JUNE, 1949

CQ

The Radio Amateurs' Journal

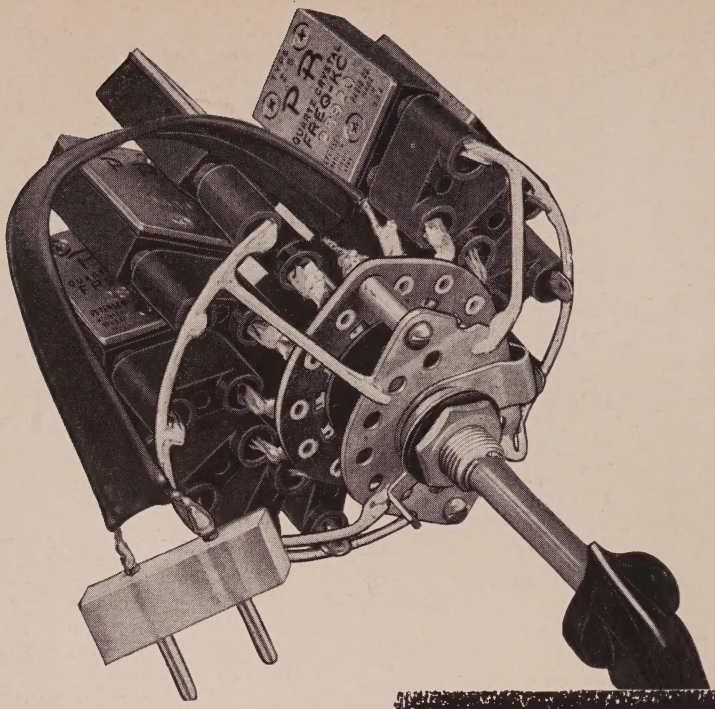
35¢



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!

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RATINGS, CLASS C TELEGRAPHY, ICAS

Heater voltage	6.3 v
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Max plate voltage	600 v
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Max plate input	40 w
Max plate dissipation	13.5 w

TOP 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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Shielding—frequently a problem at the higher frequencies—is handled neatly by a short metal sleeve, which surrounds the input of the tube so completely that no external shield is required.

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Kingston, Pa.: Stull Brothers.
Norfolk, Va.: Ashman Dist. Co.
Philadelphia, Pa.: A. G. Radio Parts Co.; Almo Radio Co.; Consolidated Radio Corp.; Penn Electronics Parts Co.; Radio Electric Service Co.
Pittsburgh, Pa.: Cameradio, Inc.; M. V. Mansfield Co.; Tydings Co.
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GL-802 GL-803 GL-805 GL-806 GL-807 GL 810 GL-811 GL-812-A GL-813 GL-814 GL-815
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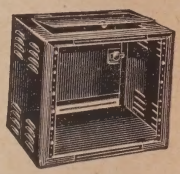
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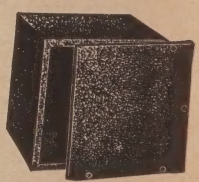
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Vol. 5 JUNE, 1949 No. 6

In This Issue

COVER—One antenna capable of highly efficient performance from 6 to ¾ 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*)

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 to1. 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.

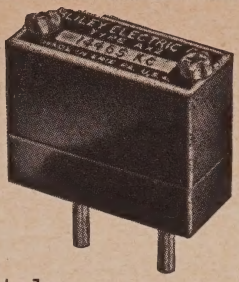
P.S. A New Portable receiver will be announced next month!

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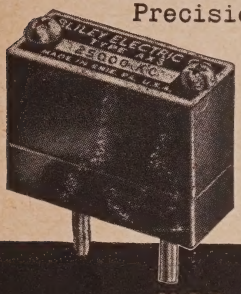


TYPES AX2 and AX3

The first plated amateur crystals.

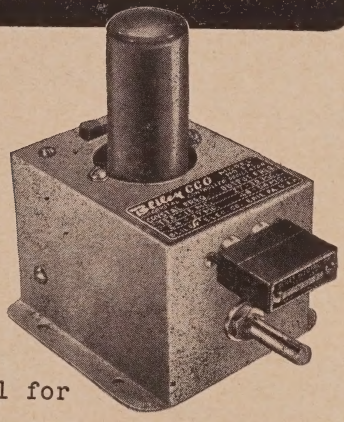
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Precision calibrated.



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Feenix, Ariz.

Deer 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*)



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National NC-57	89.50
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Recent technical achievements make the 450T a still better tube. Adoption of the Pyrovac plate and a non-emitting grid have amplified this already rugged tube's ability to "take it." Life expectancy and overload handling qualities have been increased multifold.

Comprehensive technical data on the Eimac 450T are immediately available . . . write direct.

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ELECTRICAL CHARACTERISTICS

Filament: Thoriated tungsten	
Voltage	7.5 volts
Current	12.0 amperes
Amplification Factor (Average)	38
Direct Interelectrode Capacitances (Average)	
Grid-plate	5.0 μufd.
Grid-filament	8.8 μufd.
Plate-filament	0.8 μufd.
Transconductance (I_b = 500 ma., E_b = 4000v.)	6650 μmhos

MAXIMUM RATINGS
Radio Frequency Power Amplifier and Oscillator
Class-C Telegraphy (Key-down conditions, 1 tube)
Frequencies below 40 Mc.

D-C Plate Voltage	6000 Max. Volts
D-C Plate Current	600 Max. Ma.
Plate Dissipation	450 Max. Watts
Grid Dissipation	65 Max. Watts

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217

ZERO BIAS

EDITORIAL

On 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 than 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.

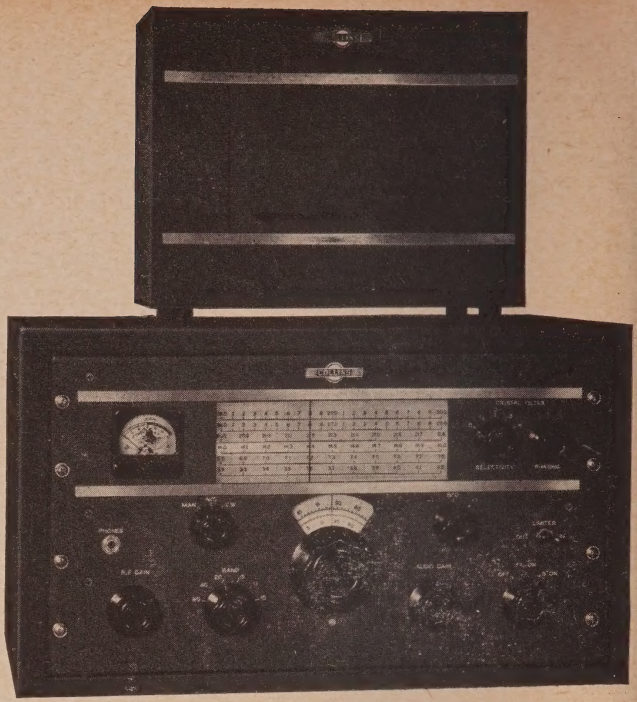
3. The receipt of the aforementioned items was not itself the occasion for the Commission to commence consideration of the fundamental and controversial issues involved in the proposals that have been received. However, the receipt of these items did serve to point up the timeliness of a study of these 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'."

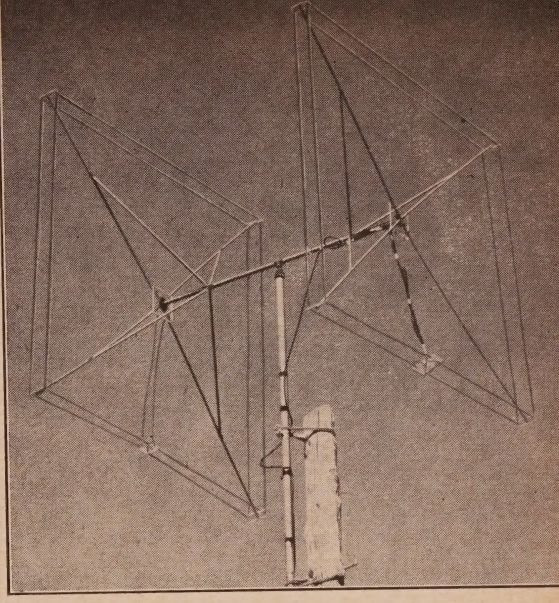
NOTE: If radio is also your business, look to Collins for very high performance in broadcast station equipment, and airborne and ground station radio communication gear.

FOR SUCCESS IN AMATEUR RADIO, ITS . . .

COLLINS

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 rotable 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 MIDDELTON, W5CA*

Constructing the CUBICAL QUAD

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

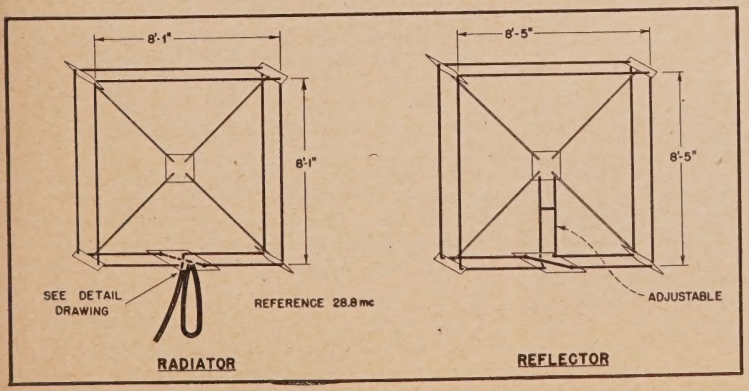
AFTER LISTENING to a lot of talk on both 10 and 20, it appears that there are several different constructional versions of the cubical quad. This article describes one particular design of the array that has withstood the onslaughts of high winds, has a well-balanced appearance, and is a good performer 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 that the effect, if any, is not detrimental. A local station, W5PAW, using only 2½ 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.

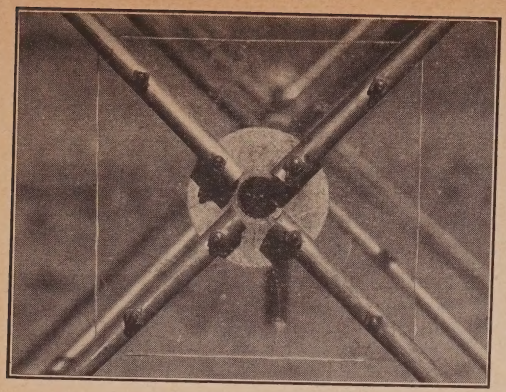
%W5MPZ, The Sandia Radio Club, Albuquerque, N. Mex.

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.



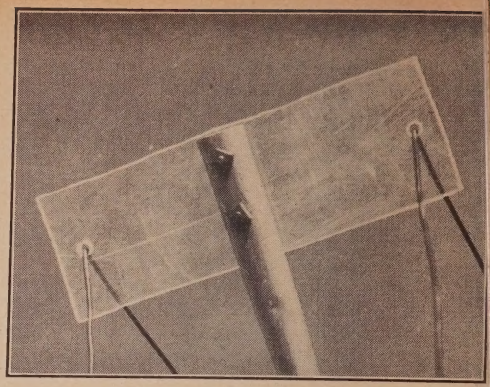


Fig. 1 (left). End on view of the center hub supporting the four arms of the radiator. The pipe flange was centered and the arms run out on diagonals to the corners of the nine inch square piece of Lucite. Fig. 2 (right). View of one of the Lucite spreaders—eight are required. After cutting off the arm 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.

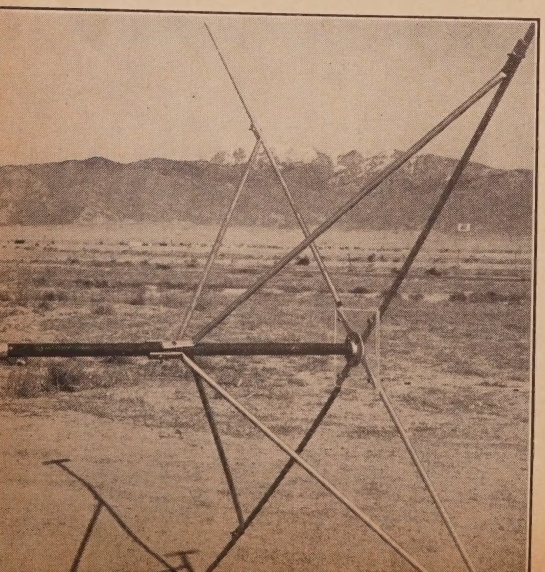
sist of two turns of wire, spaced 5½ inches apart with the cross-over point in the middle of the lower side of the square. The impedance at the feed point is the result of a rather complex set of conditions, but with the wire size and spacing used in this array it will be about 200 to 300 ohms. Since 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.[1] 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 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°. The frequency response is ±250 kc.[2]

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.



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 1½-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.

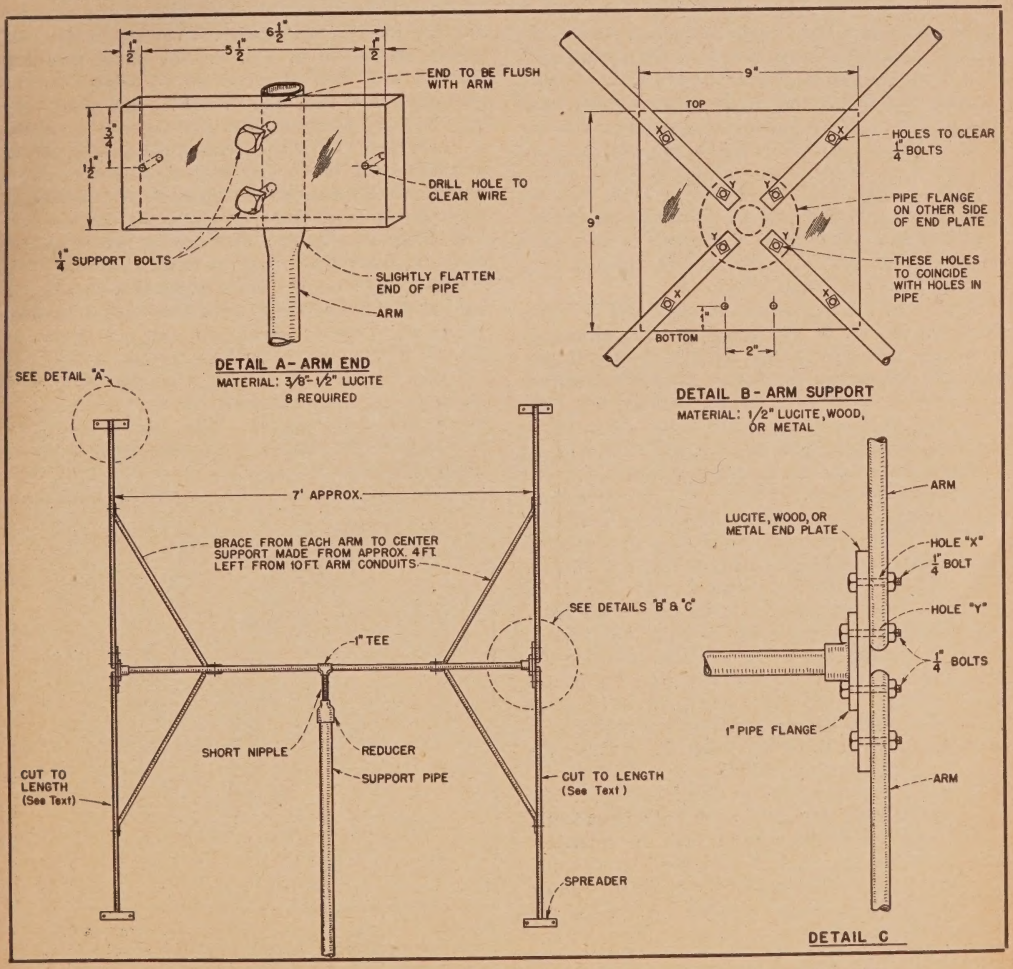
arms 10-feet long. Line up the arm with the diagonal line on the end piece and drill through the other hole and through the arm. Put a bolt through and then assemble the other X frame in the same fashion.

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 ⅜-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 ⅜"
2 End pieces	Lucite, 9" x 9" x ½"
2 Cross-over pieces	Lucite, 6½" x 4" x ⅜"
16 Spreader bolts	1¼" x 1/4" bolts with nuts, lock washers
16 End piece bolts	1½" x ¼" 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.

