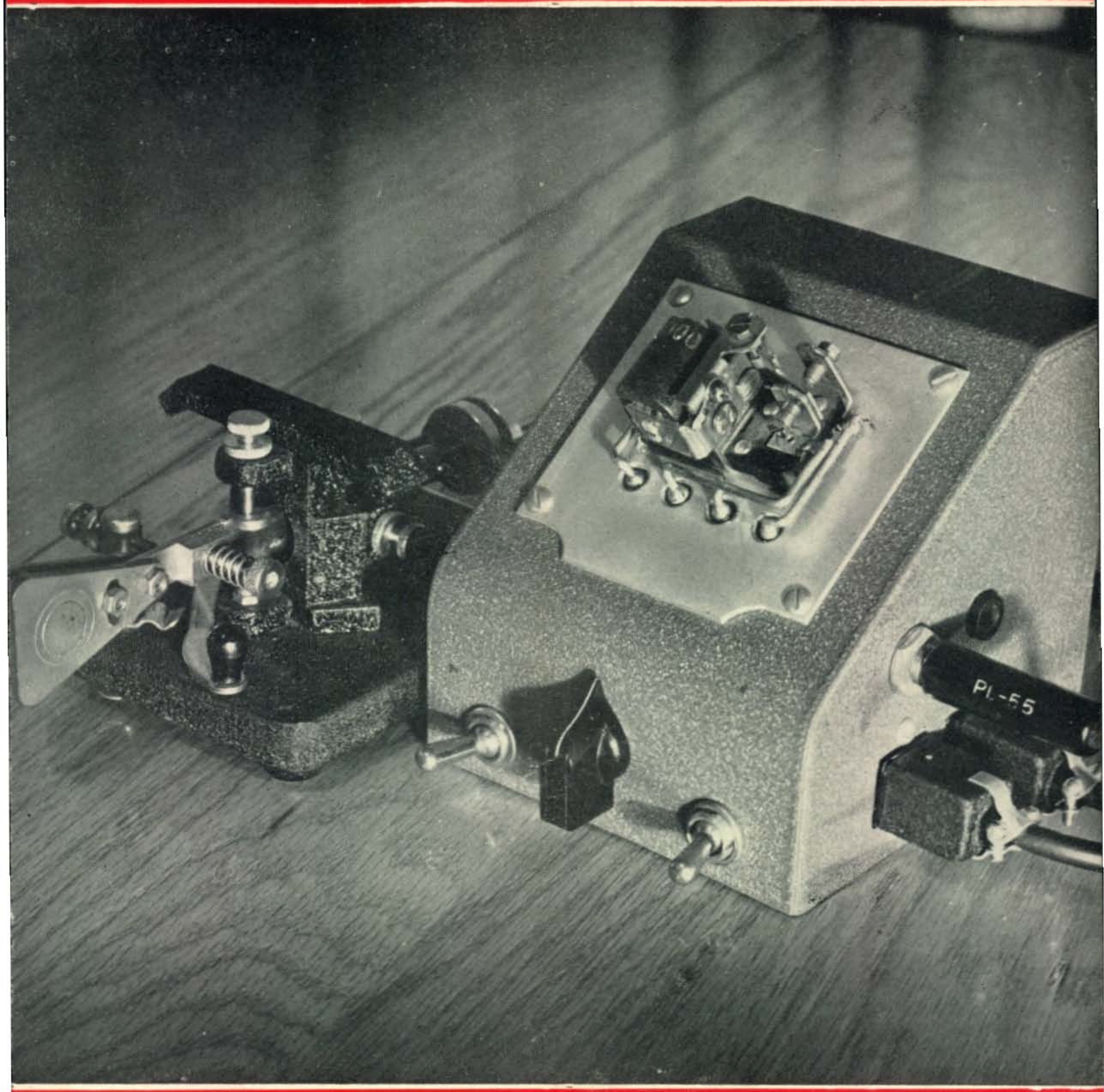
CQ

JUNE, 1947

The Radio Amateurs' Journal

35¢



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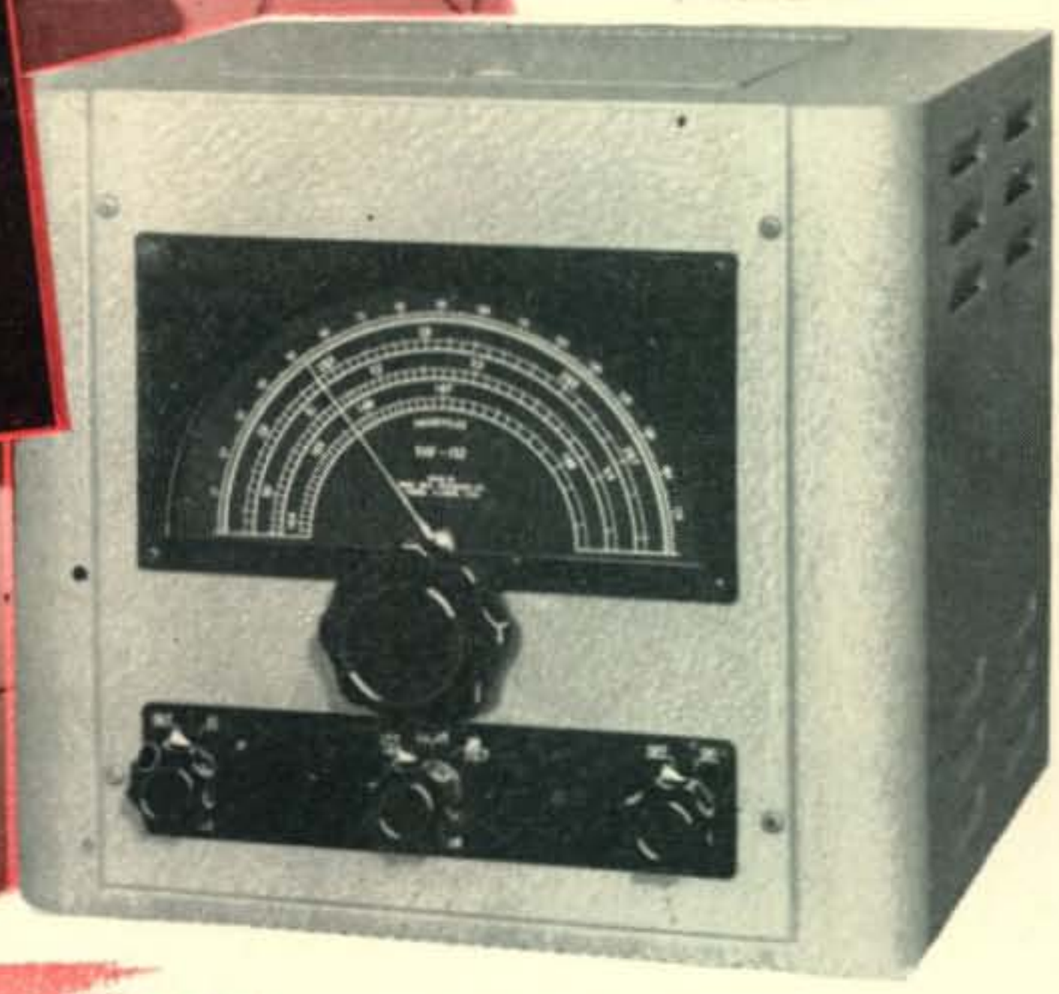
ADD TWO, SIX, TEN and ELEVEN METERS

TO YOUR OPERATING SCHEDULE

the VHF 152

FOR 2, 6, 10 and 11 METERS



BE PREPARED FOR THE INCREASED ACTIVITY ON TWO AND SIX METERS

SPRING and SUMMER will provide a new high in VHF interest and activity —and a VHF 152 Converter will enable you to get on these bands efficiently and economically. Six meters will be good for "Sporatic E" this Summer. In the Fall F2, long distance skip, will also prevail.

Because many are going to crystal control on 144 mc., the VHF 152 is a must. It employs the extremely efficient double detection system when used with any communications receiver—at a low price and with high efficiency.

What's more, amateurs are discovering that two and six meter bands are best for local rag chews—eliminating QRM on the crowded bands when they are open for DX.

In order that imageless operation on the eleven meter band can also be enjoyed, the VHF 152 has now been redesigned to include this band also. Features include a regulated power supply and provision for four separate antennas.

Yes, the VHF 152 will greatly improve reception on the high frequencies, and it's an especially vital adjunct to those receivers that tune only to 18 MC.

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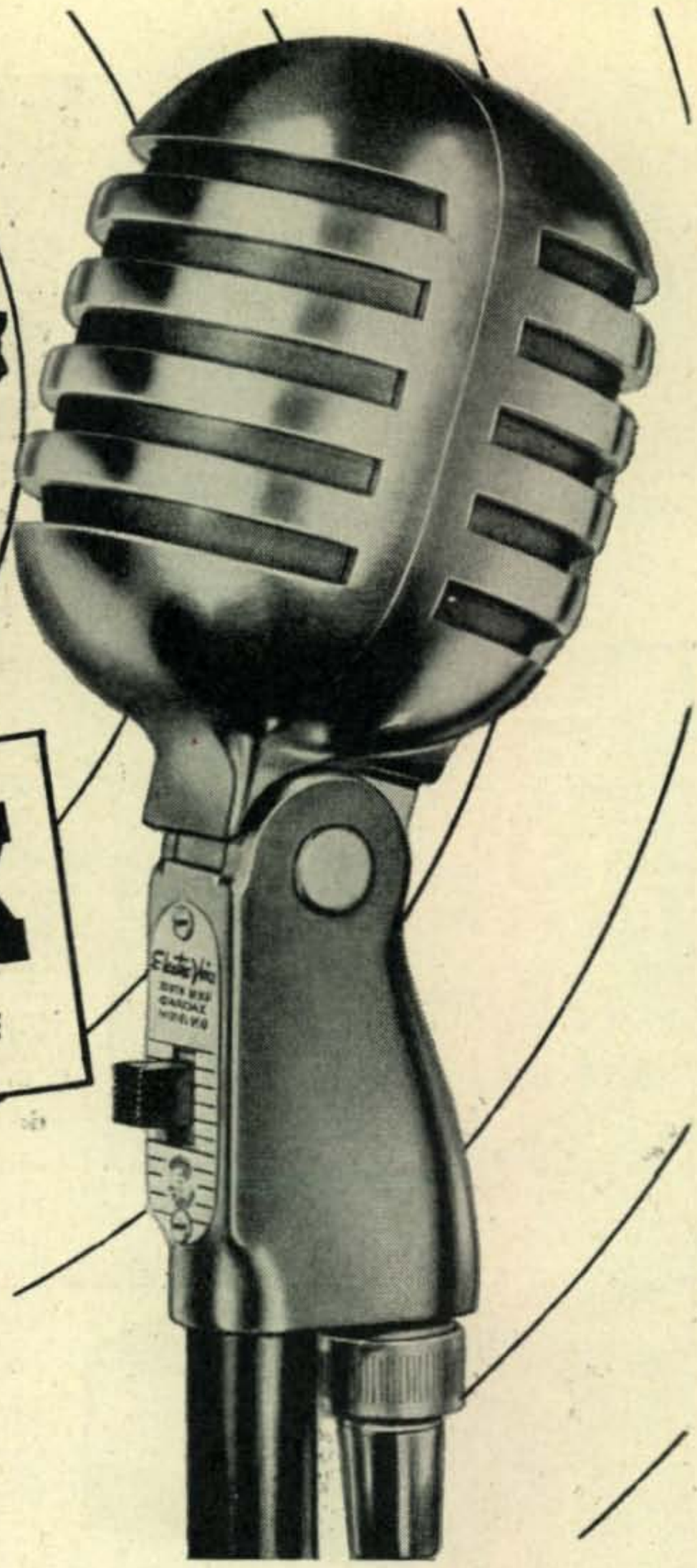

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CQ

The Radio Amateur's Journal

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Vol. 3. JUNE, 1947 No. 6

In This Issue

COVER

Here's your opportunity to have one of those outstanding fists we all admire. Starting on page 13, W6WB describes the DADIT, a novel gadget for making automatic dashes. Used in conjunction with your "bug", the Dadit produces perfect dashes adjusted to the desired length. Complete with built-in monitor, the Dadit is the answer to a c-w man's dream of manually operated keying that sounds like a tape. (*Photos by Jean Pera, W6DOT*)

PRs start Put!

Whether you're "edging the band" or working the middle . . . it's a real satisfaction to know exactly where you are, right down to the kilocycle. That's why DRIFT is the most important characteristic you look for in your crystal controls. Little wonder that tens of thousands of Amateurs—all over the world—prefer PR Precision CRYSTALS. They are truly LOW DRIFT . . . meet commercial drift standards. PRs have a drift characteristic of less than 2 cycles per MC per degree Centigrade. This LOW DRIFT characteristic does not prevent PRs from giving HIGH ACTIVITY AND OUTPUT, traditionally demanded by amateurs. You can get the EXACT FREQUENCY YOU WANT (Integral kilocycle) WITHIN AMATEUR BANDS, AT NO EXTRA COST. Accept no substitute! Get PRs at your jobbers.
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PR Precision CRYSTALS

10 METERS **PR Type Z-5.**	Harmonic oscillator. Ideal for "straight through" mobile operation. High activity. Heavy drive without damage in our special circuit $5.00
20 METERS **PR Type Z-3.**	Harmonic oscillator. Low drift. High activity. Can be keyed in most circuits. High power output. Just as stable as fundamental oscillators $3.50
40 & 80 METERS **PR Type Z-2.**	Rugged, low drift fundamental oscillators. High activity and power output with maximum crystal currents. Accurate calibration $2.65

. . Letters . .

On Learning the Code

Dixon, Calif.

Editor, *CQ:*

Reader Stephen's letter (March, *CQ*) was very interesting. First he says he is too old to learn the code—then he says he wants to study radio.

As far as (we) are concerned if he can study the "highly technical" side of radio and assimilate it then he should be able to duplicate the "feat" that thousands of fellows have already demonstrated: the ability to learn the code!

J. F. Gardner, W6LNN E. Dold, W6KCS,
B. W. Southwell, W6OJW,

Lawrence, Ind.

Editor, *CQ:*

. . . I was quite amused at a letter written by F. J. Stephens asking if the Class D license was dead. To my dismay he had worn out all his records and tapes, which I personally never used.

I took the examination . . . and found that I wasn't as good as the FCC required to get a ticket. So home I came . . . and diligently started all over as before. After three months the examination was held again. I passed and I'm 43 years old, "gray" as he calls it.

Please assure Mr. Stephens that if I failed the written exam I will try again. What gave me the incentive was a young fellow from Columbus, Ind., who has been there four times before he had mastered the great art of passing.

William R. Todd

Dividing the Bands

G.P.O., Macao, Asia

Editor, *CQ:*

. . . Have just read the letter from Fred C. White, G3XP in December *CQ*. (Mail is slow to Macao.)

I heartily agree with Mr. White re the GI phones, but in my case it is not the QRM caused by GIs in Europe, but the J9 and J2 phones plastered all over the 28-mc c-w portion of the band. With their high power and overmodulation they sure take up quite a slice of the band.

They were on right in the middle of the DX c-w contest, as usual, "*CQ* stateside!" Admitted, there are a lot of phones on this part of the band, but mostly 25 to 50 watts and they cause very little QRM. The GI phones in this part of the world are spread out evenly from 28,000 to 28,500 kc and with their power, leave very little space on the band for QRM-free c-w operation.

I also use phone on 28,150 kc, but with a maximum input of 50 watts I am sure it doesn't take up much more room in the band than my c-w signals do. It would be very fine indeed if those GIs could give us say from 28,200 to 28,500 for the phone work and let us c-w fellows work at least 200 kc of the lower portion without any phone QRM.

It is just as bad on the 20-meter band, but QRM from GI stations is not noticeable as the Chinese phone blaring away with any type of modulation from loop up, drown them and the c-w signals out. I have never finished a QSO with a W without a complaint of QRM from phone from some South American.

J. J. Alvares, CR9AG

NOW you can get Sylvania quality in TRANSMITTING tubes too!

SYLVANIA INTRODUCES THE TYPE 3D24

BEAM POWER TETRODE WITH ELECTRONIC GRAPHITE ANODE

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

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

OTHER FEATURES INCLUDE:

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

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

MECHANICAL SPECIFICATIONS

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

ELECTRICAL CHARACTERISTICS

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

Direct inquiries to Radio Tube Division, Emporium, Pa.

SYLVANIA ELECTRIC

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

EVERY ONCE IN A WHILE, we of the editorial staff feel that we belong in *Zone 23* with neither transmitter nor receiver. The cause of our momentary exile is generally a poignant letter from a reader who goes into great and meticulous detail to point out our short-comings. Naturally, since *CQ* does not claim to be perfect, many of these allegations are, in part at least, true. With this thought in mind we have given prolonged consideration to methods of acquainting the readers with the mitigating factors that often necessitate our following a course which is not of our own choosing. To date the best suggestion has been the revival of the *Private Life* series.

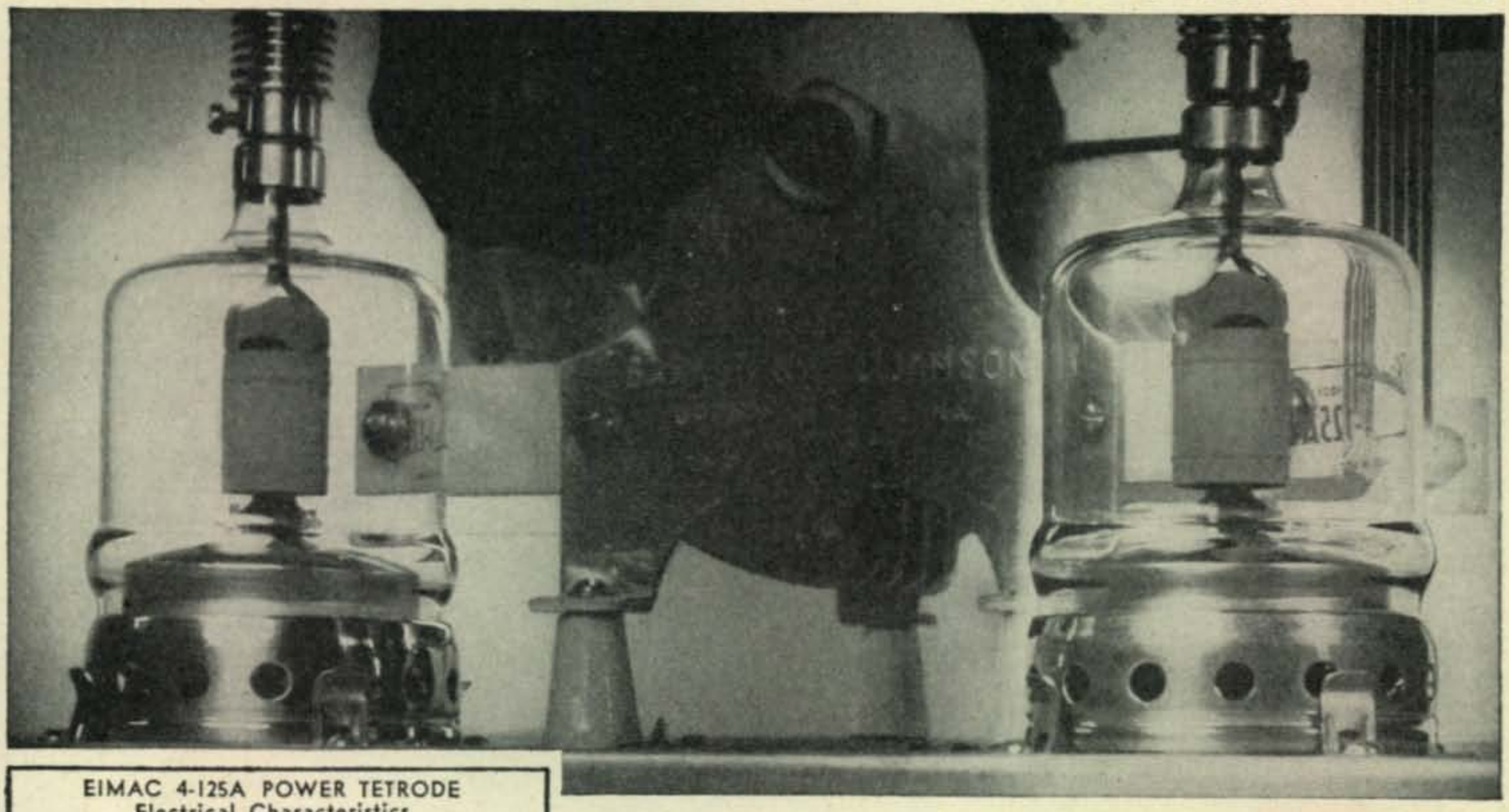
The *PrivateLife* series is simply a column, published at random intervals wherein we discuss the inner workings of *CQ*. Generally, a column of this type is very successful. It allows the reader to see that we, too, are amateurs and although we think and sometimes act as publishers we are wholeheartedly interested in the amateur welfare. Secondly, as we often bare our designs for the future we eventually lessen the burden upon ourselves and our secretarial staff. Therefore, if you have a question concerning *CQ*, which has been troubling you and which you feel will be of interest to many others, just drop us a line and we will attempt to answer it through the medium of this column.

From time to time a certain number of readers have hesitantly inquired if *CQ* has a club rate or a group subscription plan. The answer is *yes*, we do have a special group subscription plan which is available to bona fide amateur radio clubs as well as groups of amateurs located within certain areas which subscribe at one time.

With the steadily rising trend in printing costs the plan is still classified as temporary. At the present time eleven (11) or more amateurs may subscribe for $1.75 per year. If the group has less than 11 members, a year's subscription is $2.00 each. Since the regular rate per year is $2.50, the saving represented by group subscriptions is very substantial.

If you are planning a group it is not necessary to obtain the subscription blanks from Mrs. Reissman of our Circulation Department. However, to avoid any confusing situations, it is best to mention that you saw the special rates, listed in this column. Just send in a list of the group members who want to subscribe, including their addresses and call letters (if they have a call) and, of course, a check for the proper amount. Please include the name of your club. Additional subscriptions at the group rate will be accepted provided they include the necessary information to identify their group.

JUST ANY TETRODE WON'T DO

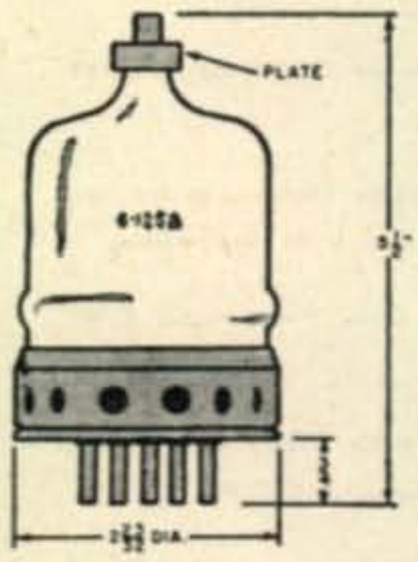


EIMAC 4-125A POWER TETRODE Electrical Characteristics	
Filament: Thoriated tungsten	
Voltage	5.0 volt
Current	6.5 amp
Grid-Screen Amplification Factor (Average)	6.2
Direct Interelectrode Capacitances (Average)	
Grid-Plate (Without shielding, base grounded)	0.05 μuf
Input	10.8 μuf
Output	3.1 μuf
Transconductance (i_b = 50 ma., E_b = 2500 v., E_{c2} = 400 v.)	2450 μmhos
Maximum Ratings (Class-C FM or Telegraphy, key-down conditions, 1 tube)	
Plate voltage, d-c	3000 volts
Plate current, dc	225 ma.
Screen voltage, d-c	400 volts
Grid voltage, d-c	-500 volts
Plate dissipation	125 watts
Screen dissipation	20 watts
Grid dissipation	5 watts

The Eimac 4-125A is the power tube that revolutionized transmitter design, a tube specificially designed with your problems in mind. Here is a stable, ruggedly built tetrode rated at a maximum plate input of 500 watts, and requiring less than three watts of grid drive.

Excellent characteristics of the 4-125A permit operation at full input up to 120 Mc. In the two-meter band an output power of over 350 watts per tube may be obtained.

Features of the 4-125A contribute to good progressive transmitter design.



EQUIPMENT ECONOMY → Drive the final directly from your vfo.

BANDSWITCHING → Be able to change bands quickly, easily, and simply — as neutralizing circuits are not required.

MODULATE EASILY → Use circuits shown on the 4-125A data sheet—no screen winding is required on the modulation transformer.

AUDIO DRIVE → Two 4-125As in AB_1 give 330 audio watts with zero drive.

Follow the Leaders to Eimac TUBES

Eimac engineering makes Eimac tetrodes better . . . Data sheets and application notes on the 4-125A are available upon request.

EITEL-McCULLOUGH, INC.
1667 San Mateo Avenue, San Bruno, California

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

. . . Zero Bias . . .

The United Nations and the Radio Amateur

IN APRIL 1946, Zero Bias discussed the contribution that amateur radio could make toward international good will . . . and everlasting peace. To quote from a portion of that editorial may emphasize its theme, for it said, "With all the talk about speed of travel and the shortened distances in an air age, no means of communications approaches the speed of radio waves. The radio world is truly small!"

"Hams—both old and new—who so ably assisted in winning the war aboard ships, in the foxholes, in planes, and in warplants, wherever radiomen were needed, now have the opportunity to continue their service to help gain and hold the peace for all the world!"

"On what more common ground can man meet man than that of common interest? On what more common basis of friendship can man meet man than in actual two-way communications? In what better fashion can man seek man than that of a QSO from home to home?"

"To encourage amateur radio is to encourage better international relations and understanding. Already hams from all over the world are in daily communication. Additional international communication frequencies for the amateur may pay dividends of incalculable value to everyone. Technical achievements and service to their community, today the most important activities of the ham, might become insignificant (by comparison) if hams are able to contribute toward creating one world, for it may well be one world or none."

When this editorial was written there was no organized attempt to use this tremendous force for good. But we hope that the April 1946 editorial brought to the attention of men who were thinking or planning peace the potential they had in amateur radio. Whatever the source of inspiration, and there can be no doubt that thousands of amateurs wholeheartedly shared our personal feeling in this matter. On April 17th, 1947, the Department of Public Information of the United Nations and the International Amateur Radio Union entered into an agreement which is reproduced in its entirety below.

The importance of this move cannot be overemphasized. The modern amateur has achieved political maturity! It is a tremendous opportunity, one which no Ham can afford to overlook. Here is a chance to show the effectiveness of amateur radio, not only in times of emergency or in purely technical fields, but as a live, active, beneficial instrument for every person in our community. As the steps for the development of the United Nations amateur program are formulated, maximum participation by active amateurs is urged. It is planned to create a United Nations radio aide title, for those who are able to assist in the tasks outlined by the Joint Board. The job, when undertaken, should be carried through. Amateurs shouldn't apply for an appointment and then fail to execute its obligations. By recognizing the amateurs as a potent instrument of good will and as a practical aid to the United Nations, amateurs have gained new prestige. It is up to us to justify this new-found responsibility.

Agreement Between The Department of Public Information, United Nations and The International Amateur Radio Union

WHEREAS among the fundamental concepts of amateur radio are the promotion of international communication and the maintenance of friendships established thereby, it is peculiarly fitting that amateur radio operators should be associated with the United Nations, through the Department of Public Information of the Secretariat which is charged with the responsibility for the dissemination of information pertaining to the United Nations activities.

It is one of the precepts of radio amateurs that they are bonded together for the promotion of interest in international radio communication and experimentation for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, and for the maintenance of international fraternalism and a high standard of conduct. The International Amateur Radio Union is composed of the representative amateur radio societies of all nations. It is governed by Delegates from all nations, and participates in international radio conferences. Its headquarters is now established in the offices of the American Radio Relay League, West Hartford, Conn.

The International Amateur Radio Union, whose constituent societies have a membership of approximately 100,000 amateurs throughout the world many of whom are in daily contact with each other by electrical means of communications, is recognized by the United Nations as being in a position to render service to the United Nations as a rapid distributing agency for material issued and distributed by the United Nations for the peoples of the world. The International Amateur Radio Union operates under the rules and regulations established by the various countries and conforms to the findings promulgated by the International Telecommunications Union. Each amateur radio operator member of a society affiliated with the Union is licensed under the rules and regulations established by his own government to operate radio transmitting and receiving equipment.

NOW, THEREFORE, in recognition of this great potential value to the United Nations and its special activities, an arrangement is hereby entered into which will permit the fullest possible use of the aforementioned communications facilities. In order to implement this agreement a Joint Board is hereby established with the consent of both the United Nations and the International Amateur Radio Union consisting of four members, two to be appointed by the United Nations and two by the Union, such Board to formulate the policies, methods and procedures for submission to the Assistant Secretary-General for Public Information, United Nations and to the President of the International Amateur Radio Union for final approval.

The purpose of this association is to promote the point-to-point or person to person service between selected amateurs handling approved United Nations material. The association will also provide a

[*Continued on page 70*]

This can be your complete ham shack

YOU will have an outstanding station with a Collins 75A receiver and a Collins 32V transmitter. You'll have good quality on phone, clean keying on cw.

The transmitter is rated at 150 watts input on cw, 120 watts on phone. Bandswitching is employed in all stages, and all circuits are ganged except the final. The final stage utilizes a universal output network, with only two controls—one for loading into the antenna and one for tuning the final.

The 75A receiver utilizes a double conversion (triple detection) circuit to give you a minimum of 50 db image rejection on all bands. Sensitivity is 1 microvolt for a 6 db signal to noise ratio. A clean, easy-to-use crystal filter and calibrated BFO are additional advantages. The *pitch of a cw signal is unchanged by any control except the tuning dial and BFO control.*

The Collins band-lighted dial is used in both the receiver and the transmitter. It gives you a direct reading of frequency. Receiver accuracy is within 1 kc or better at all frequencies below 22 mc, and within 2 kc on the 11 and 10 meter bands. The transmitter accuracy is within ½ kc. on 80 meters and directly proportionate on other bands. Stability of both units is included in the accuracy specification. Furthermore, *the band-lighted dial shows only the band in use*—no other band is lighted. This new dial eliminates the usual "getting used to it" time, and shows you the correct frequency at a glance.

The 75A and 32V make a complete station right on your desk. Everything is there. You have no power supplies or spare coils to store or hide. Your shack will be neat, attractive, efficient, *and dependable*. When you want to operate, your rig will be ready. Components used are sturdy, substantial, and are operated conservatively.

