
FT4AJ	Box 125, Tunis
FY8A	Via W4LVV
KC6EA	Truk Atoll, via APO 3410, c/o P.M. San Francisco, California
KR6AX	Okinawa, via APO 239, c/o P.M. San Francisco, California
OE1FF	Via A.R.R.L.
OE5CA	Via W2NFR
OESAN	Via W2NFR
PZ1QM	Box 679, Paramaribo
SP8XA	Via W3JKO
VK9PJ	John Wharton, c/o D. C. A., Port Moresby, Papua
VK9WL	Kavieng, New Ireland, New Guinea Group
VP3XY	Shaggy Shaw, British Guiana Airways, Georgetown, British Guiana
VP4TAY	U. S. Naval Air Station, Trinidad
VP5AT	Via W4LVV
VP8AJ	Via GPO Falkland Islands
VP6PX	Wood Goddard, Bomley Welches, Christchurch, Barbados
VP6SJ	Box 252, Bridgetown, Barbados
VR2BG	Doug Rummins, c/o R.N.Z.A.F., Suva, Fiji Islands
VS2CH	Via R.S.G.B.
VS7 QSL Bureau	Box 907, Colombo, Ceylon
YK1AB	P.O. Box 35, Damascus, Syria

## PREDICTIONS

(from page 36)

EST. Fair conditions with high noise levels on both ends from 2100 to 0400 EST the following morning. Band fades out suddenly around 0500 EST. 20 meters: C.w. after 1515 EST and then phone after 1730 EST. Fair conditions until 0200 EST. Erratic conditions from 0300 to 0530 EST. Band finally fades out after 0715 EST. 10 meters: Erratic signals varying from day to day.

### Midwest to Balkan Countries

40 meters: Absorption level too high. No signals expected over this path. 20 meters: First signals on quiet days around 1600 CST. Peak conditions 1830 to 2230 CST with phones just barely above noise level. Band fades out 0130 CST the following morning. 10 meters: No openings.

### Midwest to Equatorial Africa

40 meters: Band opens after 1730 CST. Peak condition 1945 to 2200 CST. Band fades out around 2300 CST. 20 meters: C.w. signals after 1445 CST and then phones after 1700 CST. The noise level is very high and the best period for phones may be from 2130 to 2300 CST. C.w. fades out around 0100 the following morning. 10 meters: No openings, MUF is too low.

### Midwest to Southeast Asia

40 meters: Absorption level is extremely high and no signals should be expected over this path. 20 meters: Very weak signals from 0530 to 0730 CST. Doubtful if usable due to the high atmospheric noise background. 10 meters: No openings.

### Midwest to Australasia

40 meters: First signals break through just after midnight, although they will probably hear signals after 2300 CST. Band peaks above noise level from 0130 to 0515 CST, then fades out around 0645 CST. 20 meters: Phone and c.w. signals around midnight. Good conditions until band suddenly closes just after 0430 CST. Peak conditions from 0230 till closing. 10 meters: No opening.

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### LETTERS

(from page 4)

many people believe they get more speed and zip without filters, regardless of how many radio programs they ruin.

The makers are anxious to sell their sets but you must live in a good location, otherwise its just too bad. Why do they not spend a little money on publicity of this interference which can be eliminated at trifling expense for each car.

R. G. Carr, W6PAW

### SCRATCHI

(from page 6)

sixty-five, as sixty ampere fuses are quickly telling me. Number 12 wire are serving as nice fuse until Itchi are running into town again and getting more batteries for bias for modulator toobs. After taking pile of old magazines out of corner and putting batteries there modulator toobs are calming down so new fuses are holding.

At this point Scratchi are sure that having enough modulator power to making final toobs jump out of socket. This are not strictly true. Now, Scratchi are not even able to make plate current meter in modulator stage wiggle. This are most disturbing. so I are putting fingers in mouth and making stupendous whistle, right into microfone. Hot diggedity, meter are moving! Are about to repeat same when notice smoke are coming from behind rig. Closer inspection shows modulation transformer are cause of same. Are also noticing that rectifier toobs are much bluer than usual. I are reaching for plate switch when sixty ampere fuses are beating me to it. As long as power are off are checking modulation transformer. Transformer are now having built-in short from secondary to core. This are making Scratchi bluer than rectifier toobs.

Two days later, after uncrating new and bigger modulation transformer, are discovering that it won't fitting in rack. By this time I are not even phasing, but are just putting it under operating table and running leads to rig. Just as you are suspecting, Hon. Ed., this are not curing trubble. In fact, Scratchi are not even making meter wiggle when whistling. Why are transmitter audio department losing power faster than Scratchi can pouring it in? Bad leak somewhere.

Itchi are coming over and asking if he can helping. I are explaining hole bisness in detales, after which he are asking me why not putting little surplus audio amplifier between mike and speech amp. This are sounding so foolish that I are trying it to showing his foolishness. Hokendoke! It are working! Mike are now reel sensitive, and modulator plate current are super-supendous. Who would be thinking it?

So, things are about backing to normal, although Lil are now complaining that it are no fun to being able to lean back in chair to talk into mike, as with modulation transformer under table are having no place to putting feets. So, will be having to move transformer to sum other spot. In fact, will do that right after I are putting new condenser in final tank circuit to replacing old one which are all-time arcing over.

Respectively yours,  
Hashafisti Scratchi

## SHIELDING EXPERIMENTS

(from page 34)

a minimum as illustrated in Fig. 4C. The effect of each component of the filter as it was added is shown in Table III.

The actual attenuation characteristic of item 6, Table III, is probably much greater than -40 db inasmuch as the signal cannot be found. A double-section filter inside the box behaved the same as a single choke at Z, so it is concluded that two chokes and a capacitor are all that is necessary to filter a supply line completely. Don't forget, however, that the box into which the line is going must be a complete shield if the system is expected not to radiate. The mechanical layout of the line filter is shown in Fig. 6.