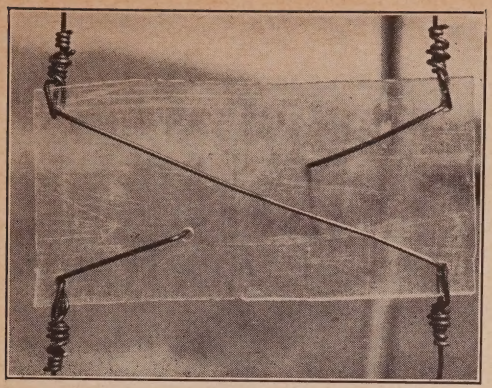


Fig. 4. One of the required two cross-over plates. Both loops are independent and are tightened down at this point. A short piece of wire is then used for the cross-over of one loop to the other. On the radiator, the broken cross-over lead goes to the coax feed. On the reflector it serves as the 2" spacer 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 (¼-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 6½-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 5½-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 ½ 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.

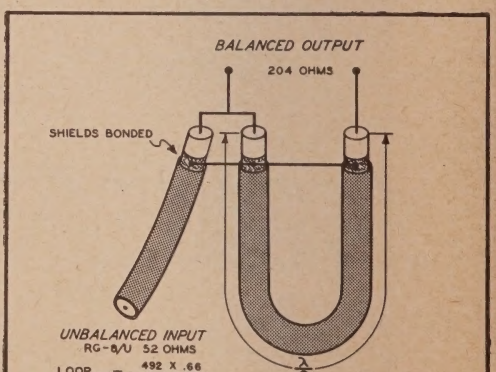


Fig. 5. Method of employing coax feed and the impedance matching transformer with a cubical quad radiator. At 28.8 mc the length of the RG-8/U loop is 11' 5½".

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.

GIVE 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 DXers 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.

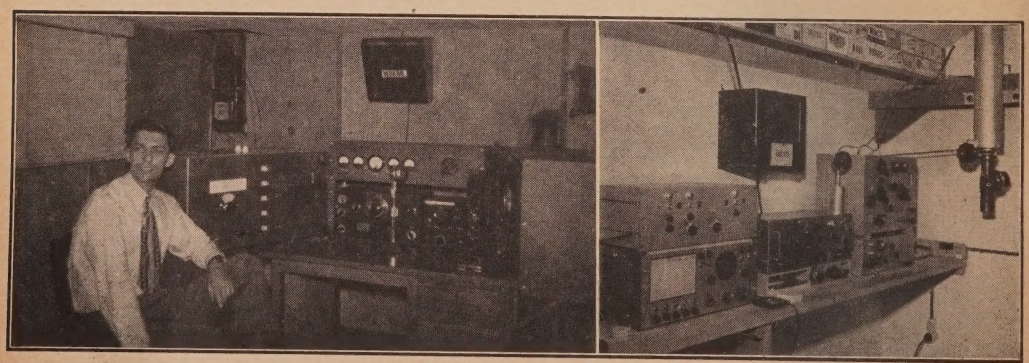
test. Conditions were extremely poor throughout the entire world and, as a result, scores are correspondingly lower than the code participants. For the lucky handful who worked C8KY in Zone 23, all other DX could be excused for the week-end.

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

KL7DE	135

Zones 3, 4 & 5

W1CJH	15,525
W1ZD	7,239
W1NCX	3,348
W1QXE	
W2YOS	9,100
W2IYO	7,938
W2QKJ	7,830
W2IOP	2,501
W2UTH	2,310
W2MA	2,046
W2NMC	1,364
W2SOY	133
W2NNB	35
W2UWK	
W2KZE	
W3DHM	10,440
W3BES	5,865
W3AOA	3,738
W3AER	3,157
W3IL	782
W3EQK	
W4HA	6,426
W4CY	342
W4IWB	144
W4DXI	84
W4CTD	
W4HCQ	
W5HFQ	3,648
W6SA 1	47,790
W6GRL	38,752
W6AM	22,659
W6EPZ	16,796
W6NIG	11,696
W6CHV	10,325
W6YI	8,840
W6MI	1,128
W6WSI	
W7ESK	32,712
W7GUI	13,120
W7MBX	7,695
W8KML	55,875
W8HUD	52,682
W8NSS	5,617
W8OBS	1,431
W9FKH	10,981
W9RBI	4,212
W9DUB	4,056
W9KXK	1,890
W9NII	1,856
W9SES	989
W9CZC	286
W9BZB	
W9WXT	
W9UAZ	
WØANF	7,011
WØAIW	4,455
WØGUV	2,378
WØRNK	
VE1QZ	1,802
VE2IZ	
VE3AEU	
VE4RO	2,345
VE7ZM	18,060
VE7MS	9,296
VE7RP	1,560
VE7IM	

1 W6SA and W6SZY ops.

Zone 6

XE1KE	3,822

Zone 7

TG9JK	7,900
HP1BR	204

Zone 8

KP4ES	34,684
KP4KD	72
KP4EZ	
VP2GB	11,448
CM2SM	1
CM2SB	1

Zone 9

HK1DZ	13,014
HK4EB	8,400
HK4DF	5,463
HK3CU	

Zone 10

CP5FB	3,348

Zone 11

PY2AC	124,068
PY6AG	13,230
PY2NX	9,620
PY3OJ	1,767
PY1AU	24

Zone 13

LU3DH	27,512
LU5BM	11,396
CX3BH	4,920
CX4AB	

Zone 14

G2PU	90,628
G8KP	59,461
G2DPZ	61,976
G2MI	12,354
GM2UU	9,620
D4AXS	71,974
DA2AT	880
F3WV	20,540
F9BO	13,860
F8PQ	1,403
HB9DS	51,415
GW4CX	3,115
PAØRE	17,136
PAØCB	
CT1NT	7,791
CT1SX	6,318
LA9T	8
LA3V	2
LA3K	
LA4R	
EI8P	11,772
EI7M	6,222

Zone 15

I1LW	3,774
I1RC	2,033
I1ADX	
OK1RW	1,536
OK1GA	45
OK1FF	6
OK1CZ	
OK2SO	8
OE7FR	665

Zone 20

ZL1CL	1,560
YR5C	722

Zone 23

C8KY	4,309

Zone 24

C1CH	47,320
C7ST	3,575
VS6AE	4,165

Zone 25

J2AAL	14,652

Zone 29

VK6RU	43,371

Zone 30

VK2WD	456
VK5NW	

Zone 31

KH6IJ	23,200
KH6BA	4,214
KH6QH	1,225

Zone 32

ZL3HC	27,984
ZL1MQ	13,384
ZL4HP	11,040
ZL4GA	6,336
ZL3LC	1,372
ZL1HY	
VR2AP	2,775
VR2AQ	1,512

Zone 33

CT3MN	

Zone 34

ST2FU	2,068

Zone 35

ZD1BD	878
ZD3A	1,296
ZD4AB	6,030

Zone 36

VQ2DH	38,952
OQ5AB	

Zone 37

VQ4ERR	28,224
VQ4SC	10,290
VQ4CUR	5,265
VQ5WCP	240

Zone 38

ZS2CI	54,982
ZS6CT	31,284
ZS5U	12,753
ZS6BV 2	6,952

Zone 40

OX3BC	893

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	28,045
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	323
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
W4KWY	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	78,580
W6EPZ	71,898
W6IBD	61,548
W6OMC	61,084
W6BPD	86,816
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
W9UIG	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	

WØDAE	180,262
WØNUC	92,105
WØAIW 5	68,328
WØUOX	25,662
WØAZT	22,134
WØCFB	20,076
WØSO	19,095
WØBBS	8,844
WØVIP	8,821
WØERI	5,830
WØHSM	3,780
WØFUH	1,400
WØDU	812
WØFID	800
WØERI	62
WØKOW	
WØKGG	
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 WØAIW and WØUQV 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	86
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.

G8RL	23,000
G5BZ	17,589
G8JR	17,242
G6CL	16,500
G3ATU	13,104
G2DYV	12,935
G2AJB	11,773
G2AO	8,424
G4QC	7,718
G8QX	7,502
G6HK	6,615
G2BVN	5,400
G8DA	2,813
G5ND	2,800
G2SO	2,520
G8TK	2,268
G3EIZ	1,666
G8UK	990
G2FZO	
G2EC	
G5RM	
G6XS	
EA1A	
EI9J	83,121
EI9N	87,577
F9BO	36,635
F8TM	19,359
F9BB	16,704
F8EO	16,024
GI6TK	452,454
GI4NU	84,358
GI6YM	10,100
GI2FHN	7,644
GM3CSM	14,750
GM8SQ	7,859
GW3ZV	188,970
GW3JI	29,640
GW4CX	7,128
HB9CX	227,458
HB9AW	178,020
HB9EU	120,100
HB9FI	27,342
HB9FF	5,644
HB9EI	
LB8R	42,330
LA6U	42,201
LA7WA	21,045
LA4K	17,169
LA8J	4,094
LA6CA	1,710
LA7KA	1,161
LA6DA	874
LA6O	779
LA5WA	18
LA3MB	9
LA3V	
LA2B	
LA2OA	
ON4QF	246,246
OZ7EU	59,136
OZ7SN	9,855
OZ5HQ	
PAØRE	228,976
PAØEP	86,888
PAØVB	12,972
PAØIF	9,680
PAØBK	4,680
PAØSJ	2,010
PAØKS	80
PAØCB	
SM6UT	31,700
SM5PA	29,378
SM6DI	10,362
SM6QP	7,590
SM5OL	6,110
SM2GO	4,495
SM5PV	3,614
SM3FY	2,184
SM5WC	1,705
SM3ANG	55
SM5EQ	
SM5IZ	
SM5KX	
Zone 15	
HA4EA	16,055
HA1KK	2,187
I1PL	130,906
I1KN	58,014
I1BCB	2,856
I1ER	1,080
OE1CD	10,260
OE7FR	6,864
OE1AD	6,165
OE1AW	462
OH2NB	70,520
OH2OP	58,450
OH3NB	33,728
OH6NR	9,000
OH5NF	
OH1NY	
OK1HI	102,116
OK1LM	74,529
OK2MV	63,512
OK1RW	37,164
OK1QD	31,185
OK1NS	29,319
OK2SO	26,778
OK3IT	26,676
OK1EA	24,564
OK3SP	19,140
OK1AW	15,788
OK2DD	11,340
OK1YQ	10,001
OK1CX	9,006
OK1WX	6,251
OK1ZB	5,720
OK1UF	4,515
OK1OP	4,410
OK3RR	4,056
OK1ZM	2,520
OK1WY	2,204
OK1UY	1,739
OK1ZW	1,540
OK1SV	1,536
OK1XA	1,288
OK1JQ	616
OK1QZ	336
OK1SI	204
OK1BM	126
OK1GU	50
OK1DZ	4
OK1DE	
OK1IJ	
ZB1Q	
Zone 20	
ZC1CL	118,020
YR5C	56,544
ZC8PM	
Zone 21	
MP4BAB	82,800
Zone 24	
C7OO	2,236
C1BC	1,086
C1JH	273
C1OH	72
C1CH	
VS6AE	16,352
Zone 25	
J2AAL	64,260
J2AHI	40,272
J9ACX	25,668
Zone 27	
KG6DI	259,740
Zone 28	
VK9BI	630
Zone 29	
VK6RF	12,600
Zone 30	
VK2EO	86,784
VK2JX	42,402
VK2GW	38,600
VK2AHB	2,332
VK3CN	25,043
VK3PG	
VK4CG	756
VK4RF	
VK5FM	8,775
VK5KO	
VK7LJ	1,827
Zone 31	
KH6IJ	259,483
KH6MI	117,264
KH6QH	89,274
KH6LF	17,292
KH6LG	12,544
KH6BA	12,338
KH6PY	4,680
KH6PM	2,828
KH6QK	2,508
KH6QS	2,160
KP6AA	128,112
8 ZL4GA, ZL4FO and ZL4BQ ops.	
Zone 32	
ZL4GA 8	152,590
ZL1MB	116,106
ZL1MQ	23,598
ZL3AB	10,500
ZL3CC	6,909
ZL1HY	
ZL1CI	
Zone 33	
CT3AA	1,911
CT3AB	
CN8AG	2,850
FA3JY	101,640
Zone 35	
ZD4AB	22,951
Zone 36	
FE8AB	29,325
VQ2GW	18,260
Zone 37	
CR7AF	7,049
CR7DF	1,875
CR7AY	476
VQ4SGC	21,417
Zone 38	
ZD9AA	11,000
ZS6CZ	162,936
ZS6BV	40,590
ZS6DZ	9,812
ZS6HM	210
ZS6QA	
ZS6RE	
ZS6KK	
ZS6HO	
ZS6CT	
ZS2X	
Zone 39	
VQ8AY	3,174
Zone 40	
OX3BC	92,820
TF3EA	58,000
TF3AB	10,816
TF3SF	8,250

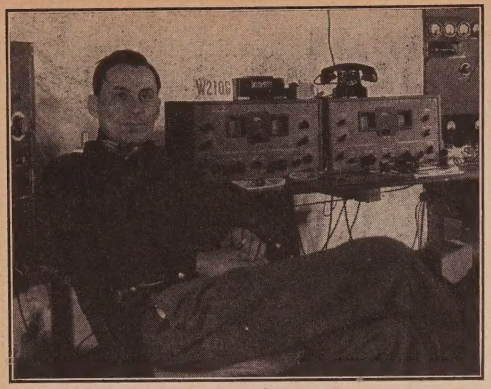
was handled by 750 watts. For receiving a Super Pro and HQ-129X were used. The amazing thing about W2IQG's performance is the fact that ordinary half-wave dipoles were used on all bands except 20. On 20 a ground plane vertical was used.

In the one operator class, galloping close on the heels of W2IQG and staff, is a man no contest is complete without. W4KFC, Vic Clark, worked 75 countries in 31 zones and made 433 individual contacts. With a multiplier of 154, his final score is 277,736 points. A 700-watt rig was used on all bands except 80 and 40, which were adequately covered by a 300-watt transmitter. Vic uses a BC-348 and converter for receiving. For radiators an end-feed Zepp on 40 and 80 and a 2-element rotary on 10 and 20 were employed. In answer to our query about other operating aids Vic's classic "cooperative XYL" should promise many more successful events aided and abetted by the better half.

Fourth and fifth world high scores are so close together both numerically and geographically that it almost looks like collusion. KG6DI, Clark W. Cox, with 665 contacts, 58 countries, 28 zones, and a multiplier of 117 amassed 259,740 points. KH6IJ, Katashi Nose, with 660 contacts in 53 countries and 28 zones with a multiplier of 113 totaled 259,483 points.

Topping 200,000 points were a handful of other top-notch world-wide DXers including: W6SZY (W6SZY and W6SA operators), 231,105; PAØRE, 228,976; HB9CX, 227,458; PY2AC, 205,140; and W8WZ, 200,250.

In the 100,000 class, a performance that took considerable operating ability, were a somewhat larger contingent who'll undoubtedly be shooting for top honors in future contests. Stations scoring over 100,000 points are: W2FBA (W2FBA and W2PUD operators), 192,072; GW3ZV, 188,970; W8JIN, 187,354; HB9AW, 178,020; W2BXA, 177,840; CE3AG, 176,252; W6GRL, 169,680; ZS6CZ, 162,936; W9IU, 137,175; W2PWP, 133,942; W6RM, 132,854; I1PL, 130,906; WØDAE, 130,262;



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.