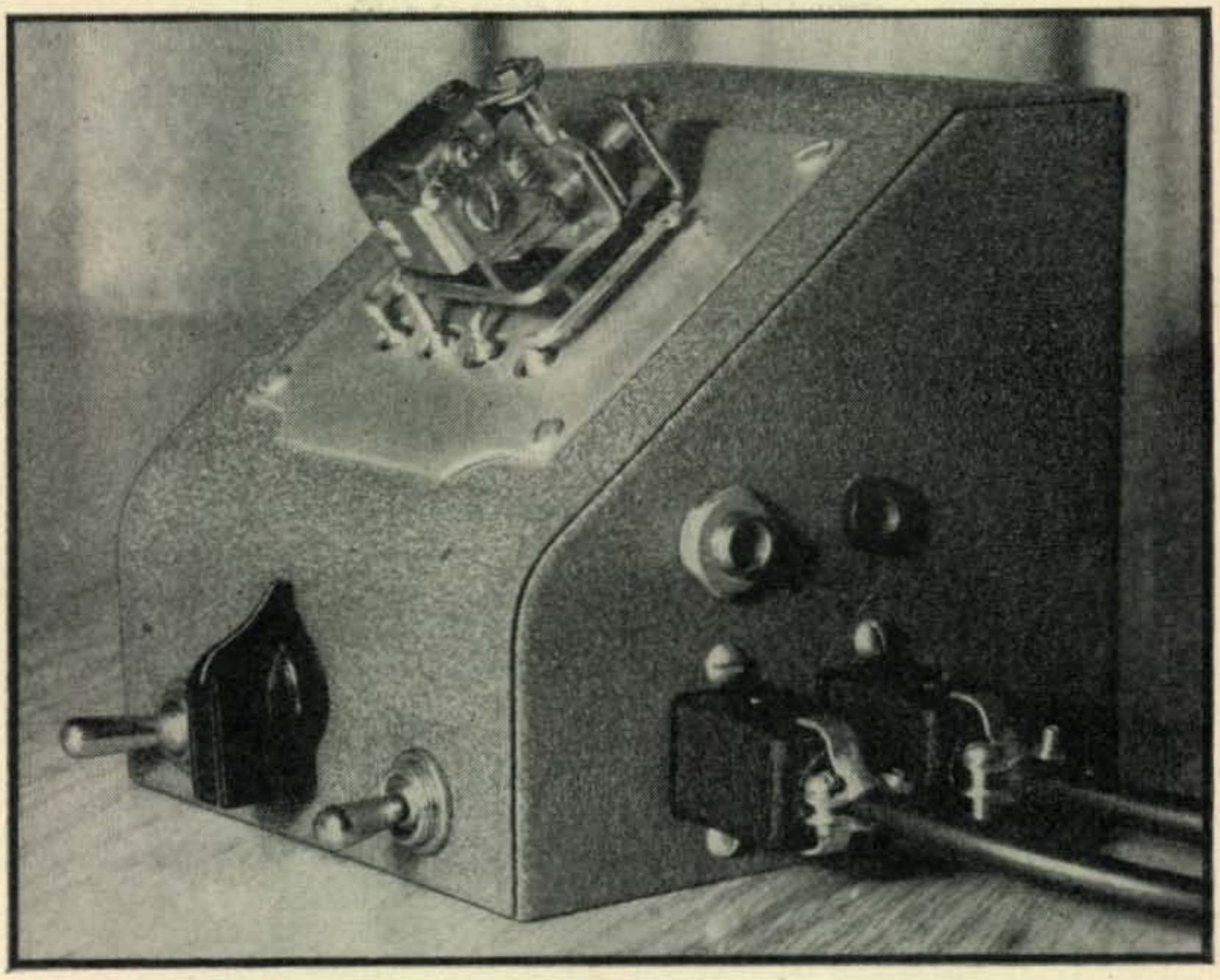
Let us send you detailed illustrated bulletins describing these units. Place your order soon for prompt delivery.

FOR BEST RESULTS IN AMATEUR RADIO, IT'S . . . COLLINS

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 West 42nd Street, New York 18, N. Y. **458 South Spring Street, Los Angeles 13, California**

- THE DADIT •



A standard, sloping front meter case houses the complete keying and monitor unit. One of the four prong plugs makes connection to the "A" and "B" batteries, the other patches in the "bug" in addition to providing output keying connections. One jack takes the earphone plug, the other patches across to the audio output jack of the receiver. The round opening normally used for the meter is covered by a small aluminum plate upon which the keying relay is mounted.

C. F. BANE, W6WB*

A new approach to automatic dashes

WITH THE C-W MEN once again in full stride, the subject of so-called "electronic" bugs is being revived after laying tucked away in moth balls for the war period. In past years some excellent articles on this subject have appeared in contemporary literature, all however somewhat more complex than would seem to be necessary in view of the relatively simple functions of these devices. Automatic dots are surely no problem—semi-automatic keys as they now exist accomplish this in a highly satisfactory manner by utilizing the familiar principle of the vibrating reed. The complication enters however when automatic dashes are attempted.

This is understandable in view of the requirements for longer hold-in time as well as the necessity for adequate spacing between dash characters. The Patent Office is no doubt full of mechanical designs that claim the ability to make automatic dashes. The proof of the pudding however is in the fact that few have ever gone into production. Many workers, realizing the difficulty of mechanical achievement, have turned to external electrical circuits as a means of producing automatic dashes of adjustable length and with variable inter-character spacing. There is another, and much more simple way of producing automatic dashes; one which suffers neither from undue mechanical complication nor electrical circuit complexity. Enter, the DADIT!

*155 Saint Elmo Way, San Francisco, Calif.

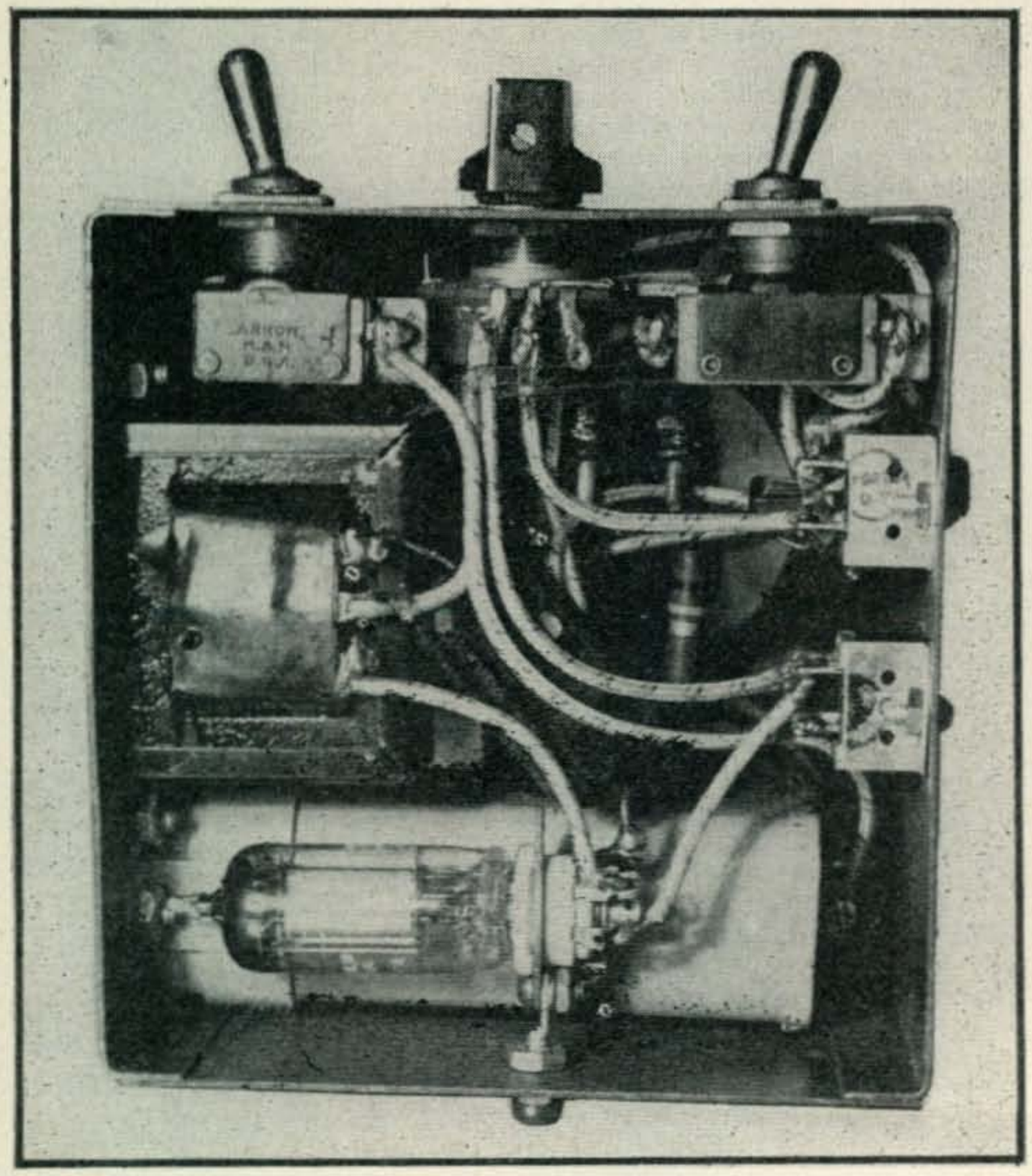
Design Considerations

As an approach to a possible simple solution, consider the elementary household buzzer a diagram of which is shown in *Fig. 1*. This unit consists basically of an electromagnet and a

pivoted armature of magnetic material positioned so that it will be attracted to the core of the electromagnet when the latter is energized. At the instant a suitable voltage is applied across the buzzer input terminals, the electrical circuit will be complete due to the armature being in electrical contact with the upper terminal. Current flowing through the buzzer coil will energize the electromagnet thus causing the armature to pull down and break the circuit. The repeating of this make-and-break cycle is obvious. Suffice it to state that the frequency of make-and-break will be dependent upon several factors among which are the spring tension on the armature, the voltage across the coil and the spacing between pole piece and armature. The frequency of vibration of the conventional buzzer is far too high to be of any use in our attempt to produce automatic dashes. None the less, it *is* producing dashes even though the length and inter-dash intervals are incorrect and since we have ready means at our disposal of controlling at least one of the parameters, the frequency, further consideration is indicated.

A large capacitor, connected directly across the buzzer coil, will become charged as potential is applied to the input terminals and will discharge through the buzzer coil as the armature pulls down and breaks the circuit. The armature will thus hold down until such time as the condenser discharge voltage drops to a value that is no longer great enough to produce sufficient magnetic pull to overcome the torque of the return spring on the armature. The length of time that the armature is thus held down will depend mainly upon the time constant of the circuit composed of the resistance of the buzzer coil and the shunting capacitor. Practically, the resistance of the average buzzer coil is so low that a capacitor of inordinate size would be required to obtain usable time constants. It follows however that our discussion thus far is illustrative only and that in practical applications we can easily substitute a coil of high resistance so that capacitors of reasonable value can be used.

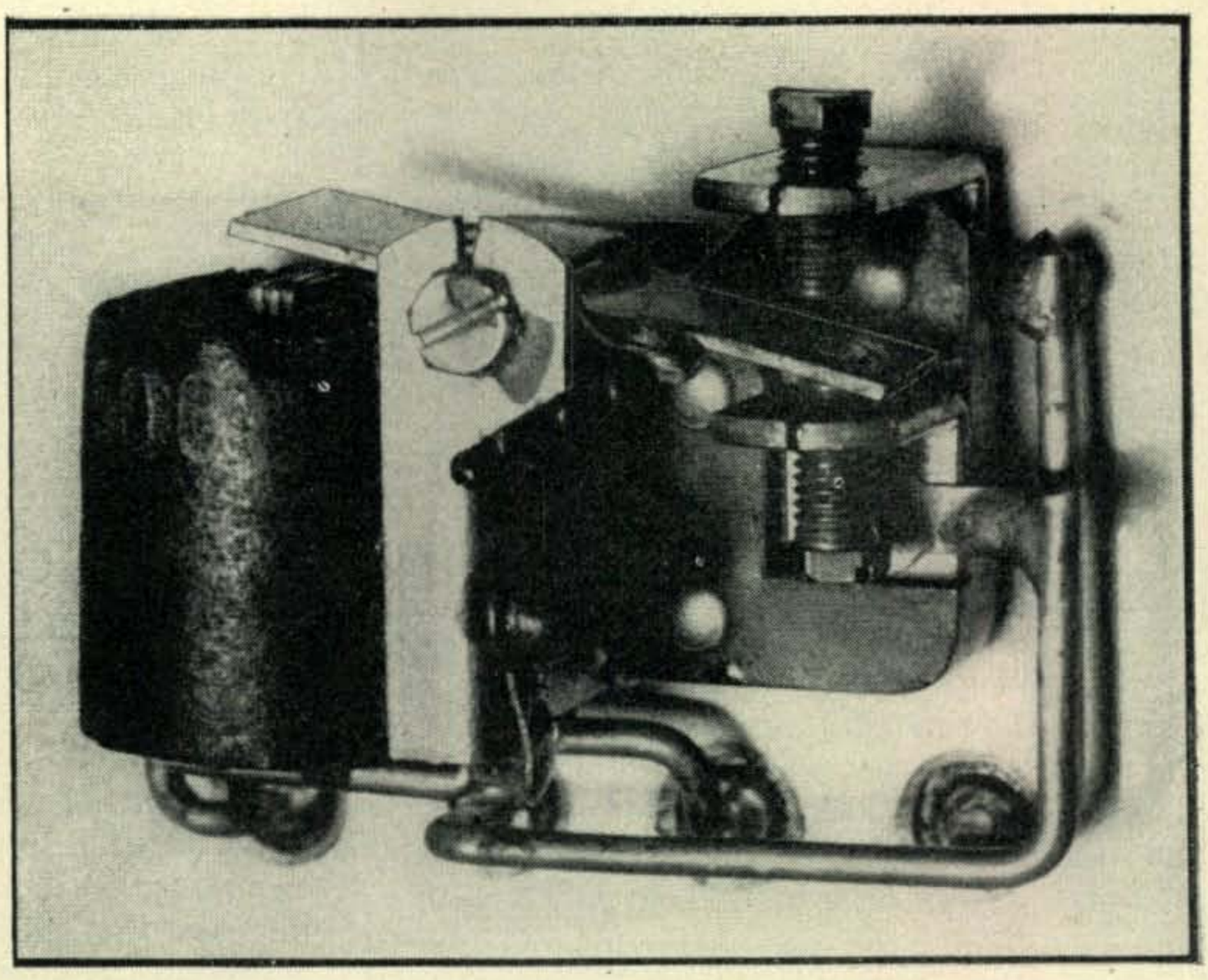
By thus introducing delay elements we can reduce the vibrating frequency and obtain hold-down periods of duration more than adequate for the longest dashes used in communications work. Further, it would not be difficult to provide an additional contact so that an external circuit could be controlled. It would appear that this combination offers almost everything we need for a simple automatic dasher key. The "almost" part however, will prevent conventional buzzers from being successfully applied. There is yet no means for controlling the *spacing* between dashes, —this latter being almost a direct function of the spacing between the magnet pole piece and the armature. In other words, the spacing between



❖ ❖

Bottom view of monitor and relay circuits shows relative simplicity of unit. The 3A5 for the monitor is horizontally mounted. One switch turns the unit on while the other permits selection of either automatic or manual dashes.

❖ ❖



The sensitive relay is the heart of the Dadit. This close-up of the Sigma relay clearly shows the extra-wide spacing between armature and top contact.

dashes is necessarily the time taken for the armature to complete its cycle of movement from the top contact to the pole piece and return. The regular buzzer has small spacing between the top contact and the pole piece and thus cannot possibly provide sufficient inter-dash spacing. Knowing this, we can abandon the buzzer as such but still hold hard and fast to the buzzer interruption principle. A relay of suitable design will offer better possiblities particularly if it is one in which the pole-piece-to-armature and contacts-to-armature spacings are readily adjustable.

The Relay Problem

Several relays of a design ideally suited to delay purposes exist and are readily obtainable on the market at the present time. Notable among these are several types manufactured by the Sigma Co., all with high resistance coils and having adjustable top and bottom contacts as well as means for changing spring tension on the armature. Suppose then that the relay contact-armature spacing is adjusted until the between-dash timing is correct. Won't this give us what we are after, assuming that sufficient time delay is introduced to make dashes of adequate length? Almost, but not quite! Some idea of the magnitude of the required spacing can be gained if we mention that in the unit herein illustrated, the spacing between pole piece and armature approaches an eighth of an inch! Proportionately, this is far greater spacing than would be normal with relays of this or similar types. If for example, a typical relay operated satisfactorily with ten volts across the coil when conventional spacing was used, we would find that it would not operate when the extra-wide spacing was introduced. Bear in mind that the spacings we are discussing are far beyond those normally recommended by the manufacturer but they are essential to our purpose and can be successfully used.

The proper approach toward obtaining wide-spaced relay pull down is to increase the voltage across the holding coil. When used in automatic keying applications, the action of the relay must be virtually instantaneous; determine the minimum voltage required to pull down the armature then use several times this value! The armature must go in with a snap if erratic operation is to be avoided. A sluggish relay is positively ruinous in fast bug sending, giving rise to "combinations" as making a "Q" sound like "MA". The best operator in the world can't improve this situation; it must be taken care of in the relay and sufficient voltage is the positive answer. Now it begins to look as though we really have something, having thus taken care of the hold-down delay and inter-dash spacing. Extensive experimental work however has demonstrated that when the delay is achieved by shunting the relay coil with a capacitor, the operation tends to be somewhat erratic therefore a more positive delay method was sought. Semi-mechanical methods of achieving delay, (as "slugging" the electromagnet) were discarded because of their possible complications.

Selecting the Time-Delay Capacitor

Figure 2 shows the reconnection of the time-delay capacitor across the "up" contact and the relay armature. It can be seen that if the relay is not energized, the capacitor will be shorted out and will have no effect on the circuit. As soon as voltage is applied to the input terminals, "x"

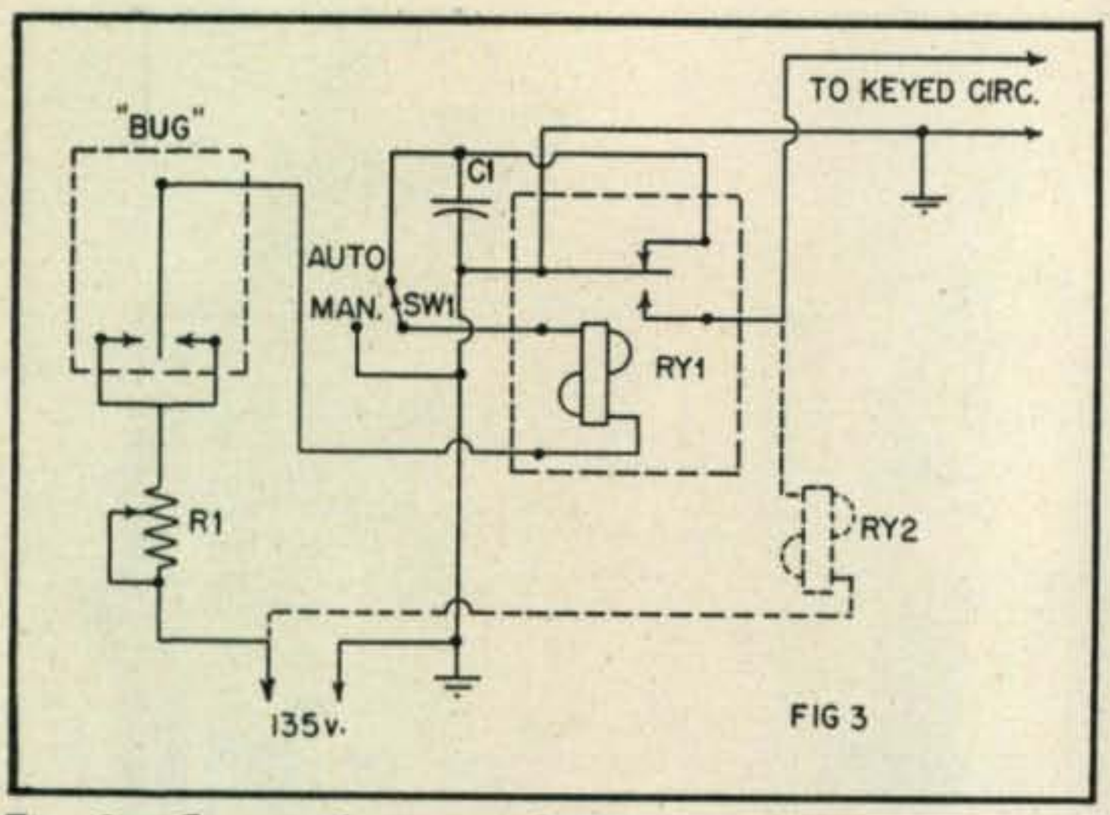


Fig. 3. Circuit diagram of a practical version of the Dadit. Relay RY2 is optional (see text).

however, the capacitor very definitely enters into the picture since the armature will pull down and thus remove the short circuit. *Figure 2A* then shows the actual connection of the capacitor to the relay coil and the input voltage. Note here that even though the external circuit was broken, (the armature having left the top contact) the input voltage remains across the series combination of the relay coil and the capacitor. To proceed with the explanation, at the instant the short is removed the capacitor *starts* to charge. Knowing that in a series circuit the sum of the voltage drops around the circuit must equal the voltage of the source, we can consider that at this instant most of the supply voltage is across the relay coil. As the charge gradually builds up on the capacitor the voltage across the relay becomes less and less, finally reaching a value where it is insufficient to create enough magnetic pull to overcome the return spring pressure on the armature. At this point, the armature snaps back, the capacitor is shorted out and discharged and the cycle repeats. We have not overlooked the fact that the relay coil also has inductance and therefore could conceivably constitute a series resonant circuit in combination with the capacitor. Careful scope examination has failed to show the presence of oscillation, therefore the coil inductance has been ignored in the belief that the resistance of the relay (5000 ohms) is so great that any inductive effects would be "swamped" out.

The amount of time that the armature will hold in is dependent upon the value of capacitor used and the resistance of the entire circuit including that introduced by the power supply. Further theoretical considerations, of which there are many, can be dismissed with the assurance that most of these factors have been duly taken into account and the builder need therefore refer only to the circuit diagram of the finished product to insure a workable unit. In a few words then, the humble buzzer interrupter principle has been utilized to provide us with an excellent means of making automatic dashes. Since this new offspring should have a name, we just call it the "Dadit."

Constructing the Dadit

A practical version of the Dadit is shown in *Fig. 3*. Here provision has been made to utilize the additional relay contact and the common armature as a means of keying an external circuit. Further, *R1* has been added as a means of controlling the length of the dashes by changing the time constant of the circuit as more or less resistance is added. It must be stressed, for proper operation, the values given are a "must"! The value of *C1* has been chosen so that with no additional resistance in the circuit, (*R1* at zero setting) the speed of the dashes is at a usable maximum. While the input voltage and the adjustment of the relay contact spacing also effect the dash speed, *C1* should be $4\mu f$, no more, —no less. As more of *R1* is cut into the circuit to increase the time constant, the voltage drop across this resistor will likewise decrease the voltage across the relay until, a point is reached where erratic operation occurs. The proper "B" voltage is also important since too little voltage will shift the point where the relay no longer responds cleanly, thereby lessening the range of speed control with a given capacitor. If you build the unit, follow *all* values including the "B" voltage, thus saving yourself the trouble of having to change everything only to come back to a result that could have been obtained initially.

The writer uses his Dadit to actuate the vacuum tube keyer in his transmitter, therefore the contact arrangement shown in *Fig. 3* is adequate since it merely shorts the grid of the keyer tube to ground and in this manner removes the blocking bias and permits plate current to flow in the keyer tube. When so used, one side of the keying circuit is conveniently at ground potential. The Dadit can be made to key an additional relay if higher current and/or voltage circuits must be keyed. If the additional keying relay has a fairly high resistance coil, say 1,000

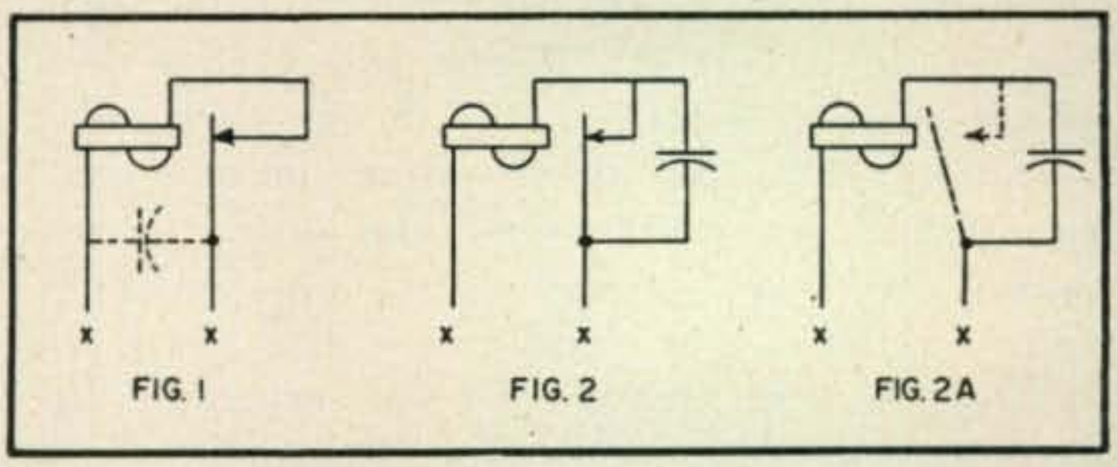


Fig. 1. (left). Ordinary household buzzer, with capacitor connected directly across buzzer coil. Fig. 2. (center). Reconnection of time-delay capacitor across the "up" contact and relay armature. Fig. 2A. (right). Actual connection of the capacitor to the relay coil and input voltage (see text).

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Fig. 4. The Dadit circuit, including a built-in keying monitor. This is the unit illustrated in the photos.

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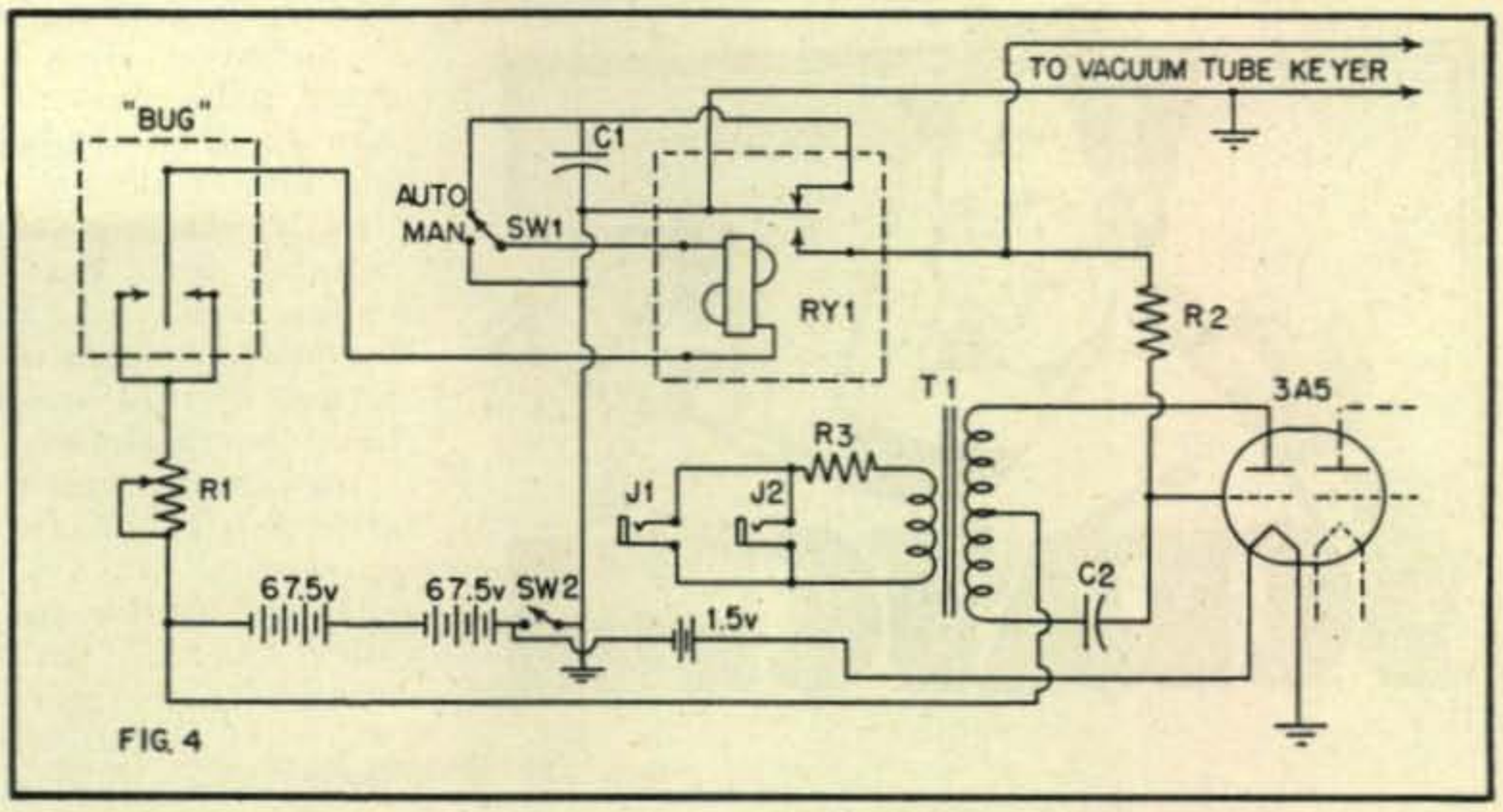


Dadit Parts List

C1—4 μf, 200 working volts, oil-filled paper.
C2—.05 μf, 400 working volts, paper tubular.
J1, J2—Single circuit jacks, short shank type.
R1—25,000-ohm potentiometer.
R2—10,000 ohms, ½ watt carbon.
R3—1 megohm, ½ watt carbon.
RY1—Sigma sensitive type, SPDT. Coil resistance 5000 ohms (see text and illustration).
RY2—Supplementary keying relay. DPDT, sensitive type, coil resistance 1550 ohms. Leach No. 1037. (This relay not normally required.)
SW1, SW2—SPDT toggle switches.
T1—Single button carbon microphone to push-pull grids transformer. Midget, push-pull plates to voice coil may be substituted.
"A" Battery—Burgess type 4F, 1½ volt.
"B" Batteries—Burgess type XX45, 67½ volts (two required).
Case 4" x 4" x 4½" - Parmet SM-12

ohms, it too can be operated from the common battery supply.

The "Dit" part of the "Dadit" is provided by a conventional bug since it is entirely possible to "key through" the delay circuits owing to the fact that the bug key is breaking the battery voltage connection to the relay. The short interval dot pulses break the charging voltage so rapidly that the delay circuit does not have time to function. It is not at all unthinkable to consider the possibility of also producing automatic dots by providing a separate control resistor connected to the dot contact circuit of the bug.

It will be found convenient to include a SPDT switch, (*SW1* in *Fig. 3*) so that the dashes can be either automatic or manual. This switch when set to "Normal," disconnects the time-delay capacitor *C1*, thus changing the relay over to a conventional keying device actuated solely by the bug key.