Notice that the lead outside the box to the power supply is not shielded. As a matter of fact, it was found to be better not to have any direct connection of a line or cable shield to the box, because, if the box is not perfect, radiation characteristics like Fig. 3A may be approached. If cable shielding must be used for safety measures, it would be better to ground the cable shield at its remote end, and then connect the braid to the transmitter box through a 25-microhenry choke mounted on the outside of the box. An antenna feeder made of coaxial cable would have to be connected to the shield, but that is another problem, and is not covered in this article.

### Shielded Pick-Up Loop

Speaking of coax, a single-turn loop of RG58/U

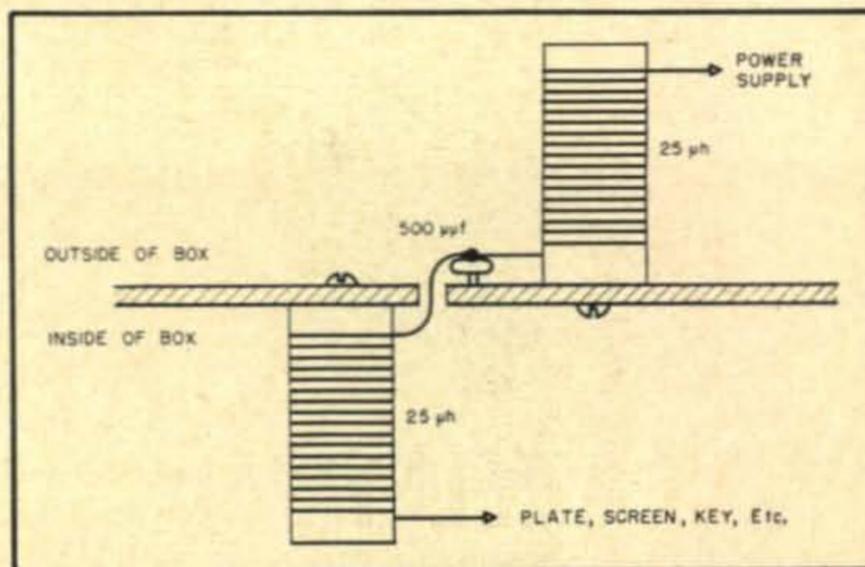


Fig. 6. Constants and layout for recommended line filter.

with its center conductor connected to the shield at the end of the loop to duplicate the pickup device first described in Grammer's article on TVI in *QST*, September 1947, was tried in the cubical box to see how it would behave. Although not coupled to the 53-mc tank, the device, when placed anywhere in the box, could deliver plenty of signal to a half-wave center-fed antenna. With the radiator removed, the open-ended coax feeder had a large 53-mc field about it. Even when the center conductor was soldered to the outer conductor at the end, four feet from the box, the thing would radiate. It is apparent that if there is a high-frequency field within a closed box, there will be some r-f pickup in a shielded loop, even though the loop

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RPS-8885	18	12	12	6.15
RPS-8886	18	46	35	19.65
RPS-8888	36	2	5	4.15
RPS-8889	36	6	12	6.75
RPS-8892	36	12	25	11.65
RPS-8890	36	23	32	19.25
RPS-8891	36	46	78	51.25

NOTE A: All transformers have 3 extra taps—for example: 20, 19, 18, 17 volts and 38, 37, 36, 35 volts.

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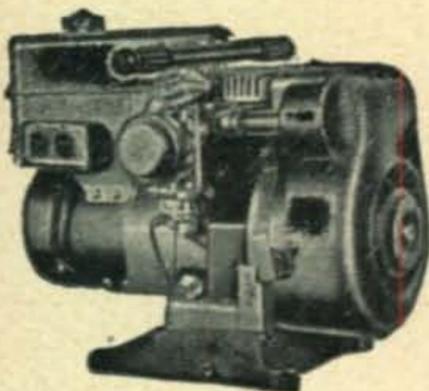


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is not coupled to the tank circuit. To remove all of the unwanted signal from a transmission line and antenna system, a filter will have to be used.

That brings us to the point in the investigation where two or more signals are being generated within a good shield. One of those signals is to be permitted to leave the box, the rest are to be kept inside. With this objective, a transmitter was designed incorporating all of the features shown to be the correct approach in the above experiments. The untested item, a transmission-line filter, was to be the object of the projected experiment. In addition, I wanted proof that any number of supply lines could enter the transmitter through filters no more complex than those outlined, without interaction and subsequent radiation of unwanted harmonics. The transmitter was constructed, a successful transmission-line filter was developed, and the rig is now on the air for tests under operating conditions on 10 meters. The transmitter will be described in a later issue.

## TRENDS IN SELECTIVITY

(from page 30)

13 ma at 200 v. and only 10 ma with a 150-volt plate supply.

The low B drain can be accounted for by the fact that the 6C4 infinite impedance detector draws practically zero plate current, while the 6BE6 converter and 6BA6 amplifier, which are not called on for amplification of any magnitude, are operated with very low values of screen voltage and draw out little cathode current apiece.

Installation of the "805" calls for connection of filament and power leads, connection of the 6BE6 mixer input grid to the last 456-kc i.f. stage of the companion receiver, breaking the detector to first audio lead of the receiver, as shown in *Fig. 1*, and inserting the 805 changeover switch connection in between. This latter permits feeding the receiver audio system from the 805, for high selectivity, or from the 456-kc detector, for band searching or broadcast reception.

Alignment consists merely of retrimming the secondary of the last i.f. in the receiver for maximum signal to compensate for the capacity added by the 6BE6 and its connecting lead. This should be done with the selective i.f. unit switch out of circuit. The 805 should then be switched in, and its oscillator coil, *L*, trimmed to proper frequency, as evidenced by "centering" of the received signal in the pass-band of the 100-kc i.f. system. That's all there is to it.

In operation, a phone signal may be shifted clear of a heterodyne on one side by detuning the main receiver slightly, so as to put the heterodyning QRM down the side of the selectivity characteristic of the 805. The same thing may be done with c.w. signals of course. The receiver a.v.c. may be left on in phone work, and the S-meter will continue to function. For c.w., both the incoming signal and the c.w. oscillator signal are passed along to the 805, and heterodyne for an audio beat in the 6C4 detector, and no special precautions are needed.