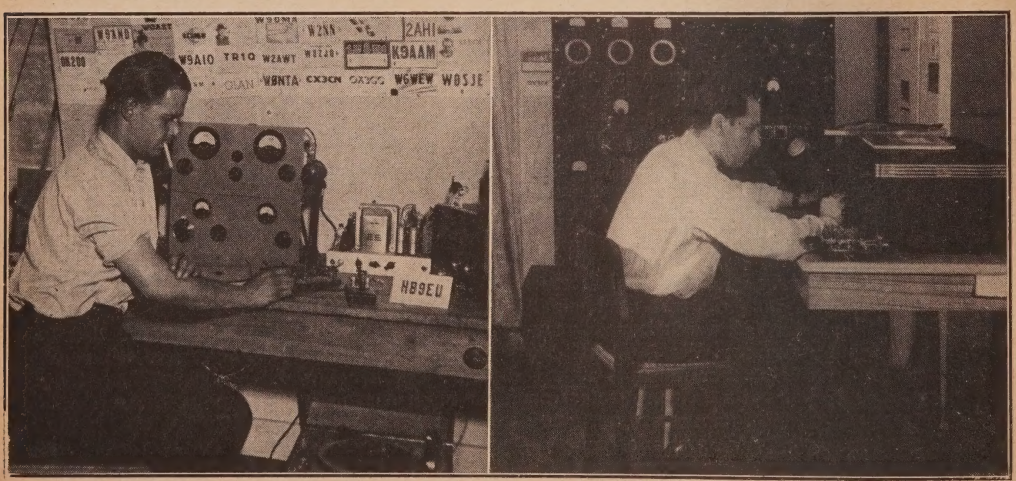
WØANF—The contest is perfect as long as it is for one week-end only. *W2UTH*—Would be easier if the DX station would say on what frequencies he was listening. That would avoid QRM all over the band. *W6MI*—Please attempt to get foreign stations to indicate approximate receiving frequency. *W6YI*—Conditions 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!

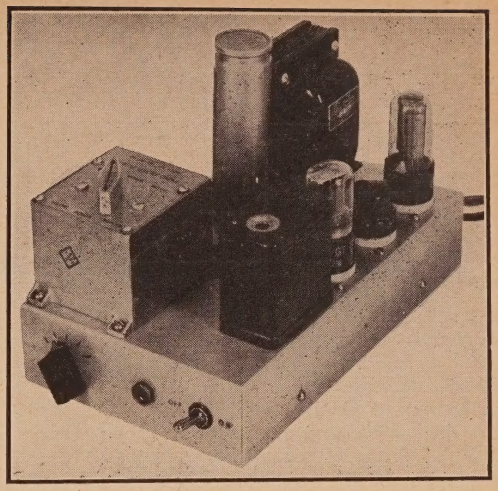
ZL1MB—Think each call area in U.S.A. should in future be counted as separate countries; also Canada. *PAØEP*—This contest has been one of the best I ever worked in. Thank you so much for sending me the log sheets. *GY6YM*—Definitely the best contest yet. Let's have two week-ends next time. *G6HK*—A very 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, I1RC, 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, W1RBK*

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

DURING 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, W1RBK 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[1] 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

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1 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

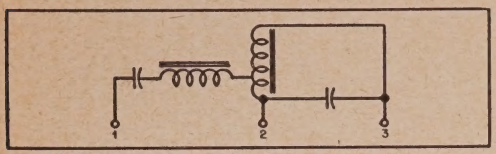


Fig. 1. Basic circuit for 70472 series audio filters.

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[2] 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 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

2 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.

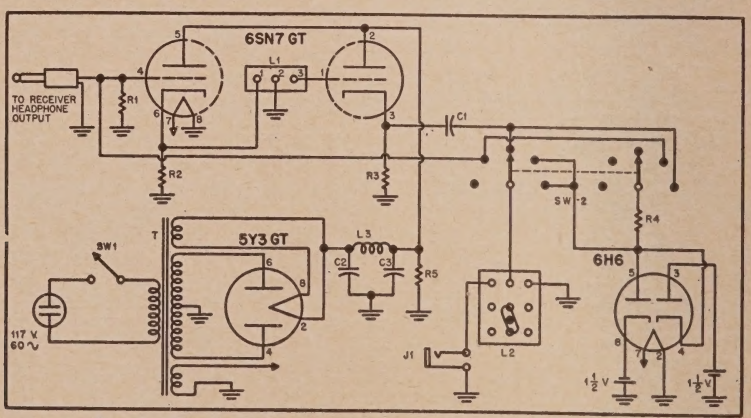
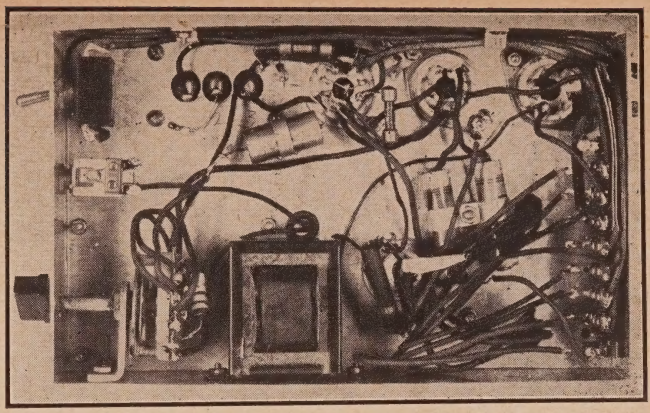


Fig. 2. Circuit diagram of the complete dual audio filter.

C1—.05 μμf, 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

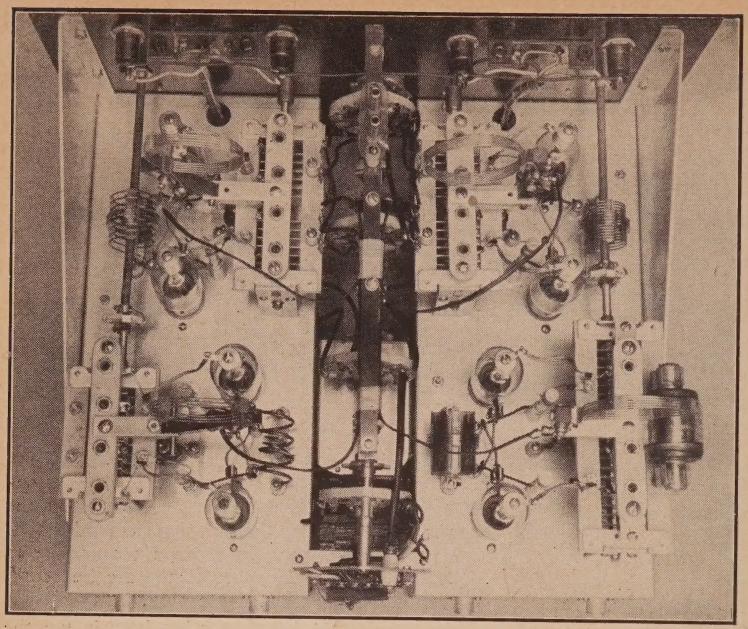
The Starved Rock Radio Club will hold a hamfest on June 5 at Boy Scout Camp Ki-Shau-Wau near Starved Rock State Park, Ill. There will be entertainment, speakers, exhibits and prizes, with lunch available on the grounds. Registration $1 in advance, or $1.50 at the gate.

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.

EVER 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. Bandswitching 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-

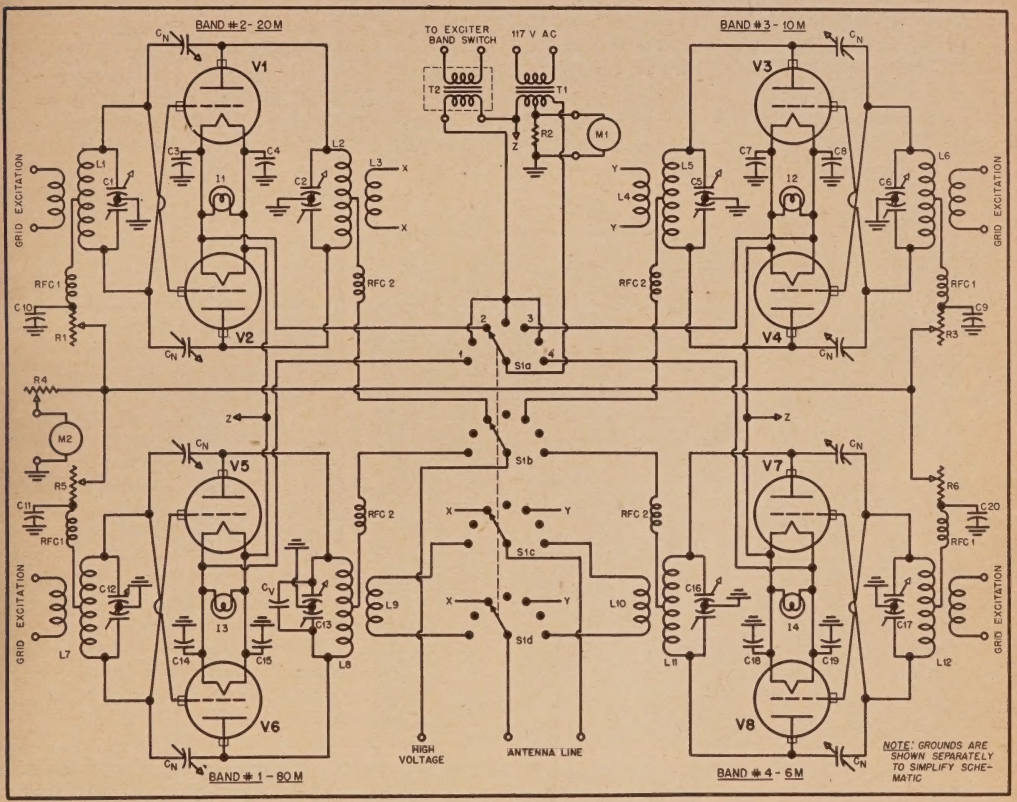


Fig. 1. Schematic diagram of the multiple bandswitching finals.

C1, C6—Split-stator variable, 50 μμf per section (Hammarlund HFD-50).
C2, C5—Split-stator variable, 50 μμf per section (National TMH-50D).
C3, C4, C7, C8, C14, C15, C18, C19—.01 μf, tubular.
C9, C10, C11, C20—.01 μf, mica.
C12—Split-stator variable, 100 μμf per section (Cardwell EU-100AD).
C13—Split-stator variable, 75 μμf per section (National TMH-75D).
C16—Split-stator variable, 35 μμf per section (National TMH-35D).
C17—Split-stator variable, 15 μμf per section (Hammarlund HFD-15X).
C_N—.5-4 μμf, neutralizing (National NC-600U).
C_V—Vacuum capacitor, 50 μμf, 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.
RFC1—2.5 mh, 125 ma, r-f choke (National R100).
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 8¾" x 19" x ⅜" 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 ½ 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.

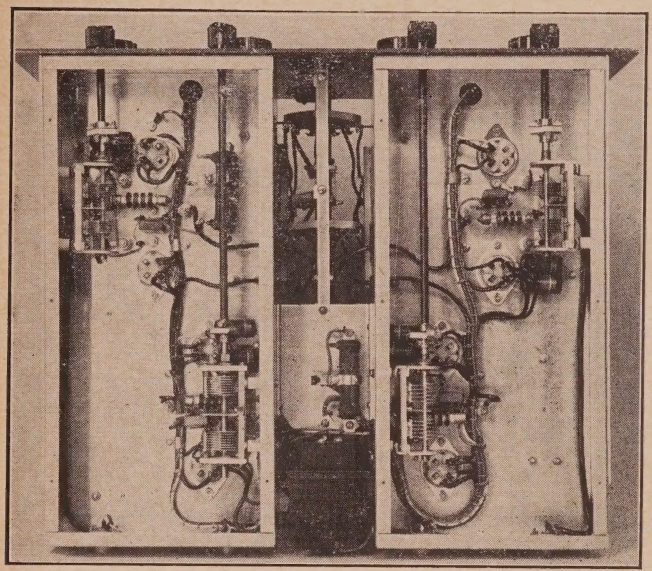
The chassis are standard 7" x 15" x 3" aluminum. (Drilling aluminum is easier on the nerves and hands). In our installation, the unit is mounted in a relay rack cabinet which is 16 inches deep. It may be necessary to use a shorter chassis in other applications. This can be done easily without cramming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

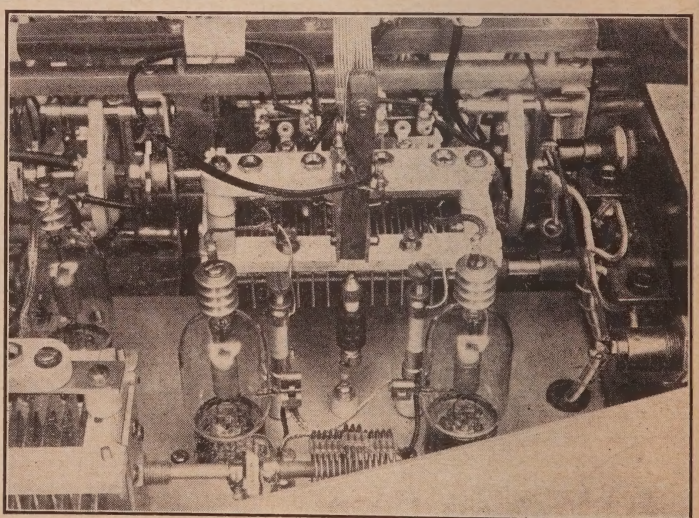
The parts used were those which were on hand, others may be substituted without any sacrifice of results. All plate circuit tuning condensers are National type TMH. Note that they are mounted with homemade brackets. All rotors are grounded.

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.

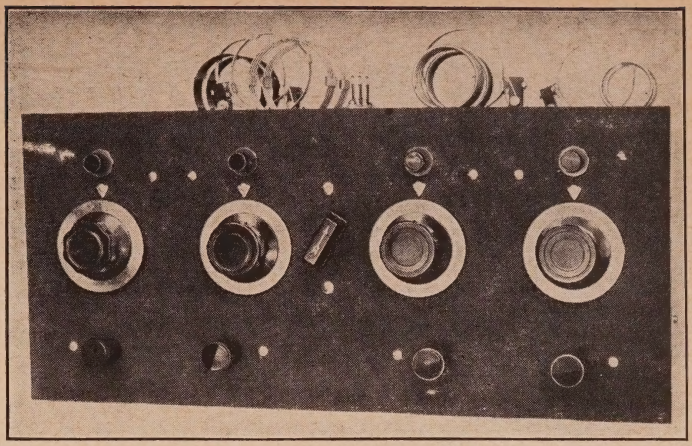
All grid coils are National type AR-16 with fixed center links. They plug into National type XB-16 coil sockets which are flush mounted. Do not get nervous because the axis of the plate and grid coils are in the same plane. Absolutely no trouble was encountered. Notice the crossed grid leads in the close-up 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 $\mu\mu$f per section. You will probably recognize the 50-$\mu\mu$f vacuum capacitor shunted across the condenser as one from surplus equipment. A couple of fuse clips used for ⅛ diameter ferrule type fuses and ¾ 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 ⅜" high by ½" 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 (⅜ x ⅜). Use Millen type 39006 couplings. They compensate for side play and misalignment better than any others. In almost all commercial switches the detent mechanism consists 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*)

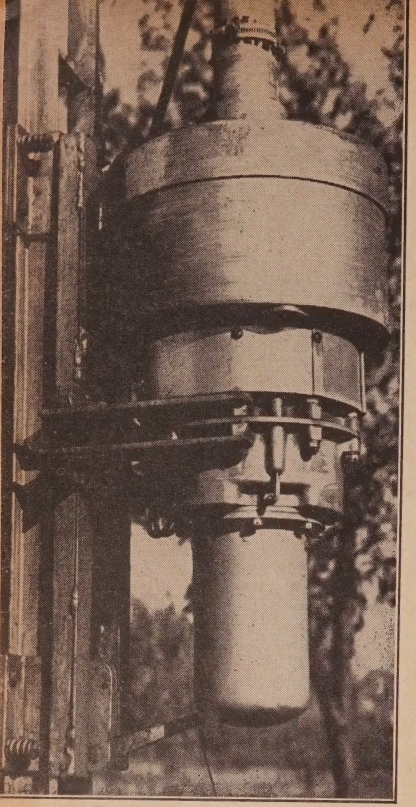


Fig. 1. The dolly and beam rotating motor. The track runs the entire length of the telephone pole. A cable winch on the other side of the pole is used to raise and lower the beam. The lever at the bottom is an optional stop mechanism.

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.

"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."

As 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 project, if the instructions below are carefully followed.