Companion Monitor

Proficiency in the use of the Dadit (or any other automatic keyer) can only be acquired by dint of practice, therefore it was deemed advisable to design a simple monitor that could be built into the same case that houses the relay and its associated components. In its final version the monitor becomes a simple, foolproof audio oscillator, the output of which is connected directly across the earphones. By providing parallel, double jacks on the oscillator output it becomes possible to patch the receiver output into one jack and the earphone plug into the other, in this manner avoiding the necessity for an unsightly patch on the receiver panel. The monitor output is padded down with a high value resistor which further serves to prevent the monitor output winding (low impedance) from loading the receiver audio circuits.

Circuitwise, the principle note of interest may be in the use of a small microphone transformer to provide the necessary feedback and frequency determining elements. The 180 degree phase differential between grid and plate circuits is automatically established by using a center-tapped secondary winding with the tube grid connected to one side, through the blocking capacitor, and the tube plate to the other. This circuit will oscillate without any reversal of either primary or secondary windings. Additionally, a midget push-pull output transformer would accomplish the same result.

With the particular transformer used the audio tone approximates 800 cycles. The pitch can be raised by decreasing the size of the grid blocking capacitor, *C2*, and lowered by adding capacity across the transformer from grid to plate. Inspection of *Fig. 4* will show that the oscillator grid resistor is "floating" when the keying relay is not energized. With no return, the tube grid becomes sufficiently negative to block the plate current whereas when the grid resistor is grounded, by the keying relay, the circuit goes into immediate oscillation. One section of a 3A5 double triode is used as the oscillator tube with only half of the center-tapped filament being necessary for 1.5 volt operation. Oscillator plate current will run about 5 ma from the B supply when the 10,000-ohm grid resistance is used.

An inspection of the close-up photograph of the

[*Continued on page 72*]

Feenix, Ariz.
AIR-MALE SPESHUL
RUSH RUSH

Deer Hon. Ed.:

Hokendokey Hackensacky!! Now Scratchi in the muddle of a 1/c predikament, and no kiddings. So Hon. Ed., please taking that one bux cigar out of your mouth and paying attentions. I are in reel troubles and hoping you can help.

Here are what happening. I get out of U. S. Armies with lots of monies, on acct. Scratchi are not taking leaves when he should. So I decide to use all this monies to get myself a reel ham rig—one that wud make all the others look like walkie-talkies with week batteries. So Scratchi are first of all putting up all kinds of antennas—rotery beams for ten and twenty meters, rhombics for forty and eighty meters, a cupply of energetic-H's (Lazy-H's bottom side up) for ten and twenty, vee-beams for twenty and forty, and even others that Scratchi not knowing what they are. Transmission lines are carefooly brought into shack reel neet like.

Then Scratchi are building beootiful 1-kw rig and putting in shack. Then are going in attick and building up my 5-kw toobs in a sooper-dooper final. Have leads from 1-kw driver going to antenna change-over switch which are dummy, but actually feeds one kilowhats upstairs to drive Ariz. Kw. final. These prekautions in case FCC inspektor come noseying around. Scratchi even fix shack like ham heaven. Icybox parked near rig. Operating table fixed up with brand new Side-swiper Speshul—chromium plated bug made speshul so makes lite dots. Scratchi even bot a new Super-Streamline mikerophone with bilt-in throat spray for tired tonsuls.

So, one evening Scratchi settle himself in easy chair, lite up the filaments, switch to NNE rhombic, turn on power, and rattle off a snappy for minute seek-you on 13,990 kc. Just to make shure I get a lot of calls, I sine juicy dx call. (Still haven't heering from FCC regarding applikation I sent in under assuming name). Are standing by, turning on receiver, and listen over band. Hon. Ed., it are terribel. Such signal strengths. Was planning only listening to R9 plus signals in answer to my seek-you, but finding that R9 signals not even Q5 as being below noisy level. Scratchi fix this quick by shunting R-meter with pc. no. 12 wire. Now meter just barely go off scale.

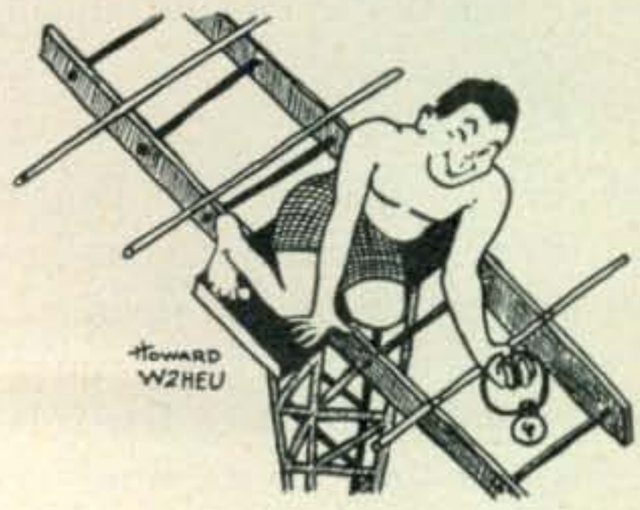
So, Scratchi tuning over band and listening hard but no one calling! Quick check log to see if using call I thot I was, and again listen on band. Scratchi now getting pretty diskouraged. Deciding to take listen on my own frequency, but not expecting heer anybuddy there, as carefooly chosen outside band. Still heer nothing, so just about to check antenna connections when really suddenly my speaker emit grate noise like all fury getting out. Piece no. 12 wire on R-meter beginning to smoke as I are reaching for sensitivity control, finding this no goods so hastily yanking antenna off receiver. When things calming down Scratchi find a see-w signal R-9 plus calling seek-you. Evidently just warming up as in first two minutes not even bothering to sine call, so I tune around and find key-clinks covering up hole band. Scratchi are getting inscensed at such operating practise and deciding to find out who station are. Another minute can tell he getting a tired fist as slowing down to about 35 wpm.

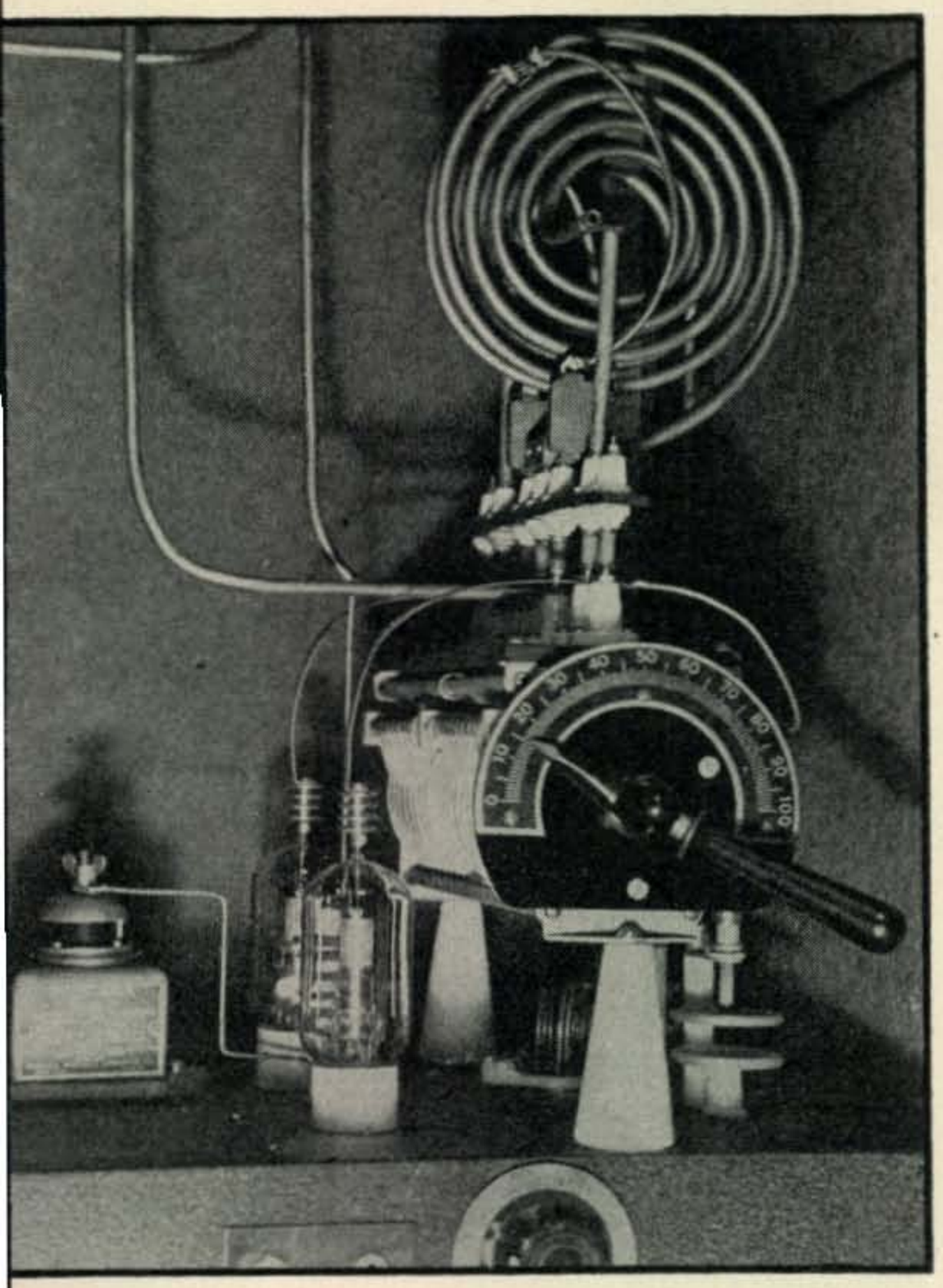
I are totally unprepared when station sines a juicy dx call—some coincidense—same call I are just using. Scratchi reely getting hot now, just like 807 with 1000 jolts on it. A bootlegger, using Scratchi's call! Decide better tune over band to see if such nefairious praktises getting results. Goodness gracious saki alive, hole band now dead except first five kc., all calling juicy dx. Won by won stations sine over to juicy dx—but he not answering. Scratchi quick throw on rig and call couple quick qrz to see if he can steel a qso. No dicey. Then suddinly hearing bootlegger calling qrz, still signing juicy dx call. Quarter-what neon bulb in Scratchi's brain begin flickering dimly about goings ons. So Scratchi send out serious of dots. For minutes later on comes bootlegger with a serious of dots. Make more tests then come to astounding conklusion. Other station is no bootlegger—is Scratchi! But how is Scratchi's signal coming in on Scratchi's receiver for minutes after I getting thru sending signal? Pulling out trusty Almanack find moon not in rite fase so signals not bouncing off moon.

Next day, with help of brother, Itchi, we are taking field-strength meter out on desert, after putting wait on key, to see if we can find what are happening to signal. After a long daze work and much scientific deduckshun here is what are happening. Signal is leaving NNE rhombic and coming to small 3000 footer mountain about three miles from Itchi's ranch. Are hitting mountain on bias and coming back and exciting SSW rhombic, sending out nice signal two ways. Signal going out one way hitting twenty meter rotery and shorting over on commutator and leeking to ground, making nice vertical radiator. Signal other direction diving into two vee-beams and several energetic-H's and finally getting all mixed up and going out all directions. All this is natchurly taking time, so mane signal getting delayed a few minutes before blasting either waves.

Now Scratchi knows he getting out all right, but that is the dilema. Scratchi not able to work anybuddys as having too much qrm from own sigs. Hon. Ed., can you please putting this problem before the Bored of Experts on your Hon. rag and sending me solution postal-hasty speshul rush.

Yours very truly,
Hashafisti Scratchi





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Unconventional in appearance, the resonant line tank coil is well suited to the high and very high frequencies.

❖ ❖

A Plug-In Type

RESONANT LINE TANK COIL

H. C. SHERROD, W5ZG*

THE WRITER has had the opportunity to experiment extensively with 28-mc output tank circuits for use in a high level, amplitude modulated, radiotelephone transmitter. The output stage of this transmitter consisted of a pair of Eimac type 35T tubes connected in push-pull with criss-cross neutralization, series plate and grid feed, and with split-stator condenser tuning of both plate and grid. The plate voltage was 1500, plate current 180 ma, grid current 90 ma and grid bias voltage -360, derived from the IR drop across the 4000-ohm grid bias resistor. The complete diagram is shown in *Fig. 1*.

Initial experiments were carried out using the conventional tank coil and condenser to determine the optimum tank LC ratio for best amplifier performance during modulation. The modulator consisted of two more 35T tubes operating at Class B with 1500 volts on the plates and -50 volts grid bias, using conventional input and output transformers.

*4715 Crockett Blvd. Galveston, Texas

After some weeks of experimenting with the amplifier described, during which time an almost infinite number of combinations of amplifier loading, excitation, grid bias voltage, and output tank LC ratios were tested, it became apparent that excessive modulator output would be required to modulate the final amplifier properly. As the Q of the output tank circuit had only been varied within the limits of the conventional coil and tank condenser, it appeared that better fly-wheel action of the circuit might improve the modulation characteristics. The reason for this is fairly obvious since in a push-pull amplifier there is no necessity for the higher C values usually encountered in single-ended Class C amplifiers. The overall fly-wheel action however may be greatly improved by bringing up the Q of the circuit through the increased efficiency in the lumped inductance.

The most effective means of increasing the output tank circuit efficiency was with a quarter-wave resonant line. This substitution not only

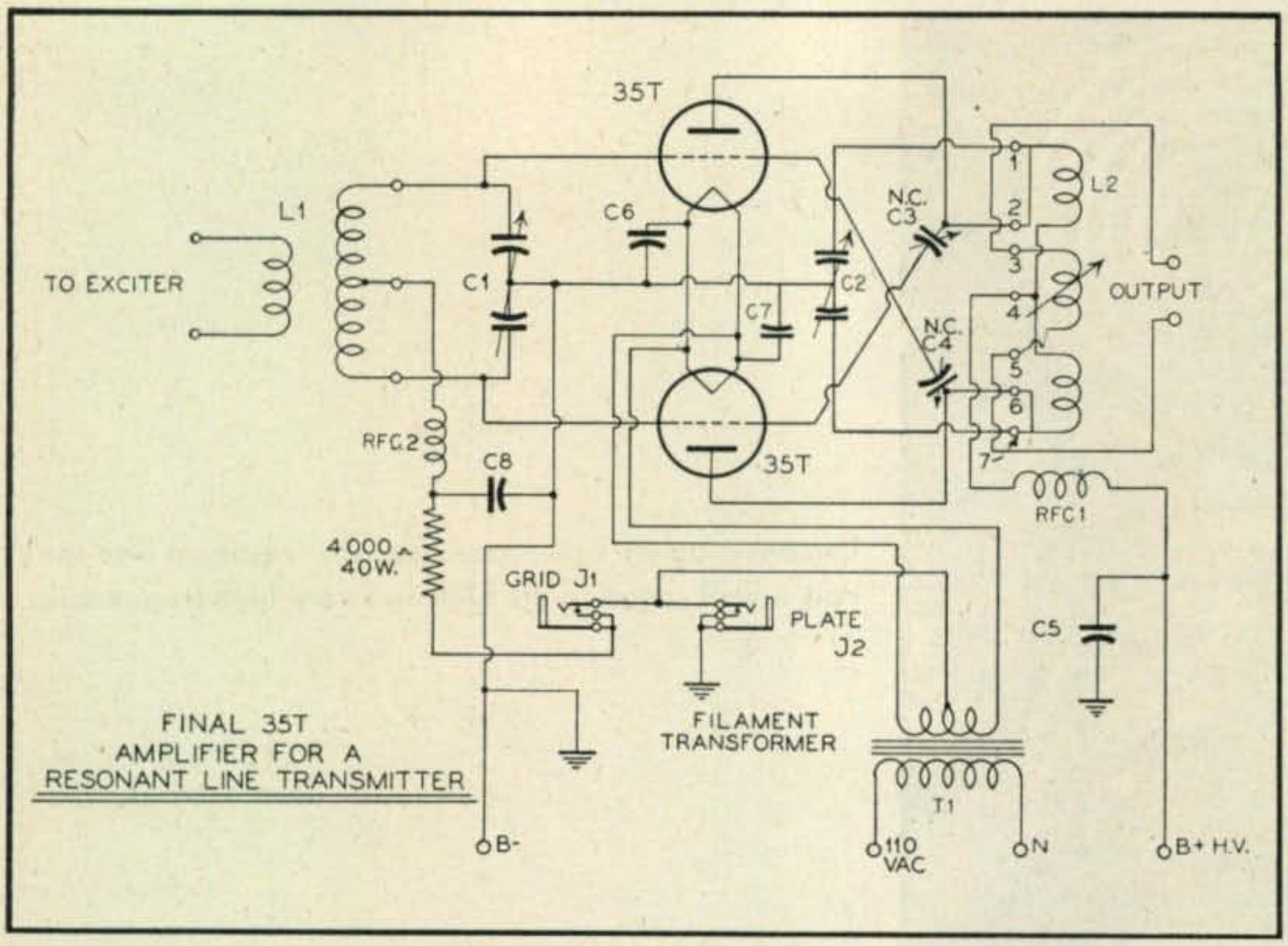


Fig. 1. Circuit diagram of push-pull amplifier using resonant line tank coil.

greatly improved the modulation characteristics, but also resulted in an increase of approximately 10% in overall amplifier efficiency.

However, mechanically the amplifier under consideration had been designed to operate on frequencies between 1.7 and 28 mc, using conventional type plug-in coils. Therefore it was necessary to mount the resonant line on a plug-in coil strip. Secondly, space restrictions dictated that the physical size of the line be reduced to values approximating those of the usual plug-in coil. Futhermore, modifications of coil mounting connections were necessary in order that the tank tuning condenser connections would be omitted when using the resonant line, but would be automatically established when the low frequency coils were plugged in.

Space restrictions were overcome by coiling the line into a double pancake spiral and mounting on a plug-in coil strip as shown in *Fig. 2*. It will be noted from *Figs. 1* and *2* that the tank coil mounting and all plug-in coil strips have seven terminals. From *Fig. 2* it will be seen that terminals numbered 1 and 7 are open on the resonant line strips, and as a result no connection is made to the stator plates of the tank tuning condenser when this unit is plugged into the mounting shown schematically in *Fig. 1*. The terminals numbers 1 and 7 are strapped to terminals numbered 2 and 6 respectively on all coil strips other than those on which resonant lines are mounted, thereby providing connections to the tank tuning condenser when a low-frequency coil is used.

To determine the approximate total length of ¼-inch copper tubing required by a resonant line of this type, operating on any frequency between 21 and 54-mc, use the formula

$$L = 492/f$$

where L is the total length of tubing required in feet and f the desired frequency in megacyles.

As no consideration is given in the above formula to *end effects* introduced by neutralizing and tube capacities, the length obtained will be somewhat greater than that actually required. This discrepancy will increase with the operating frequency.

To construct the line, cut two pieces of copper tubing so that each will be approximately one-half the total length required. Form these two lengths of tubing into spirals and temporarily mount on plug-in strips as shown in *Fig. 2*

To resonate the line and to determine the exact length required, remove the normal operating voltages from the amplifier with which the lines are to be used and substitute a source of voltage of about 200 to 350 volts. Light the filaments of the final amplifier and apply excitation to the grid circuit. Disconnect the output circuit leads from the resonant line. These are the two conductors connected to the fixed condensers mounted on terminals 3 and 5 in *Fig. 2*. Upon applying plate voltage from the low voltage source, it will be noted that the plate current may be 50 ma or higher, depending upon the type of tubes in use.

Beginning on the resonant line at the point where the two conductors attach to the brass block, slide a temporary *shorting bar* along the two conductors. This shorting bar can be an insulated handle type screw driver. As the bar slides along the line, a point will be found where the amplifier plate current dips sharply. This is the point for permanent attachment of the brass shorting block. The excess tubing should

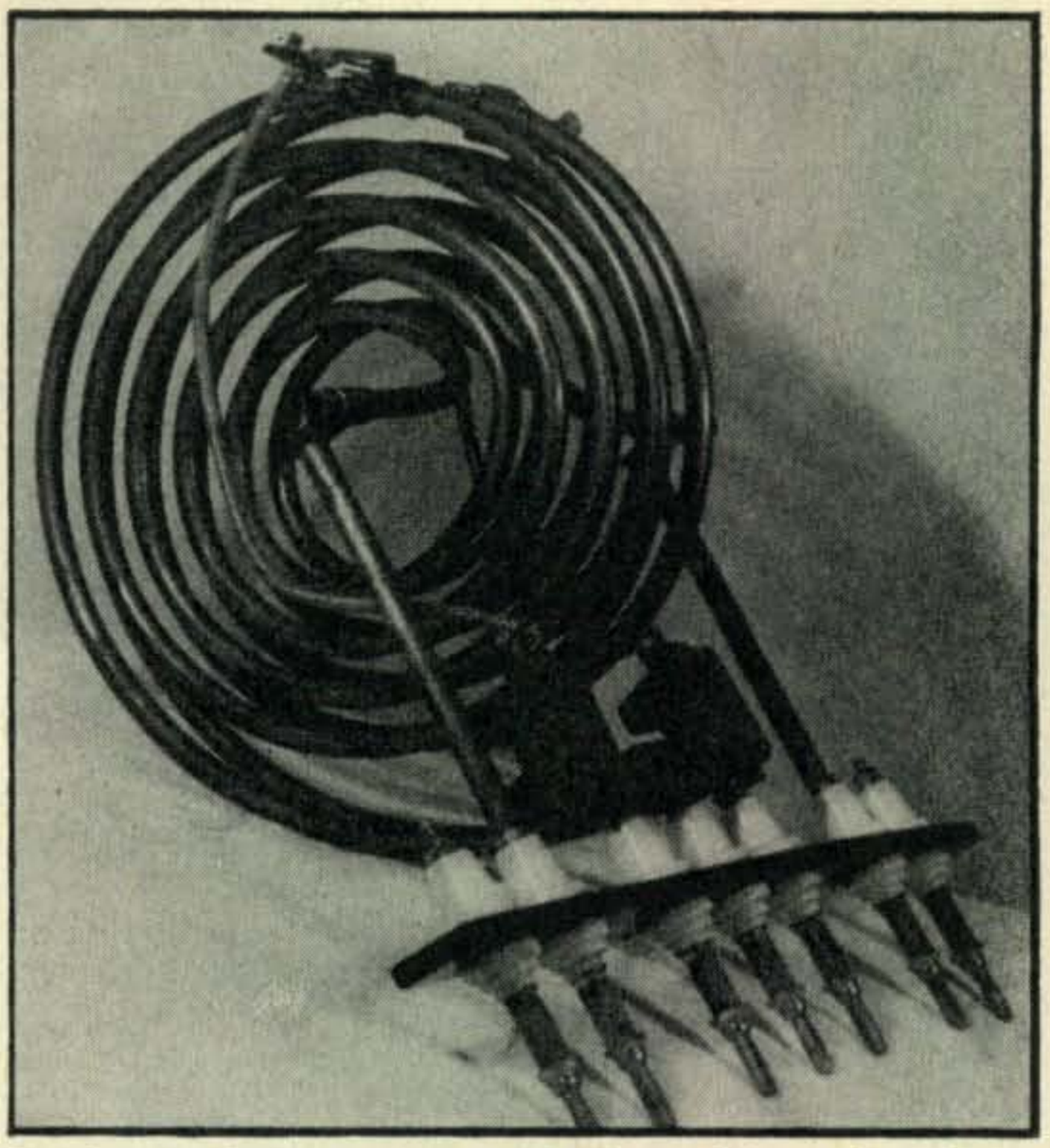
be cut off and the line now remounted permanently on the mounting strip. When the line has been remounted it should again be plugged into the mounting and readjusted for resonance. This is necessary because the resonant adjustment may be lost after the removal of the excess tubing. However, the discrepancy will be small and resonance can be obtained by varying the spacing between the two coils in small increments until the plate current dip is again obtained.

When resonance has been determined as accurately as possible with the 200-350 volts applied to the final amplifier, remove the low voltage supply and apply the normal plate operating voltage. Again vary the spacing of the coils in very small increments until minimum plate current is obtained. *In this connection, be sure that the plate voltage is off before any adjustment in the spacing is attempted.*

Neutralizing

All the foregoing assumes that the amplifier is neutralized. To recheck neutralization, remove the plate voltage from the final amplifier and with the filaments lighted and excitation applied, slide a one turn insulated coil on an insulated handle between the two spirals of the resonant line and adjust neutralizing condensers *C3* and *C4* in *Fig. 1* until insertion and withdrawal of this one turn coil produces no variation in the grid current of the amplifier. When this condition has been obtained, recheck resonance of both the resonant line and grid circuit condenser *C1*. Very slight retuning of these circuits may be necessary due to the detuning resulting from the variation of neutralizing condensers *C3* and *C4*.

When the resonant line has been tuned and the amplifier adjusted, the output leads which were previously disconnected should be attached



Simplicity of construction is clearly visible in this close-up of the resonant line tank coil. Output leads are brought out through the two .02 μf mica condensers.

to the resonant line about five inches from the shorted end of the line and the antenna system tuned for maximum plate current. If this plate current is below normal operating current for the type tubes in the final amplifier, the output leads should be moved away from the shorted end of the line. Conversely, if the amplifier draws too much current, move the output leads along the line towards the shorted end.

While the construction and subsequent adjustment of this type of tank circuit may at first appear somewhat complicated and inconvenient, the writer feels that the effort required is amply justified by the results obtained.

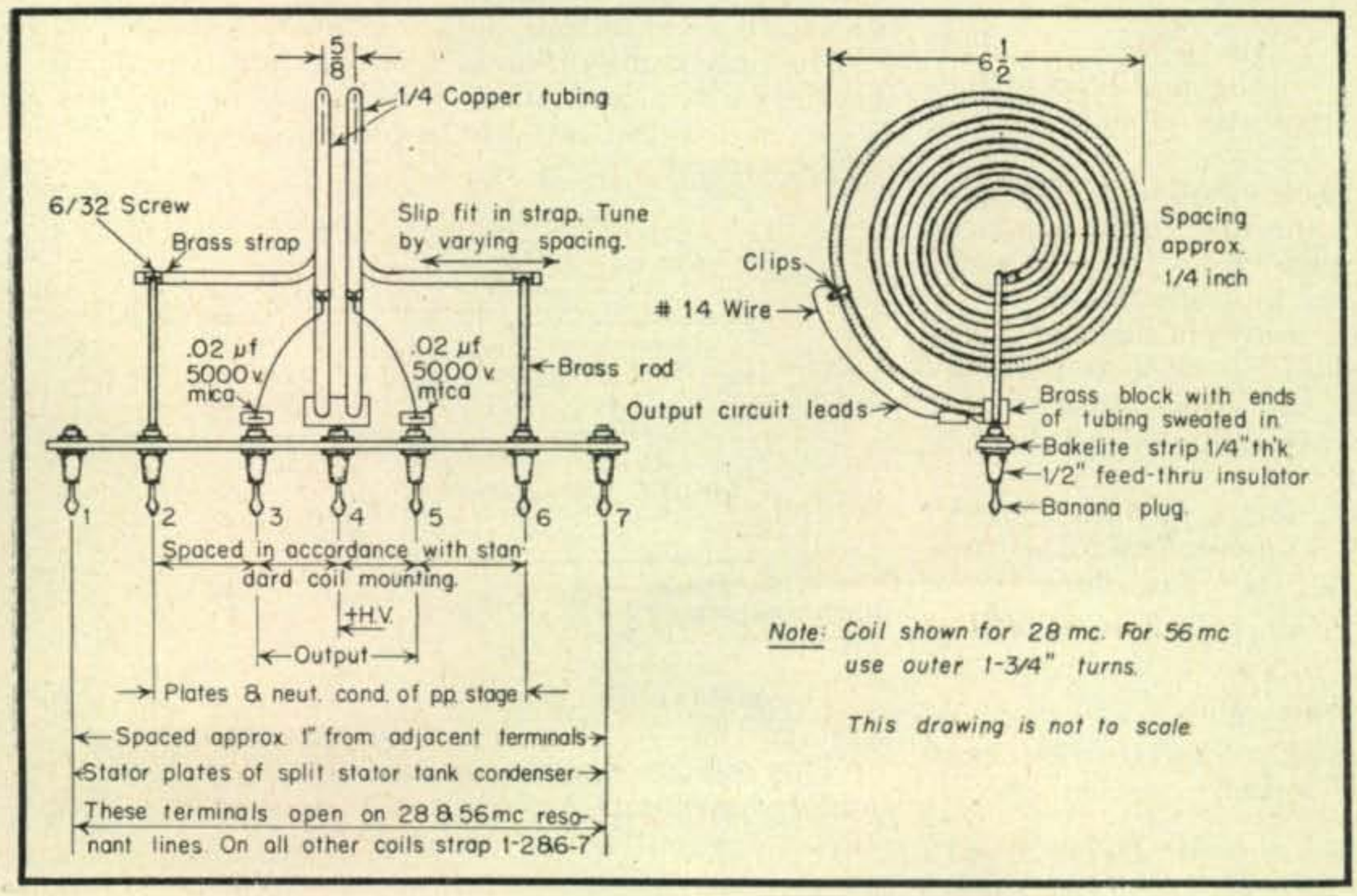


Fig. 2. Construction details of resonant line tank coil.

Inside the SHACK AND WORKSHOP

Conducted by A. DAVID MIDDELTON, W1CA*

Pistons Into Neutralizing Condensers

In the past several issues of *CQ* I have noticed a lot of griping about the shortage of parts. I wonder what has become of the old ham spirit, in which we made parts from other types of products in the event we could not obtain the identical components required.

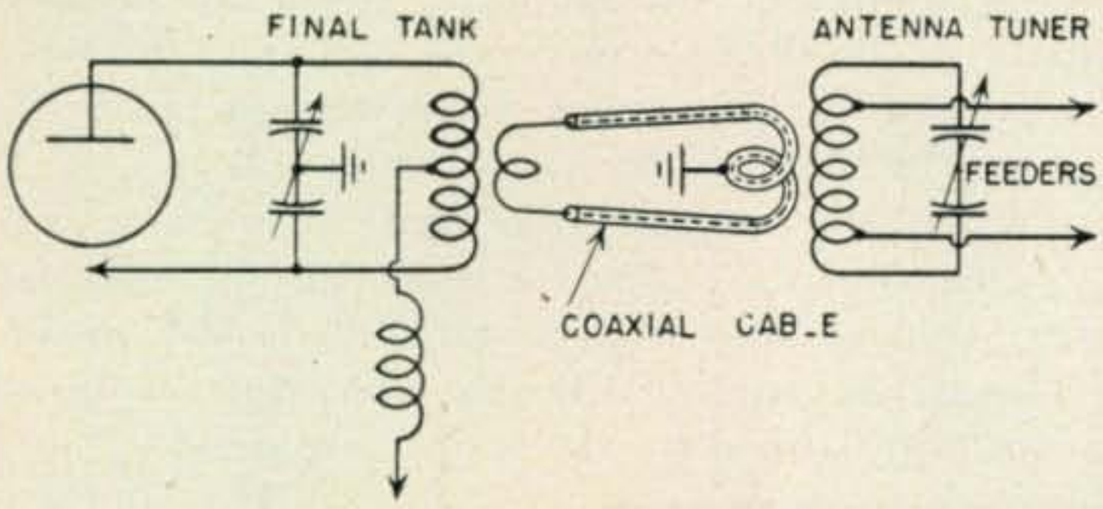
Take the case of neutralizing condensers, for example—Obtain two small aluminum pistons from a garage junk pile or scrap metal dump. Get someone who has a lathe to turn them down to the size desired. Mount one plate directly to the tank condenser by means of a bracket and a countersunk bolt. The other plate is mounted on a stand-off insulator by means of a 10/32 flat-head bolt (2½ inches long) and a bushing taken from a large dial. This bushing was tapped for 1/32 and then soldered to the stand-off insulator bolt.