## RESULTS — CQ'S DX CONTEST

(from page 20)

—A very interesting contest, especially the possibilities of contacting rare DX stations. *GW3ZV*—A really first class contest showing great improvement over others.

*G4AR*—A lovely week-end. A station not in



Hungary was well represented by L. Radnai Szolnok, HA4EA, who gave many a DXer a new country.



L. Adalberto Brito CE4AD, one of Chile's outstanding DX men, second high c.w. score from Chile.



Top contest man Vic Clark, W4KFC, highest scoring individual contestant in the United States.

contest was exceptional. Please keep to one week-end only, or else XYL will revolt. *W6WWQ*—Two week-ends instead of one; otherwise FB. *GI4NU*—A very good competition, and judging by the activity it was most successful. *OH2OP*—Thanks for that nice contest. *W9VW*—Best contest. Would like to see two week-ends myself. *W9BVV*—Contest recognized by world-wide amateurs to entire degree. A great success. Keep it going year to year.

*W6QD*—I liked the contest very much. My score would have been larger if I was permitted to

QSO power leaks, too. As it was I had a good sleep. *W6EJA*—Eliminate W contacts for local zones. Also drop 80 meters. *KH6QK*—It was a very nice contest. *W2EMW*—DX conditions were excellent. Contest lasted just the right length of time. *KL7PJ*—I also like the idea of being on equal footing with the States. *KH6MI*—A very enjoyable contest and the only one that has a real appeal to those outside the States. I have no suggestions—keep it the way it is. *LU5BM*—The most

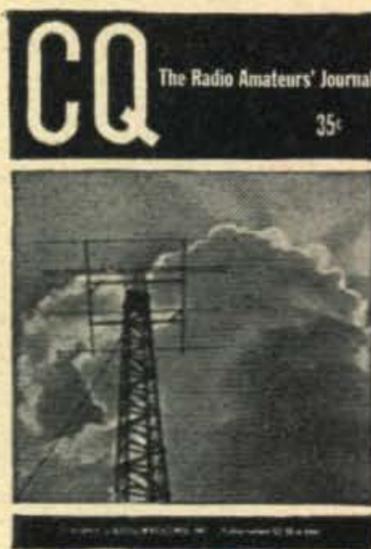
interesting world-wide DX contest, but must be for two week-ends.

*W2JB*—How about running a "one watter" contest? Let's show that Ws are not power happy! *W1RY*—The contest rules are satisfactory as they stand. One week-end (48 hours) is sufficient. *W4KFC*—Enjoyed this affair immensely and consider it a noteworthy addition to the fall calendar of activities. Prefer the one week-end period—rules are perfect as they stand. *W3JKO*—This was the finest contest I ever worked in. I like the zone business.

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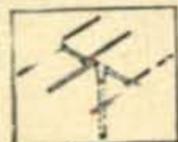
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## LOWER THAT BEAM

(from page 29)

ing four holes a bolt, washer and spring arrangement as shown in Fig. 4 was placed. The spring, *L*, is a Ford radiator spring. The spring allows enough "give" to pass the dolly over any rough spots in the track and yet maintains enough tension to prevent the dolly from rattling. The bolt without the spring serves merely as a safety bolt and is not tightened down completely.

### Mounting the Track

Before mounting the track make sure that the top of the track is high enough so that the cable passing through the pulley will clear the top of the pole. Mark the pole for the 1/2" bolts (spacers *D* and *E*) and drill through the pole at these points. Long bolts, *G*, are used at these points. In addition, 4" x 4" x 1/8" galvanized steel plates were placed under the nuts next to the pole. These long bolts provide the leeway to level the track off vertically, as well as furnish solid support at the point where the beam normally rests. The remainder of the track is lagged to the pole at each spacer with 3/8" lag screws. Use washers and shims to make the track as level as possible.

The hoisting mechanism requires another pulley at the top rear of the pole. This pulley was welded to a longer piece of metal and fastened to the bolt *G*, and lag bolted again at a point below *G*. Obviously, this pulley, like the one at the top of the track has to clear the top of the pole.

The winch used is a discarded arc light winch with a ratchet and pawl locking system and a removable crank. It has a drum diameter of about 8 1/2" with ample cable capacity. The winch was lagged to the rear of the pole about seven feet above ground level to keep it out of the reach of

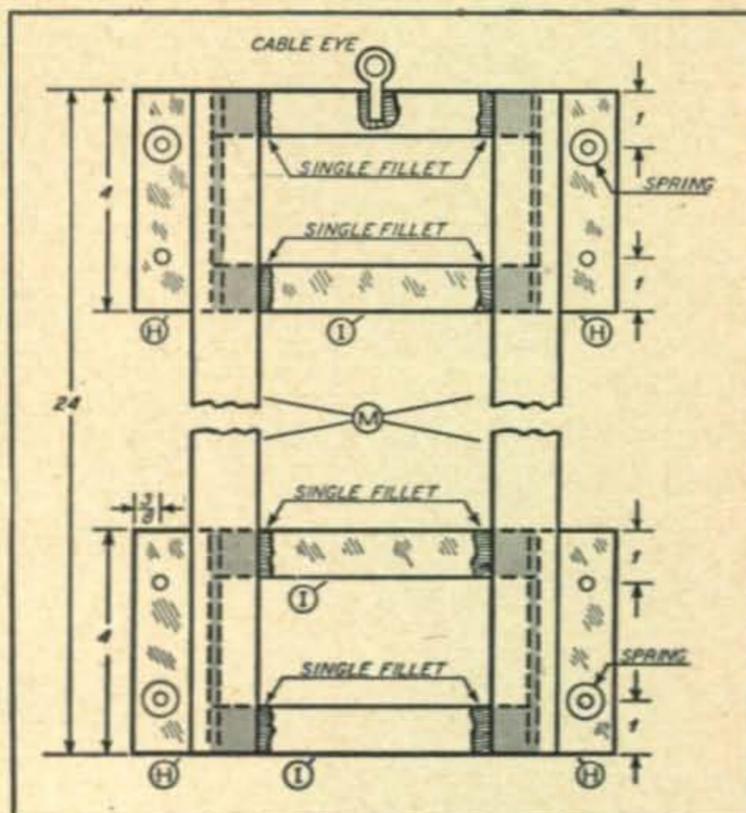


Fig. 4. Front view of the dolly tracks on which the beam rides. A cross-section view is shown in Fig. 3. The cable eye, fed with a good grade of galvanized cable, is attached to the pulley at the top of the track.