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

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 3/8" x 7/8" x 1/8" angle iron, are positioned as shown in *Fig. 2*. The 1 3/8" sides are paralleled and spaced 4 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 1/2-inch hole is drilled through the center of the 1 3/8" side of spacers *D* and *E*. The remainder of the spacers were drilled to clear a 3/8" lag screw. To space the rails for electric welding, a gauge block 4 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 1/2" x 1 1/2" x 1/8" angle iron stock 4" long. Four pieces are needed since the slides are spaced about 16" apart. Two holes for clearing 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*,

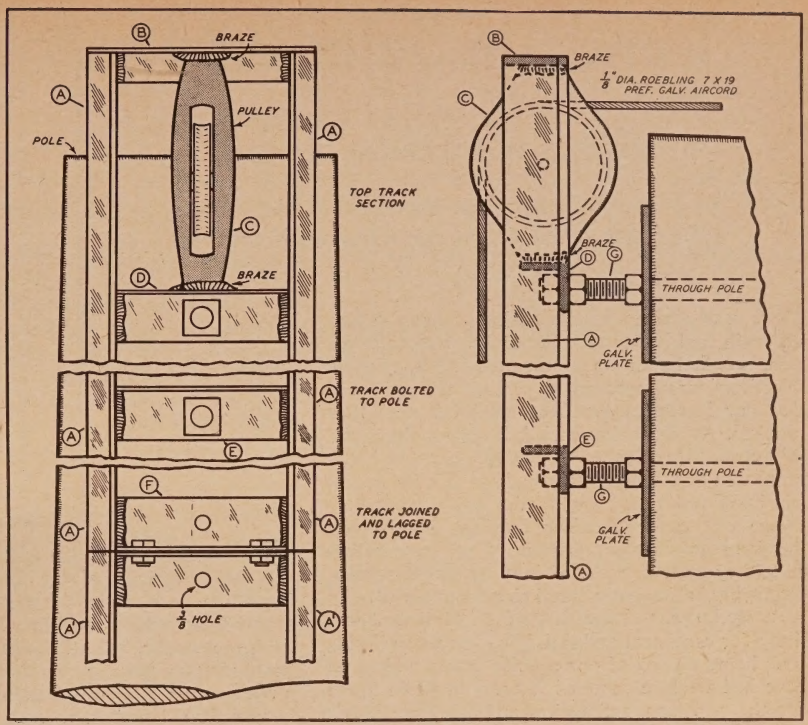


Fig. 2. Top-front view of the track, and (right) side view of the track.

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 ⅜" x ⅞" x ⅛" 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 completed 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 ¾" x ⅛" strap iron, 4" long. These were then drilled to clear ¼" bolts and to coincide with the holes already in piece *H*. Next four pieces of 1 ¼" x ⅛" strap iron also 4" long, were tapped ¼-20 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 ¼-20 bolt long enough for a lock washer and lock nut, plus *H*, *J* and *K* was fitted. Into the remain-

(*Continued on page 76*)

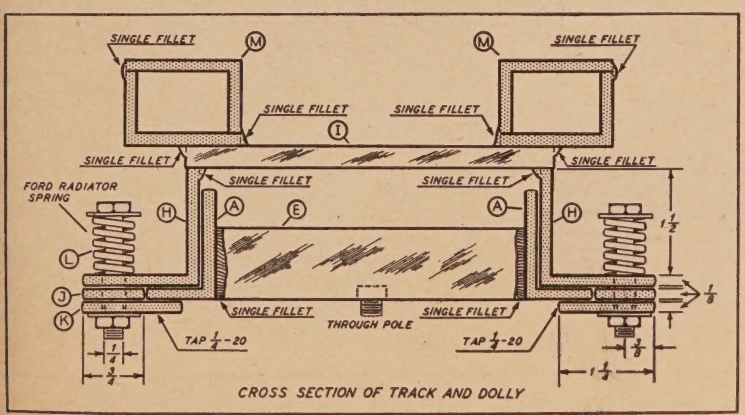


Fig. 3. Top view of track and dolly slides.

Trends in Selectivity

DOUGLAS H. CARPENTER, WIKQD*

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

QRM 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 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*)

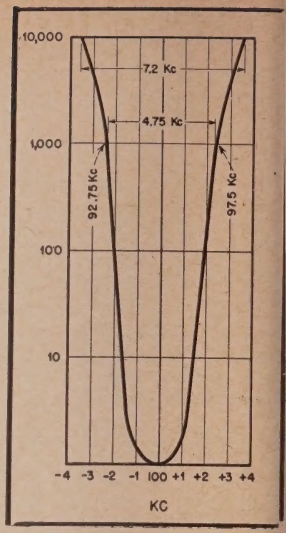


Fig. 2. Optimum selectivity curve for Silver 100-kc amplifier.

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

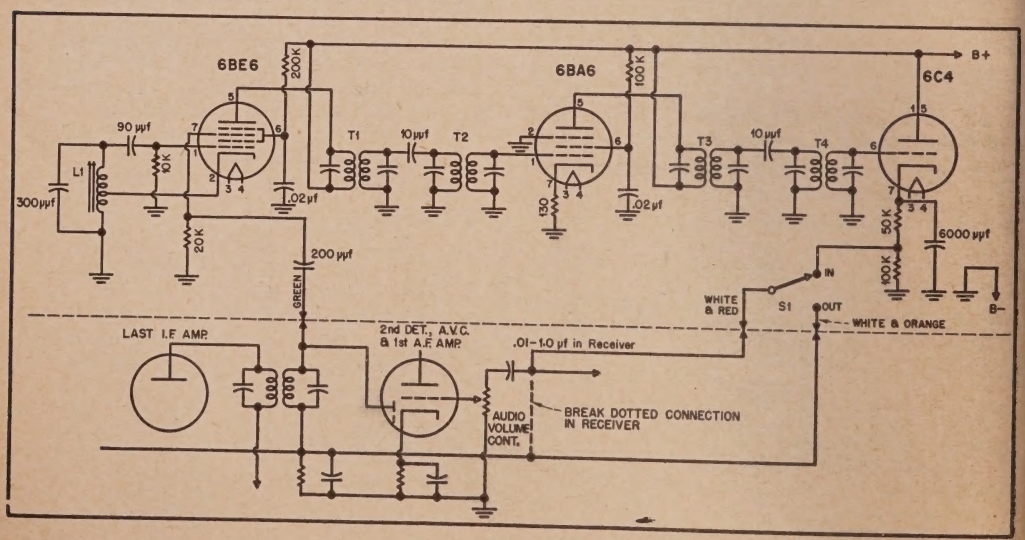


Fig. 1. Circuit diagram of the McMurdo Silver Model 805 100-kc i.f. amplifier.

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.

FOR 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 together were tight, no signal could be detected by either a superregenerative receiver, or by a Hallicrafters' 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.

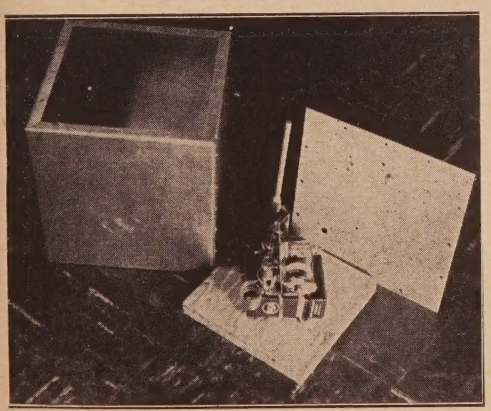
It is obvious that a triode-connected 1R5 drawing 3 milliamperes of plate current at 67½ volts is no California kilowatt, but when this little oscillator's frequency is set at 56 mc, the XYL can hear "We the People Speak" on our television set, but she can't see them! That's why I decided to run the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

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



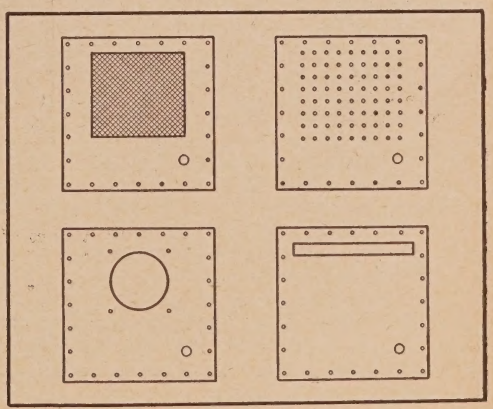


Fig. 1 (left). The r-f tight aluminum box used to house the 53-mc test oscillator. Fig. 2 (right). Four patterns representing the covers tried on the test oscillator. The amount of leakage in each case is given in Table I.

TABLE I

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

Box-top opening	db output	Levels of output with ¼ λ radiator
Solid — no opening	—40	—40
4 x 4" copper screen	—40	—40
4 x 4" grill of ¼" holes	—39	—37 to —30
Meter in 2 ¾" diam. hole	—35	—38 to +6
2 ¾" diam. hole	—32	—38 to +12
Meter connected to B— of osc.	—24	—30 to +12
½ 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.[1]

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 (½" 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 ½ 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

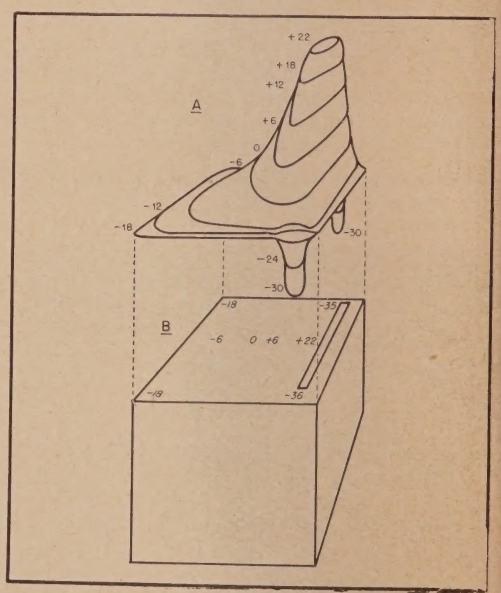


Fig. 3. (A) Graph of radiation measured when using cover on test oscillator with ventilation slot ½" x 5". (B) Slotted lid showing some of the 64 points used to assemble the three-dimensional graph.

1 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 ¼-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 $\mu\mu$f represents 6 ohms of reactance, and at the same frequency, 5000 $\mu\mu$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 $\mu\mu$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-$\mu\mu$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)	½ 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.[1] 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 b.f.o. in the S-27, nor can it be found in a super-regenerative receiver placed three feet away.

TABLE III
The effect of each filter component

	Item	db output
1)	C_1, L_1, C_2 only	+27
2)	Series choke at X	—12
3)	Series choke at Z	—27
4)	Choke at Z, and C_3 connected to Y	—38
5)	Choke at X, and C_3 connected to Y	—36
6)	Chokes at X, Z, and C_3 connected to Y	—40

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-$\mu\mu$f 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-$\mu\mu$f 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 $\mu\mu$f would not permit the circuit to resonate without changing the coil, so the 1000-$\mu\mu$f 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-

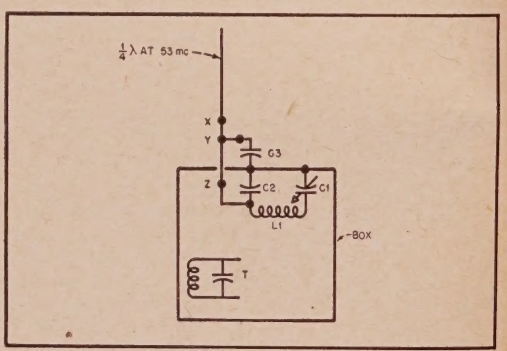


Fig. 5. Circuit employed for supply-line filter tests.

C1—25 $\mu\mu$f, variable.
C2—1000 $\mu\mu$f, button.
C3—500 $\mu\mu$f, button.
L1—Antenna coil.
T —53-mc oscillator.

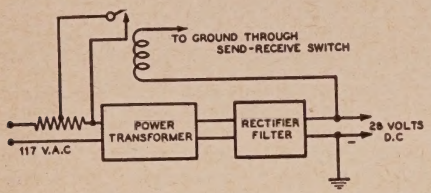
henry chokes were introduced as indicated in *Table III*. Point *Y* is the connection point for the 500-$\mu\mu$f bypass capacitor, *C3*. Both *C2* and *C3* were mounted at the lead-through hole so that lead lengths and coupling characteristics were kept to

(*Continued on page 73*)

Inside the SHACK AND WORKSHOP

Voltage Regulator for Command Sets

When using the command sets as v-f-o exciters 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

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

where V_P 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 iton 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.[1]

Gordon W. Schmitt, W7UK

1 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

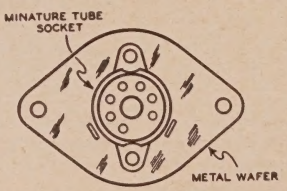
Coupling the 453 as a Q-fiver

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 minature 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 study 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*

THE 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)[1]. Calculation of the optimum working frequencies (FOT) was according to methods described in "Ionospheric Radio Propagation" (NBS Circular 462)[1]. Additional material shown in the November, 1948 issue of *CQ* was also used[2].

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*

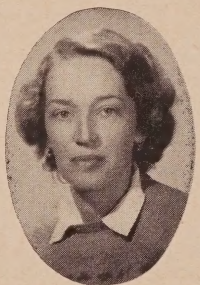
1 Obtainable from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.
2 O. P. Ferrell, "A New Method of Predicting Band Conditions", *CQ*, November, 1948, page 26.



Conducted by LOUISA DRESSER DeSOTO, W2OOH*

SOUTH 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.



Helen Whittlesey XE1SE

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 hobby," Helen exclaims, "and I just wish I could spend more time on the air. With three small fry and the constant problem of chauffering 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-

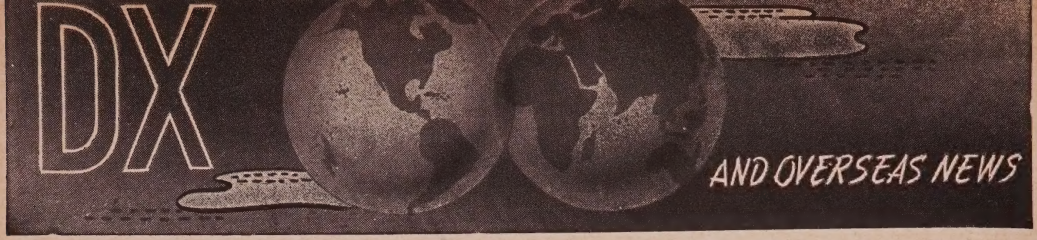
(*Continued on page 79*)

**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.



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 well known to you.

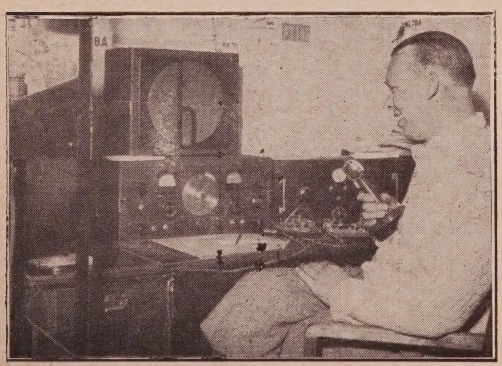
From across the pond, G8VB is still working any and all 75 meter phone DX that bumps into his antenna. Harold says he is most anxious to work stations like *TA3FAS, SV5UN, HZ1AB,* and *CN8EQ*. OK1AW is now working 10 phone and seems to be doing very well at it.

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 WØSQO, 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.

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



SM5WZ smiles happily while working HL1BA.