A neutralizing condenser, made as described, cost the writer seventy-five cents including all the parts. In addition to being inexpensive, this condenser provided short leads and excellent insulation.

J. G. Freeland, W8GSN.

An Electrostatic Shield—Without Pain!

Here is a "dingus" that has helped keep me from receiving those unwanted QSLs from the FCC re-



porting my signals in the "Never-Never" land around 8 mc. when I operate on the high end of the 80-meter band. It's an electrostatic shield—quick, simple and painless.

The drawing will give you the general idea. The link around the remotely-located antenna tuner is made from co-ax line, (RG8U etc.) which is extended over to the link circuit at the final amplifier tank. The amplifier link connects to the *inner* conductor of the co-ax and the outside (or shield) is connected at one point only, a centertap on the co-ax link at the antenna tuner. Adjust the coupling in the usual manner.

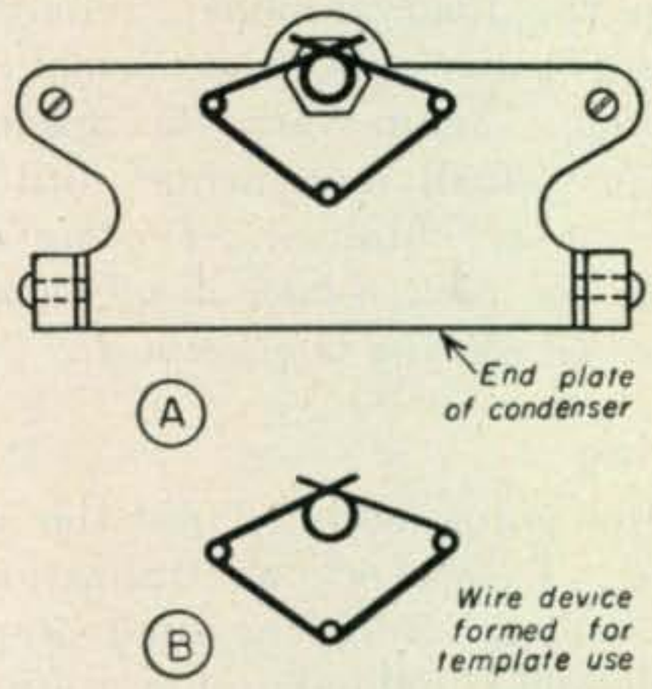
I ran a full kilowatt to a single 304TL, low-C tank, on the high end of the 80-meter band and this shield sure helped me clean up the harmonics.

Joseph C. Juel, W9BGC.

Drilling Template Fabricated from Wire

It's easy to lay out irregularly spaced mounting holes for components such as variable condensers or even dials if a simple, bent-wire, drilling template is used.

Place the screws in the mounting holes, temporarily, and wrap a turn of No. 18 or 20 wire around each screw, the shaft or other protruding mounting



devices. Pull taut before moving on to the next point to be templated. Remove the screws, then slip off the harness. Place this template on the chassis or panel, mark the positions, center-punch them and the job is ready to drill.

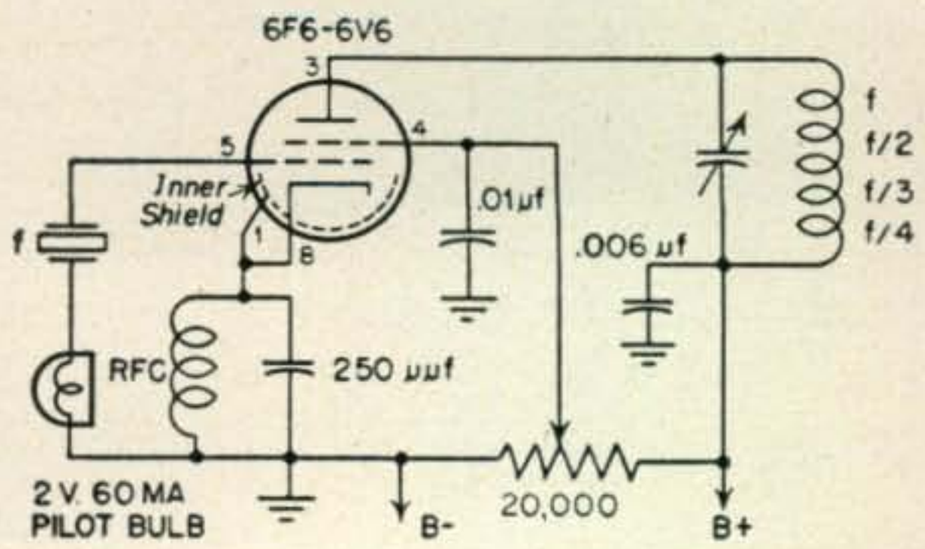
In making a template for a dial, stick a short length of shaft material in the center hole and proceed as before. The above figure will give you an idea how this gadget looks. Tuck this idea away in your "think box" and put it to work the next time you need a drilling template.

Herbert S. Brier, W9EGQ.

A Crystal Oscillator with High Harmonic Output

The oscillator shown below has been incorporated in several transmitters around Boise, with execllent results obtained with low crystal current and with good output obtained on harmonics.

The only thing different from normal regenerative crystal circuits is that the *inner shield* of the tube is connected to the cathode instead of ground.



The 20,000-ohm variable resistor varies the screen voltage thus regulating the output obtained.

This oscillator works fine up to and including the fourth harmonic of the crystal making it a handy circuit for multi-band transmitters.

Frank Fine, W7GQA.

*Address all contributions to: S & W Department, c/o CQ, 342 Madison Ave., N. Y. 17, New York.

Why Doesn't Someone Tell Me These Things?

HERBERT S. BRIER, W9EGQ*

So you've taken the examination and are eagerly waiting for your license to become a full-fledged ham. Countless articles have been written on how to get a ham license but, like love stories ending at the wedding ceremony, assume that everything will be rosy from then on. Actually getting the license is the easiest part of the whole thing. Let's examine a few of the problems confronting the new ham that make this true.

Naturally the first thing to decide is what band to work. Logically if you wish to work stations close enough to visit occasionally, you will choose a band like two meters, while if you like a leisurely band good for up to 2,000 miles or so, you'll choose 80 meters. You'll choose ten or 20 meters for daylight DX, and if you like solitude and the wide open spaces, you'll choose six meters, and so forth.

Yes, that's the way you would do it if logic ever had anything to do with with a ham's choice of frequency. Actually it works out something like this: the dyed-in-the-wool two-meter man spends endless hours and incalculable effort building multi-element arrays and supersensitive receivers to work stations 40, 50, 60, and even 100 miles away. Surely this is commendable.

Now let's take a look at him on "75." QRM is very bad; so he builds a high power transmitter to overcome it, with the consoling thought that at least he won't be limited to working stations in his backyard. Then he spends most of his time rag-chewing with a crony across town who could be worked on two meters with a transceiver. They battle QRM every step of the way and, at the same time, QRM two fellows in Omaha, 650 miles away, who are working each other. They, in turn, QRM two fellows in Denver, who . . . ad infinitum. And what are they talking about? About the QRM, of course.

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With the band chosen, it is necessary to select a good frequency. (You tell a "good" one by the number of stations on it.) When there are many signals on the air, this selection is easy. Light anywhere in the band, preferably close to the edge and you are set. However, when the band is lightly occupied, like the 75-meter phone band of an afternoon, it may take careful listening to find another signal to light on. I do not understand fully why it is necessary to pick an occupied frequency; yet it has been verified, time after time, that if only four stations are on a band at one time, three of them will be on the same frequency, and the fourth one is a beginner.

Even on six meters, where not a discouraging word, or any other kind of a word is heard from late August until May, the rugged individualists who roam this desolate wasteland hug the low-frequency edge, where faint traces of other signals can be occasionally found. Much of the trackless wilderness between 50.5 and 54 megacycles has never heard the blood curdling, choking gurgle of a v.f.o., nor felt the slender, yet powerful signal from a "rotary" slipping through the "grass." Is it the "herd" instinct?

After picking your band and frequency, the next question is how much power to run. Listening on any band will quickly answer that question. You hear a mass of heterodynes from one end of the band to the other. Suddenly, like a water-

melon in a bowl of grapes, one tremendous signal crowds all others aside. Listen to it for a while. Is it from a low-powered transmitter? Ha ha. Does the operator admit that his kw and a half (officially 990 watts) has anything to do with the tremendous signal he puts out? Haha again. Never yet has there been a ham running high power who didn't claim that he got out about as well with 100 watts. Therefore the thing to do is to run 100 watts . . . but just a minute! If 100 watts is such an ideal input, why does every ham dream of the day when he, too, can run a "conservative" kw? It's too much for me.

The mechanics of getting a contact 'varies slightly from band to band; however it is beneath the dignity of many hams to answer a CQ. Their method is to call CQ themselves until they run out of breath, or their wrists fall off the bug, and listen on their own frequency for replies. It is considered unethical to tune the receiver over five kilocycles from your own frequency no matter how many stations may be calling further away. When more than one station does respond to a CQ, a delicate decision must be made. Which one should you answer? The one destined to be smeared with QRM on the next transmission, of course. No one can tell you how to acquire this prophetic skill, because it is done by feel and instinct. Don't worry about it; you'll learn automatically. After a few weeks the average beginner hits a percentage of 90, while the experts do it oftener than 95% of the same time.

If you plan to answer CQs yourself, there is one unalterable rule you must obey. Carefully copy the instructions given in directional CQs; so you will never commit the unpardonable sin of answering one as the sender wishes. He can't tell you what to do! Especially, *never*, answer a directional CQ aimed right at you. The maximum concession to make is to call CQ immediately yourself. If he is so darned anxious to work Hog Wallow let him call you. That's the least he can do. Later I'll discuss how to work DX, but first there is the matter of reports.

Handbooks and manuals list two systems for giving signal reports, the old QSA, R, T system, and the newer R(eadability), S(trength), T(one) system. The QSA system is supposed to be obsolete in Hamdom, but most phone hams do not know this, and 75% of them use it. Readability is rated on a 1 to 5 scale, with a report of 3 or better indicating a signal 100% readable with various degrees of difficulty. Strength and Tone are each rated on a 1 to 9 scale. If a signal is readable a QSO is possible, otherwise not; so you can easily see that R(eadability) is the important thing.

Are you sure? It is these obvious things that will show you up as a beginner. All any ham wants to know is how strong he is "on the meter". He would a dozen times rather get a 399X report than a 549X one. Let's analyze them and find out why. According to the book, 399X means "Your signal is extremely loud, has a perfect tone, and is 100% readable with considerable difficulty. (Maybe he forgot to take off his shoe before reaching for the bug.) 549X, again according to the book, means "Your signal is 100% readable with no difficulty, and has a perfect tone, but it is very weak." Theoretically either is a perfectly legitimate report and about as likely to be given as for AC4YN to answer your first CQ. This is because all hams firmly believe that any S9 signal is automatically QSA5, even if not a word of it is readable, and no matter what the book says, no S4 signal can possibly be readable. Why? Don't ask me. I'm only acting as a reporter.

An S5 report is usually given when you are asked to listen for a station and don't want to admit that you can't find it. S5 then means "OM, your signal would be louder if it were stronger." This sets the minimum "S" report at S5. Any signal above the noise level is S6 to S7, and a fair signal is S9. And for DX stations all reports go up one point. Now you know why phone signals so dearly love to get R9, double-plus reports.

"Readability" reports are also modified in practice. While the book says an R3 signal is 100% readable, in practice R3 means 60%or less readable, R4 means almost 80% readable, and R5 nearly 100% readable.

As for Tone reports, a bad note corresponds to "B.O." and your best friend won't tell you; so T8 and T9 are the only reports ordinarily given. T8 covers all signals from raw a.c. to near d.c. and T9 from near d.c. to purest d.c. (The "X" after a tone report means the signal sounds "crystal-controlled", and is given to all signals which creep slow enough to be followed across the band with the receiver.) Oh yes, a T5 or T6 report is occasionally given to a station who always raises the stations you call. This is done without malice aforethought, simply as a legitimate method of getting him off the air long enough to give you a chance. However it is not universally successful, because the station is apt to tie his key down while he looks for the "trouble". And, as no self respecting ham has a monitor these days, you can see that it may take him a little time to discover he has been "taken". You don't have to be told on whose frequency he is.

A few paragraphs back I promised to tell you how and when to call DX. The when part is the easiest. Call it always: when you hear it and when you don't. The instruction to call DX when you hear it may seem unnecessary, but it isn't. You don't merely call a DX station when it has called CQ or has signed off with another station. You

[Continued on page 77]

2-Meter Conversion OF THE 1068-A

CHARLES B. WARE, W3GQS*

THE PLEASURE OF SAYING, "We've a superhet here, OM," when operating in the 2-meter band is rapidly becoming a very low cost proposition. The basis for this statement is the influx of BC-1068-A radar receivers in the war surplus market places. Since the original tuning range is somewhat higher in frequency than the 144-mc band, the problem of converting the r-f end is greatly simplified. A converted model shown in the accompanying photographs has been in use at W3GQS for the past eight months and we feel that our DX contacts, many of which are over 200 miles, speak for themselves and the receiver.

Mechanical Conversion Points

The first step in the conversion of the BC-1068-A is the rearrangement of the back panel connectors. This is accomplished by removing the top receiver cover, the shock mounting (if it has one) and the bottom plate. Using glyptol solvent, loosen the nuts holding the three *Amphenol* weatherproof sockets to the rear of the chassis. Remove the connectors. Prepare to cover the openings with a sheet of lucite, or for the phone jack, a piece of aluminum or bakelite. Mount a phone jack in one of the connector openings and ground the outside sheath and connect the center terminal to point marked *C*. Over the antenna opening use lucite insulation with a later type antenna connector or binding posts. Resolder the two antenna leads coming from the silver-plated tube. Connect a new a-c cord to points *A* and *B* of the a-c input.

Turning to the front panel, remove the spare fuse holder and mount in its place an SPST toggle switch for "standby" operation. The best method appears to be the removal of the ground wire from terminal #4 on the power transformer and running a new length of wire from this terminal to the switch and grounding on the other. This opens the high voltage circuit. The next step is to remove the DPST switch on the right hand side of the receiver. Solder the three 6-volt dial lamp leads together and insulate. Solder

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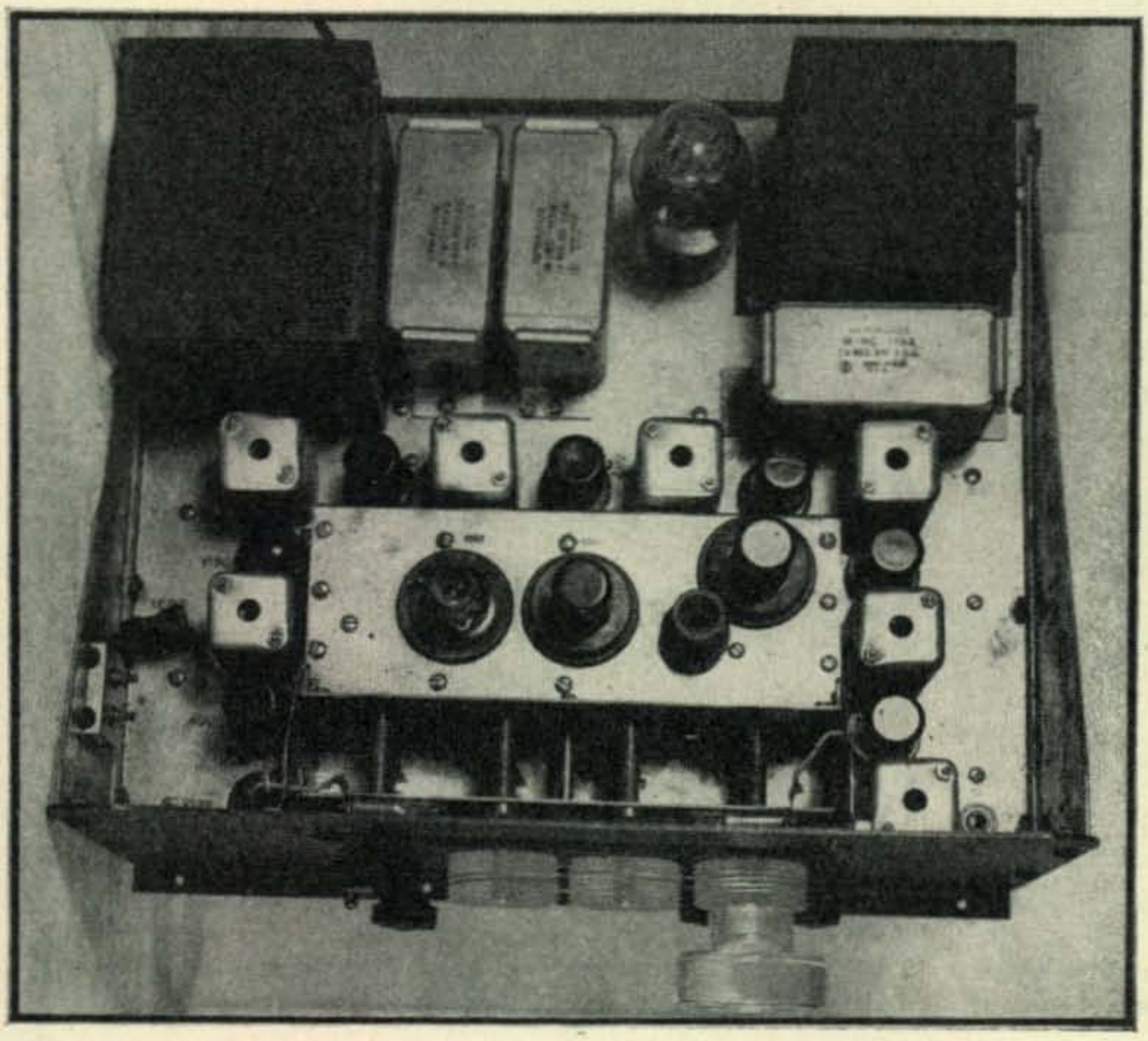

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Top view of the converted 1068-A. The r-f section appears in the right hand center. The bottom tube is the 6AK5 with the octal adapter arrangement described in the text.

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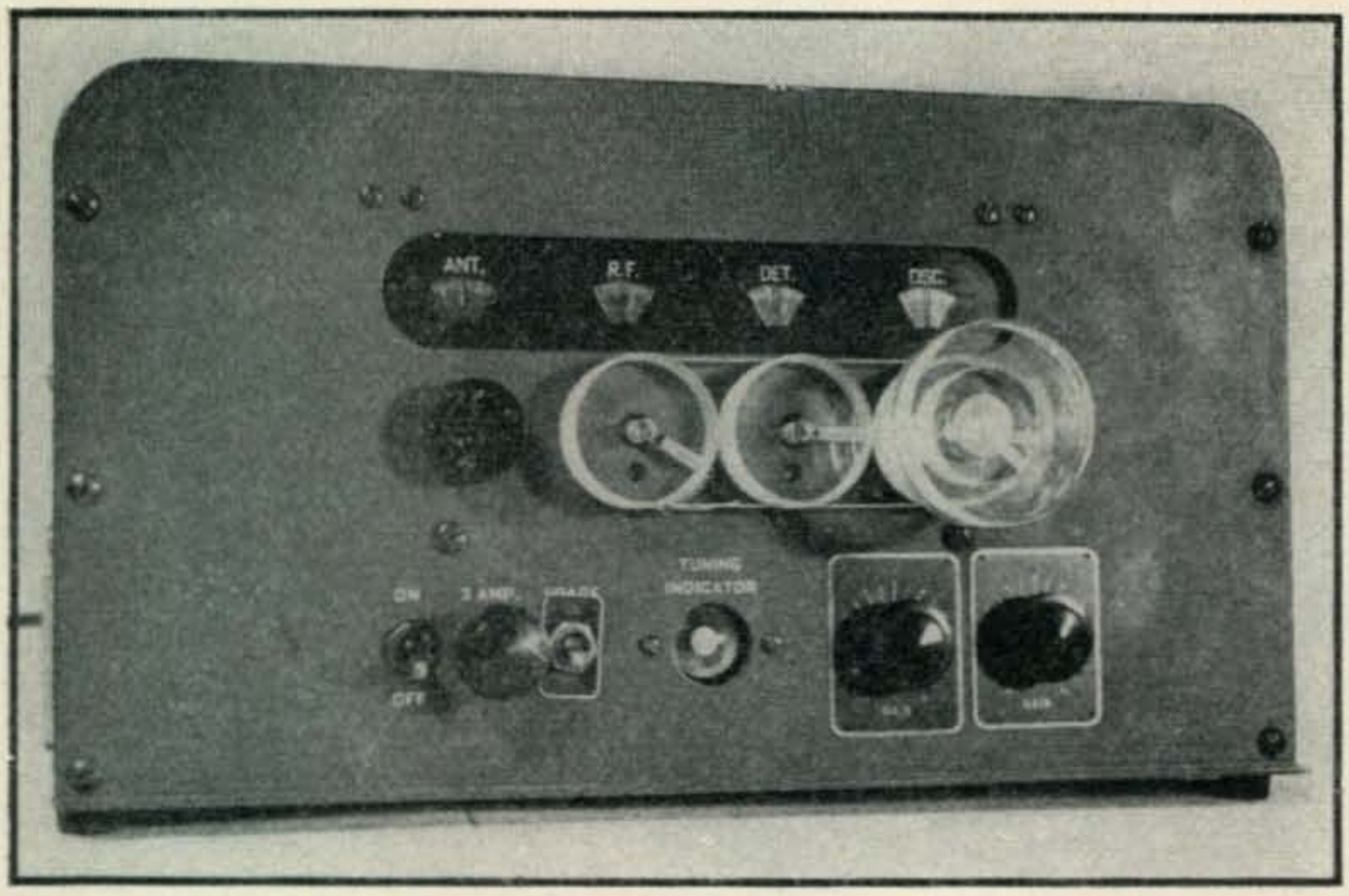

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Front panel view of the two-meter receiver at W3GQS. A volume control, an i-f gain control and a standby switch have been installed. The r-f detector and oscillator tuning controls are ganged with specially cut lucite knobs. Substituting the 6AK5 in the first r-f stage reduces the band-spread on the antenna tuning control.

❖ ❖

the *B*+leads for the magic eye together and insulate. Enlarge this hole and install a 5000-ohm wire-wound potentiometer. Ground the arm of this control and connect one side to *15-4 spark plate*. This is now the i-f gain control. A 0.5-megohm volume control is then installed as shown in *Fig. 1*.

Tube Substitution

Replacing the 6SH7 r-f stage with a 6AK5 will greatly improve the sensitivity of the receiver. Although the socket assembly may be completely replaced, with a little careful soldering it is possible to use the octal base of an old glass tube with a miniature 6AK5 socket as an adapter. The wiring arragement of the pins is then:

6SH7		6AK7
2		3
7		4
5		2
3	200 ohm resistor	7
6		6
8		5
4		1
1 metal base of miniature socket		

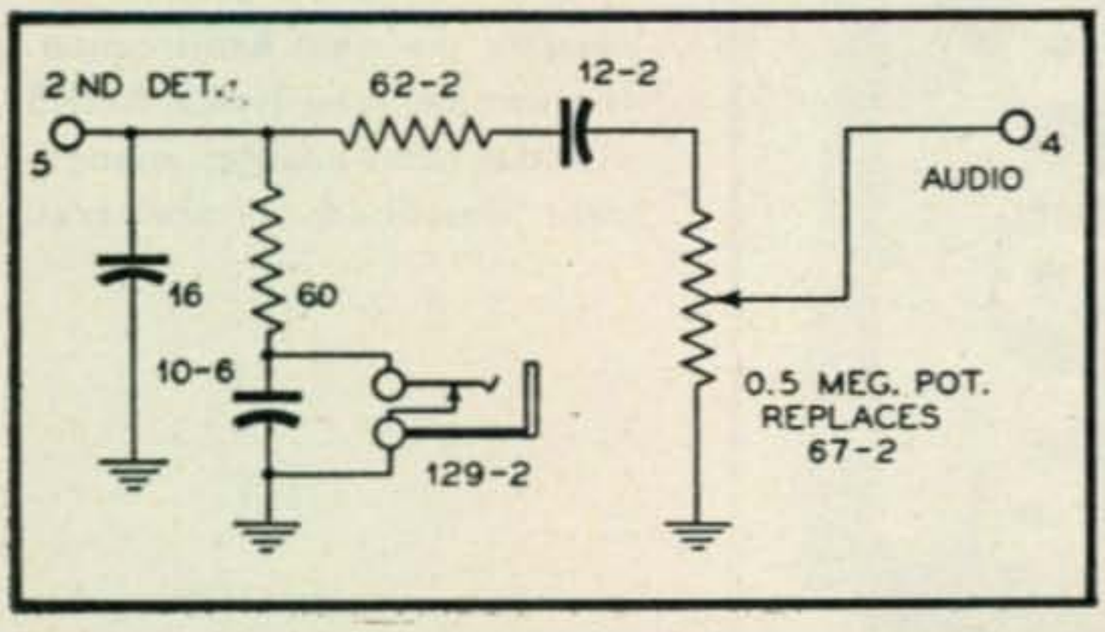
In some installations the 6AK5 will have a tendency to oscillate, but this may be cured by correcting the value of the screen resistor. Substituting a 0.1 megohm resistor for the 22,000 ohm *74-1* is generally sufficient.

Some improvement in the tone of the receiver will result if either a .005 μf or 0.01 μf paper condenser is connected from the plate of the *video amplifier* to ground. If the receiver does not motorboat after alignment the selectivity may be improved by replacing the grid resistors of the first three i-f transformers. 100,000 ohms across the i-f transformer secondary will sharpen selectivity considerably, but will prevent increasing the i-f gain to full. A simple solution is to place another potentiometer of about 4000 ohms in series with the i-f gain control. Locate this control under the chassis and adjust the value until i-f oscillation stops with the panel i-f control full up.

Aligning the Receiver

After making the conversion outlined above the receiver is ready for re-alignment. Stand the receiver on end with the power transformer down. Plug earphones or a PM speaker into the output jack. Do not connect an antenna. Turn on the power switch and tune all four dials

[*Continued on page 70*]



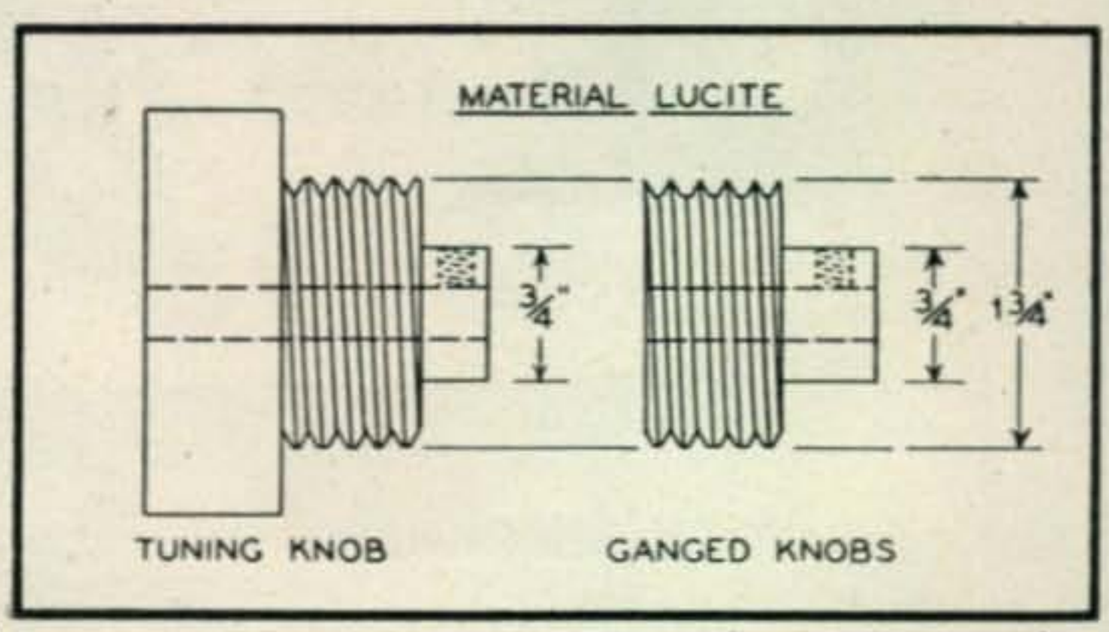


Fig. 1. (left). Volume control of the converted 1068-A is accomplished by replacing resistor #67-2 with a 0.5 megohm potentiometer. Fig. 2. (right). The tuning controls of the r-f stage and mixer oscillator may be ganged after conversion by turning on a lathe two knobs pictured on the right view and one knob as pictured in the left hand view. Cord is used to gang the knobs and is loaded with small springs.

The Amateur Newcomer

HOWARD A. BOWMAN, W6QIR and WILLIAM A. GODDARD, W6AKQ

Construction and theory of operation of a simple receiver

THE WRITERS HAVE OBSERVED that most frequently the urge to enter amateur radio first manifests itself in a desire to construct equipment with which it is possible to receive radio signals. Once this first step has been taken, and the builder discovers that he can put together workable equipment, the ensuing steps follow one another in rapid succession.

The equipment shown in the following sections will be predominantly of "bread-board" construction, because this makes layout and wiring most obvious, and because it is easiest for the beginner. This need not mean that this method of construction must be followed, however. If the beginner has the tools to work with sheet metal, this is probably preferable, because most present-day ham equipment is built on metal chassis and panels.

It is not necessary to have a full cabinet of tools. A saw, hammer, brace and a few bits, some assorted screwdrivers, a pair of small diagonal cutting pliers and a pair of long-nosed pliers, and a soldering iron will just about complete the list of necessary equipment. If more is available or can be purchased, by all means make use of it. A ham's life becomes a good deal easier as he procures the proper tools for a variety of tasks. Where tools must be bought, be sure to get good ones and to take good care of them.