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small children. After several cable changes, the most satisfactory cable was found to be 1/8" Roebing 7x19 Pref. Galv. Aircord.

The coax cable and beam control cables are made long enough to allow the beam to be raised and lowered without interference. To lower the beam it must be rotated to a predetermined position that allows the elements to clear the pole. The beam, of course, cannot be rotated in the down position.

## THE FOUR-IN-ONE

(from page 27)

of feed-through insulators. High voltage is fed through the chassis in the same manner. Amphinol 75-ohm Twin Lead is used for connecting the r-f output pick-up coils to the band switch. Note that they are lashed to the phenolic strip mounted on the band switch and terminated at the points mounted on the plate tuning condensers. Connection to the band switch is made with buss-wire.

The wiring of the under side requires little explanation. The filament, d-c and grid circuit wires are cabled together as shown. Leads from the grid condensers to the grid coil socket are very short (about 3/4" long).

### Tuning and Operation

Select any band for operation. With tubes and grid coil in place and the plate voltage off, connect suitable grid drive to the respective coax input at the rear of the chassis.

It has been found from practical experience (operating 24Gs for about three years on 20-meter phone) that at a plate input of about 1000 to 1100 volts at 150 ma, a minimum grid current of 30 ma is required for efficient phone operation. This means that if you intend to drive any one of these units with an 807, an input of approximately 50 watts will be required to that tube (with 807 doubling). With the variable 1000-ohm resistor at maximum value, adjust R1 for maximum grid current, the average value of which will be 40 ma.

Neutralize the tubes in the orthodox manner, making sure the grid leads are crossed.

It was found necessary to remove two turns from each of the 80 and 20-meter tank coils. Connect a dummy lead across the antenna terminals. (A 100-watt bulb is suggested.) Another 100-watt bulb should be connected in series with the high voltage and the r-f pickup coil all the way out. No trouble should be encountered in loading the circuit to 150 ma.

The tuning procedure is the same for the other stages except grid current is adjusted by changing the resistance of the variable resistors R3, R5, and R6.

Before changing bands, switch off high voltage and connect excitation to correct input.

The 80-meter unit may be operated on 40 by substituting the correct coils and removing the vacuum capacitor.

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**NEW Ham Band METER SWITCH** 7 deck 5 pos HV Loss CERAMIC.ThruOut..\$1.49

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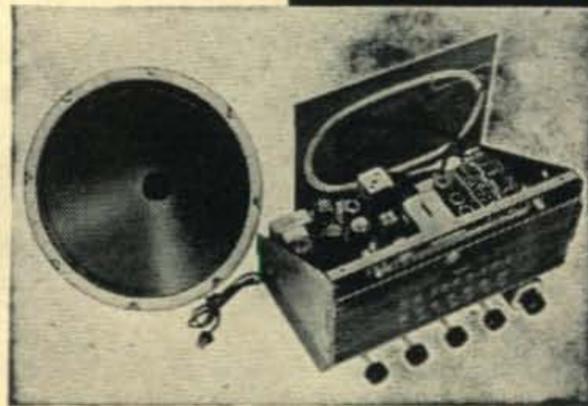
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- Here is a fine radio, in chassis form, to please the most discriminating music lovers.
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- Features, 12 tubes plus rectifier and tuning indicator; drift compensated circuit for high frequency stability; tuned RF on AM and FM, high fidelity push-pull audio; 13 watts power output; wide range 12" PM speaker; smooth fly-wheel tuning; phono input provision; separate AM and FM antennas.

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TEL. BUTTERFIELD 8-2300

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# Classified Ads

Advertising in this section must pertain to amateur radio activities. Rates: 25c per word per insertion for commercial advertisements, 5c per word for non-commercial advertisements by bona fide amateurs. Remittance in full must accompany copy. No agency or term or cash discounts allowed. No display or special typographical ad setups allowed. "CQ" does not guarantee any product or service advertised in the Classified Section. Closing date for ads is the 25th of the 2nd month preceding publication date.

NATIONAL RACK MODEL HRO-7R receiver complete with coils A-B-C-D-E-F. Used only several months, \$275.00. Webster model 81 wire recorder with spools for 15-30-60 minute recordings, new, \$85.00. Instructograph code machine complete with tapes, oscillator type, \$25.00. All prices f.o.b. Gainesville, Ga. Wm. E. Fennell, P.O. Box 672, Gainesville, Ga.

WILL TRADE Philco 2500 projection television for Collins 75A1, 32V1 or other factory built equipment. What have you? W9ECC, 161 Main St., West Bend, Wisconsin.

NEARLY NEW HALLICRAFTERS SX-43 receiver with matching R44 speaker. \$140.00. C.O.D. Edw. Freiburg-house, W5NXI, 1620 Van Buren, Amarillo, Texas.

ART-13 TRANSMITTER in good condition. BC-348 RECEIVER, converted a-c power supply, noise limiter, S-meter, extra audio stage, universal output transformer, and with 10 meter broad-band converter. Best offer takes either or both. All letters answered. W5NKL, 661 Robert Drive, Corpus Christi, Texas.

10-METER 3-ELEMENT BEAMS—\$19.50. Send card for free information. Riverside Tool Co., Box 87, Riverside, Illinois.

AMATEUR RADIO LICENSES. Complete theory preparation for passing amateur radio examinations. Home study and resident courses. American Radio Institute, 101 West 63rd Street, New York City.

QSLs. Samples for stamp. Henry L. Carter, Jr., W2RSW, 747 S. Plymouth, Rochester 8, N. Y.

HOTTEST SURPLUS LIST in the country. Electronics-hydraulics-aircraft gadgets. Dick Rose, Everett, Wash.