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				W7HTB	39	143
W6ENV	40	212	G3AAM	40	154	W9YNB	39	143	W2ZA	37	160	VE7ZM	39	121
W6ITA	40	210	W6TI	40	154	G2WW	39	147	W3JKO	37	154			
W6PFD	40	210	W6BPD	40	152	DL2KW	39	147	W1KFV	37	158	W6DI	38	172
W2AQW	40	208	VK2QL	40	151	W2COK	39	146	W3OCU	37	151	W4CYU	38	163
W8HGW	40	208	W6LEE	40	150	W2GUR	39	146	W2CNT	37	142	W2BXA	38	155
W2BXA	40	208	W6FHE	40	150	W2MEL	39	145	GM2UU	37	133			
W6ADP	40	207	OK1FF	40	148	W6JZP	39	141	W3WU	37	133	W1JCX	37	158
W6SAI	40	206	W6DLY	40	148	W9DUY	39	140	W4ML	37	133	W8REU	37	149
G2PL	40	204	W6TS	40	147	G6BQ	39	140	WØAZT	37	129	W8BF	37	146
W3BES	40	204	W7DXZ	40	146	SM5WI	39	139	W2WZ	37	127	W6WNH	37	139
W3GHD	40	204	W6AYZ	40	146	G3FJ	39	139	G4CP	37	117	W3JNN	37	136
W6SN	40	204	W9NRB	40	145	WØEYR	39	137	VE1EA	37	116	G3DO	37	136
G6ZO	40	200	W6MUC	40	145	OK1CX	39	133	W6CTL	37	111	W1HKK	37	136
W6MEK	40	200	W6QD	40	145	G5RV	39	132	G4AR	37	108	G6LX	37	124
WØYXO	40	199	W6LER	40	145	G2VD	39	132	W7BTH	37	105	G2AJ	37	121
W6GRL	40	198	ON4TA	40	144	W8VLK	39	132	W8HSW	37	104	F8VC	37	115
VK3BZ	40	197	I1IR	40	144	W9FKC	39	131	G5MR	37	100	C1CH	37	83
VE7ZM	40	195	JA2KG	40	143	VK4RC	39	131	W2BLS	37	99			
W3LOE	40	194	W6LRU	40	141	W2BJ	39	131	G3AAE	37	99	XE1AC	36	155
W4CYU	40	194	OK1LM	40	141	WØOUH	39	131	W2SGK	37	95	W1NWO	36	150
ZL1HY	40	194	W6PH	40	137	G2FSR	39	130	KL7KV	37	88	W1MCW	36	147
W6FSJ	40	193	W6CEM	40	136	OK1AW	39	129	W4LVV	36	147	W9RBI	36	146
W6TT	40	192	G3AZ	40	133	W6RLQ	39	128	W2RGV	36	136	W6PXH	36	137
W6MJB	40	192	W6RDR	40	133	W6ID	39	127	OA4AK	36	128	W9HB	36	136
W6MX	40	191	W6YZU	40	129	W6LGD	39	125	W3AYS	36	124	W2DYR	36	135
W9KOK	40	191	W7GBW	40	127	G5VU	39	124	W4DIA	36	121	W4ESP	36	130
VK2DI	40	191	G8IP	40	127	VR5PL	39	124	W2WC	36	119	W1FJN	36	128
W3EVW	40	190	G5BJ	40	126	KH6PY	39	123	SV1RX	36	119	G2PL	36	128
W4BPD	40	189	PK6HA	40	124	G3AAK	39	122	MD5AK	36	118	GM2UU	36	127
W7GUI	40	189	W6NRO	40	123	G5WM	39	120	W2BF	36	115	G6BW	36	127
LU6DJX	40	188	W6MJY	40	123	G8RL	39	120	G2CNN	36	114	W4INL	36	125
W6DI	40	188	W6LN	40	117	W6BUD	39	118	G2AKQ	36	112	W6TT	36	122
W6MVQ	40	187	OK1WX	40	112	G6BS	39	117	W3FYS	36	110	G5YV	36	106
W6AMA	40	186	W6BIL	40	101	W6NRZ	39	117	W5CD	36	108	G6WX	36	105
W2CZO	40	185				G3QD	39	116	GM3CSM	36	107	VE3BNQ	36	101
W2IOP	40	185	W2PEO	39	202	W7ETK	39	115	W2JA	36	102	W3DHM	36	96
W6RM	40	185	W9IU	39	202	G3TK	39	114	G2AO	36	100	W6SA	36	92
W6PKO	40	185	W2HHF	39	199	W6MI	39	113	W5BK	36	99	F8DC	36	87
W6SA	40	184	W2NSZ	39	196	W6MUF	39	112	WØRBA	36	99			
W6AM	40	183	W3KT	39	194	W7GXA	39	105	G6WX	36	95	W6PCK	35	126
W9VW	40	183	WØNUC	39	194	KG6AL	39	104	W7PK	36	91	W9BZB	35	125
W6NNV	40	182	PY1DH	39	194	W6LEV	39	103	GM2AAT	36	75	W9CKP	35	114
W6KRI	40	181	W2GWE	39	193	W7ENW	39	101				G3FU	35	115
ZS2X	40	181	W2HZY	39	191	W6WJX	39	101	W4IWO	35	142	W6CHV	35	113
W6ZCY	40	180	W3JNN	39	191	W6AX	39	93	W4DHZ	35	132	W4OM	35	106
W6SC	40	180	W3DPA	39	191	G6PJ	39	76	W8ZMC	35	131	W3PA	35	102
W6AVM	40	180	W4ATT	39	191				W4HA	35	131	W6AM	35	102
VK2ACX	40	180	W8NBK	39	190	VE3QD	38	179	W2GVZ	35	129	G8QX	35	100
W6OMC	40	179	F8BS	39	189	W1JYH	38	173	W9WCE	35	127			
W6RW	40	179	W9ANT	39	185	W2PUD	38	172	VE3AAZ	35	123	W4HA	34	120
W7DL	40	177	W8RDZ	39	184	CM2SW	38	167	W2AYJ	35	122	W8ZMC	34	113
W7AMX	40	177	W1ENE	39	184	W1ZL	38	160	W9CKP	35	122	W8BIQ	34	111
VE7HC	40	176	W2CWE	39	181	W8IYE	38	160	VE3ACS	35	117	W2RGV	34	110
W6DZZ	40	176	W9RRI	39	181	KP4KD	38	159	W8AVB	35	113	W2GHV	34	108
ZL2GX	40	176	W1BIH	39	180	W2EMW	38	158	W9LI	35	112	W8UIG	34	100
W6PB	40	175	W3EPV	39	178	W3DKT	38	157	VE1PQ	35	111	W8QBF	34	92
W6PCS	40	174	W4INL	39	177	W8FJN	38	153	W6ZZ	35	109	WØBFB	34	70
W6WKU	40	174	W5ASG	39	177	VO6EP	38	151	G8VR	35	100	W2NXZ	34	65
W7FZA	40	174	W3JTC	39	176	WØDU	38	151	W2HAZ	35	99			
W6RBQ	40	174	W3DRD	39	175	W4OM	38	149	W6EHV	35	98	W5ASG	33	119
WØNTA	40	174	W6OEG	39	173	W8CVU	38	141	G2AVP	35	89	W9RNX	33	118
VE4RO	40	171	W6SYG	39	173	W3KDP	38	141	W8JM	35	86	W2ZW	33	115
W6BAM	40	170	WØSQO	39	171	W3LVJ	38	141	G8RC	35	78	W5ALA	33	107
W5AFX	40	169	W4GG	39	170	W4VE	38	140	G3BDQ	35	74	WØHX	33	103
ON4JW	40	169	W9LNM	39	170	TF3EA	38	135	W7FNK	35	71	VE3ZM	33	100
W6ANN	40	167	W1NMP	39	169	W9FKH	38	134	W4IYT	34	127	W5LWV	33	100
W6GDJ	40	167	W2CYS	39	167	W4FPK	38	131	W9FNR	34	109	W2PQJ	33	100
W6PQT	40	166	W8LEC	39	166	G8IL	38	131	G8QX	34	99	W4LZM	33	100
W6DUC	40	166	W4DKA	39	165	G5CI	38	130	WØFET	34	99	W2DRH	33	60
W1AB	40	166	W4BRB	39	162	W2POJ	38	130	VE5JV	34	98			
W6AOA	40	165	W6IFW	39	161	W3ZN	38	129	G8KU	34	96	W9MIR	32	110
CE3AG	40	164	I1KN	39	160	G6LX	38	126	WØFWW	34	93	W9WCE	32	107
W6UCX	40	163	G5DQ	39	160	W9MZP	38	126	W9ABA	34	92	WØEYR	32	100
W6SRU	40	162	W9LM	39	159	GW3AX	38	123	G6XX	34	89	WØSQO	32	95
W6KUT	40	161	WØGKS	39	158	W8WWU	38	125	W9WEN	34	83	WØAIW	32	93
KH6IJ	40	161	W6EAK	39	158	W9TB	38	122	W8PCS	34	80	W6UZX	32	92
W6IBD	40	161	WØAIW	39	157	GW4CX	38	120	W6WUD	34	68	W2HY	32	85
W6RLN	40	160	W8SDR	39	157	W8KPL	38	117				W2SVK	32	84
WØUOX	40	160	G8KP	39	156	W5CPI	38	113	W4QN	33	110	W9GZK	32	72
LA7Y	40	159	G6QB	39	152	W7EYS	38	107	WØGBJ	33	89			
G3DO	40	157	W2RDK	39	152	G3ZI	38	107	W8QUS	33	85	W7MBX	31	101
W7BD	40	157	G5YV	39	151	G8IP	38	105	G8VG	33	78	W4BA	31	97
W7BE	40	156	G2AJ	39	151	C1CH	38	84	G3BFC	33	77	WØPUE	31	95



Conducted by VINCE DAWSON, JR., WØZJB*

ANOTHER 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 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.

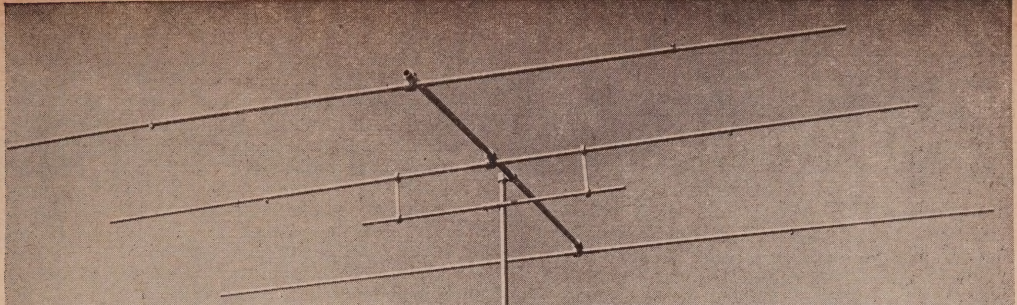
XE1FU in Mexico City bought XE1KE's rig and is now quite active on the band, running 100 watts to an 829B, feeding a 4-element closed-spaced beam 75′ high. The receiver is a Gonset ahead of an HQ-129X or RME 45. So far XE1FU has worked into LU, CX, OA and HC. Several states have been worked, the majority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

Send all contributions to Vince Dawson, Box 887, Gashland, Mo.



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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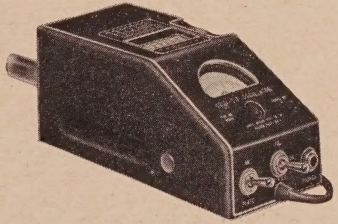
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- EXTREME STABILITY — permeability tuned oscillator and multipliers.
- ACCURATE FREQUENCY CALIBRATION—built-in 100KC crystal calibrator.
- VARIABLE OUTPUT CONTROL—control circuits for KW final amplifier.

Can be used as a complete low power transmitter (terminals provided for AM modulator) Gray cabinet. Well engineered, yet reasonably priced.

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The "Outdoor Issue" featuring mobile and portable gear, a real good phone patch, our big mobile contest, etc. will be ready soon. If you're not on our mailing list, send a postcard today!

BEAM ROTATOR MOTORS

FULLY CONVERTED

Brand new, small size, propeller pitch beam rotators. Continuous rotation in either direction at approximately 1 RPM—instantly reversible with SPDT switch. Gear reduction, 9000 to 1, gives tremendous power and eliminates free swing, even in highest winds. These motors are ready to use. Leads plainly marked. Simply connect to a 24 to 30V transformer. (3 amps will be o.k.) ALL THE HARD WORK IS DONE! Full instructions included.

Item RO-10 $19.95

(Add 90c each for packing, if shipped)

Step Down Xfmr to operate PP motor.....$5.95
Neutral Center, SPDT, Momentary Switch.....49

COOL THOSE TUBES!

Get more output from those final tubes without exceeding plate dissipation ratings. Prolong tube life! These blowers are a **must** for rigs that are completely shielded and enclosed, and tubes that are operating at or close to ICAS ratings. Quiet induction type motor—no brush interference. No mechanical vibration. Delivers 25 cubic feet of air per minute. For 115V, 60 cycle AC. Item RO-1.....$7.95

WORLDS BIGGEST TRANSFORMER BARGAINS

The "COOL KILOWATT", 2600-0-2600 Volts AC at 550 MA ICAS. Item TP-18—What a buy!.....$28.95
. . . and the TP-17, 1750-0-1750 Volts AC at 550 MA ICAS. Still available for only.....$19.95
(Please add 85c each for crating, if shipped. See our ads in previous issues of CQ and QST for complete specifications.)

AMPHENOL TRANSMISSION CABLE AND TWIN-LEAD

NEW STOCK! RG-11U 72 ohm KW Co-ax		Per ft.	$ .13
300 ohm Ribbon Twin-Lead	100'	Package	2.06
300 ohm Kw Tubular Twin-Lead Rainproof!		Per ft.	.07
HSS Connector Plugs for RG-8U/RG-11U		Each	.29
HSS Chassis Receptacle (Matches above plugs)		Each	.34

HARRISON RADIO CORPORATION

11 WEST BROADWAY, NEW YORK 7

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. mer.

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 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.

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



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. Mightly 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 W5HXK in Watonga, near the middle of the great plains.

(Continued on page 60)

MORE FOR YOUR MONEY EVERYTHING FOR THE HAM

yes sir.. it is easy to buy by mail and prices are right

Vertical Antenna

MAST KITS

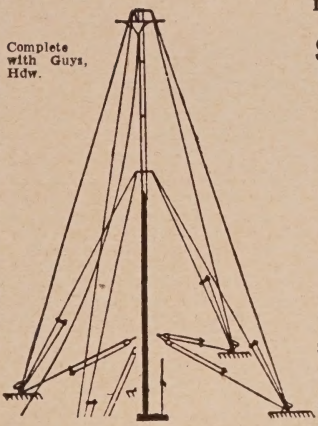
Fully Adjustable 5 to 35 Feet

Easy to Set-up

FOR FM, TELEVISION AND ROTARY BEAM

COMPLETE

$19.95



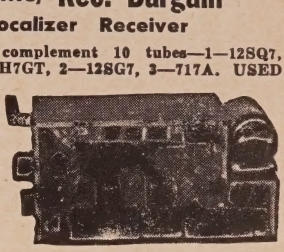
Doublet Antenna Kit used with the famous Hallicrafters BC-610, consisting of 7 steel-alloy mast sections in a handy canvas bag. Each section is 5' 6" long, 1½" OD with the last 6" rolled to a smaller OD to telescope into the end of the preceding section. No taper. Assemble high or shorter by any multiple of 5'. Finished in weatherproof olive drab. **Ideal for erection of FM and Television Beams!** Drop your coaxial cable right through the center! Brand new, export packed.

Complete with Guys, Hdw.

SCOOP! 110 (MC) Rec. Bargain

BC-733 D Localizer Receiver

Freq. 108-110 Mc. Tube complement 10 tubes—1—12SQ7, 2—12SR7, 1—12A6, 1—12AH7GT, 2—12SG7, 3—717A. USED CONDITION. Companion to the glide path receiver. Also contains 90 and 150 cycles band-pass filters. Has the best AVC system yet developed. Can use parts or use as a model for construction. 10 tubes, crystals, relays, etc. Schematic included, with dynamotor. Don't pass this up. Individually Boxed $3.95



BARGAIN 2 FOR $6.95

SPECIAL, FOR YOU



CATHODE RAY
5FP7, 5BP1, 5GP1
$1.95 each
2 for $3.00
5BP4
$1.95 each.

TUBES JAN TYPE BOXED

24 G	$1.00
28 D7	.29
807	1.49
874	.98
HY-615	.39
803	7.95
12SL7gt	.29
211	.39
VR150	.75
814	4.95
12SK7gt	.75
845W	3.45
2051	.69
927	1.95

SURPLUS UNUSED

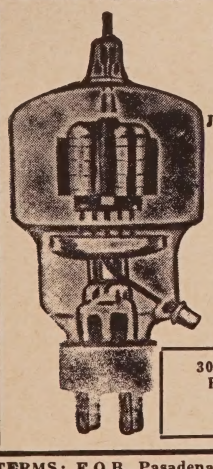
24V relays all types..... 90c ea.
2 FOR $1.49

Gibson Girl Transmitter SCR 578B (New) $19.95

SPECIAL

150 ohms twin lead in 50 ft. coils with eyelets on one end..... 49c ea.
3 Coils $1.00

POWER!! POWER!!