The Simple Crystal Receiver

Construction of even the simplest type of receiver is a laboratory exercise which affords ample opportunity to observe some of the fundamental concepts of radio communication. It should not be thought that the simple receiver proposed is *too* simple. This would be about the same as arguing that one should not learn the multiplication tables before tackling algebra.

Twenty-five years ago most home constructors were building "crystal sets" as the simplest type available. Even after the widespread advent of the vacuum tube the crystal detector continued to hold its place, and with the novel electronic demands of World War II, uses were found for the crystal rectifier in spots where existing vacuum tubes would not perform satisfactorily.

It was for this reason that the writers chose as a first project the construction of a simple receiver employing a fixed crystal detector.

Essentially, such a receiver consists of but four elements. The first is the antenna, which serves to intercept random radio waves as they arrive at the receiving location and feed the signals into the receiver. Next comes the tuned circuit, consisting of a coil, or inductor, and a capacitor, or condenser. The function of the tuned circuit is to select the particular radio signal, within its scope, to which the operator wishes to listen.

The third element is a rectifier, in this case a metallic crystal, which possesses the property of of permitting electrical current to pass in one direction only, thus changing alternating current to pulsating direct current.

The last element is the reproducer. In this particular case we employ a set of headphones, because these are responsive to relatively weak pulsations of current flowing through them. If the pulsations of current were made stronger, or amplified, we would be able to employ a loudspeaker.

Construction of the Receiver

The crystal used in the simple receiver is a Sylvania 1N27, obtained as it happened from war surplus material, but also available through radio stores as a stock item. Numerous other designations may be discovered, and all will probably work just as well as the one shown. Failing this newer type of crystal, the builder may use a fixed or variable galena crystal, or an old carborundum crystal from some ham's junk box, or virtually any other kind of crystal detector.

The receiver was built on a piece of soft wood, six inches by four inches in size, and about an inch thick. All the wiring is on top of the board, and the several parts are mounted by means of wood screws. The photograph shows clearly the mounting of the parts, and the diagrams labeled *Fig. 1* and *Fig. 2* show the wiring. *Fig.1* is a pictorial diagram, a drawing of the parts and their wiring. *Fig. 2* is a schematic diagram.

The schematic diagram may seem more difficult to understand for the beginner, but once one has learned the meanings of the symbols employed the schematic diagram will be found vastly easier to read.

The antenna and ground connections are made by means of two Fahnestock clips. These are small affairs of spring brass, so made that a wire may be inserted through a loop in the clip, the spring action holding the wire firmly in place. The headphones are similarly connected by means of Fahnestock clips. With some types of headphones, reception is improved by connecting a .001 fixed condenser across the phone clips.

From the ground clip, a piece of heavy wire—tinned copper bus wire of No. 14 gauge—is run to one headphone clip, and all common, or "ground", connections are soldered to this wire. All other connections are made by means of short pieces of tinned copper wire—ordinary "push-back" hookup wire of about No. 20 gauge, with the insulation removed.

The crystal detector is held in place by means of two small brass clips. A "grid clip" of the type used to connect to the top cap of metal vacuum tubes is fitted around the larger part of the crystal. On the small end of the crystal is fitted a connection taken from an old broken six-prong tube socket. Your neighborhood radio service man should have both of these. A different type of detector might need a different mounting.

The inductor *L1* employed is commonly sold at radio supply houses as a receiver antenna coil. It may be obtained with or without the piece of heavy bare wire which extends up and around the coil. It is so proportioned as to cover, with the variable capacitor or condenser used, the standard broadcast band; the combination will tune from approximately 550 kilocycles to 1600 kilocycles.

The variable condenser was originally a part of a midget broadcast receiver of the superheterodyne variety, such as have been sold by thousands in chain drugstores. Since this condenser has two sets of plates, we had to decide which to use. The smaller section was not suitable for our purpose, being too small, so the larger rear section was used instead. If both had been the same size, either might have been used, or, of course, we might have used a single-section condenser of the proper size to begin with. The maximum capacity of this condenser is 365 micromicrofarads, which probably doesn't mean much to the reader now, but should before he has finished reading this article. Any variable condenser having approximately this maximum-capacity rating may be used.

When the set is wired and antenna and ground and headphones are connected, local broadcast signals should be heard immediately. If the area in which the set is tested is crowded, so far as broadcast stations are concerned, spots may be noticed on the dial at which two stations can be heard simultaneously. Careful tuning should make one considerably louder than the other.

Experiments may be made to determine how the receiver responded to signals with antennas

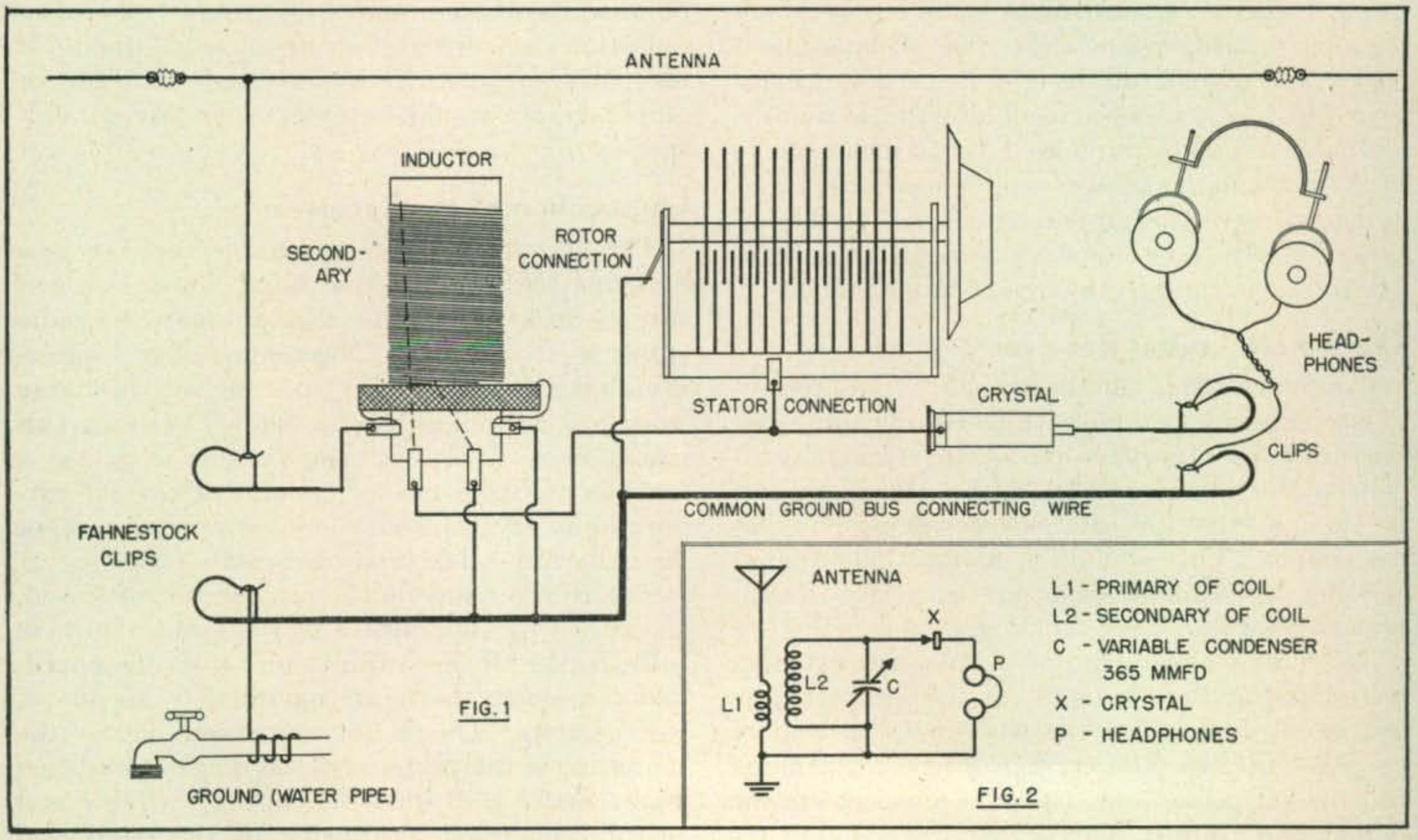


Fig. 1. Pictorial diagram of simple crystal receiver.

Fig. 2. Schematic diagram of same receiver.

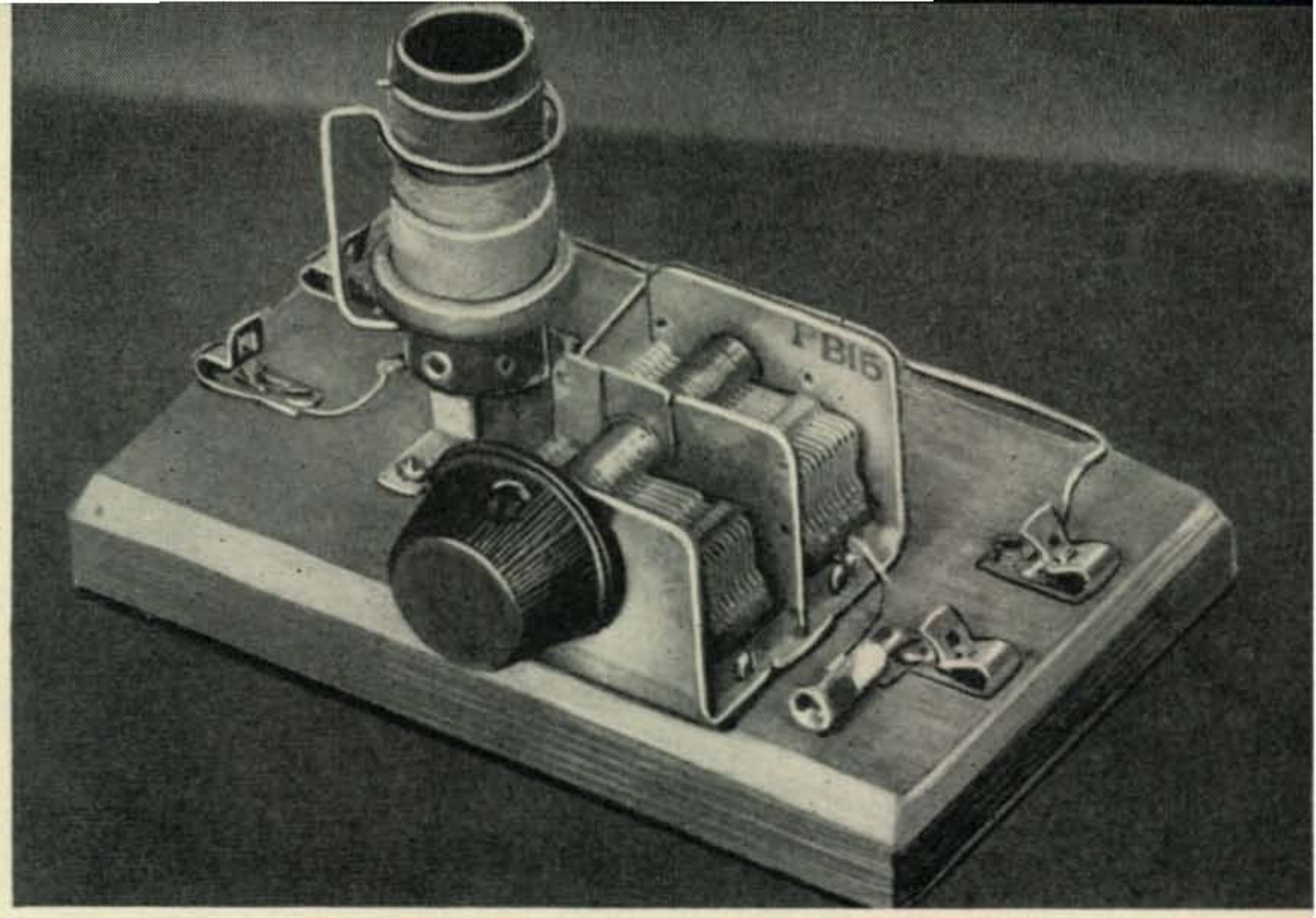


Fig. 3. Crystal receiver. Note only one section of two section condenser is used. Heavy wire used as ground bus, extending from ground clip to one headphone clip; all ground connections made to this wire. Crystal is in foreground, mounted in clips. The heavy wire extending up and looped around the inductance is often found on commercially made coils, but is not necessary for operation of this receiver.

of different lengths. It will be discovered that the performance improves as the antenna length is increased, up to the limit of length available.

Later in this series there will be described the construction of an audio amplifier, driving a large loudspeaker to which the simple receiver may be connected. Signals should then be heard very clearly, and of excellent quality.

Theory of Operation

In considering the theory of operation of the simple receiver, two fundamental points must be made. The first is that every radio receiver, no matter how complex, depends for its operation on the same fundamental concepts as are illustrated by the simple crystal set. The second point is tha , if these concepts are not learned in connection with the simple receiver, they will be vastly more difficult to comprehend in terms of more complex receivers.

The Antenna System

Both antenna and ground are considered as parts of the antenna system. In many applications, particularly at higher frequencies, the antenna wire is divided in two, each wire properly connected to what might be otherwise considered the antenna and "ground" connections of the receiver (or transmitter). In our application the ground is considered as half the antenna.

As was pointed out earlier, the received signals become stronger as the length of the antenna is increased. This is because the stations received are operating in the standard broadcast band, which means on comparatively low frequencies or, to put it in reverse, on long wavelengths.

A definition of the term "frequency" is necessary at this point. All alternating currents, of which radio waves are one type, are designated in terms of their "frequency" or number of alternations per second. Ordinary house-lighting alternating current is most often of a frequency of 60 cycles per second (with 25 and 50 cycles also found in certain regions). Audio frequencies, or those which are audible to the human ear, normally extend from about 15 to 15 thousand cycles per second. Radio frequencies lie above the 15,000-cycle mark, with the standard broadcast band beginning at 500,000 cycles per second in frequency.

Since it is awkward to use the extra zeros in designating frequencies in the radio range, the prefix *kilo-* is used to designate thousand, and *mega-* to designate million, so we speak usually of kilocycles (kc) or megacycles (mc).

Frequencies are linked with the length of the radio wave, and there is a standard set of formulas for changing frequency to wavelength, or vice-versa. The two have an inverse relationship. Short wavelengths lie in the higher frequencies, and long wavelengths lie in the lower frequencies. The length of the wave is commonly expressed in meters (one meter being equal to 39.37 inches, or slightly more than a yard).

For maximum efficiency, an antenna for transmitting or receiving a radio signal must approximate the length of one-half wave at the operating frequency. In the standard broadcast band, this optimum would be something in the neighborhood of 450 feet; this explains why increasing the antenna length increases the strength of the signal.

The reasons for this antenna-length characteristic will be covered in a later section on antennas and feed systems.

It will be evident from the above, however, that an antenna must usually be designed for some one frequency or closely allied group of frequen-

cies, such as one "band", to achieve the greatest possible efficiency for both reception and transmission. When the antenna is operating at the frequency for which it is cut, it will intercept the greatest possible amount of radio-frequency energy and feed it to following portions of the receiver.

The Tuned Circuit

That portion of the receiver which receives the energy from the antenna in the form of impulses unselected as to frequency (except insofar as the natural frequency or length of the antenna may emphasize them), and selects the one signal which it is desired to hear, is known as the tuned or frequency-determining circuit.

In its simplest form, this circuit consists of an inductor, or coil of wire, and a capacitor, or condenser. Either or both of these may be made variable, in order to be able to alter their characteristics of frequency selection at will. For mechanical reasons the condenser is usually the variable component, although recent developments have also brought the variable inductor back into common use.

The inductor, or coil, obtains its name from the fact that it possesses *inductance*, or the property of storing energy in the magnetic field which is created about the coil by the passage of current through the turns of wire composing it. It should be pointed out that the inductor need not necessarily be composed of coiled wires; it may consist of a single loop of wire, or merely a straight piece of wire.

The inductance of the coil is determined by a number of factors, chief among them being the number of turns of wire, the diameter and length of the winding, and the number of layers of wire.

The symbol L is used to denote inductance. The basic unit of inductance is the *henry*. Since coils at the frequencies commonly employed in radio work are rather small, the henry is too large a unit to be advantageously employed, and the more commonly used terms are the *millihenry*, which is 1/1000th of a henry, and the *microhenry*, which is 1/1,000,000th of a henry. Throughout radio work, it will be observed that the usual basic units of electrical measurement are too large; hence, the prefixes *milli-* and *micro-* are often employed to indicate thousandths or millionths of the basic unit.

When an alternating current, such as a radio-frequency current, flows through a coil of wire, the magnetic field about the coil alternately rises and collapses, many thousands of times each second (the rate depending on the frequency). Each individual turn of the coil sets up its own field. This field, in rising and collapsing, cuts not only the turn itself, but adjacent turns. As this happens a voltage is induced in the coil, the induced voltage being opposite in polarity to the original exciting voltage.

This induced voltage tends to keep the quantity of current flowing in the coil from changing. That is, as the initial voltage increases, the counter-voltage decreases, and vice-versa, tending toward a leveling-out process. The inductor thus has the property of offering opposition, or resistance to any change in the amount of current flow. This property is known as *inductance.*

When a magnetic field is set up, the force which originates or causes it is termed magnetomotive force, and the unit of magnetomotive force is the *gilbert.* More often, however, magnetomotive force is measured in terms of the *ampere-turns*; that is, multiplying the number of turns of wire in the coil by the number of amperes of current flowing through the coil will give the ampere-turns.

The variable tuning capacitor, or condenser, also possesses the property of storing energy, by virtue of the fact that its two sets of plates are separated from each other by air, which is a nonconductor of electricity. Other types of condensers have other forms of nonconducting separators. These are called insulators, or dielectric material.

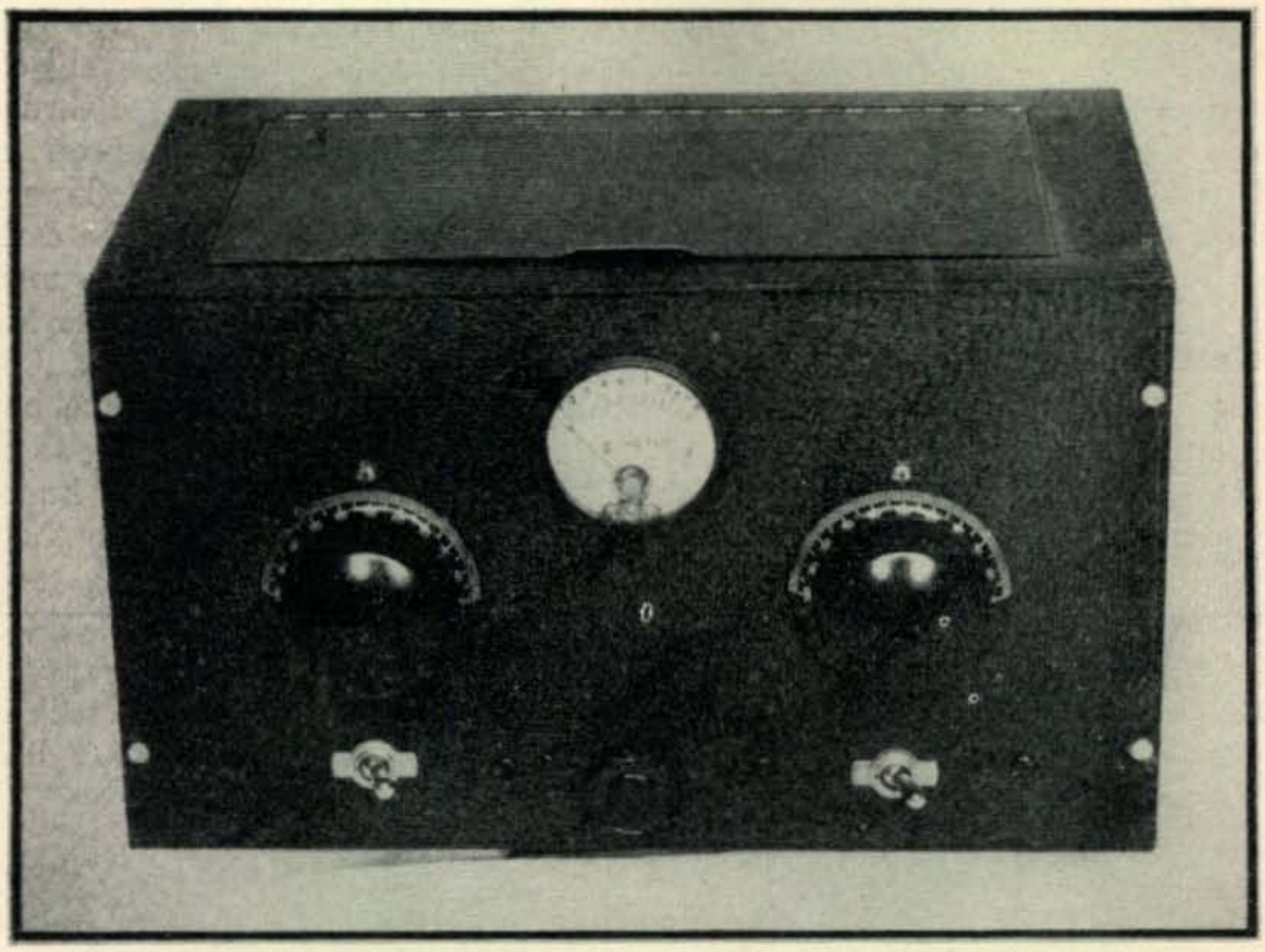
When a voltage is applied across a condenser, because of its influence electrons attempt to flow from one plate to the other the circuit containing the source of the voltage, but find they cannot complete their flow because of the interposing insulating (nonconductive) material. One plate, or set of plates, hence accumulates an excess of electrons, this excess having been drained away from the other. The resulting unbalance is called a "charge."

This excess of electrons is constantly pressing to rejoin its lost minority group by leaping across the intervening gap of nonconducting material. This pressure is known as electromotive force, and is measured in terms of *volts*. The *volt* is the unit of electromotive force.

If a piece of conducting material were laid across the terminals of the condenser while this charge was present, the electrons would flow through it to rejoin the smaller group, and this flow would be electrical current, measured in *amperes.*

As a condenser receives its unbalance of electrons through a source of voltage, the number of electrons which are accumulated on one set of plates will depend on the area of the plates and their spacing with respect to each other, since the electrons already present resist the advent of more electrons. Obviously, the condenser will be able to receive more electrons as its plates are made larger. This ability of a condenser to

[*Continued to page 73*]



Front panel view of the 6AK5-6C4 converter. The vernier dials are from the coil units of a BC-375E transmitter. The S-meter is actuated by the bridge circuit triode and the receiver a-v-c line.

Simple Converter-Preselector

FRANK C. JONES, W6AJF*

A unit to give broadcast band, 15- 10- and 6-meter coverage, as well as preselection on other bands, for a receiver with limited tuning range

THE LARGE NUMBER of war surplus radio receivers on the market has finally resulted in the writer purchasing one for his own station. This receiver was a very well built model and required only the substitution of an a-c power pack for the dynamotor supply, a power tube bias change, and the addition of a 1N34 diode series noise limiter. Thus becoming a very useful receiver on the lower frequency amateur bands. Since the upper frequency limit was 18 megacycles a converter was needed for reception in the 50, 28, and proposed 21-mc bands. Several models were built and tested; two of these are fairly similar in design with slight variations to accomplish specific purposes.

Design Features

The unit shown in *Fig. 1* was built for use by a friend with a receiver having a low impedance antenna input circuit. He wanted to use the receiver on the 50 and 28-mc bands and broadcast band—ranges not covered by his particular model. In order to cover the broadcast band, the r-f stages in the converter needed a large tuning condenser having a maximum capacity of 365 $\mu\mu$f per section. This tends to make too high a C to L ratio in the higher frequency bands unless special coils are wound for the amateur bands such as the 28-mc coils listed in the 6AG5 converter coil data table.

Both units serve as converters over the higher amateur bands (and broadcast band in one unit) and as r-f preselectors over the range of from 18 or 20 mc to about 1500 kc. The latter feature was not deemed necessary for certain types of communications receivers, but is desirable for receivers such as the BC-224, 312, 342, or 348. Most of the surplus receivers were designed for a high impedance input which is not suitable for connection to a doublet or other balanced line feeder antenna systems. In such cases, the preselector greatly improves the receiver performance even on the lower frequency amateur bands. When serving as preselectors, the high frequency oscillator in the converter is turned off using *SW1* and

*2037 *Durant Ave., Berkeley 4, Calif.*

SW2 and the mixer tube becomes an r-f amplifier. It adds some r-f gain to the receiver, increases image rejection, and greatly improves noise reduction by permitting the use of a two wire balanced feed to the antenna. As a converter, it permits reception in frequency bands not possible with the receiver alone.

Construction Details

The converter shown in *Fig. 1* has a twin triode 6J6 oscillator. This form of oscillator is very stable and requires no feedback winding on the tuned coil circuit. It is remarkably stable for moderate changes of plate voltage. The mixer plate circuit can be capacitively coupled into a high impedance receiver input thru a short length of shielded lead, but for connection to a low impedance input, a cathode follower with a 955, 9002, or 6C4 is desirable. The cathode follower tends to act as an impedance matching transformer effective over the whole high frequency band. Most converters have a tuned output transformer set to an i-f value between 5 and 12 mc. This works fine as long as it is used only as a converter, but prohibits its use as a preselector on other bands. The cathode follower is

CONVERTER COIL TABLE FOR FIG. 1

Frequency Band	Oscillator Frequency	Oscillator Coils (L5)
50—54 mc	38—42 mc	4½ turns ¾" dia. X ½" long
27—30 mc	39—42 mc	Same as above
21—22 mc	33—34 mc	5½ turns ¾" dia. X ½" long
550—1500 kc	12.5—13.5 mc	17 turns ¾" dia. X ¾" long

Frequency Band	R-F. Coil (L2)	Antenna Coil (L1)
550—1800 kc	97 turns # 28E. 1½" dia. X 1⅝" long	15 turns
1.6—5.7 mc	34 turns # 24DCC 1¼" dia. X 1¼" long	8 turns
5.3—18.0 mc	10 turns # 22 1¼" dia. X 1¼" long	4 turns
17 —55 mc	3 turns # 20 1" dia. X ¾" long	2 turns
28-mc coil	4 turns # 20 1¼" dia. X 1¼" long	2 turns

Frequency Band	Second R-F. or Mixer coil (L4)	Primary (L3)
550—1800 kc	97 turns #28E. 1½" dia. X 1⅜" long	25 turns
1.6—5.7 mc	34 turns #24DCC 1¼" dia. X 1¼" long	12 turns
5.3—18 mc	10 turns #22 1¼" dia. X 1¼" long	6 turns
17—55 mc	3 turns #20 1" dia. X ¾" long	3 turns
28 mc coil	4 turns #20 1¼" dia. X 1¼" long	3 turns

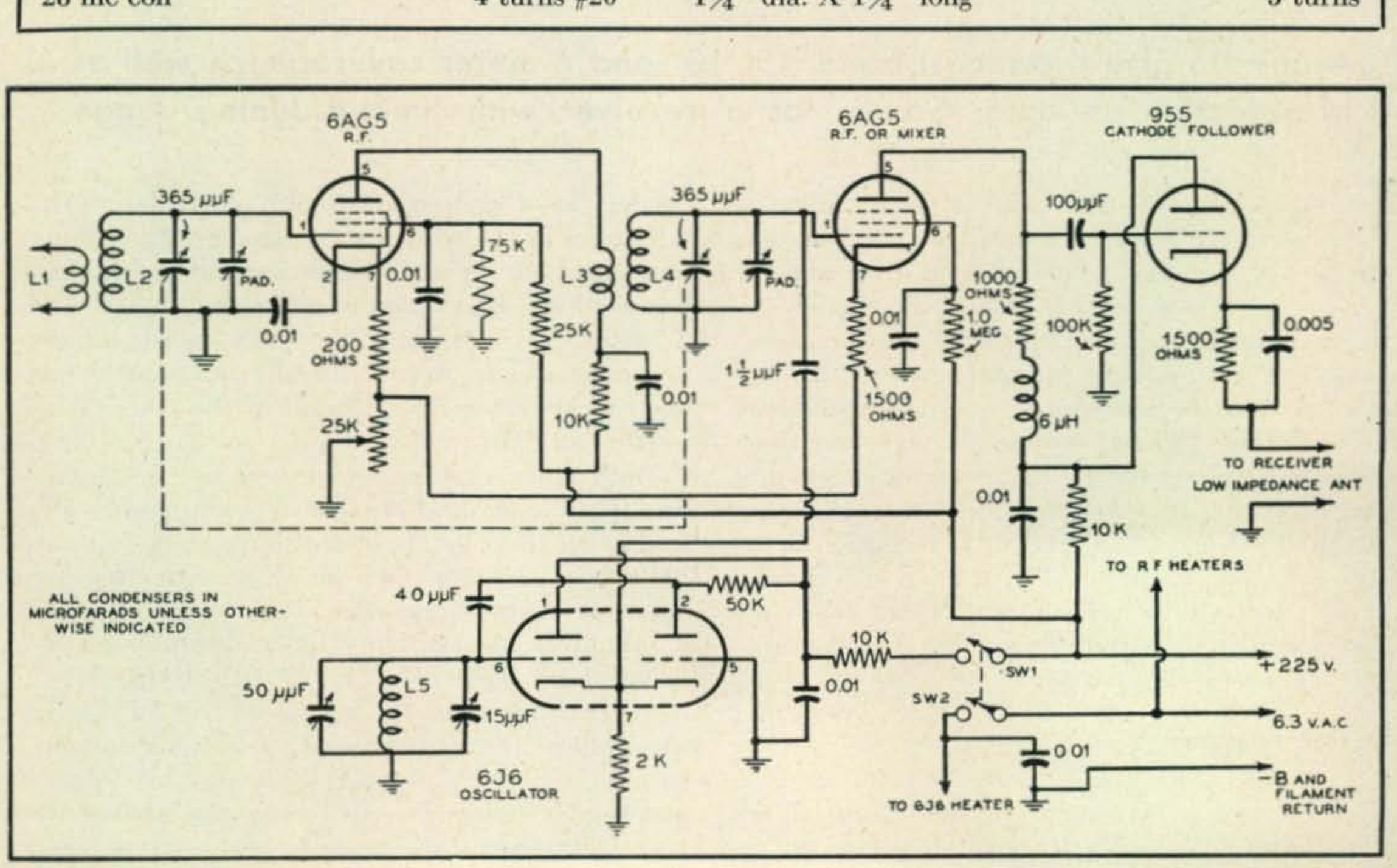


Fig. 1. Schematic of the broadcast band and v-h-f converter for use with receivers having a balanced low impedance antenna input circuit. By disconnecting the power to the oscillator, the two 6AG5 stages may be made to act as r-f preselectors.