QSL's. SWL's. MADE the way you want them. Samples? W9BHV QSL Factory, 857 Burlington, Frankfort, Indiana.

WANTED: AN/ART-13, BC-348, RTA-1B, AN/APN-9, R5A/ARN-7, AN/ARC-1, AN/ARC-3, BC-788-C, I-152, MN-26, test sets with TS- or I- prefix, dynamotors, control boxes, transmitters, receivers, power supplies, etc. State quantity, condition and best price first letter. HEMU Electronics, Box 105, New Haven, Conn.

QSLs, SWLs, quality cards. W5FAY Press, 6118 Goliad, Dallas, Texas.

FOR SALE: Collins 30K transmitter, complete. Used about 40 hours. Cannot be told from new both inside and out. Guaranteed perfect. First \$1200. F.O.B. Wakefield, R. I. Transmitter Exchange.

HT-19, never used, complete, \$275.00, express collect. J. Redlingshafer, W9FRH, 1429 So. Crescent Avenue, Park Ridge, Illinois.

WHY WAIT? Join N.A.R.C. today. The best \$2.00 investment ever made for the good of the amateur. Send your application with handle, QTH and class of license to: National Amateur Radio Council, Inc., 610 South State Street, Champaign, Illinois.

QSLs! G. L. Taylor, Sumrall, Mississippi.

BARGAINS—NEW AND USED TRANSMITTERS—receivers—parts. Globe King \$299.00; new 150 watt phone \$199.00; 60 watt phone \$99.00; Globe Trotter \$57.50; R9er \$15.00; Millen exciter & VFO \$25.00; TR-4 \$19.95; HT-9 \$295.00; MB-611 \$45.00; TR-1, 801, 809, 829 \$29.50 ea.; NC-173, SX-28 \$149.00 ea.; NC-240C, HQ-129X, HRO \$139.00 ea.; RME-45, SX-25, DB-22A \$49.00 ea.; S-38 \$29.95; S-41 \$22.50; many others. Large stocks—trade-ins. Free trial. Terms financed by Leo, W0GFQ. Write for catalog and best deal to World Radio Labs., Council Bluffs, Iowa.

WANTED: 10 cm waveguide and other 10 cm equipment. State condition, quantity and price. All inquiries answered. Mark Wayman, 511 Ceres, Fontana, California.

BC610 WITH SPEECH AMPLIFIER and spare set of tubes, perfect condition. First \$500 gets it. 2½ kw 110 v. gasoline generator, perfect, \$125. f.o.b. C. Wheatley Cleveland, W4FZN, Fairhope, Ala.

QSLs? SWLs? Distinctive? Cartoon? DeLuxe? Photographic? Samples 10c. Sackers, W8DED, Holland, Michigan.

ALUMINUM TUBING, angles, sheets, fittings for complete beam. Write for list. Willard Radcliff, Fostoria, Ohio.

ARR-7 TECH MANUAL badly needed. Please write W0NFA, Chester, Franz, 2110 Parkridge Ave., Bentwood, Mo.

WANTED: 300-1000 megacycle or 500-900 megacycle equipment. ASB and APR receivers, LAE signal generators, slotted lines, UHF tuning units, etc. Give details and price. W6LWP, John Poole, 2140 Ocean Blvd., Balboa, California.

TRADE: Mono-key for Gon-set 3-30 converter. Weldon T. Stripling, W5NZD, Mineral Wells, Texas.

WANTED: Recent radio course complete, Lincoln School, Nebraska. Floyd, 850 West End, New York City.

TRADE Bolex H-8 w th foc. mt. lenses Fl. 9, 1.5, 3.5; ½", 1" and 1½" respectively with case, condition good, for xmitter or will sell for best offer over \$300.00 M. L. Skelton, 202 Conklin Ave., Binghamton, New York.

WANTED: Several 300-1000 megacycle tuning units for APR-1 or APR-4 receivers. Also want ASB-5 receivers. Advise number, condition, price. W6LWP, 2140 Ocean Blvd., Balboa, California.

WANT SIGNALS INSTEAD OF HISS? Get proved idea-packed circuit diagram and home construction suggestions for a high performance, very low noise level receiver. Use elements to improve your receiver or as a hot converter. Send one dollar to Dan Poteet, W2UDT, P. O. Box 7, Little Silver, N. J.

COMPLETE STATION! Hallicrafters HT-9, hand microphone, key, coils for 10-20-40-80. Black wrinkle finish. Being operated nightly. Hammarlund HQ-129X with matching speaker. Very nice condition. Both for only \$299.00. Will sell separately. ATR inverter 110 d.c. to 110 a.c., 60 cycle. 250 watts intermittent. Used 10 hours. Sacrifice \$18.00. Please write or phone for appointment. Seldom home before midnight. Telephone evenings only. Bayside 9-7423W. Suito, W2ZCS (Ex-W9HJS), 58-47 215 Street, Bayside, New York.

TRANSMITTER FOR SALE to nearby buyer. Bargain! 150 watt fone, 200 c.w. W8DED, Holland, Michigan.

W1HJI QSLs—SWLs are tops. Try some! Samples, Box 32, Manchester, N. H.

BEST OFFER: Amateur radio station ready to go on air. A 350 watt input xmt NBFM fone/c.w., all bands, new, 813 & 807 tubes PP, 4 large meters, gray crackle rack 30" x 16" x 20". Magazines: QST '42-'47, Electronics '45-'48. Radio math books, Ghirardi, Cooke, W. L. Everett. TR 2-4550.

BARGAINS: New and reconditioned Collins, National, Hallicrafters, Hammarlund, RME, Millen, Meissner, Meck, etc. Reconditioned S38 \$29.00, S40 \$59.00, SX43 \$139.00, SX42 \$199.00, NC57 \$69.00, HQ129X \$129.00, DB20 \$29.00, RME45 \$99.00, HFS, NC173, NC183, HRO7, NC101X, DB22A, HF-10-20, VHF152A, RME69, S20R, SX25, HR6, HT9 BC610, other receivers, transmitters, VFOs, etc. Terms. List free. Henry Radio, Butler, Missouri.