EIMAC 304TL

BRAND NEW
JAN. INSPECTED
SUPER VALUE
BETTER ORDER
4 OR MORE
79c EA.
4 for $3.00
While They Last
Any Quantity

304TL SOCKETS
BRAND NEW
JOHNSON
$1.20 ea.

SAVE ON THESE VALUES

300 ohm Amphenol. Per hundred	$2.34
150 ohm Amphenol. Per hundred	2.16
75 ohm Amphenol (small). Per hundred	1.98
Kilowatt 75 ohm Amphenol. Twin lead, Per C. ft.	7.20
3 Gang 410 mmfd. per Sect. Cond. Excellent Quality	2.95
4 Gang 150 mmfd. Variable	.95
Condensers—New:	
2 mfd. at 2500 W.V. Each	2.95
4 mfd. at 600 V. Oil—round can. Each	1.19
Relay, Leach, 115V-AC DPST. New	1.50
SPDT—Center off .39 each.....3 for	1.00
Toggle Switch—SPST—plus spring return	.19
Toggle Switch—H.D.-DPST—12 amp. 125 V.	.39
Phosphor Bronze dial cable 16 str.—250 spool	.69
Cable—6 wire No. 16, glass insul. shielded, plastic covered—perfect for beam control. 15c per ft. 100 ft.	12.00
Cable—6 wire No. 18, unshielded. Per ft.	.08
Cable—4 wire No. 18, plastic—Shielded. Per ft. 100 ft.	.10 5.50
Cable—Single shielded grid wire No. 20-AN Specs. Special—Per hundred foot coil	1.50

TERMS: F.O.B. Pasadena unless postpaid. No C.O.D.'s under $2.00 25% deposit on ALL Orders. All C.O.D.'s shipped by Rail Express. Save freight and C.O.D. fees by sending full price with order and we will ship by fast truck, transportation collect. Californians include 2½% sales tax.

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DOW RADIO

1759 EAST COLORADO ST.
PASADENA 4, CALIFORNIA
Tel. Sycamore 3-1196—L. A. Ryan 16683

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 COMMMUNICATIONS COMMISSION

Adopted: April 20,1949
Released: April 21,1949

T. J. Slowie,
Secretary

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

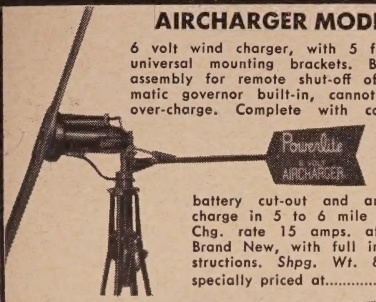
Directions for altering text:

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

HARVEY for variety for bargains

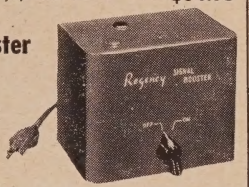
VARIETY-BARGAINS

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**

½ 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 ½" 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 ½" 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.

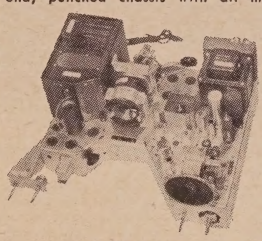
In stock—the new **NATIONAL MODEL TVB-1** all-band television preselector, booster amplifier. We highly recommend this unit as one of the best. *Shpg. Wt. 5 lbs.* **$28.00**

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*.....

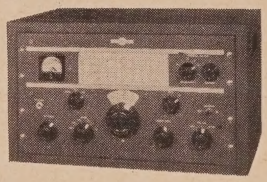
$198.50

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



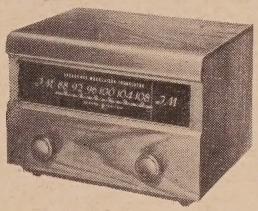
Collins 75-A

$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

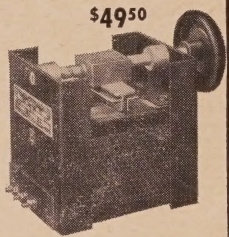


Only a few left of this unusual buy. Covers 88-108 mc range, uses guillotine tuning. Designed for export and tropicalized, has power inputs for 110 to 250 volts 60 cyc. *Shpg. Wt. 30 lbs.*

HARVEY SPECIAL PRICE

$49.50

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 3⅛" x 3½" x 7" plus inductor length. Complete with tube and inductors. *Shpg. Wt. 5 lbs*.....

$55.00

All in stock for immediate delivery.

NOTE: All prices are Net, F.O.B. N.Y.C. and are subject to change without notice.

Telephone: hrc LUxemburg 2-1500

HARVEY RADIO COMPANY INC.

103 West 43rd St., New York 18, N. Y.

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, provided 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.
SPECIAL AT ONLY..... $87.50
Terms: 17.50 down, 6.18 monthly for 12 months



Send for the Leading Amateur Buying Guide

You'll find *everything* you want in receivers, transmitters, instruments, parts and station equipment in our up-to-the-minute 180-page Catalog. Get it today. And get every buying advantage at ALLIED—fast shipment, money-saving values, top-quality equipment, ideal easy-payment terms, square trade-in deals and down-to-earth help from ALLIED's old-time Hams. For full satisfaction, get and use the ALLIED Catalog!

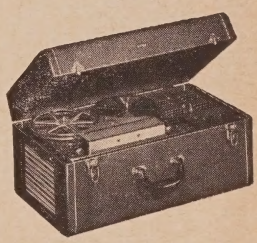
HERE'S YOUR BEST BUY IN A HIGH-QUALITY WIRE OR TAPE RECORDER



Knight Wire Recorder

Makes and plays high-quality wire recordings; plays any 10" or 12" 78 rpm disc recording; serves also as PA system or as wireless phono oscillator. Easy to operate. Ruggedly constructed. Complete in compact simulated leather case; with crystal handmike, playback pick-up, all tubes, and 2 half-hour spools of wire. For 105-125 v., 60 cy. AC. Shpg. wt., 29 lbs.

96-172. Only..... $99.50



Knight Tape Recorder

A top-grade tape recorder and playback unit at amazing low cost. May also be used as 6 watt PA system. Excellent frequency response. Easy to record; stable constant-speed mechanism. Exceptional playback quality. In sturdy portable case; with crystal handmike, 600 ft. reel of tape, take-up reel, and all tubes. 105-125 v., 60 cy. AC. Shpg. wt., 36 lbs.

96-187. Only..... $127.50

ALLIED RADIO

Everything for the Ham

FREE



ALLIED RADIO CORP., D. L. Warner, W9IBC
833 W. Jackson Blvd., Chicago 7, Ill., Dept. 16-F-9

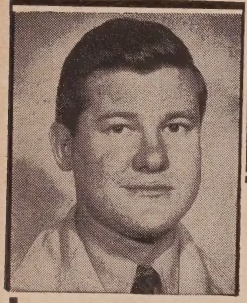
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Enclosed $..... ☐ Full Payment
☐ Part Payment (Bal. C.O.D.)

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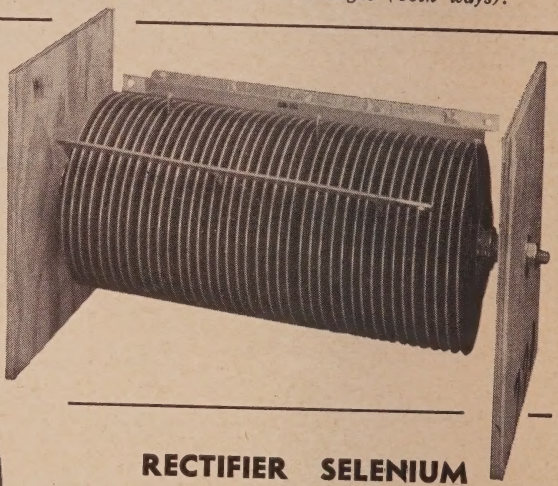
ESSE Specials!

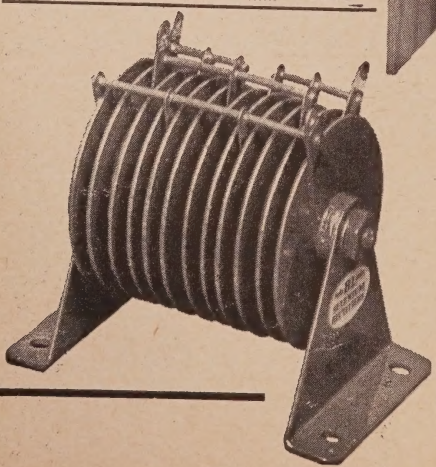
Do not fail to closely examine this list of bargains. We believe that every item listed below is a sensational value that soon can never be repeated. All equipment advertised herein is unconditionally guaranteed to the customer's satisfaction to this extent: Return any item advertised within five days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

RECTIFIER ASSEMBLY

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 4⅜" dia. x 12 ¾" 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 3⅛" x $1\frac{11}{16}$" x $1\frac{11}{16}$". 12 square plates bridge circuit. (New).

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

ESSE RADIO CO.

Esse's Special Offer

INDIANAPOLIS, INDIANA



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.

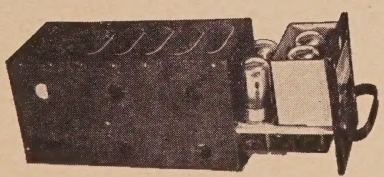
The unit consists of a balanced inductance bridge, a two-tube amp. and a 1,000 cycle oscillator. The presence of metal disturbs the bridge balance, resulting in a volume change of the 1,000 cycle tone. The tubes used are low-battery drain types such as 1G6 and 1N5. The circuit may be modified for control 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 8¾"x 28¼"x16". 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**

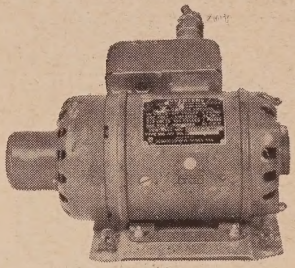
NAVY CRV-46151 AIRCRAFT RADIO RECEIVER



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. Including case. **$24.50**

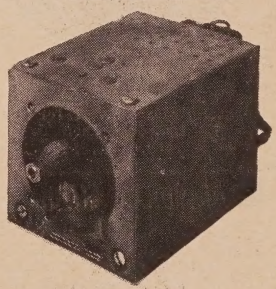
MG-149F INVERTER



(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

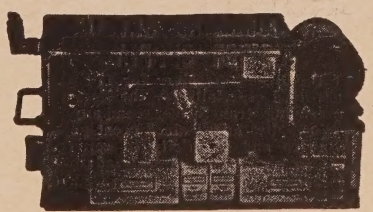
DETROLA AIRCRAFT RECEIVER



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 14½"x7"x4⅝". Price with dynamotor

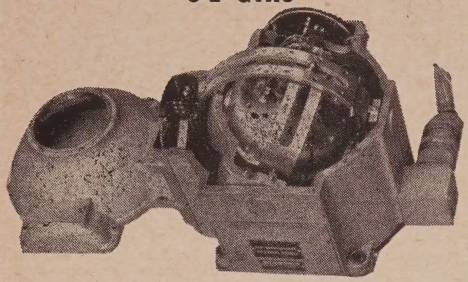
Price without dynamotor..... **4.95**

ESSE RADIO CO.

Esse's Special Offer

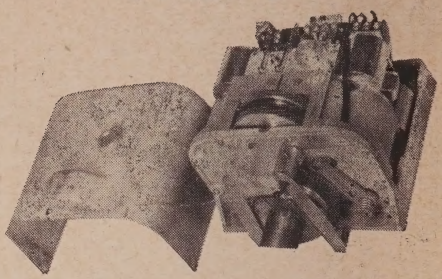
INDIANAPOLIS, INDIANA

C-1 GYRO



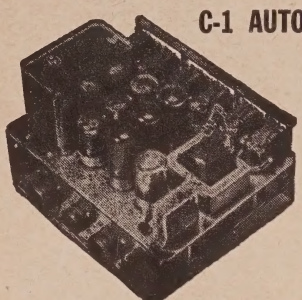
Part of the C-1 Auto Pilot which is sold separate and may be used to conduct many interesting and amusing experiments. Operates from 24 V. DC or may be operated for short periods on 110 V. AC. Gyro will run for approx. 15 minutes after actuating. Size—approx. 8" x 8½" x 8½"..... **$6.95**

C-1 SERVO UNIT

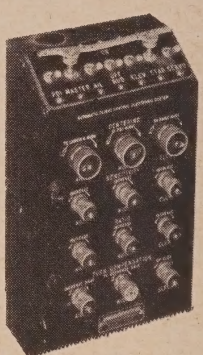


Use to rotate beam antenna, actuate boat rudder control, etc. Contains 24 V. motor, clutch, relays, etc. Reversible. Size overall approx. 10½" x 8½" x 6½"..... **$4.50**

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**

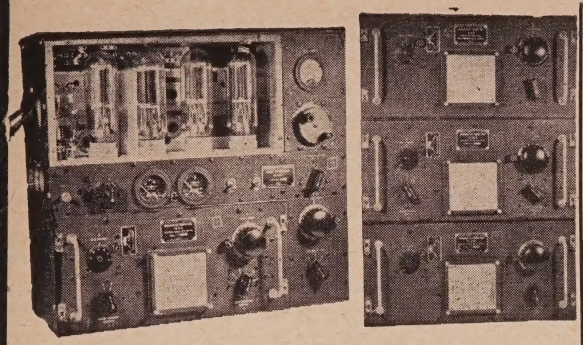
JACK BOX BC631-B.

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**

ESSE RADIO CO.

Esse's Special Offer

INDIANAPOLIS, INDIANA



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

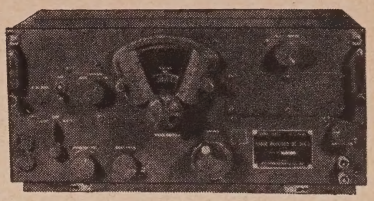
Antenna tuning unit (BC-306A)..... 3.00

CABLE CONNECTORS AND PLUGS

Choice .25 — All Brand New

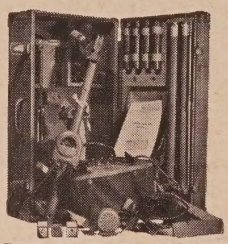
Manufacturer	Type	Price
Amphenol	AN3101-16-10P	25c each
Amphenol	AN3101-18-18S	25c each
Amphenol	AN3101-22-5S	25c each
Amphenol	AN3102-22-15P	25c each
Amphenol	AN3102-28-10P	25c each
Amphenol	AN3102-32-5P	25c each
Amphenol	AN3106-18-11S	25c each
Amphenol	AN3106-18-18P	25c each
Amphenol	AN3106-24-6S	25c 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. PRICE, BRAND NEW $14.95

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.

ESSE RADIO CO. **Esse's Special Offer** INDIANAPOLIS, INDIANA

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 approximately $500.00. Price— **$295.00**

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". Like new condition. A steal..... **$50.00**

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". Excellent condition. Price— **$50.00**

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. Price— **$49.50**

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 with manual. Price— **$42.50**

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. Cannot be told from new. Price— **$80.00**

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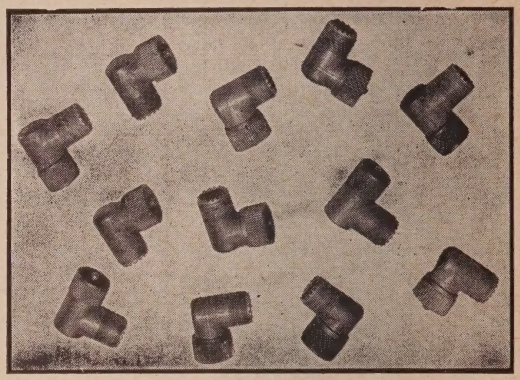
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Made by Delco-Remy

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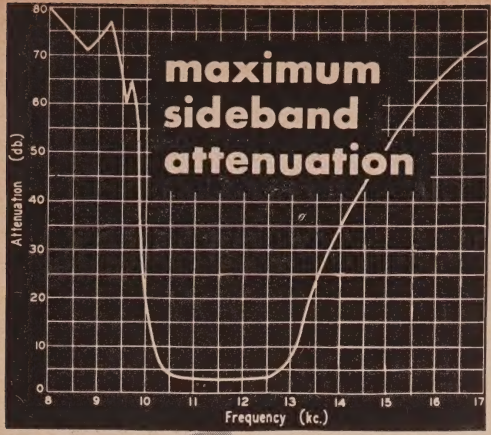
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BC-221 Frequency Meters
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SCR-522 transmitters & receivers
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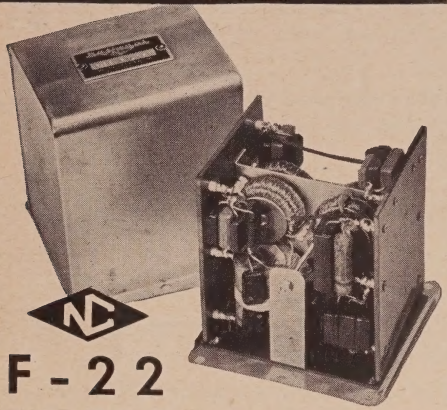
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such license and not later than one year from the date of expiration, and the following renewal requirements shall be fulfilled as appropriate for the class of license:

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 minmum 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.