CONVERTER COIL TABLE FOR FIG. 2

Frequency Band	Oscillator Frequency	Oscillator Coils (L3)
50—54 mc	61—65 mc	2 turns c.t. ¾" dia. X ½" long
27—30 mc	38—41 mc	5 turns c.t. ¾" dia. X ¾" long
21—22 mc	32—33 mc	6 turns c.t. ¾" dia. X ¾" long

Frequency Band	R-F. or Mixer coils (L2)	Antenna coil (L1)
1.75—5 mc	68 turns #30E. ¾" dia. X ¾" long	7 turns
4.3 —10 mc	27 turns #24E. ¾" dia. X ¾" long	5 turns
9.5 —24 mc	13 turns #20E. ¾" dia. X ¾" long	3 turns
15 —35 mc	8½ turns #20E. ¾" dia. X ¾" long	2 turns
30 —60 mc	3½ turns #20E. ¾" dia. X ¾" long	1 turn

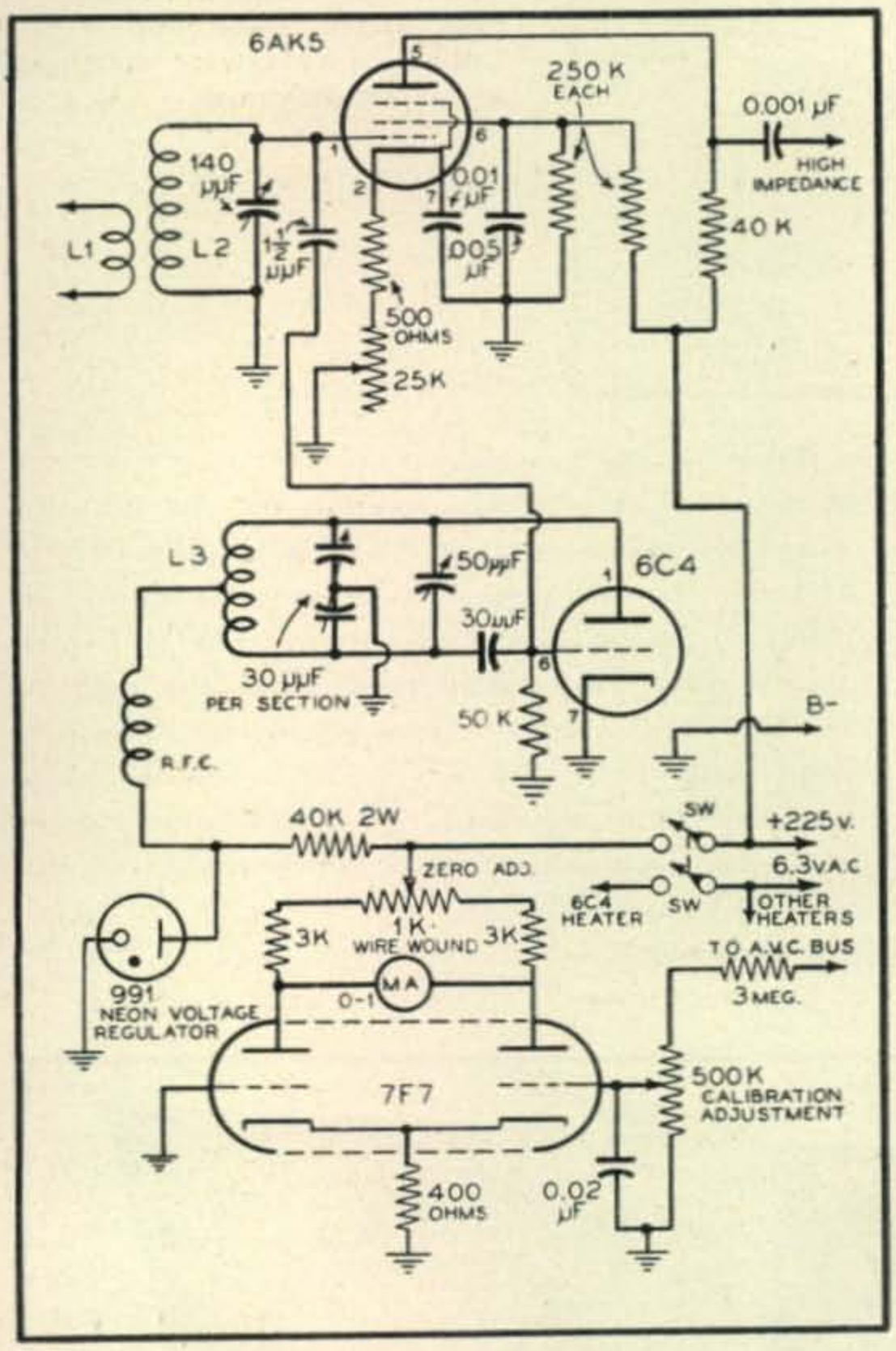


Fig. 2. Schematic of the preselector and converter for extending the range of war-surplus receivers having high impedance antenna input circuits to the ten and six-meter bands.

one method of utilizing preselection with the same unit by turning off the oscillator and tuning the r-f stage or stages to the same frequency as the receiver. It is not necessary to incorporate any antenna switching circuits to cut out the converter when receiving in the 14, 7 and 3.5-mc bands as the unit can be used as a preselector.

Alternate Circuit

In general the second type of converter shown in *Fig. 2* has some decided advantages. It has no circuit alignment problems since it has only a single r-f tuning circuit. It does not have as good an image rejection as the unit described above but is less costly and is easier to construct. The second unit has a 6AK5 high gain tube as a mixer or r-f stage and a low current drain 6C4 oscillator which means it will add little drain to the B supply and 6.3 volt heater supply of the communications receiver. Changing a dynamotor supply over to a built-in a-c power supply in a BC-224 or similar receiver, means that a 75-ma transformer and chokes, are about as large as can be fitted into the space previously occupied by the dynamotor. The r-f tubes in the converter-preselector shown in *Fig. 2* only draw about 0.3 ampere at 6.3 volts and approximately 10 ma at 200 to 250 volts, so it may be connected directly to the receiver supply. The second unit also has a vacuum tube controlled S-meter for connection to the a-v-c line in the receiver. This adds a little more to the power supply drain but is very useful for phone reception tuning and signal reports on all amateur bands.

Both units were built into standard 7 x 7½ x 12 inch metal cabinets with hinged lids to permit coil changing. Most of the vernier dials were of the planetary motion type recovered from the

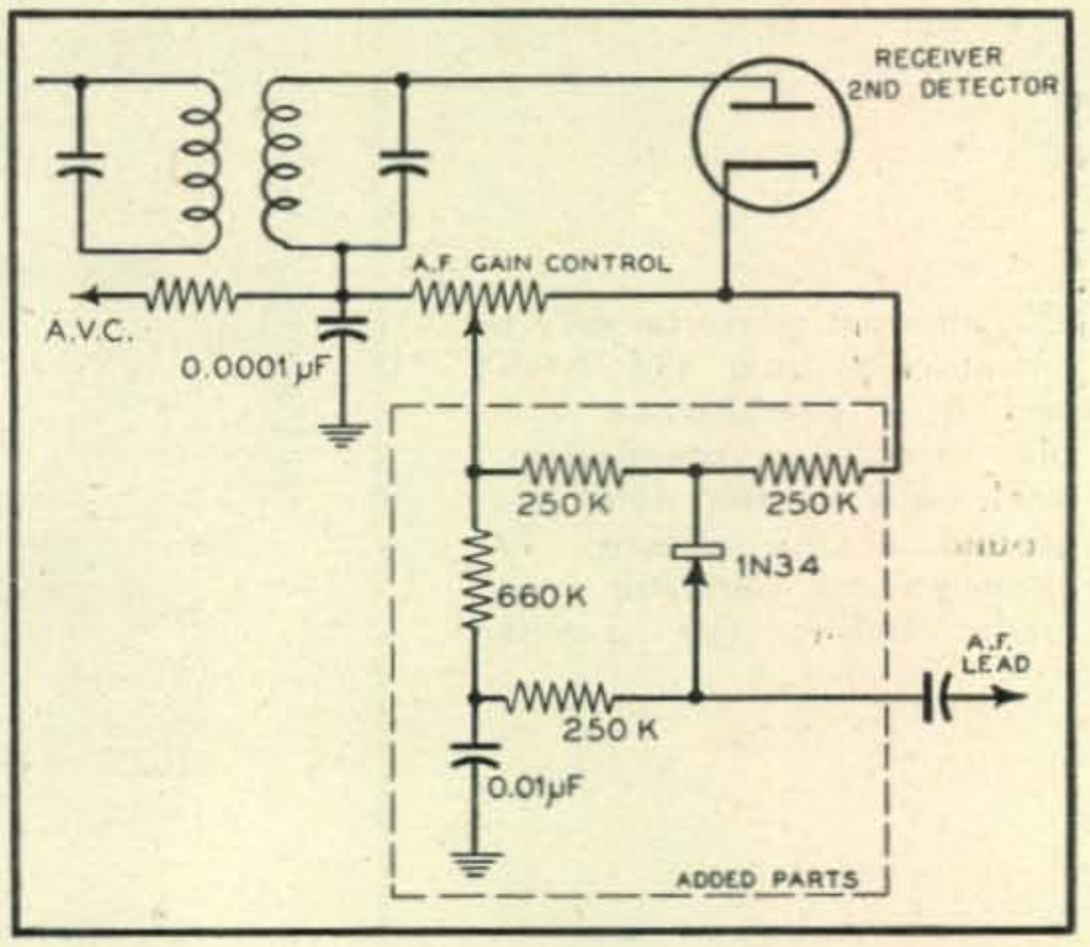
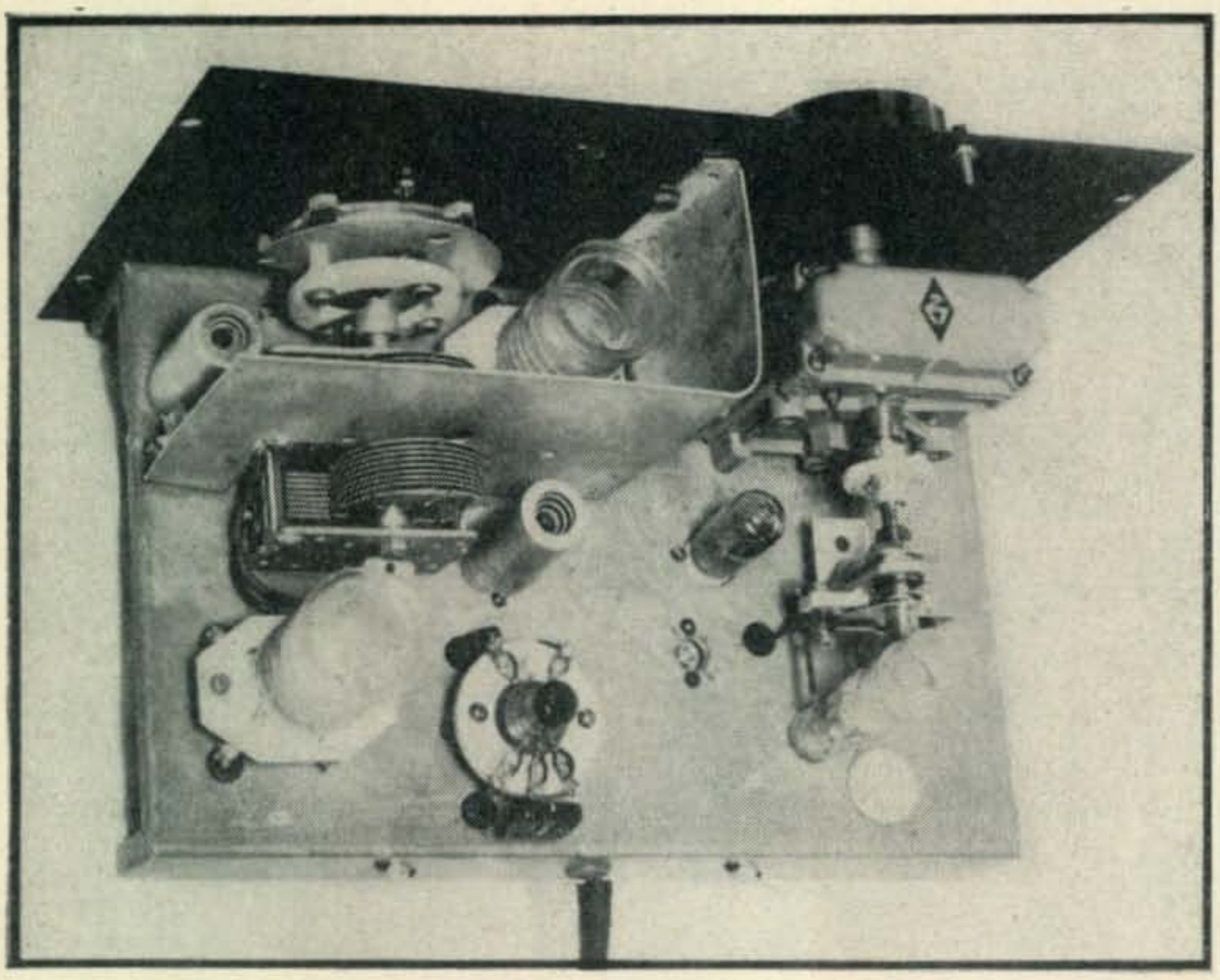


Fig. 3. An effective noise limiter is easily constructed for any of the surplus receivers with the addition of four resistors, one condenser and a 1N34 crystal rectifier.



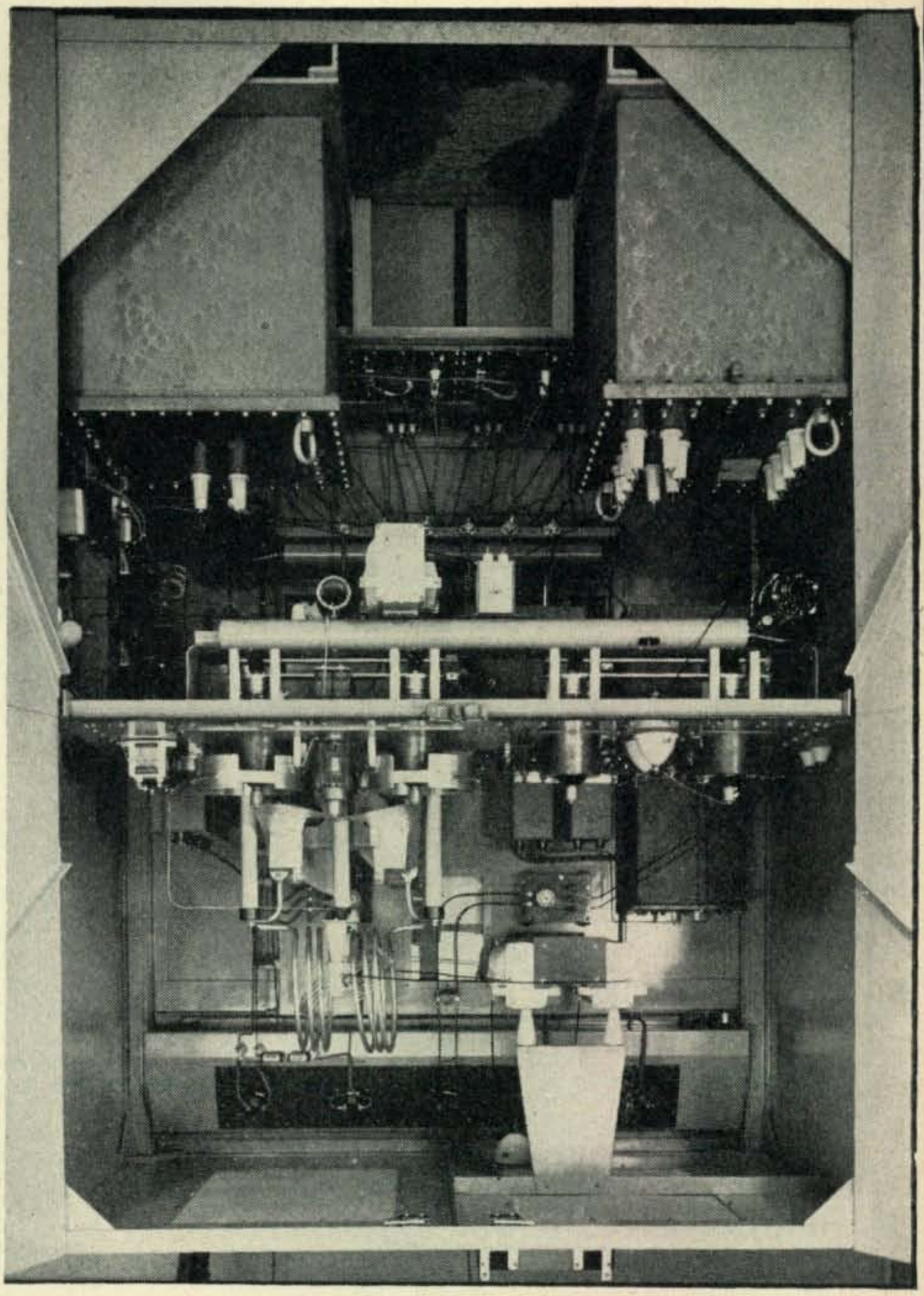
The preselector-converter using 6AG5 type tubes in the r-f stages. The HRO dial drives the oscillator condenser. A broadcast type 365-$\mu\mu$f tuning condenser is used in the r-f and mixer stages. The acorn tube in the foreground is the cathode follower matching transformer.

tuning units of a war surplus BC-375E radio transmitter. The spare coils in the second converter are stored along the rear edge of the chassis between the cabinet and a railing made of No. 12 bus wire. These coils are standard midget coil forms. A small disk of lucite was lettered with the approximate frequency range and circuit position, then cemented into the top of each coil form to permit rapid identification when changing bands.

A calibrated absorption type frequency meter is useful in checking the oscillator tuning range so one padder condenser setting will function for all oscillator tuning ranges. The coil turn spacings can be changed slightly to help in this manner before the coil forms are treated with polystyrene coil dope. The value of each inductance should be correct for each converter range. The coil data tables show the oscillator range which is approximately 11 or 12 mc above or below the r-f tuning circuit range in the 6AG5 or 6AK5 circuits. The communications receiver is always tuned to 11 (or 12) mc when used with the converter, and tuned to the signal frequency below 18 mc for all other bands where the converter becomes a tuned r-f preselector. [*Continued on page 70*]

An efficient converter may be constructed from the 6AK5 and 6C4 combination. The plug-in coils are grouped in a small rack in the right foreground of the picture. The neon voltage regulator is directly below the S-meter.

DEPARTMENTS



10-kw broadcast transmitter which Doc Stuart, W6GRL/XU6GRL supervised building and is now being installed by Doc in Nanking for the Chinese government. Transmitter uses a pair of Eimac 3X2500A3 tubes in the final. Doc doesn't use this on 10 and 20 even if his signal sounds it.

Order of the Brilliant Star to W6GRL

Dr. Charles E. Stuart, W6GRL (temporarily XU6GRL), who during the war operated the Ventura, Calif., radio listening post of the Chinese Ministry of Information, on March 21st was awarded by the Chinese National Government the Special Collar of the Order of the Brilliant Star "for his outstanding meritorious service to the Chinese people and government throughout the years of China's resistance to Japanese aggression." In presenting the medal Dr. Peng Hsueh-Pei, Minister of Information, said: "The continued selfless devotion of our American friend and his wife to the cause of peaceful national reconstruction in our country is indeed a challenge and inspiration to every one of us." Participating in the ceremonies were various high officials of the Chinese government and K. T. Chu, president of the China Amateur Radio Relay League.

W6GRL, a dentist by profession, began his ham career in 1912, and has won fame in working DX. Chosen to operate the Ventura listening post, beginning in May, 1940, Dr. Stuart assisted by his wife received and transcribed from 3,000 to 10,000 words daily from station XGOY, the "Voice of China", in the wartime capital of Chungking. For a period following the fall of Manila, Hongkong and Shanghai, when commercial radio facilities in the Far East were brought to a standstill, Dr. Stuart's station became the only outlet of Chungking to the outside world. Millions of words of press were handled, besides regular government traffic, and some 2500 radio rebroadcast programs, both live and recorded, were delivered by W6GRL to radio networks throughout the U. S. In addition, 8500 radio "letters" were relayed from persons in Chungking to their respective addressees.

"Doc" Stuart is now in Nanking, China, directing the installation of a 10-kw transmitter and complete station to replace the Chungking circuit. At the same time he is operating his Ham station, XU6GRL described in April *CQ*.

Monthly DX Predictions - - - JUNE

OLIVER PERRY FERRELL

THIS MONTH WE are presenting the average DX conditions over two representative paths. Generally, June is a rather slack month in 10 and 20 meter DX with only those countries below or near the equator being consistently audible on either band. The atmospheric noise level is slowly rising on 40 meters and 20 meters and signal absorption in the ionosphere on these bands is becoming somewhat greater.

In *Fig. 1* the average predicted conditions for a path from the eastern and central section of the United States to Argentina is shown. Following the outer curve, or the maximum usable frequency (MUF) we find that 20 meters will probably close for a short period around 0330 hours CST. The band should reopen after 0400 hours CST and with the exception of the mid-day signal absorption will probably be quite good the remainder of the day. Conditions after 1800 hours CST until 2400 hours are particularly favored. The inner or lower curve represents the optimum usable frequency and may be used to provide an accurate basis for the arrangement of schedules. Attempt to keep the time of the schedule and the frequency band within five megacycles of the OWF curve. 10 meters is expected to open around 1100 hours CST with peak time over this path around 1400 to 1500 hours CST. The band will close around 1730 hours CST.

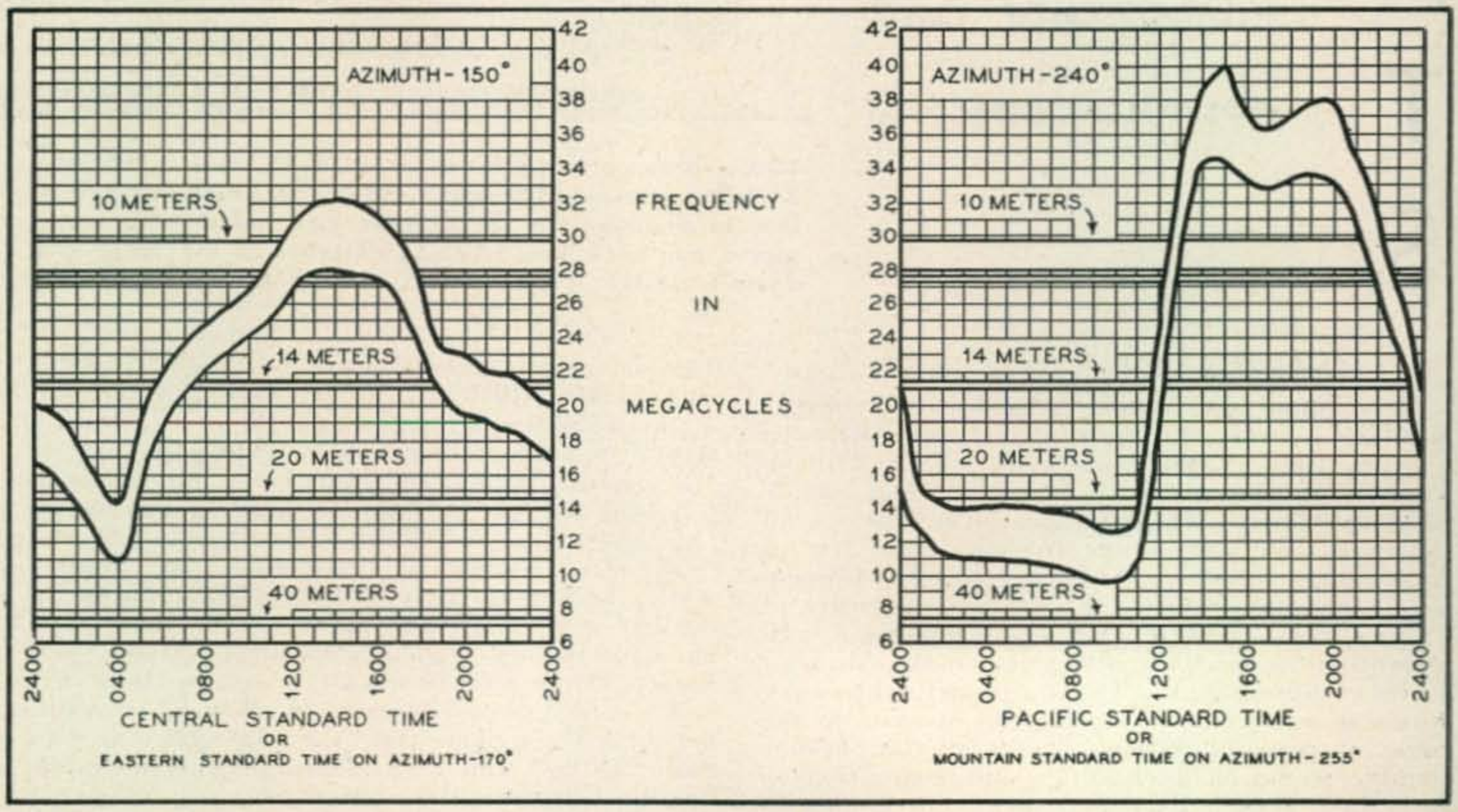
The graph in *Fig. 2* illustrates the average conditions from the western areas of the United States to the eastern areas of Australia and New Zealand. The 20-meter band will be closed from 0100 hours PST until about 1100 hours PST. Both 10 and 20 meters are expected to open around 1300 hours with a 10 meter peak at 1430 hours. Another 10-meter peak is expected around 1930 hours PST and a 20-meter peak will probably occur around 2100 to 2200 hours PST.

6 Meter Short Skip DX

As the month of June rolls around there is less talk of DX on 10 and 20 meters and more comments on the possibilities of 6-meter DX openings. This month and probably in our July, August and September issues we are presenting a list of the most likely dates of sporadic-E, or short-skip openings on 6 meters. The data employed in arranging this listing is obtained from composite sources—but mainly represents a long range analysis prepared by the writer.

Numerous methods of sporadic-E prediction have been reviewed. However, it has been determined that in most instances the forecasts were only valid for periods of 25 to 30 days after the date of the analysis. Quite possibly this has been due to the limited quantity of observations at hand, or to the desire to localize the sporadic-E occurrence within the borders of the United States. In every instance it was particularly evident that a very long range secondary cycle has been completely ignored. The evaluation of this long range cycle appears to be the keystone to the prediction of sporadic-E short-skip on 6 meters. Naturally, in speaking of the cyclic variations of sporadic-E we do so in the lieu of evidence to the contrary of this theory. While at pres-

[*Continued on page 56*]



Predicted DX conditions for June over two transmission paths. The outer or the upper curve denotes the maximum usable frequencies and the inner curve the optimum working frequencies. Fig. 1 (left). Central United States to Argentina. Fig. 2 (right). Western United States to Australia and New Zealand. A notation of the azimuth over which the path is effective is in the upper inside corner of the graphs. By displacing the azimuth the graph may be used in the Eastern and Mountain time zones.

CQ DX

By HERB BECKER, W6QD

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

LAST MONTH, we started the DX Honor Roll with W6VFR being high man on the totem pole; this month sees W2GWE on top. Keep those Zone and Country lists coming in, and we will get them checked and registered as soon as possible. I have heard a lot of you fellows moan about what a job it is to compile an alphabetical list of countries, showing the call, date, and time, and, of course, in addition to this, another list showing the zones. I agree with you 100%, but just keep this in mind; where you only have one list to compile, we take a kind of a beating because we must check *all* lists that come in. In a way, this is almost as difficult as compiling a batch of Zone and Country lists. I want to thank the whole bunch of you fellows for the fine comments you have made, regarding the system and policy we intend to follow, relative to entering the WAZ Honor Roll. The lists that have been coming in, during the past few days, have been neatly and systematically compiled, and I'm not kidding when I say this is going to save us a great deal of night work in getting them checked and the totals entered in the Honor Roll.

Generally speaking, we have not had much occasion to question the lists of zones and countries sent in; however, it is not the easiest thing, as you well know, to determine the zone in which some of these stations are located. We don't mind having you put these on the list with a question mark, and we will, no doubt, drop you a line letting you know the correct zone. The same idea applies to the country list. There have been a lot of screwy calls on the air, and, naturally, none of you are going to pass up any bets, so you go ahead and work these guys. At the same time, you may choose to include some of these stations on your country list with the idea that we may have more information about them than you have. In many cases, we may have additional information about questionable stations, and then again, we may not have a thing. If we don't happen to have too much information regarding certain stations shown on your lists, one of the DX committee may drop you a line on the subject. Andy Elsner, W6ENV, has been giving me some first class assistance in this direction, and I do hope you will cooperate with us, if he happens to drop you a line.

Once again, I would like to say that we take your original list of zones and countries, and after each one is checked, it is filed to be used as a master list. Then, as new zones and countries are worked, you can drop us a letter listing the country, call letters, date, and time, and, of course, stating that this is to be added to your master list. Now I'll get down off the soap box, and we'll dive into the mail bag.

C-W Chatter

It is good hearing from G5GK. Among other things, he says he has had over 700 "W" and "VE" QSOs since December 1, 1946. This fellow concentrates on 40 meters, and, at the moment, he needs a few states for WAS on this band: Utah, Oregon, Washington, North and South Dakota, New Hampshire, Vermont, and Idaho. He is on the air everyday from 0500 to 0700 GMT. By the way, G5GK has a darn good looking QSL card, and this might be some inducement.

G6AA suggests that when DX stations call CQ, they insert the frequency while calling, and this frequency to mean that he would listen at this spot for stations calling him. He thinks this would automatically separate some of the fellows, as everyone would not be able to land exactly on the frequency suggested. Personally, I don't know if this would work or not, as everyone seems to have some sort of an idea on how a DX man should conduct himself on the band while working DX. We always get back to the same palce, however, the result being that everyone piles on or near the DX station's frequency, and then, I guess, it's "may the best man win".

OK1AW is up to 36Z and 87C since he was relicensed in June, 1946. He needs Arizona, Mississippi, Utah, Wyoming, Colorado, and Idaho for post-war WAS. Right now Alois is impatiently awaiting for a QSL card from W5LGS, his first station in New Mexico. He called his head off one day for W7QAP in Arizona with no luck. (S'matter, Bud, no receiver?)

Fred B. "Doc" Westervelt, W5MY

It is good to hear OK1AW in there pitching again. W6ZY (ex-W2VY) has worked a few good ones, including I6USA, FM8AC, J2ROC, J5ABA, VP4TW, etc. Considering that George was only recently married, this DX isn't too bad. W7PDA works 40 c.w. and is located in Phoenix, Arizona; running 700 watts into a pair of 813s; recent DX worked include C1JF, VS1AF, HH5RP, and at this moment is gunning for PK6AC, who seems to be around 7150 kc.