WHERE DO YOU GET PERSONAL ATTENTION and prompt service? At northern New England's foremost amateur radio supply house. Carl Evans, W1BFT, Evans Radio, Concord, N. H.

FOR SALE: SCR-522's, perfect condition, \$24.00. Write George Copland, Box 722, Gunnison, Colorado.

FOR SALE: 400 watt c-w transmitter, PP 35TGS final. Super Pro. 1.25-40 mc. Write for details. W7IGE, Route 3, Nampa, Idaho.

MUST MOVE. Selling out all transmitting gear plus BC348Q receiver. Enough parts for 750 watt rig including power supply. \$180 takes it all, send for list. K. C. Bruce, W6BKV, 1158 Sevier Ave., Menlo Park, Calif.

FOR SALE, CHEAP, transmitters, receivers, antennas, parts. Write for list. W4OHM, Warren Rudolph, Winchester, Va.

BC459A, 750 volt supply, Globe Trotter, coils for 40 and 10, crystals. Make offer. Roy Elkins, 812 Walker, Elizabethton, Tenn.

SELL: Supreme AF100 transmitter \$375.00. Hallicrafters S29 Sky Traveler receiver \$40.00. Scott SLR-F receiver 80 kc. band converted for BC. \$125.00. R. S. Adams, W5OKQ, P. O. Box 1729, Meridian, Miss.

BC 610E COMPLETE converted all bands, antenna tuning unit. \$500.00. Ivan Cidlik, 3825 Jay, Lincoln, Nebraska.

WE BUY your used equipment for top prices. Contact The Overbrook Company, Overbrook, Massachusetts.

A RARE OPPORTUNITY. Due to combining of stations several major components of W2IOP are for sale. Included is the Gold Plated Special and Lazy Kilowatt. For details write, wire or phone Larry LeKashman, Ike Place, Woodmere, L.I., N.Y. Franklin 4-3280.

# THE YL'S FREQUENCY

(from page 37)

perience. Sixteen years ago, Louise and her Dad took a two-year cruise on a 65-foot schooner all through the South Seas. Her Dad took a portable along, and she acted as second op of W1ZZA.

"I've been licensed since 1940," writes Louise, "but my Dad, W7DXV (ex Mexican BX—first ham in Mexico), is the real radio ham, and what I know is due to him. My two boys, ages 11 and 7, are studying the code and know it well already. They are quite enthusiastic about it, and I feel sure they'll follow in their grand-dad's footsteps."

## YLRL Callbook

From Lenore, W6NAZ, we hear that the YL Callbook, which she and Sandy, W6YRL, have been putting together, is now available. In addition to listing all YLRL members, the booklet will include a paragraph of interesting details on every member who completed her questionnaire—how each YL became interested in ham radio, the call of her OM, her gear, preferred operating frequencies, awards, etc. Since the project has to pay its own way, the cost of the booklet will be \$1 per copy, with any extra proceeds going into the YLRL treasury. About 80 pages in size, only 400 copies of the book are being printed, so first come, first served. While of interest to all, the directory will be of particular benefit to those seeking WAS/YL. For your copy write to YLRL Secretary-Treasurer Carrie Jones, W9ILH, 606 East 8th St., Alton, Ill.

A busy gal, that W6NAZ. Making up the YL

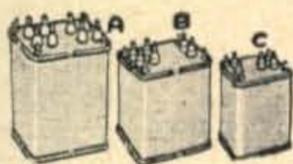
Callbook was just one more detail in a hectic schedule. Writes Lenore: "All through January and February I did about 6758493 TV shows. Then I was up for the part of 'Blondie'—which I didn't get (Ann Rutherford), but it kept things exciting for a while. Now I am back to one TV show a week only—the dear ole Mailbag of Household Tricks—which still seems to keep me busy." We hear, too, that Lenore and her OM are looking for a nice, quiet, remote mountain top for a QTH far removed from TVI!

## "Lapsus Calimi"

It took a ham all the way down in Sao Paulo, Brazil, to catch this one—or at least to bring it to our attention. PY2JU writes: "With great interest I read the report of your visit to the W6s in the January '49 issue of CQ. Living in a 'Land of Sunshine and YLs' myself, I had the privilege of visiting W6-land during November last. My visit to California was also 100% FB. I was the guest of W6LQN in Santa Monica, who made me acquainted with several other OMs, but—no YLs! I noticed in your story, however, that Vada Letcher's call, W6CEE, also is applied twice to Violet Sasse (see pages 29 and 90). Is it possible in the U.S.A. that two different persons may use the same call letters, or is it, perhaps, a *lapsus calimi*?"

Many thanks for your nice letter, PY2JU, and we must confess that it was indeed a "lapsus calimi." Our apologies to you, Vada, W6CEE, and Violet, W6CBA (did we get it right this time?), for listing the same call for you both—just don't see how it ever did happen . . . must be that "printer's devil" again. . .

## TRANSFORMERS AND CHOKES



115V 60cy. INPUT  
Equip. Conservatively Rated

6.3V/2ACT, 6.3V/2ACT	2.45
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5083: 6.3V/.6ACT, 5V/2A	1.85
5087: 6.3V/1ACT, 6.3VCT7A	2.75
5103: 6.3V/1A, 6.3V/1A, 6.3V/1A	1.95
5123: 6.3VCT/5A, 6.3V/1A	2.25
5127: 6.3VCT/3.2A, 6.3VCT/1A	2.25
7470674: 8.1V/1.5A	2.75
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U10885: 1620VCT/400MA	11.95
U8965: 78V/600MA, 6.3VFI	4.00
15-3410: 800V/40MACT, 760VCT/500MA	6.95
15-3415: 690V/450MA	4.95
5111: 300V/42MA, 300V/42MA, 55V/125MA, 45V/35MA	4.50
5102: 1080VCT/55MA, 6.3V/1.2A, 6.3V/1.2A	5.95
CS5608: 880VCT/150MA, 5V/3A, 6.3/6.25A	4.25
KS8931: 585VCT/86MA, 5V/3A, 5055: 525VCT/75MA, 5V/2A, 6.3V/1.8A, 10V/2A	4.45
6.3/6A	3.95
68G699: 300VCT, 300VCT, Approx. 150 MA	2.25
34J436: 90V, 80V, 70V	2.95
03HY, 2A, \$1.25; 8.5 HY, 125 MA	1.50

Send For List.