Subtitute 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-

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4MFD — 600V — 59c	8MFD — 1500V — 1.95

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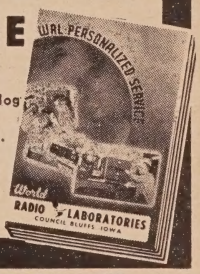


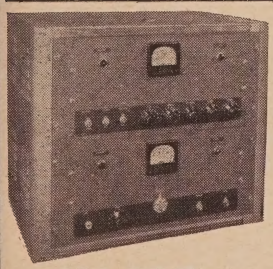
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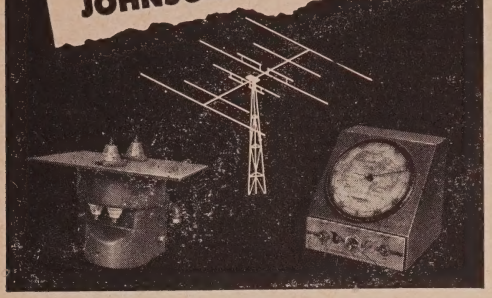
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Every desirable feature has been incorporated in the new JOHNSON Rotomatic plus the new JOHNSON Phased Array, a unidirectional beam employing driven elements. Elements are also available for conventional parasitic beams. Both arrays are furnished in 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.

NEW JOHNSON PARASITIC ARRAY

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 impedence matching on two bands — any impedance from 50 to 600 ohms — with the same transmission line.

NEW ROTATOR and DIRECTION INDICATOR

The new Rotomatic Rotator was designed for those who want the very finest. The heavy duty drive unit will take rain, sleet and high winds in its stride — will turn on the coldest mornings. Rotation is instantly reversible, 360° at 1¼ RPM. The direction indicator is a selsyn. Motor control and antenna relay switch are contained in the indicator case.

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

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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 Commssion.

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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PE-101-C—Dynamotor unit; 12 or 24v in. output 800v, 20ma. 400v, 135ma. 9v, 1.1A..... **2.75**

PE-55—Dynamotor unit: 12v in, 16 amp, 500v out. 200ma. F.O.B. Chicago only..... **3.75**

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DM-53—Dynamotor used with the BC-733. 24v. in 240V., 60ma out. New..... **2.95**

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For 11 and 15 meters; can be operated on 10 meters by use of proper xtals; 10 channel pushbutton xtal controlled, with all tubes, meter, schematic, case and covers; less crystals. Used, excellent, with dynamotor—FOB Chicago only **$10.95**

BC-684 27.0-38.9 FM TRANSMITTER

Same as above except for freq. range.
New, FOB Chicago only..... **24.95**

ALTIMETER TRANSCEIVER RT-3/ARN-1

Frequency 418-462 mc. FM with 14 tubes including 3- 12SJ7, 4- 12SH7, 2- 12H6, 1- VR150, 2- 955, 2- 9004. 24v Dynamotor, used, in working condition..... **$4.95**

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BC-458—XMTR	NEW	7.95
BC-459—XMTR	EXC.	9.95
BC-696—XMTR	EXC.	14.95

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2 MFD, 4000V, Pyranol	ea.	$ 2.95
4 for		10.00
2 MFD, 5000 V	ea.	3.95
6 for		20.00
.25 MFD, 15,000 V	ea.	5.95

SPECIAL

WESTINGHOUSE TRANSMITTER BC-122

Freq. range .325 to 800 Kc; in portable field case; 3 meters plus excellent parts (less tubes)—An Excellent Buy. BRAND NEW..... **$7.95** ea.

PE-117 UNIVERSAL POWER SUPPLY

6 or 12 v input; out. 145 v and 90 v. less, vibrator, voltage, regulator and rectifier tube; ideal mobile power supply unit; excellent condition. FOB Chicago, only. each..... **$2.95**

SCR-283 40-80 METER XMITTER

New equipment: Transmitter-Modulator and coil sets to cover 2.5-7.7 mc, transmitter tubes 2 No. 10 special and 2 No. 45 special, receiver (less the receiver coil sets), receiver tubes 1—37, 1—38, 4—39/44, shock mounts, dynamotor, antenna switching relay, receiver control box, transmitter control box, charts, dials, and instruction book.
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BC-709 INTERPHONE AMPLIFIER

Ideal for aircraft, booster for telephones, etc. FOB Chicago only..... **$3.49**

SURPRISE PACKAGE

20 pounds assorted radio parts. A $25.00 value for only **$1.95**

R-89 ARN-5A

Glide path receiver. Crystal control of local oscillator. 332-335 mc, complete with relays, 7—6AJ5, 1—12SR7, 2—12SN7, 1—28D7, and 3 crystals: 6497 kc, 6522 kc, 6547 kc. 90-cycle band pass and 150-cycle band-pass filters, excellent for making an intermodulation checker. Beautiful cabinet and chassis as foundation for many interesting experimental and construction projects. Broad pass band on 20.7 mc IF's ideal for television. Schematic furnished, less covers.
Used, excellent, Only..... **$ 3.95**
New..... **12.95**

EE-8 ARMY FIELD TELEPHONE

Sturdy, highest quality telephone at less than price of a better-class toy. With ringer. Requires only two flashlight batteries for each phone and two wires between each phone. Excellent condition. Used. Each..... **$7.95**

GEARED TUNING DIAL

5 band, vernier. Freq. range from 3.2 to 32 mc. BRAND NEW. Ideal for many applications. An excellent buy **$1.39**

APS-13 UHF ANTENNA

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

BC-620 TRANSMITTER-RECEIVER UNIT

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**

VHF TRANSCEIVER

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

VERTICAL ANTENNA

½ wave vertical dipole antenna, complete with 36 inch whip, 36 inch skirt, 7 ft. aluminum pole, mounting brackets and 8 ft. of coaxial cable with PL-259 plug. New..... **$12.95**

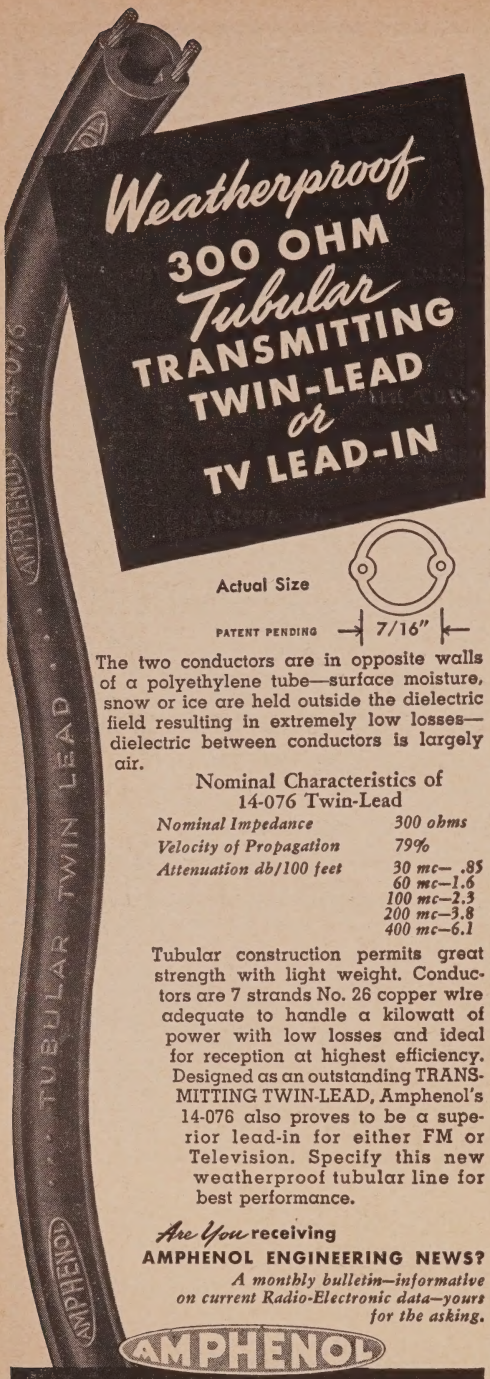
All shipments FOB Chicago or Los Angeles unless specified. 20% Deposit required on all orders. Minimum order accepted—$5.00. California and Illinois residents, please add regular sales tax to your remittance.

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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 preamp 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.

W8NQD 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?

Our 26th Year

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The Home of RADIO

QUALITY—PRICE DEPENDABILITY

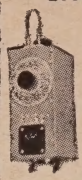
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Multiple Contact Telephone Type Relay No. A2-2—
Windings 125 ohms. Each ..... $ .49
No. A1—
Single winding 12,500 ohms ..... .49
Heineman 5 amp. circuit breaker ..... .95
Crystal Mike and Stand 5.50
Sockets for 813, 829 ..... .73
¼ watt Neons bayonet base ..... .20
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GENERAL ELECTRIC PYRANOL CONDENSER

1 Mfd 15000 V.D.C. Brand New. Shipping Weight 35 lbs. A Terrific Value **$10.95**

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 good buy at **$33.50**

CONVERTERS

Mobile or Fixed. RF Gain control. Simple installation. Size 2" x 6" x 5".
Model 210—
27 to 30 Mc-10 meters $25.50
Model 202—
144 to 148 Mc-2 meters 25.50
3 tubes for converter 3.49

BIAS TRANSFORMER TYPE KS8779

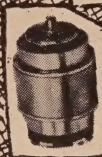
Completely shielded, Insulator Terminals. Primary: 115 Volts 60 cycle @ 500 Ma.
Secondaries
180 V. @ 20 Ma.
300 V. @ 20 Ma.
6.3 V. @ 1.2 amps.
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Special **$1.95**

GREENLEE PUNCHES—

Cuts to ⅛" thick metal.

½"	$1.94
⅝"	$1.94
1"	$2.12
1⅛"	$2.25
1-3/16"	$2.25
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We carry a complete line of all sizes of punches up to 3½" diameter.



SELSYN MOTORS

115 V.A.C. 60 cycle #C-78248. Can be used to turn small antennas or as indicators. Size 3½" x 5½". Price per pair **$6.95**

TRANSMITTERS

Mobile or Emergency, 8 watt output crystal control, push to talk. Power requirements 6.3V. at 2 Amp; 350V. at 110 Ma. without dynamotor.
Model 129—
27 to 29.7 Mc (10 meters) $23.95
Model 175—
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3 tubes for transmitter 4.98
Noise Limiter—Model NXL—adjustable threshold control. Power 6.3V—150 Ma.
100V. 6Ma. D.C. $4.50
6AL5 tube 1.11

ALUMINUM CHASSIS—

Heavy Duty

7 x 7 x 2	94c
7 x 9 x 2	$1.06
5 x 10 x 3	$1.00
7 x 11 x 2	$1.15
7 x 13 x 2	$1.23
10 x 17 x 3	$1.88

STEEL CHASSIS 16 GAUGE

4 x 17 x 3 Black Crackle	$1.05
4 x 17 x 3 Cadmium	1.17
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Complete stock of steel & aluminum chassis & panels on hand.

ISOLATION TRANSFORMERS

All 117 Volts to 117 Volts 60 Cy.
P-96, 40 watts.. $3.60 P-98, 100 watts $9.30
P-97, 80 watts.. $5.10 P-99, 250 watts $17.70

SCOPE & TELEVISION TRANSFORMERS & CHOKES

2500V. RMS @ 5 Ma D.C.—6.3V. @ 3 amps tapped at 2.5V. @ 3 amps; 2.5V. @ 2 amps; Type P-3171 ..... $6.76
1700V. RMS @ 2 Ma D.C.—6.3V. @ 9 amps tapped at 2.5V. @ 2 amps; 2.5V. @ 2 amps; Type P-3170 ..... $5.14

2 Hys @ 250 Ma D.C. 50 ohms type C-2991 ..... $1.62
2 Hys @ 200 Ma D.C. 50 ohms type C-2974 ..... $1.92

VERTICAL BLOCKING OSC. turns ratio pri. to sec. 1:4.2
Unshielded type A-3000 ..... $1.18
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Unshielded. type A-3035 ..... $3.09

RELAYS CS DIFFERENTIAL

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**



OIL FILLED CONDENSERS

1.78 Mfd 200 V.A.C.	$ .29
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2 Mfd 600 V.D.C.	.39
7.5 Mfd 330 V.A.C.	.98
10 Mfd 330 V.A.C.	1.23
2 Mfd 1000 V.D.C.	.59

HEAVY

.25 Mfd 6000 V.D.C.	1.69
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TRANSFORMER SPECIAL

870 volt CT @250Ma with 80V bias tap
5 volts @ 3 amps
2½ volts CT @ 10 amps
2½ volts @ 3 amps
6.3 volts @ 1.5 amps
115V. 60 cycle primary
$5.88

FILAMENT TRANSFORMERS

Type 940	2.5VCT @	10 Amps. 7500V Ins	$2.79
Type 040	5. VCT @	3 Amps. 2500V Ins	$2.06
Type 941	5 VCT @	6 Amps. 2500V Ins	$3.38
Type 943	5 VCT @	20 Amps. 2500V Ins	$5.29
Type 946	6.3VCT @	3 Amps. 2500V Ins	$1.91
Type 947	6.3VCT @	6 Amps. 2500V Ins	$2.79
Type 948	6.3VCT @	10 Amps. 2500V Ins	$3.67
Type 960	7.5VCT @	4 Amps. 2500V Ins	$2.35
Type 143	7.5VCT @	8 Amps. 2500V Ins	$4.12
Type 146	10 VCT @	10 Amps. 3000V Ins	$4.99
Type 961	Dual 6.3VCT @	3 Amps 2500V Ins	$3.38
Type 041	5VCT @	3 Amps. 2500V Ins	$3.38
	6.3VCT @	3.6 Amps.	

RAYTHEON VOLTAGE STABILIZERS

Positive Stabilization ±½%
Input 95-130 volts, 60 cycles single phase; output 115 volts stabilized to ±½%. *Output 6.0 or 7.5 volts stabilized ±½%.



Catalog No.	Output Cap. Watts	Net wgt. lbs.	Net Price
VR-6110	15	4	$15.00
VR-6101*	30	5	$17.00
VR-6111	30	5	$17.00
VR-6112	60	8	$24.00
VR-6113	120	14	$31.00
VR-6114	250	25	$48.00
VR-6115	500	45	$75.00
VR-6116	1000	92	$125.00

SUPERIOR POWERSTATS



Smooth, efficient voltage control. 0 to 135V. output from 115V. AC line.
Type 20 (illustrated 3 amps $12.50
116 for table mtg 7.5 amps 23.00
116U for panel mtg 7.5 amps 19.00
1126 15 amps 46.00
1156 45 amps 118.00
Also available for 230 volt input. Write for descriptive literature.