VK2RA has four stage transmitter, winding up with an 813 in the final. Most of his DX has been worked with a 67′ V beam, and although short, he has worked 38Z and 101C. He is in the midst of moving to a new location, and expects it to be much better in every direction, than his former spot. (Better get that list of zones and countries in for the Honor Roll, Ray.) VK2DI is batting along at a good clip

and has worked 36Z and 93C. He says EK1AS is ex-HH4AS.

W6UNH will soon be on the air on Guam, using a pair of 807s. His new antenna will be a lazy H, with 4 reflector elements. W7QAP, located in Tucson, Arizona, is still running 150 watts into a pair of 3C24s, which is low power for Bud. He tried a 4-250A, but since he is located in the sticks outside of Tucson, and has to rely on a gasoline driven power plant, the tube is just too much for this supply to put up with. So, back to the little tubes, he went. Anyway, Bud, doesn't do too badly, as it is a pretty good location out in the sand and cactus.

W1ZL has been doing some heavy concentrating on 40 meters, and has worked the following: ZE2FI, SU3GM, SM7HT, CN8BF, OX1G, ZS1M, ZS2CX, ZL2BV, KL7CC, KH6CV, and many other European stations. W1ZL thinks the 40-meter band sounds something like the banner years of 1927 and 28. Incidentally, he worked ZS2CX for an hour and thirty minutes, while the sun was still shining late in the afternoon. I would say this was pretty darn good on 40 meters. Some of Carl's latest on 20 include: PK6EE, ZC1AN, ZD4AB, HZ2BY, and I6USA. Up to the middle of March, 1ZL had been running 50 watts into an 807, but since he was jostled around a bit on 20, he put in a pair of 811s running 250 watts. W1ZL uses c.w. exclusively, because, as he says, he makes his living "barking soapy sonnets into a 50 kw rig in New York City."

W6VNF passed along a copy of the F.E.A.R.L. news. This is the temporary name of the official organ of the Far East Amateur Radio League. They are forming this league, and applications for charter membership were closed as of April 1. Their first president is Major Wadsworth, J2BRX; he was formerly W4BRX in Birmingham, Alabama. This organization should really do a swell job over there, and we wish them all the good luck in the world.

W2JA is running 500 watts to a single 813, and says he is a died-in-the-wool c-w man. He is using off center fed half-wave antennas on both 20 and 40 meters. W6QL has been doing O.K., the recent ones being: ZM6AC, FB8AG, YR5V, VU2PB, HS1AL, I6USA, and HZ1AB.

W4FPK has worked KS4AC, ZD1KR, OE9AA, KG6AE, PK6EE, and VO6T. He says he is worried about HP4Q, but the guy is there, and is sending cards, so maybe he shouldn't worry.

PY1DH has sent in a nice list of zones and countries totaling 35Z and 104C. While working OI2KA, he told him he was operating OH2OF also. He also mentioned to PY1DH that it would be O.K. for the boys to QSL via S.A.R.L., Box 250, Helsinki, Fin-

W.A.Z. HONOR ROLL

	POST WAR		ALL TIME	
	C.W.—PHONE			
W2GWE	39	149		
W6ITA	39	146	39	154
W6VFR	39	144		
W8BKP	39	138		
W8HYC	39	127	39	140
W6SA	39	114		
W6SAI	39	107		
W6ENV	38	133	39	152
W6SN	38	117	39	143
WØGKS	38	92		
W6LER	38	90	38	108
W6LEV	38	79		
W4OM	37	105		
WØYXO	37	105	38	118
W3IYE	37	104		
W6ANN	37	95		
W6WKU	37	94		
W3JNN	36	127		
G3DO	36	113	37	132
W2IOP	36	110	37	135
W3EVW	36	104	38	143
W4FPK	36	101		
W8CVU	36	99		
W6VBY	36	95		
W6TI	36	91		
OK1AW	36	87		
W5ASG	35	122	37	145
PY1DH	35	104		
W3KDP	33	75		
W6UZX	33	69		
CM2SW	32	100	34	107
W8NBK	32	96	34	114
W2VND	32	86		
W9RBI	32	73		
W7FNK	32	50	35	68
W6QD	31	62	39	145
WØLAW	30	67		

	POST WAR		ALL TIME	
W4GVP	29	60		
W2PUD	28	68		
W6JFJ	28	53		
W9WEN	28	51	28	62
KP4KD	27	67	31	104
WØAZT	27	66		
W6LRU	27	57		
W6PBV	27	56	28	61
W5EWZ	27	45	30	57
W9ACU	25	48	26	51
W9KMN	25	45		
W8PCS	25	41	26	51
W1LQQ	24	51		
W6ZZ	23	44		
W8QUS	22	43		
W2GVZ	20	41	39	126
W6UWL	13	19		
	PHONE			
W1JCX	36	105		
W3DHM	36	96		
W6DI	35	103	36	125
W1MCW	35	102		
W8BKP	35	99		
G3DO	35	96	36	113
W9HB	35	89		
W1FJN	35	84		
W6SA	34	66		
W4CYU	33	104	34	106
W2DYR	33	82		
W5ASG	32	77	32	95
W8BIQ	32	75		
W5LWV	31	70		
W2NSD	29	72		
W9FNR	29	65		
W9RBI	28	58		
W6ITA	26	65		
W4GVP	25	48		

land. There will soon be a Finnish Expedition going to Brazil covering the eclipse. They will have their own station, the call being OI2KAF, which will be operated by OH2QM. Naturally, PY1DH is looking forward to having them visit him. Some of the latest for PY1DH include: SK1AG, VO6K, UC2AD, FT4AN, ZC6WP, HS1AL, ST2AM, EA7AV, and SU1HF. W2OOH is up to 71 postwar running between 20 and 40 watts.

W6LER has a few new ones in VS9AN, W3KCG/VP2, PK6AX, CN8BL, GI6TK, and HS1AL. W6POZ worked C8KY, who is located in Lanchow, Kansu Province. This doesn't mean too

[*Continued on page 59*]

C1CH	P.O. Box 409, Shanghai, China
C1JF	P.O. Box 409, Shanghai, China
C1QY	H. H. Foo, % Shanghai Telephone Co. 460 Fokien Road, Shanghai, China
C6KL	Box 409, Shanghai, China
CN8EE	Navy NR 214, % F.P.O. New York City
CR4AA	Cape Verde Islands, QSL via R.E.P.
CR6AS	Jose Sanches, CBC Station, Luanda
DXEH7	Konstancin, Poland, QSL to 230 E. 167 Street, N. Y. C.
EK1AS	% RCA Communications, Tangiers, North Africa
EA7AV	Comandante Joaquin Portelo, Ministerio Marina, Madrid, or Ciudad Lineal, Madrid
EA9AL	Melilla, Spanish Morocco
FM8AC	P.O. Box 260, Fort De France, Martinique, F. W. I.
HA1KK	Box 185, Budapest 4, Hungary
HP4Q	QSL via A.R.R.L.
HS1AL	QSL via C.N.A.C., Foochow, China
I6USA	Jess Goldstein, Asmara, Eritrea, APO 843, % P.M. N. Y. C.
J2AAK	Joe Scaccia, Navy 3923, Comm. Yokosuka, % F.P.O. San Francisco
J2ARB	Tokyo, Japan, Co. B, Sig. Svc. Battalion, APO 503, % F.P.O. San Francisco
J2ROC	Nagoya, Japan, APO 710, % P.M. San Francisco
J3AAD	Kyoto, Japan, APO 301, % P.M. San Francisco
J4AAC	Major J. Drudge Coates, Brindin Signals, B.C.O.F. Okayama, Japan
J5ABA	Kyusha, Japan, APO 929, % P.M. San Francisco
KG6AE	Navy 939, Box 29, Guam, % F.P.O. San Francisco
KL7CF	Box 1134, Fairbanks, Alaska
KL7GG	Box 307, Anchorage, Alaska
KS4AC	F. A. Griffin, Swan Island, West Indies, % P.M. Tampa, Florida
KZ5NA	Navy 121, Box 10, F.P.O., New York City
LX1AO	Jean Oswald, Avenue Pasteur, Luxembourg City
LX1BG	Box 179, Luxembourg City
OQ5AR	Rene Libonton, UMHK Jadotville, Belgian Congo
OQ5BW	American Presbyterian Congo Mission, Moma Par Luisa, Belgian Congo
OQ5CE	P.O. Box 491, Leopoldville, Belgian Congo
OQ5LL	Andre Lippens, Ingenieur des Travaux Publics, P.O. Box 16, Stanleyville, Belgian Congo
OX1B	APO 858, P.M. New York City
PK4OO	Bert Modderman, Netherlands Forces Intelligence Service, Palembang, Sumatra
PK6HC	Hollandia, Dutch New Guinea
PM2I	QSL via A.R.R.L.
PY1DH	Box 4222, Rio De Janeiro, Brazil
SU1HF	Hal Frost, Box 360, Cairo, Egypt
TI2AJ	Anuar Jalet Leon, P.O. Box L, San Jose, Costa Rica
TF3K	Box 61, Reykjavik, Iceland
UC2AD	Box 88, Moscow
VO6T	Al Hamel, APO 677, Goose Bay, Labrador, % P.M. N. Y. C.
VP4TE	Major L. Kerr, C.S.O., British Army, Trinidad, B.W.I.
VP4TJ	Electronics Offjce, Navy NO. 117, F.P.O., New York City
VP4TW	Herb Wong, Piarco Field, Trinidad B.W.I.
VP4TZ	Post Signals Office, APO 869, % P.M. Miami, Florida
VP5JB	J. B. Duncan, 5 Central Avenue, Newton Square, Kingston, Jamaica
VP5RS	100 King Street, Kingston, Jamaica
VP9E	Box 11, Mangrove Bay, Bermuda
VP9K	Cavello Bay, Somerset, Bermuda
VP9F	R. Fox, Texas Manor, St. Davids Island, Bermuda
VQ4PB	Box 1091, Nairobi, Kenya Colony
VQ6HOS	Hargeisa, British Somaliland, QSL to John R. Endall (G2HOS) 46 Salisbury Rd., Moseley, Birmingham, England
VR2AO	Tom Duxbury, Nandi Air Base, Fiji
VS7AP	Box 72, Colombo, Ceylon
VS7FF	Box 433, GPO, Colombo, Ceylon
VU2BX	J. Bullick, Rungamuttee Tea Estate, Mal P.O., Dooars, N. Bengal
VU2FO	Capt. (Q.M.) T. H. Grieg, I. Ind. Air. Fmn. Sigs., Palaiu Delhi Contt, India
XADW	L. R. Hass, Signal Office, Rome Area Allied Command, APO 794, % P.M. New York City
XZ2EM	R. M. Hall, Lloyds Bank, Rangoon, Burma
YS3PL	Prudencio Llach San Salvador, Republic of Salvador
YU7KK	QSL via A.R.R.L.
YV5ABQ	P.O. Box 1247, Caracas, Venezuela
ZM6AB	Via ZM6AC, Pat Irwin, Apia, Western Samoa
ZB1AC	APO, Malta
ZC1AR	QSL via R.S.G.B., or Box 360, Cairo, Egypt
ZC6WP	Royal Air Force Station, AQIR, Plain of Sharon, Palestine or via R.S.G.B.
ZD1KR	Norman Wadsworth Kortright, % P.O. Freetown, Sierra Leone, West Africa
ZK1AV	Gus Marshall, Radio, Aitu Iaki, Cook Islands
J4s	QSL via J4 Headquarters, P. S. Pelling, Capt. of B.C.O.F., APO 311, % P.M. San Francisco
VU2s	QSL via VU2BC, A. B. Whatman, Sig. 2, Signal Directorate, G. Hq., APO Delhi, India
YNs	QSL via YN1RA, Rigoverto Agrenal, Box 78, Managua, Nicaragua
W3KCG/VP2	QSL via AACS Det., APO 855, % P.M. Miami, Florida
W8URU/C7	APO 912, Peiping, China
VU7JU	S. G. Abbott, Officers Mess, RAF Bahrein, Persian Gulf

V.H.F.-U.H.F.

by Vince Dawson, Jr., WØZJB

[Send all contributions to Vince Dawson Jr., Box 837, Gashland, Mo.]

"CQ 6-METER DX", has become a reality sooner than we have been used to expecting in the month of April. It appears to have it all over the old 56-60-mc band, for *Es* contacts.

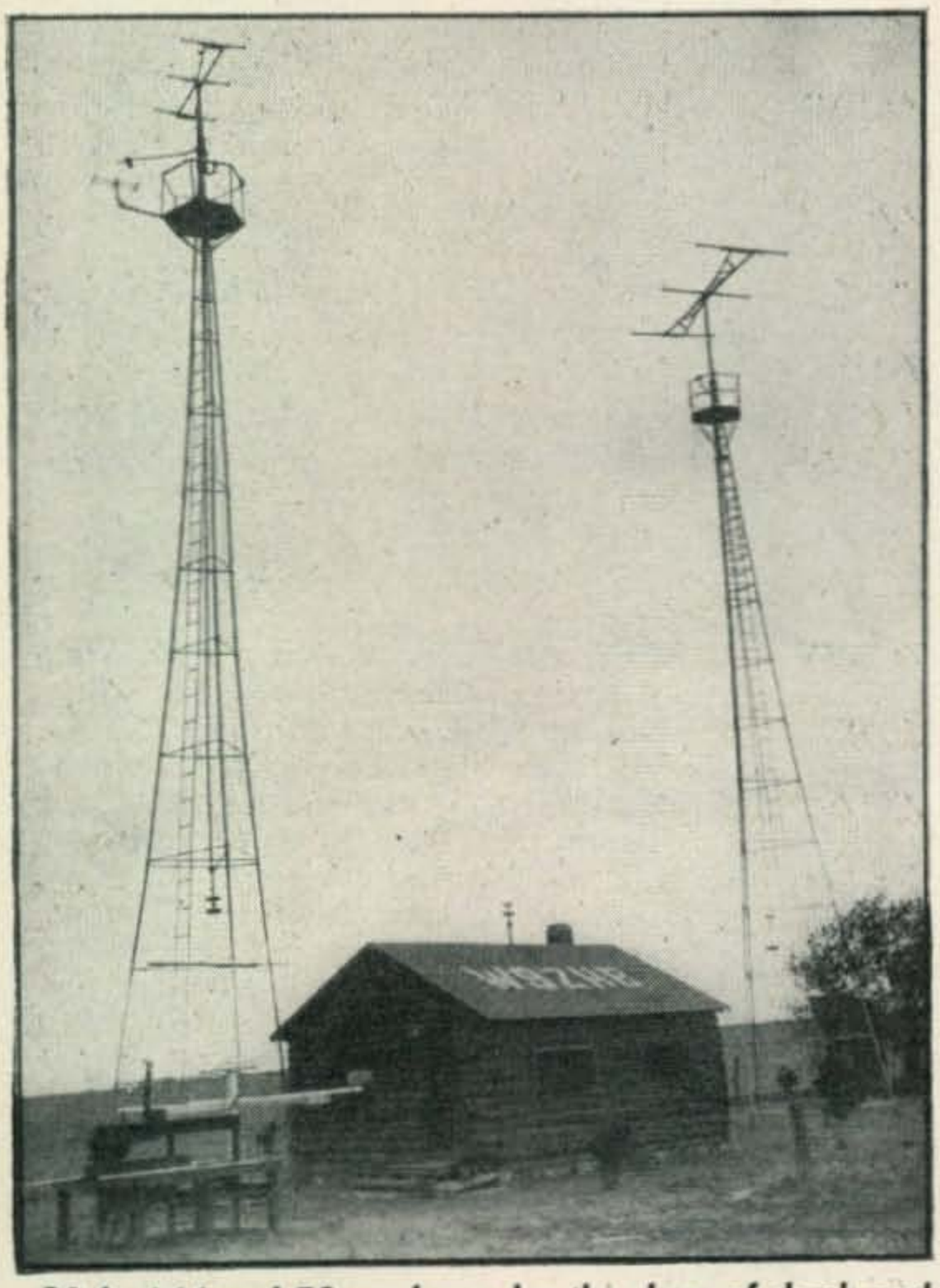
On the 5-meter band there were usually a few spotty openings during the month of April, but already the 6-meter band has produced some rather good ones. Activity is also much better than last year and fellows in the remote areas are going to town.

New states are represented by W5MLE, Los Alamos, New Mexico on 52 mc, W7SP and W7JPN both in the Salt Lake City, Utah area on 51.4 and 50.12 mc respectively, W7GBI, Stafford, Montana on 52.3 mc, W5ML, W5DXB and W5ZS are on in Louisiana while W5HTZ is now back on the band in Cromwell, Okla.

50-mc Predictions

Perry Ferrell, Propagation Editor of CQ, has been giving us weekly predictions of 50-mc openings, both *Es* and aurora. We have already passed them along to some of you, and hope to be able to continue this new service. Those of you who desire to be placed on the mailing list for these predictions drop us a card. There is a slight catch to it. As these predictions cover the entire world, it is of great importance that we get a report from you even if the band *isn't* open to your locality on the dates predicted. Your report can be of great help in determining the accuracy of such predictions and the area where openings do occur.

Perry's predictions so far have been very good, and those who received the notices were on the air and ready to take advantage of the openings. Perry predicted that between March 27th and 30th would be good for aurora skip, which did work out for the boys in the northern states. Other dates for *Es* were April 4th to 7th, April 13th and 15th, April 22nd, 26th, 27th, spotty openings from April 28th to May 2nd, May 6th and May 9th to 10th. Perry further says that a large number of very good openings will be concentrated in the period between May 10 to June 10. Openings will be sharp, but fairly long in duration, lasting four to six hours. Skip distances will be shorter than last year and signals will generally be much stronger. Frequent daytime openings will occur, particular emphasis is placed upon the week-ends of May 30-31 and June 7-8. A look at the 50-mc openings will show you how close previous predictions have turned out!



80-ft. 144 and 50-mc beam by the door of shack and 70-ft. 28-mc beam at the rear at W9ZHB, Zearing, Ill.

International V-H-F Notes

Via WØQIN we received the following from G5BY in South Devon, England. An aurora opening on March 8th and 15th occurred in England, the best contact being 233 miles. A *sporadic E* opening came on April 2nd from 1800 to 1915 GMT, when a BC harmonic on 57.7 mc came in S-9 from Algiers. Another opportunity for DX missed, as no one was on the band for this 1200 mile skip.

PAØUN was heard on 50 mc by ZS1AX, ZS1IP, and ZS1IT on March 26th. March 29th, ZS1IP worked PAØUN cross-band 50-28 mc. ZS1IP heard a navigational beacon harmonic on 59.4 mc (29.7 mc fundamental) on March 26th.

Hilton, G5BY, now has a new rhombic 8 wavelengths on each leg, beamed on Italy and is looking forward to *Es* this summer from Europe.

B. J. Kroger, XE1KE, has been spending considerable time on 50 mc calling and listening, and has yet to hear any stations except XE1GE. B. J. will be looking for the W5s this summer on *Es*, and adds that XE1A, OE, FE, LE and XE1GE are now on, or getting on.

On April 2nd at 2000 CST, XE1GE heard HCJB in Quito, Ecuador on 49.6 mc, but no one replied to his many CQs, another of the many opportunities missed because of inactivity.

W6ONP/KW6 Wake Island, has a kw to a stacked "V" beam on the states, with an S-36 as a converter into a Super-Pro, on 50 mc, and will be looking for DX very soon.

Gordon Coleman, VE3ANY, Lakeview, Ontario is now the v-h-f Editor of *XTAL* and is doing his bit towards plugging activity on 50 mc and higher. The VEs are now concerned about their Department of Transport, Radio Branch putting diathermy and dielectric heating units on the six-meter band instead of on 7-9 meters where they were. Naturally the QRM is bad and at present nothing can be done about it. Has anyone in the states noticed this new QRM as yet?

Gordon goes on to say the best ground-wave DX from the Toronto area is about 50 miles, unless the *Es* helps them out. About 50 stations are on in the

Toronto, Hamilton and Oshawa area with good stabilized rigs and superhet converters.

50-mc Openings

Here are the openings by dates, as reported by the gang.

March 23rd: WØKQO in Conde, S. Dak. worked WØQIN with good signals on aurora.

March 25th: WØQIN hooked WØYSJ, who was weak at 2245. WØDZM also reports this date open for aurora to Ill, S. Dak.

March 27th: WØKQO again got WØQIN with loud signals on aurora. WØDZM was in on some of it also. WØYSJ in Fargo, N. Dak worked WØNFM, WØBJV, WØCUS and heard WØSV, CHI, HXY, DWU and W9QUV.

March 28th: WØYSJ got WØDWU and WØDZM and WØKQO also report the band open for aurora, WØQIN was in on it too.

March 29th: WØDZM says aurora was in again, WØQIN worked into S. Dak. and WØYSJ got WØUSI, SV, DWU.

March 30th: W7QAP in Tucson found SS on 28 mc in the eve and at 2102 MST worked W5JLY in San Antonio, for the latters 1st 50-mc QSO. W5JLY had better results, working W7QAP, W6BOS, W6APG, W6WNN and heard W6ANN from 2159 to 2314.

April 4th: W5EVJ in El Paso, Texas heard a harmonic on 50.1 mc of IAEIT at 1500 MST, and a fast c-w sig on 60 mc. WØDZM in Anoka, Minn heard an FM BC station on 45.2 mc. He called CQ and heard one weak c-w station answer, but couldn't get his call. W8QYD in Dayton, Ohio worked W2RLV on this date via aurora. W7GBI in Stafford, Montana heard several weak sigs between 2030 and 2100 MST. W4EQR in Pensacola, Fla worked WØHAQ.

April 5th: WØBJV in Watertown, S. Dak., heard a W8 on 51 mc that faded out in a few mins. W8ZQE in Toledo heard W5s around 2030 EST, but no contacts were made. W1ATP in Holliston, Mass. said no skip was in that night but bending was very good, with W1HDQ getting W1DEO in Portland, Maine and other stations along the east coast S-9, up to 200 miles.

April 6th: W8TOB, Lorain, Ohio worked W5ML, DXB in La. and W5FSC in Texas around 1930 CST. VE3ANY reports the Toronto gang gone to church, but a few were on to join in on the fun. VE3AVW heard W5LM, DXB and others, VE3AVG worked W5WI and heard others. VE3AZV heard W5ML, W5DXB. VE3AND heard W5s and WØs. VE3AZT got W5DXB and heard other W5s and WØs. VE3DC worked W5DXB and heard WØs. W2AMJ hooked WØHAQ around 2200 EST and adds that W1EYM and W2BYW worked W5HTV around 1800 EST. W5AJG didn't hear any 50-mc sigs but says the MUF was up to 47.5 mc. W5HTZ in Cromwell, Okla made his first skip contacts this day when W8TDJ in W. Va. answered his CQ at 1625 CST, at 1505 Merlin got W1EYM and then W2BYW. All had strong sigs and nice QSOs were had. Merlin unfortunately had to leave during the height of the opening. WØHAQ in Davenport, Ia. found the band good to W4s, working W4EMM, EQR, HVD and W4-EQM around 1800. W2AMJ broke through at 2100. W4EQM in Langdale, Ala., got W9IOD, VZP, DWU, WØHAQ, HXY, SV and WØDZM from 1840 to 1945 EST. WØTQK, Parkville, Mo., got his first taste of skip when W4HVV, WMI, HVT, AVT came in around 1600 to 1800. At 2120 it opened to W1 for Art, when he hooked W1NNQ, CLS, HDQ. W8TDJ in Morgantown, W. Va. worked W5HTZ at 1725 EST the only signal on the band although he had a high noise level from SW and 15° north of west. W9ALU in Ill. heard W4EQR for a few minutes, at 1900 CST. WØYUQ joined the fun and QSOd W4HVV, WMI and W4HVT. WØDZM got W4EQM, HVD, EMM and W4EID. WØJHS had a quickie with W4EMM before having to leave. WØSV worked W4EQM and W4HVD. W9DWU was in on it and made contacts with W4EQM, W4HVD and W4EMM. WØHXY made it with W4EQM. WØIJK still listening from Leavenworth, Kans. heard W4HVV, WMI and W4HVT, using a 40-meter Zepp antenna.

April 13th: W4GJO had a spotty opening but worked W3HC in Del. and W8CMS, hearing VE3BFF and another VE3 from 1939 to 1952 EST. W9UNS in Marshall, Ind, worked WØGHW (we knew you would be back, Ben), WØJVE and WØYKF all in St. Louis and W8QYD, CYE also W9HSB, not mentioning if it were aurora or good bending.

April 14th: This opening appears to be only in the west with W6YBP in LA getting W7JPA, CAM and W7HEA in Wash. and VE7AEZ, BQ in Vancouver. Harold heard W7AWX, EUI, BQX, from 2154 to 2245 PST. W6FPV in Van Nuys had nice QSOs with W7CAM, AWX, HEA, EUI, VE7AHZ, VY and W7BQX during the same period. Poncho, W6WNN worked VE7AEX, AHZ, BQ, heard two W7s in Wash. and a commercial harmonic at 2000 PST from Hawaii on 50.25 mc. W7ERA near Portland, Ore. heard W6VXQ and W6FPV on his ARR-5 for a few minutes. W7ADW heard W6JUM and W6FPV around 2230 PST. W6QUK, in San Bernardino stuck with the band all day and finally got VE7BQ and W7BQX. His location in the center of Calif., is not so hot for skip.

April 15th: This was a hot opening for the Eager Beavers, first starting to W4 then shifting all over the Eastern part of the U. S. and Canada. WØTQK really put his kw into high gear and came out with 33 contacts in 14 states. He worked W4WMI, AVT, EQM, FJ, W3MWE, IAL, IUN, KFM, GUF, OMY, W2IZP, KZG, AMJ, GYV, HEL, W1CLS, AEP, LLL, VE3DC, ANY, LU, AZV, W8TDJ, ANN, NKJ, KQC, AZZ, W4KMA. WØDZM worked W4BYA, WMI, HVV, EQM and W4AVT around 2130, with sigs spotty. W4EQM down in Alabama found condx good and worked W8QQS, TIU, VIB, NZ, W9LMX, WØSV, TQK, DZM, QIN and WØURQ, hearing W8AJM, WØZJB and WØUSI, all this from 1935-2200 EST. W4HVD also worked the same stations. WØIJK still an SWL heard from 1900-2129 CST, W4WMI, HVV, FJ, CYW, W8KQC, W2RLV, VE3BFF, WØTQK and WØZJB. VE3DC got WØTQK, VE3LU and VE3AZV also worked WØTQK. VE3ANY had better luck and hooked WØZJB, ICV, YUQ and WØTQK, and heard W1HDQ for a brief minute. W1HDQ gathered some new states with W5DXB, WØJVE, GHW, YUQ and ZJB. At 1940 MST W7QAP heard a W5 on 51.4 mc on phone where c.w. would have made him audible. WØYUQ wound up with W4HVV, WMI, CYW, FJ, W2IAL, RLV, W3KFM, GUF, MWE, RUE, W2AMJ, W1HDQ, W8ANN, TDJ, KQC. W5LCZ a new station in Benton, Ark., worked W3RUE, W8SFG, W2RLV and heard W1, 2, 3, 8, and VE3, with all sigs weak but readable. W2RLV in W. N. Y. had his first skip opening working, W5ML, W5DXB, W5LCZ, WØ-YUQ, TKQ, ZJB, TKS, TQK. WØKQO in S. Dak., worked W4HVV and heard other W4s rather weak. WØDZM found sigs weak but got W4BYA, WMI, HVV, EQM, AVT.

April 16th: WØDZM mentions this as the nite he worked state 25 when W7SP, near Salt Lake, Utah came in for a QSO.

April 17th: This is another good opening and saw more new states added to the band. W4GJO heardW9ZHL andWØNFM but the sigs were weak and fading fast. W5WX in Amarillo got a chance to try his new VHF-152 and beam by working W9PK, HGE, IOD, ZHB, LMX, ZHL, DWU, JMS, MBL, FKI, HSB, WØIIC, KYF, DZM, BJV, JHS, IFB, QIN,

50-MC DX HONOR ROLL

Calls	States	Districts	Other
W1LLL	30	10	
WØZJB	29	10	VE3-4
W9ZHB	28	10	VE3
W1HDQ	28	10	G5-6*
WØYUQ	28	10	VE3
W9PK	27	9	
WØDZM	25	10	VE3
W1PFJ	25	9	
W2AMJ	24	9	
WØBJV	22	10	
W4GJO	21	9	VE3-OA4
W8QYD	21	9	VE4
W9DWU	21	9	
WØTQK	20	8	VE3
W2RLV	20	8	
WØSV	19	9	
WØQIN	17	8	
W2IDZ	17	7	
W3RUE	16	9	
W4HVV	16	9	
W8SLU	14	10	
W5FRD	14	9	
WØJCQ	13	10	
W6NAW	13	8	
W4WMI	13	5	
W6ANN	12	7	VE7
W9AB	11	5	
W8NKJ	9	7	
W9ALU	7	6	
W5WX	7	5	
W6QUK	6	4	VE7
W7ERA	5	3	
WØPKD	4	3	
W8TOB	4	2	
W5JLY	3	3	
W7JPA	3	2	
W6WNN	3	2	VE7
WØYSJ	3	2	
W6YBP	2	2	VE7
W7BOC	2	2	
W7CTY	1	1	

**Cross-band.*

W8KQC, CYE, DAL, BFB, VIB, QYD, for a total of 9 states in one opening, between 2055-0030 CST. W7ERA in Oregon reached out east for WØDNW in Nebr., W7JPN, SP, both in Utah heard W5WX and a WØVIC or BIC on FM in Colo. W5LOW says the opening was so late only one station heard anything and that was W5BOY who heard WØDZM and WØQIN in QSO with W5WX around 2330 CST. W7QAP in Arizona says that c.w. would have been better as QSB was bad on W7HEA, CTY, AWX, DYD, EUI and heard VE7AEZ, BQ, W7BQX, CAM, JPA. W7UPF in Tucson worked W7DYD and heard the same stations that Bud did, all around 2100-2145 MST. W2RLV found the band open for aurora and worked W2BYM, W1CLS and heard W5FRD in Ft. Worth, while the west was enjoying some *Es* skip, around 2100 EST. W5HLD in Okla. was testing a new NC-173 and heard WØZJB at 300 mi and other sta but weaker (tks pal). The Ark. lad, W5LCZ between 2130-2315 CST added a new state to the lists of WØ-BJV, TI, DNW, W8NZ. The WØs were S-9 with weak W8s. W6FPV says sigs were in and out but worked, W7JPA, FLQ, CTY, HEA, BOC, DYD, CAM, EUI, BQX and VE7VY. W6WNN heard W7FLQ and W7IQ? both in Idaho at 1900 PST, then W5FRD broke in S-9 for over an hour. Poncho hooked him at 2040 PST, then the W7s came in and he worked W7CTY, CAM, BQX, DYD, DNM, HEA, JPA, AWX. W7GBI in Montana didn't have his rig on but heard W6SAE, ANN, PBV, GGM and a VE7, between 2110-2130 MST, Bud says the rig will be on but quick now. At 2242 the band opened again for W6IWX, EUL, FPV, OVK, IWS to 2245 MST. W5HF, in Amarillo, Texas went to town with W5WX and worked W8QKC, VIB, QYD, W9ZHB, IOD, ALU, PD, DWU, QUV, ZHL, JMS, FKI, IKI, MBL, HSB, WØJHS, DZM, DYG(Nebr.), KYF, IFB for a total of 23 contacts in 9 states.