**INTER. CONT. BOX**  
BC-606F Metal (4x4x2")  
2"D) Contains: Recep. Jk-34A (Phone) Jk-33A (Mike) 2000r 1/2w Resis. 50K ohms Pot, SPS1 Lum. Tip Sw Term Strip \$1.00



Write for CEC  
Flyer of Bargains  
Galore:

## PRECISION RESISTOR

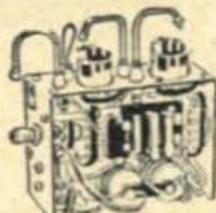
1.01	125	1450	20000
3	128	1900	25000
5	150	2230	30000
5.05	200	4300	33000
10	250	5000	35000
10.1	300	7000	40000
18	430	7500	50000
43.5	468	8500	55000
50	800	10000	57000
75	920	12000	75000
82	1000	17000	Ship type
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Above Sizes Ea. .30c Ten For. \$2.50  
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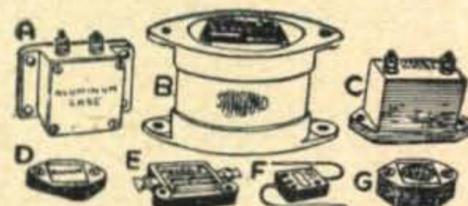
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cy. Price. . . . . \$3.95

**Freq. Mult. Unit**  
ART-13 — Xfmr Assy  
2 to 18 Mc Doubling  
Package set up, for Two  
1625 Tubes. No Coils.  
Complete Assy Less  
Tubes w/ckt diagram.  
Price . . . . . \$9.50



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.1 MFD	6000VDC	2.60	5.00
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2X.5 MFD	1000VDC	.95	1.80
1 MFD	1500VDC	.95	1.80
2 MFD	1000VDC	.67	1.30
4 MFD	1000VDC	.87	1.70
6 MFD	600VDC	.65	1.25
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**H. V. MICAS**  
SEND FOR LISTS OF OTHERS

Fig.	Mfd.	Voltage	Price	2 For
D	.01	1200WVDC	\$0.50	\$0.95
E	.00025	2500TVDC	.29	.55
D	.00004	2500WVDC	.39	.75
E	.000047	2500WVDC	.39	.75
E	.01	500WVDC	.25	.45
C	.002	3000WVDC	1.05	2.00
C	.01	2000WVDC	1.50	2.90
C	.00003	2000WVDC	.49	.95
C	.00009	3000WVDC	.75	1.45
C	.00082	3000WVDC	1.00	1.95
C	.002	3000WVDC	1.00	1.95
C	.005	5000WVDC	1.65	3.25
C	.0004	6000WVDC	1.50	2.95
C	.0006	3000WVDC	1.00	1.95
C	.0008	3000WVDC	.95	1.85
E	.0016	3000WVDC	.65	1.25
E	.000090	3000WVDC	.40	.75
B	.08	1500VDC	10.00	19.00
B	.03	2000VDC	12.00	23.00
B	.045	2000VDC	12.00	23.00
B	.00015	2000VDC	24.00	47.00
B	.0001	2000VDC	24.00	47.00
B	.002	1500VDC	19.00	37.00
C	.006	2500VDC	1.45	2.85
E	.00027	2500WVDC	.35	.63

## FUSES

1 AMP	250V	8 for	\$1.00
10 AMP	250V	4 for	1.15
3 AMP	250V Indicator	4 for	1.00
30 AMP	250V	4 for	1.15
1 AMP	1000	7 for	1.00

Send for List of fuses.

## 932 PHOTO TUBE

This Tube is a Gas Phototube having S-1 Response, particularly sensitive to Red and Near Infrared Radiation. Can be used with incandescent light source. Send for Data.  
Price . . . . . \$1.25

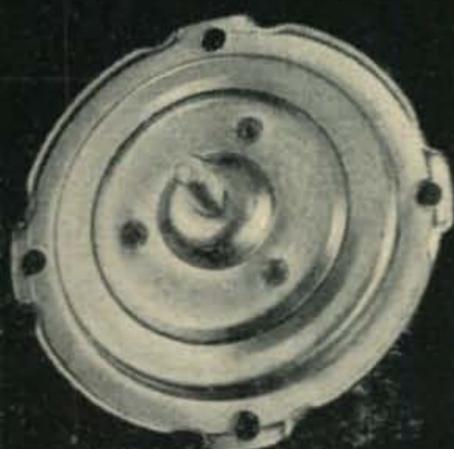


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RADIO TELEVISION ELECTRONICS  
MICROWAVE RADIO SONAR



# NATIONAL

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Standard AN has an insulated coupling for connecting to 1/4" shaft. Drive shaft fits 1/4" knob. Ratio 5-1. Price \$1.80 net.

AVD same as AN except coupling is not insulated. Price \$1.65 net. Many variations available for commercial applications. Write Dept. F. for particulars.