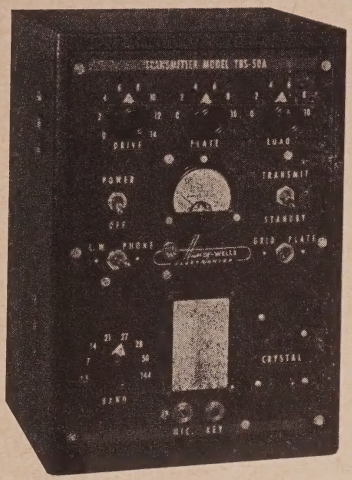
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Only 8" x 8" x 12" IN SIZE

Yet AMERICA'S MOST VERSATILE SMALL TRANSMITTER

Write today for details for using TBS-50 & TBS-50A for 160 meter operation.

SEND FOR DESCRIPTIVE LITERATURE

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.

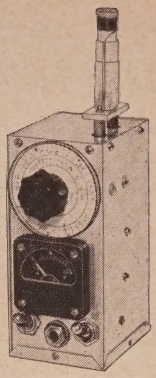
W7GBI in Great Falls, Mont., and W7JRG in Sheridan, Wyo., both have stacked arrays, and have tried the 175 mile hop, but the mountains have them stopped. Looks as if you fellows will have to resort to billiard tactics to make it. Great Falls sports eight stations with 24-element beams that are of the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

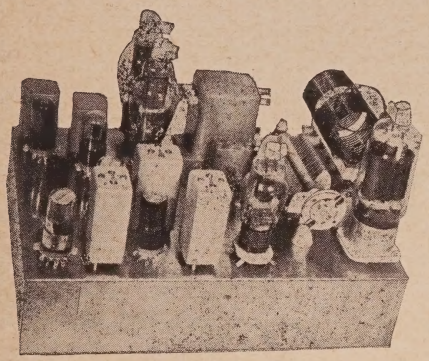
THE "ORIGINAL GRIP-DIPPER"

As designed by W. M. Scherer, W2AEF.

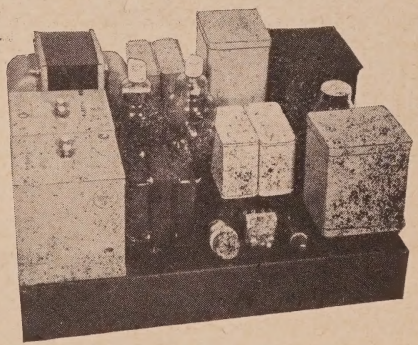


Now available in kit form, just as described in Feb. CQ. Its application includes signal generator, field strength meter, r-f voltmeter, Q checker, measures resonant frequencies of antennas, stubs, tuned circuits, capacity, parasitics, TVI, harmonics and many others. A complete laboratory in itself and 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 5¼x2⅜x3. PRICE..... **$21.50**

MODEL TR-1 300W TRANSMITTER

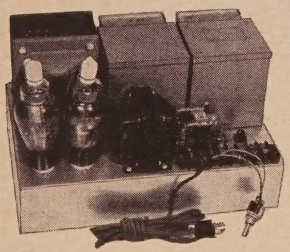


- 300 Watt Input, Class B Modulated.
- All Bands 80-40-20-15-10 meters.
- 813 Final, 2-811 Modulators.
- Crystal Control With Provision For VFO Input. Watch For Our Low Cost VFO Companion Kit!
- Complete Transmitter Kit In All Respects, Including Everything From A Mike And Key To The Ant. Changeover Relay.
- Commercial Type Components, Yet Compact And Light Weight.



- 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.

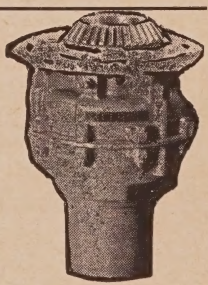
HIGH VOLTAGE SUPPLY KIT



Gives a husky continuous duty 1500 vdc or 1250 vdc @ 350 ma. Includes HD plate transformer 3600 and 2800 vct, 2 chokes 6 hy @ 350 ma., 2 oil filter condensers, 2.5v @ 10A transformer 10,000v insul., bleeder, light assembly, sockets, and small parts. A husky matched commercial supply, in neat two tone grey and black.
PRICE less tubes, and base..... **$29.50**

PLATE TRANSFORMER—as used in HV KIT, grey and black case..... **$17.50**

ROTARY BEAM MOTOR



Heavy duty prop motor ideal for the largest beams, operates with 28-35 volts, ac or dc, ¾ rpm. **$12.95**

BEAM MOTOR TRANSFORMER — Provides 36 vac @ 10 A, also ideal for low voltage dc supplies. PRICE **$5.95**

SURPLUS RADIO INC.
44-31 Douglaston Pkwy. Douglaston, L. Is.
Phone: Flushing 7-9173
Minimum order $3.00
Send MO. or check

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 something 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



SPECIAL

FT - 237 MOUNTING:
For BC-604 and 603's and for BC-684 and 683's — NEW.....**$9.95**

ANTENNAS FOR ALL USES:

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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.

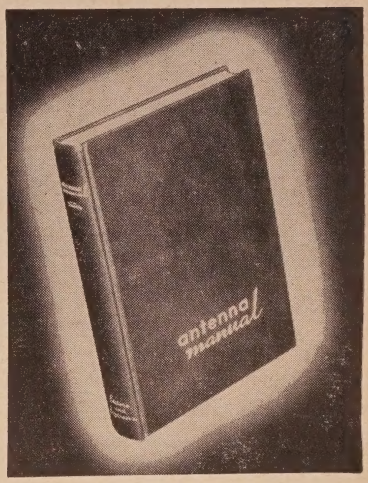
April 4—XE1FU, between 2100-2300 EST, worked LU9AX, LU1AM, LU1BV, LU4DI and LU4MA. HC2OT heard LU9EV and worked LU6DO between 2015-2055 EST. XE2C, between 2015-2120, worked LU6DO, LU9AX, LU4DI, and heard XE1GE and LU9MA.

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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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. W8NQD 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. WØIJK 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.

WØAZT 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 W6DI. 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, Sellerville, 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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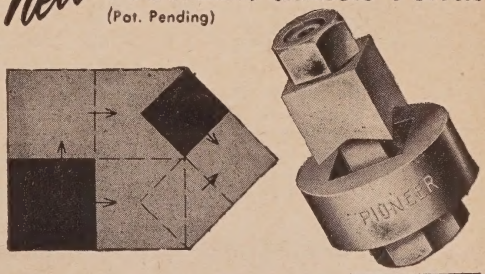
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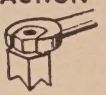


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100, Nicobar Island, is on once in a while. Since this is counted the same as Andaman, this will not be a new one for those who previously worked *VU2PB*. If you need Canary Islands, you might take a look for *EA8MC*. He has a T7 note, and can be found 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 *FI8ZZ* 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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BC-357 BEACON RCVR W/BOOK	NEW		**2.95**
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ARC-4 W/TUBES, XTALS & DYN	USED		**14.75**
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MATCHING NETWORK MC-519 50 coax to 250 OHMS BALANCED New W/BOOK			**4.75**
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T/22 ARC-5 7-9.1 MC XMITTER	NEW	$	**9.95**
T/23 ARC-5 VHF XMITTER W/TUBES	USED		**14.95**
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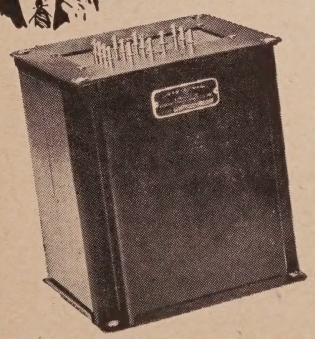
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written by *HB9GP*, the Swiss QSL manager. You draw your own conclusions . . . I won't print mine.

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. Wuenthrich, 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 6UZX. 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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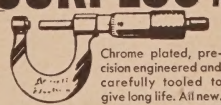
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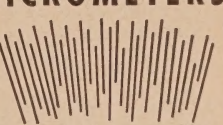
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called CQ 75 times without signing his call. No, . . . he doesn't expect you to believe that!

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 Obrien'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.

W1ENE 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.

WØYXO 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, *T19BR*, *SV5UN*

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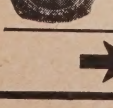
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28,400, and *ZC1CL* 28,200 . . . W1AB who has been under the weather for a while is now up and at them again. He says one of his ambitions is to visit the West Coast someday and try the West Coast Martinis.

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**
OE8AN	**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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75TL	3.95	954	.59	717A	.97	810	4.95	959	.59	4E27	12.95	1616	.89
832A	3.95	6SN7	.89	861	12.95	6AK5	.89	VR150	.79	829	3.95	872	1.98
6L6G	.89	6J7	.79	958	.59	VT127A	2.95						

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10 mfd. at 600 volts	1.19	1 mfd. at 4000 volts	3.49
1 mfd. at 1000 volts ..... 3 for	.49	2 mfd. at 4000 volts	4.95
8 mfd. at 2000 volts	3.49	3 mfd. at 4000 volts	5.45
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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 repeet 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*.

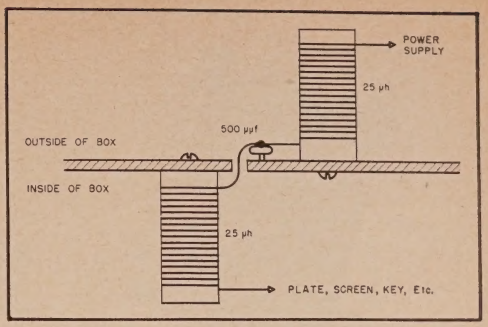


Fig. 6. Constants and layout for recommended line filter.

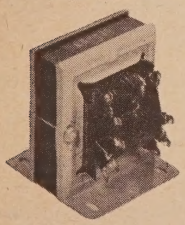
Notice that the lead outside the box to the power supply is not shielded. As a matter of fact, it was found to be better not to have any direct connection of a line or cable shield to the box, because, if the box is not perfect, radiation characteristics like *Fig. 3A* may be approached. If cable shielding 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 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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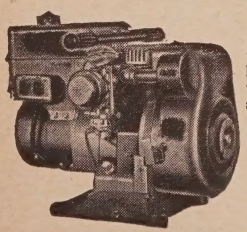
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is not coupled to the tank circuit. To remove all of the unwanted signal from a transmission line and antenna system, a filter will have to be used.

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 selctivity, 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.

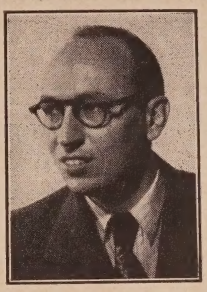
G4AR—A lovely week-end. A station not in QSO power leaks, too. As it was I had a good sleep. *W6EJA*—Eliminate W contacts for local zones. Also drop 80 meters. *KH6QK*—It was a very nice contest. *W2EMW*—DX conditions were excellent. Contest lasted just the right length of time. *KL7PJ*—I also like the 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



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 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. *W4-KFC*—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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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 ½" 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 ⅛" 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 ⅜" 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 8½" 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

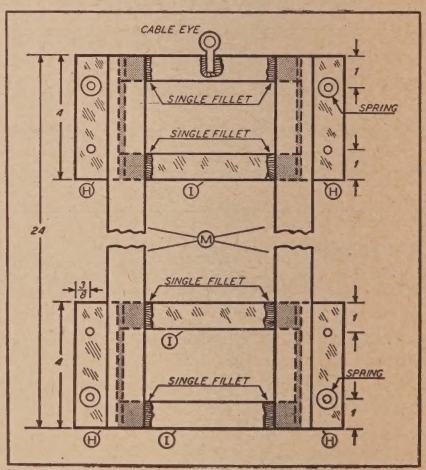


Fig. 4. Front view of the dolly tracks on which the beam rides. A cross-section view is shown in Fig. 3. The cable eye, fed with a good grade of galvanized cable, is attached to the pulley at the top of the track.

small children. After several cable changes, the most satisfactory cable was found to be ⅛" Roebling 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. Amphenol 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 ¾" 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.

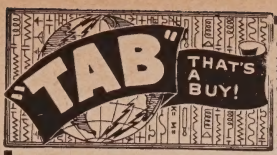
Neutralize the tubes in the orthodox manner, making sure the grid leads are crossed.

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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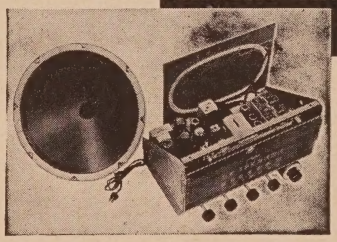
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WANT SIGNALS INSTEAD OF HISS? Get proved ideapacked circuit diagram and home construction suggestions for a high performance, very low noise level receiver. Use elements to improve your receiver or as a hot converter. Send one dollar to Dan Poteet, 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 xmtr 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.

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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

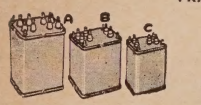
From Lenore, W6NAZ, we hear that the YL Callbook, which she and Sandy, W6YRL, have been putting together, is now available. In addition to listing all YLRL members, the booklet will include a paragraph of interesting details on every member who completed her questionnaire—how each YL became interested 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. . .



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5127: 6.3VCT/3.2A, 6.3VCT/1A	2.25
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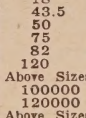
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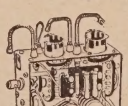
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1	MFD	1500VDC	.95	1.80
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4	MFD	1000VDC	.87	1.70
6	MFD	600VDC	.65	1.25
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E	.00025	2500TVDC	.29	.55
D	.00004	2500WVDC	.39	.75
E	.000047	2500WVDC	.39	.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	18.00
B	.03	2000VDC	12.00	23.00
B	.045	2000VDC	12.00	23.00
B	.00015	20000VDC	24.00	47.00
B	.0001	20000VDC	24.00	47.00
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C	.006	2500VDC	1.45	2.85
E	.00027	2500WVDC	.35	.63

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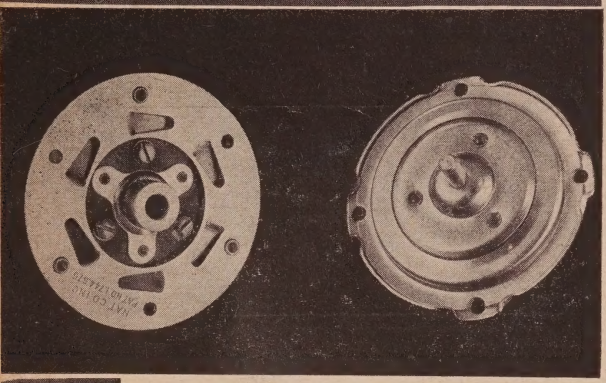
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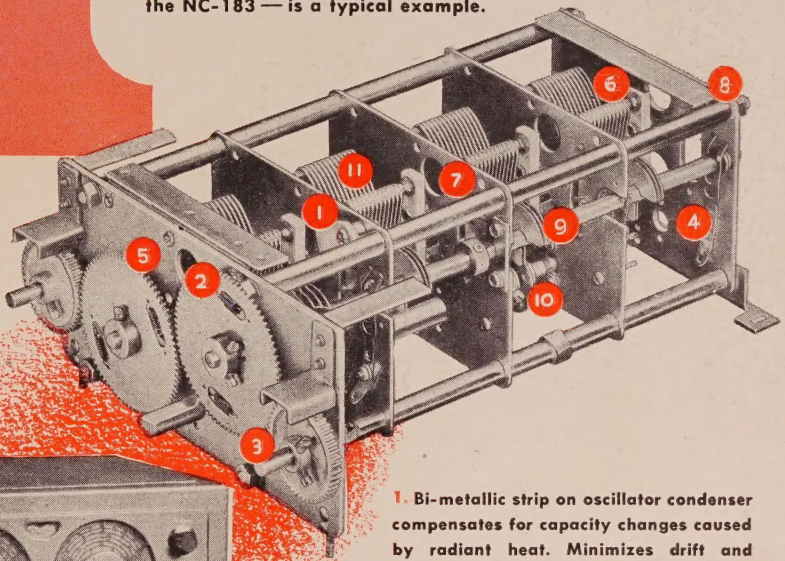
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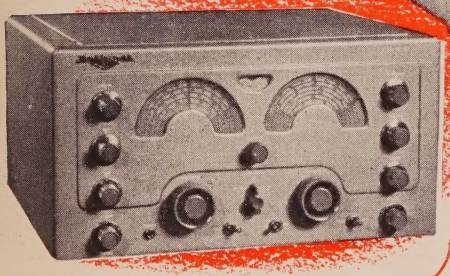
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