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 MALDEN, MASSACHUSETTS

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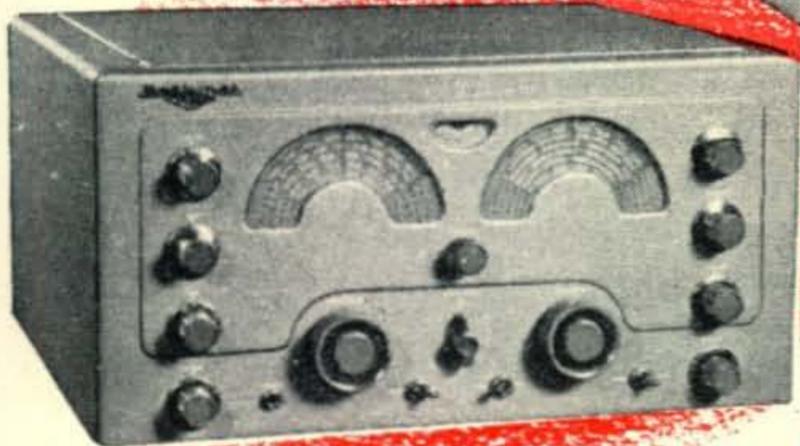
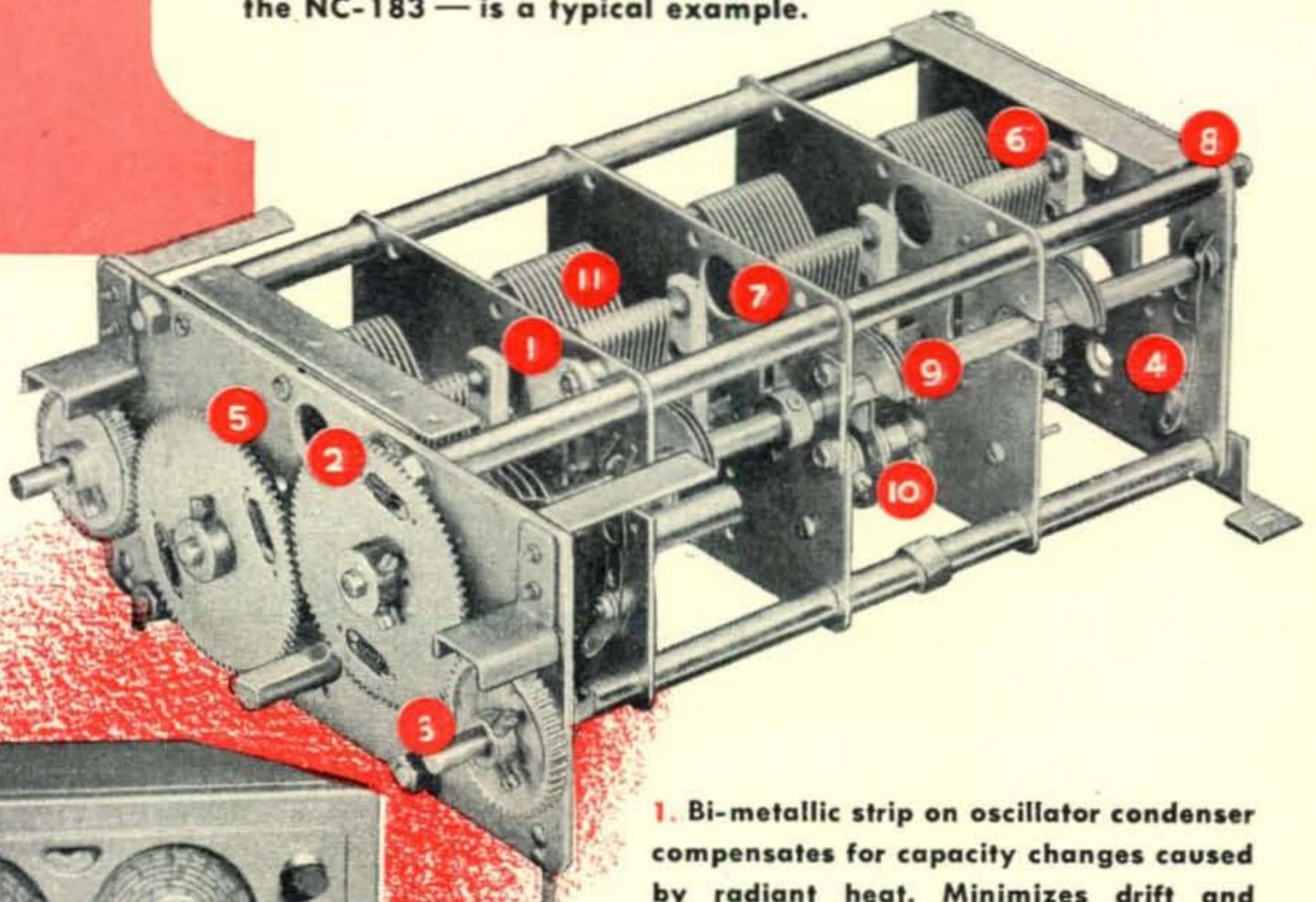
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# 1

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Why do National receivers still establish DX records after 10 or 15 years of service? Why — when you're ready to buy a new National — does your old one bring a higher re-sale price? Because National receivers are National-built (not just assembled), using National components specifically designed to out-perform and out-last commercially available substitutes. This tuning condenser — from the NC-183 — is a typical example.

  
RECEIVERS



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540 kc to 31 mc plus 48-56 mc coverage. Bandsread over entire range — calibrated on amateur bands. Two high gain RF stages. Image rejection 40 db at 30 mc. Variable threshold noise limiter. Crystal filter provides 6 steps of selectivity from 4 mc bandwidth to 250 cycles. S-meter with adjustable sensitivity. Temperature compensation and voltage regulation. Push-pull 10-watt audio stage with phono input and tone control. NFM adaptor socket.

**\$268**

less speaker  
(slightly higher west of the Rockies)

- 1. Bi-metallic strip on oscillator condenser compensates for capacity changes caused by radiant heat. Minimizes drift and warm-up time.
- 2. Spring-loaded gears eliminate backlash.
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- 7. Condenser sections shielded from each other.
- 8. Rigid construction eliminates instability.
- 9. Bandsread construction identical to large condensers.
- 10. Antenna trimmer condenser for line match.
- 11. Plate serration for individual capacitor adjustment.

**National**  
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MALDEN, MASSACHUSETTS



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## In plate-modulated finals it's safety factor that counts . . . and RCA tubes have it

A FINAL AMPLIFIER TUBE in plate-modulated service is subjected to plate voltage peaks approximately *four times* the dc plate supply voltage. Plate voltage and plate current peaks are *double* those encountered in unmodulated service, and input power peaks *four times* as high. No wonder, then, that in plate-modulated finals it's *safety factor* that counts.

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