April 18th: WØKQO worked W7BQX and heard W7DNN and W7DYD, he also heard another signal calling him but QRJ . W5HF stayed up in the wee hours and got WØQIN, W7HEA (a nice one there) from 0024-0031 CST. All this a hangover from the big opening on the 17th. Down in Florida at W4GJO, Grid heard, W9ZHL and WØNFM from 2309-2330 EST, sigs in and out.

50-mc Gang

As mentioned before, April has shown a station increase in states where there were none last year, so let's find out more about them.

W5LCZ in Benton, Ark., now has an 807 dblr with 50 watts into a folded dipole and VHF-152 ahead of a SX-25. Paul has the v-h-f bug and will be quite active this year. He also mentions that he hears fellows testing or just fooling around, 'tis maddening he says. Paul has heard harmonics of South American commercial c-w stations between 1100-1230 CST for the past week.

In Idaho, W7ACD has a bad power leak that he says is keeping him from being active on the band. He has heard some signals but the noise just covers them up. Louie has W7EHP in Rigby, Idaho for a companion, but stills wants some DX. Louie had 6 districts and 14 states on 5 meters, so there is hope.

W1HDQ says those needing Maine watch for W1DEO on 50650 kc and W1EIO on 51.2 mc. Ed also adds that he got W3CGV in Del., 225 mi., on bending, after missing him on aurora.

In western Nebraska at North Platte, WØDNW is another welcome addition on 50 mc. Bill is starting tests with WØYKX.

Here is more good news from W4KMK in Greenville, S. C., where 50-mc activity has lagged. Mack has 150 watts and a 4-element beam, with a VHF-152 into an SX28A.

Down in Brownsville, Texas, the Rio Grande International Radio Club is sponsoring a v-h-f/u-h-f contest from April 1, to May 15, 1947, on 50 mc and higher. This has perked up activity and W5LSO is on 51.2 mc, W5EVL on 51.4 mc, W5CX on 50.9 mc and W5JHW on 52.5 mc. Let's help keep these lads interested after the contest is over.

In Los Alamos, New Mexico we find W5MLE with 100 watts to a pair of HK-54s on 52 mc feeding a folded dipole which is tacked on the wall. The receiver is a 3-tube converter ahead of a Super-Pro.

Working mobile is W5EHM's latest fad, and the picture of his rig on the cover of March *CQ* shows he has a nice set up. Pat is hoping to do some traveling in the southwest this summer to help some of the fellows get some new states.

W9QCY in Ft. Wayne sends us his log showing how an S-9 power leak has him blotted out. Well Glenn guess you will have to get the local Power Company out to help you.

Bill Copeland, WØYKX in Woodbine, Ia., has a new 4-element beam going up, with mercury slip rings. Bill worked WØCHI in Grand Junction to start off his ground wave and has added WØTQK and WØZJB at 200 miles.

In Lorain, Ohio, W8TOB is now rolling on 6-meters and working to W8JLQ, SUL at 75 miles, W8CEQ, KNF, KQC, SLU are others he QSOs.

Clair Could, W4JSU in Jacksonville, Fla., had settled on his converter and was ready to get going when he fell and broke his foot. Clair still will join the fun though.

John Powers, W2QKE, ex-W3AXU in Trenton, N. J. is busy getting back on 50 mc now and hopes to see the old gang.

Arnold Smith, WØKQO in Conde, S. Dak., with his gas driven 110v a-c power plant, is now working out to WØCJS, BJV, USI, about 100 miles, since putting an 829 in the final. He is fortunate to be in the country and can see the northern lights very bright when they are on display. This helps on aurora.

W1CGY is now on NBFM around 52.5 mc and wants to have contacts with the gang if they will tune that high in frequency. Clark has moved and is now in Enfield, Conn.

In Minneapolis, WØQIN is working on a 500 watt final with VT-127s. The bolts holding the coil leads get kinda red with heat, so he is now making a new final condenser.

From Dayton, Ohio W8QYD, reports that W8CYE worked into Terre Haute, Ind., running 40 watts to an 815 into a folded-dipole 25′ high. Harold adds that W8NSS and W8DAL will soon be on in the Dayton area.

Bud Keller, W7QAP in Tucson has been doing a lot of listening on the in-between spectrum of 30-50 mc and has noticed the 45-mc region has opened daily about 1000 MST. It quickly surges to 46-7 mc, and then vacillates back and forth until sigs seem to hit a peak between 1400-1500 MST. Very soon after this peak, the 28-mc band seems to konk out. Well Bud, this is the time that there is a seasonal change and may or may not be giving you

V.H.F.—U.H.F. RECORDS

Call	Distance Miles	Date
50 MC		
J9AAK-KH6DD, W7ACS/KH6	4700	1/25/47
144 MC		
W3HWN-W1MNF	410	11/19/46
235 MC		
W6OVK-W9OAW/6	186	
420 MC		
W6FZA/6-W6UID/6	170	9/28/46

No other record reports received for other bands.

this effect. There have been reports that the boys in Louisiana have heard Peru on 50 mc and XE1GE heard HCJB in Ecuador on April 2nd. Perhaps a final thrust of the MUF before giving in to the *Es* layer.

Jim Brannin, W6OVK, near San Francisco says he has little time for "hamming" these days but says the Bay area is well represented by W6NJJ, EUL, WKL ex-W7IFL, and W6NNS who are looking for any signs of DX. W6QT and W6BPT are expected any day now also.

W9UNS in Marshall, Indiana reports that there are 9 stations now active in the Terre Haute area, with W9ZHL, ANH, ET, IKI, JPB, LVH, CZD, JMS all having nightly round-tables and looking for ground-wave or DX signals.

W9ALU says he has an ex-Army buddie, W4EQP, in W. Columbia, S. C. now interested in 50 mc and that he should be on very soon. Hod is a believer in low power and good beams, with which he expects to work some nice DX this summer.

Out California way, W6ANN is now back on with a new 4-element beam and VHF-152. Bill notices that when sigs from W6WNN at 110 miles start to fade skip usually comes in. We have noticed the same thing here in the Beaver net on WØYUQ.

W8RKW, in Grand Rapids, Michigan has been working out on bending and shows a log that would make the east coast lads take notice. Vic has worked W8CVQ, AKR, NZ, BTL, AJM, VIB, W9IOD and W9LMX most every night he was on during the month of March.

Frank Lester, W2AMJ says that his skeds with W2GYV are still holding up nicely, but that the television BCI is starting to get in the boys hair back east. So far indications are that the 28-mc harmonics are having more effect than the 50-mc ones, although if one of the TV receivers is near enough the beam a "blackout" effect usually results due to the strong field. Frank is still getting heard reports from Maine and New Hampshire, but the prize one was when W4FJ called him on the land line from Richmond to tell him that his sigs were getting in there via aurora. Naturally Frank got W4FJ, so he is sporting a new state now, making it 24, to date.

W5HTZ is now living in Muskogee, so his operating is confined to week-ends when he gets back to Cromwell. Merlin has a DM-36, and 3-element .2 wave spaced beam and already gave some of the boys a new state.

W4QN, in Orlando has a new 3-element beam going up and a new final with VT-127A, and has revamped his converter so we may expect to hear from him very soon.

A card from WØJCQ, who is now in Japan, says he can't wait to fire up his rig and see how things sound in J2. Bill visited W6WPQ in Oakland before leaving and says that W6WPQ has a sweet location for six. Well what are you awaiting for, WPQ?

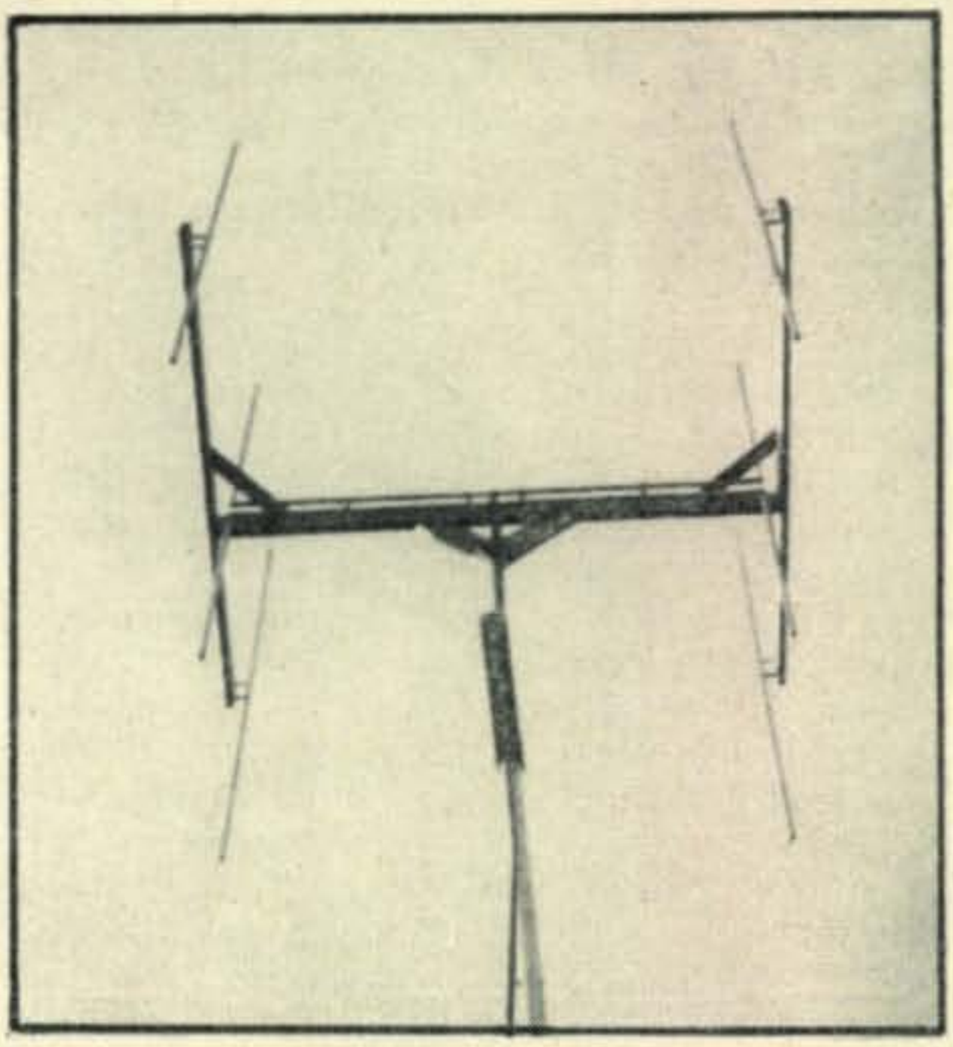
W7UPF in Tucson is now on 52.5 mc with an 829-B final and a folded dipole antenna, with a 3-tube converter, keeping W7QAP company till DX commences.

In Toledo, W8JLQ says that ground wave activity has picked up and that he has worked 19 stations in the past week, showing that more and more of the gang are tired of battling QRN and QRM on the lower frequencies.

W5EVJ, in El Paso had a deal worked up on his super-regen receiver using the rectified hiss voltage to bias a squelch tube. This rings a bell when a signal kills the hiss, but the system is a failure because what sounds like a diathermy harmonic comes on and the bell rings. The XYL at W5EVJ is a very impatient woman and shuts the thing off, after making 40 useless trips to the front door, and forgets to turn it back on again. Well it's a start towards 24 hour monitoring, Otto.

W5JLY in San Antonio, says that the gang there includes W5LBG, LIV, GTZ, BUV, and that he has 50 watts to a 3-element beam on 51.45 mc, with a VHF-152 converter.

A station for you to watch is WØTQK, in Parkville, Mo. just across yon pasture from Gashland. Art has a full kw to a 4-element .2 wave spaced beam up 34 feet. The converter is home built and with



144-mc 6-element beam at VE3ANY

only 4 openings for skip DX he has 20 states in 8 districts, and VE3. Art is another of the thrill-seekers from the lower frequencies, after getting 96 countries since our being back on the air.

W4EQR, in Pensacola now has 200 watts, feeding a 3-element beam and a new VHF-152 converter. Harvey says that W4CNK has 50 watts to an 807 and is always on the band.

144-mc Gang

Although reports for 2 meters are down, we hope they will pick up now that summer is here and the bending becomes pronounced.

Some bending is now in effect as WØDDX and WØYUQ are making the haul from Kansas City to Manhattan, 125 miles, several times a week. What without benefit of a body of water to help on the bending, the haul is made rather by brute force and some nights it is just like skip on 160. The topography between the two stations is not flat, which shows that even here in the midwest some good 2-meter DX can be worked. The boys have found that when 6 meters is good for bending that 2 meters is also. Never have they contacted on 144 when it couldn't be done on 50 mc also.

Herb Johnson, W3QKI, in Erie, Pa. sends us one of W8UKSs fb reports although we haven't heard from W8UKS for sometime now.

W3QKI is on 145 mc AM and c.w. with a 24 mc xtal, 6AG7 tri-tet, 815 tripler, 829B final, 140 watts input. The antenna is a single section square

[*Continued on page 69*]

The YL's Frequency

by Amelia Black, W1NVP - W2OLB

STILL "WORKING DX IN PERSON," Old Lady Black comes up this month with W6RYJ, Pearl Stout, of Sacramento, Calif. Pearl's been licensed since 1939 and tells a humorous story of how she got interested.

Seems the OM, W6OJX, was, as usual, trying to interest Pearl in the hobby, but she jest natcherlly rebelled. Thought he was wasting a lot of time and money on a senseless hobby. Besides, once he got his nose into a receiver or a transmitter, she says, he was oblivious to all else. Pearl kept getting annoyed at this, and the OM kept getting annoyed at Pearl's lack of interest.

One day, however, she broke down and called a CQ. Pearl was amazed to get an answer and further surprised to find she enjoyed the QSO. The OM says that was the day he became a "radio widower."

"It's like eating olives," Pearl believes. "You have to acquire a taste for it, and I sure did."

Soon Pearl, with her own operator's license, was monopolizing the rig to the extent that she was known as "the voice of OJX."

The OM was then working a swing shift, and Pearl couldn't get at the rig till midnight. Before long she had to have her own rig, blossomed out with her own call of W6RYJ, and became a confirmed 80-meter ragchewer.

Pearl Stout, W6RYJ

She likes to stick on one frequency, get to know the gang around "her spot", and indulge in long ragchews. Some traffic handling, too. Pearl likes to work people she knows, or hopes to meet; therefore doesn't bother chasing DX much. Rig is 6L6 oscillator, and 6L6 final.

Pearl's rig is temporarily on the blink, but she says that's a chronic condition. The OM does the repairing, who complains that Pearl just "wears out rigs for him to fix." It takes, he says, "three rigs to keep her going—the one in use, the one in the shop, and a stand-by to go on the air with." Pearl's nickname, by the way, is "Aunt Min."

Interest is growing in the YLRL "YL-WAS" contest. Even the menfolks are vying. W2QHH has now QSOd YLs in 46 states, and is trying his darndest to get Wilma, QJH, to get back on from Nevada so he'll be able to have his last state. Seems there are no YLs in West Virginia.

New position for Kitty, 2FKA, is that of publicity chairman for the Northern New Jersey Radio Assn., a lively club of 80 or more hams.

Mildred Wildman, W8PZA, is another of those gals who first became interested in radio when she became interested in a ham. She and Rol, W8PWY, then lived in Eugene, Ore., and all his friends were hams.

"It wasn't long," says Milly, "before I had to find out what those noises were they were always listening to. So I borrowed an oscillator and a Handbook and got myself a license, W7FKS.

"Shortly afterwards Raleigh (then W7UJ) left for Cleveland. We held nightly skeds with the help of the AARS gang in Oregon, who cleared the net frequency on 80 meters. We both were AARS members.

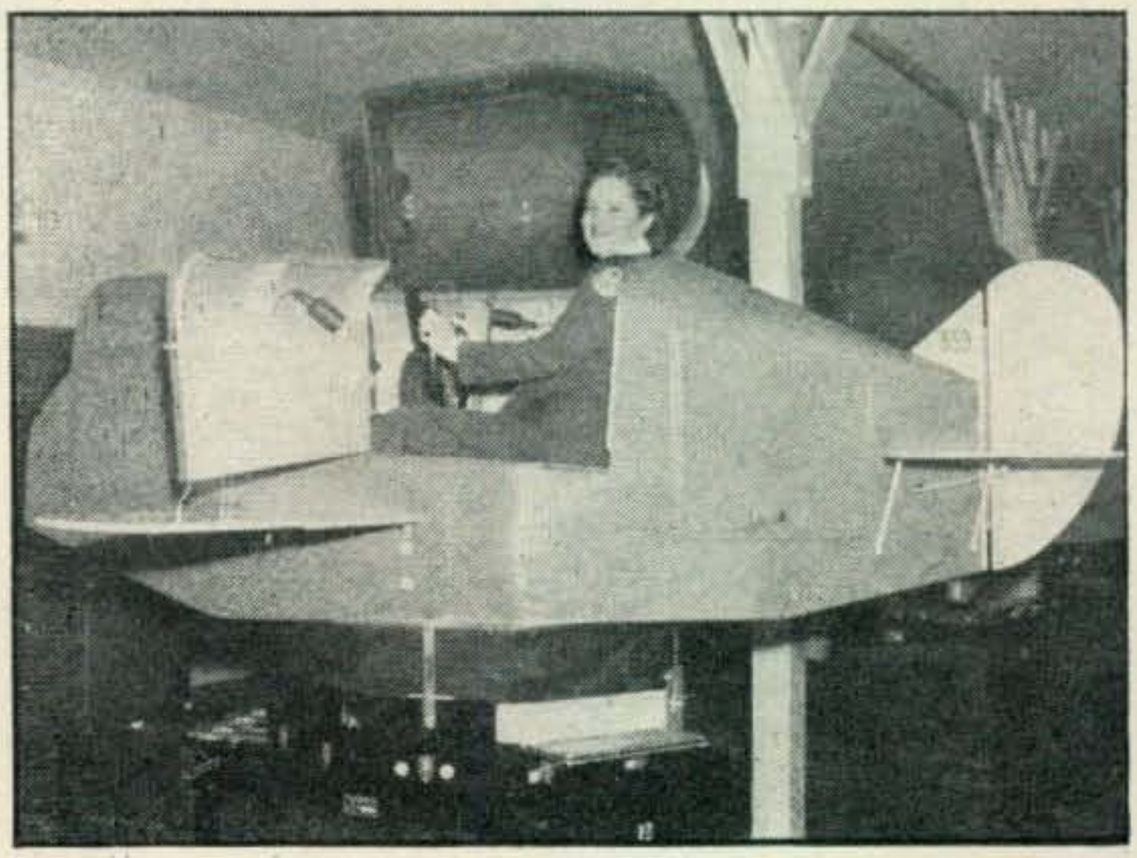
"Early in 1936 I came to Cleveland, where we were married. Our calls were changed to W8PZA, and W8PWY. My activity has been mainly traffic handling with AARS, and some YLRL operating. I was district chairman at one time, and a Cleveland club member. When war came I went to work calibrating electronic test equipment, and later, at the same plant, my OM built u-h-f equipment. I took part in WERS all during the war, and Cleveland had an outstanding bunch.

"Since the war I joined the Buckeye Net, a traffic net, while waiting for AARS to start again. Now I don't have much time for operating, outside of drill time, because of our six-year-old youngster, whom we adopted a couple of years ago.

"Rol's operating time, is almost all DX. He is part owner of Assembly Products, Inc., in Chagrin Falls, Ohio. They make those beautiful plastic front meters that have lights running around the edges.

"We belong to the Cuyahoga Radio Assn. I was secretary for a couple of years, and participated in field days. Received an award for the 1937 Ohio

[*Continued on page 66*]



Jerry Stock, W4HWS, YL of the month.

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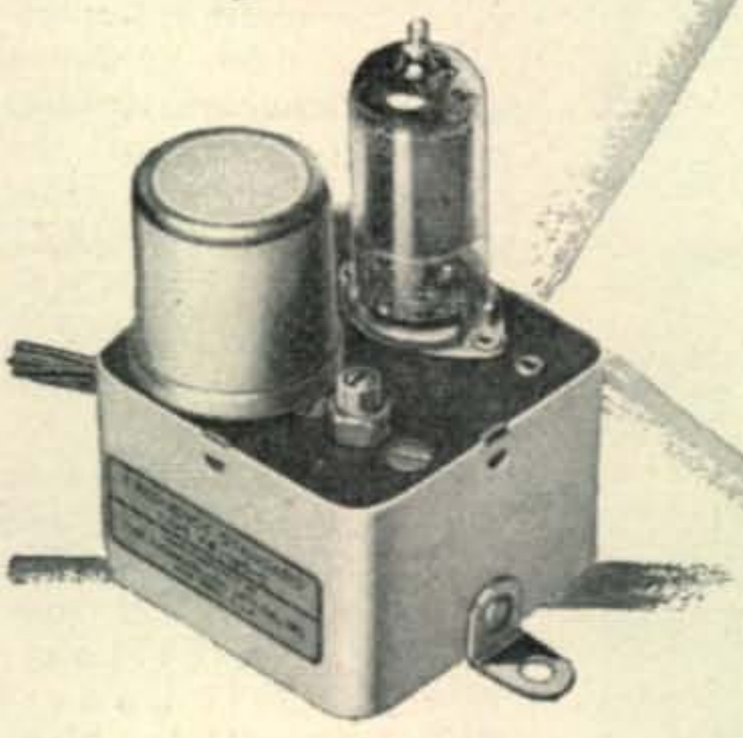

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· Postscripts and Announcements ·

11-Meter Band Shifted

The 11-meter amateur band has been shifted 25 kc lower in frequency. New limits of the band are from 27,160 to 27,430 kc replacing the old band of 27,185 to 27,455 kc.

Northern New Jersey Radio Association

The Northern New Jersey Radio Association is planning a field day for club members on June 7th. Refreshments will be served and prizes drawn. Details may be obtained from Kitty LePine, W2FKA, 80 Surrey Lane, River Edge, N. J. Regular club meetings are held twice monthly, the 2nd and 4th Mondays, at the Hackensack YMCA, Hackensack, N. J. All licensed amateurs and their friends are welcome.

Iowa 75-Meter Net

The Iowa 75-meter net was organized in 1940 by W9LKL, then of Cedar Falls, and functioned until the outbreak of war. It was reactivated by Bill Davis, WØPP, when 75-meters was made available, for the purpose of relaying messages from servicemen overseas to their parents, and for communications in time of disaster or emergency. Net operating frequency is 3970 kc.

Just such an emergency presented itself recently when rain, sleet and snow, accompanied by 60-mile winds and dropping temperatures, descended on Iowa from the northeast. By nightfall southeastern Iowa was cut off from the outside world. For 59 continuous hours the amateurs of southeastern Iowa stayed on the Iowa 75-meter net.

The emergency network key stations included the Centerville station, WØKZI, Ottumwa, relieved by WØCFB; WØNYU and WØCVM in Burlington; WØUOP, Des Moines control station, assisted by WØOCG and WØREN; WØWML, Newton, assisted by WØNNM; WØTWX in Iowa City; and WØFPO, WØCVU and WØBPG, all in Cedar Rapids. WØTNI operated WØNMA, while WØNMA supplied two portables and kept them serviced. WØEQZ operated one portable in Mt. Ayre and WØVNM operates the other in Leon. In Creston, a portable furnished by WØCPU was operated by WØDMX.

With wires broken the Associated Press turned to the Iowa 75-meter net to transmit releases to newspapers in the area. An AP man in Des Moines read releases into the mike in the key station in Des Moines and newspaper men throughout southeastern Iowa sat in receiving stations typing news as it came through, for publication in their papers which were otherwise cut off from the world.

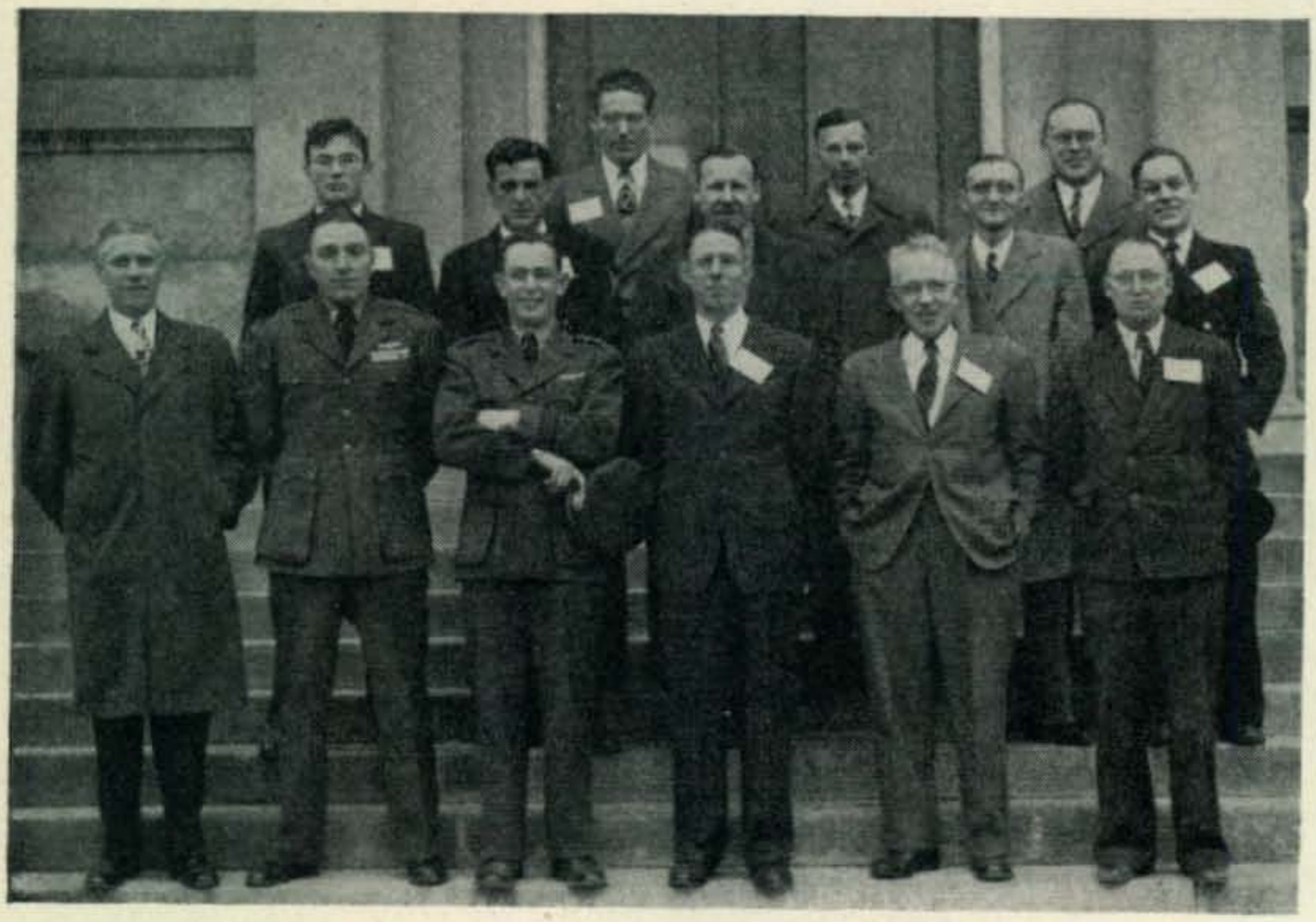
News of a death in the area was transmitted to hams who relayed it to relatives in four directions, and reported back within an hour of the original transmission. As a result, relatives in Missouri, western Nebraska, Texas and Illinois were contacted immediately although all commercial communications were cut off.

Amateur Code Lessons

The Heart of America Radio Club of Greater Kansas City is sponsoring lessons in the continental code for those desiring to obtain their FCC license. The lessons are given nightly from 7 p. m. to 8 p. m. in the 11-meter band, on a frequency of 27,370 kc. The stations participating are WØBCD, WØUID, and WØUBR. The code lessons will start at two words per minute and gradually increase to fifteen words a minute. Those joining these code lessons are requested to advise the Club by writing to P. O. Box 5940, Kansas City, Mo.

Key Clicks

April *Letters* contains a letter appearing under the heading "Illegal Operation." The letter arrived unsigned and was erroneously credited to WØCVU, who was not the author. Our apologies to WØCVU.



Hams active in the Southeastern Iowa storm emergency gathered at Centerville Feb. 16th as guests of Iowa Southern Utilities in appreciation of the Hams' services. Front row, l. to r.: WØKZI, Lester Cook; WØQLP, H. P. Crowder; W6MZY, J. N. Fitzgerald; WØCPH, Kenneth M. Wells; WØARH, Bob M. Simmons, and WØDMX, Ralph Stufflebeem. Second row: WØTNI, Jim Elliott; WØQC, Bill Lauer; WØVMN, Dale Newman; WØAYC, Lee Driggs, and WØYCK, Ralph E. Blad. Third row: WØEQZ, Bob Hathaway; WØWML, Walter Keith, and WØNMA, Stewart Wight.

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SCR-522 VHF Transmitter-Receiver

17 tube, 4 channel fixed frequency transmitter and receiver, both crystal controlled. All operations push-button controlled. Freq. range 100-156 MC. Transmitter 15 watts AM voice output. 28 volt DC dynamotor with input and output filters and carbon pile voltage regulator. The control and jack boxes are small and can be mounted conveniently. Complete with all tubes, dynamotor, control and jack boxes, and necessary connectors. X5B9550—Your Cost..... **$38.50**

SCR-274-N Aircraft Command Set

29 tubes, 3 receivers, 2 transmitters, RF current indicator and antenna relay, 4 dynamotors, and 25 watt modulator. Separate remote control box for each receiver and transmitter. For CW, MCW, or Phone. Receiver freq. ranges: 190-550 KC, 3-6 MC, and 6-9.1 MC. Transmitter freq. ranges: 3-4 MC and 4-5.3 MC, 50 watts output. Complete with tubes, and connectors, but less wire and flexible shafts Net wt. 77 lbs. 24-28 volt DC operation. X5B9557—Special..... **$33.95**

BC-348 Communications Receiver

6 bands—200-500 KC, and 1.5-18 MC in 5 bands. High sensitivity, 2 stages RF, crystal IF filter, beat frequency oscillator, high-ratio non-backlash greared dial, and output for phones or 500 ohm speaker. Has combined audio and sensitivity control, variable frequency BFO control, IF crystal off-on control, and BFO off-on switch. Built-in 24 volt DC input dynamotor power supply. Complete with tubes and instructions for converting to 110 VAC 60 cyc. operation. Size: 18" x 8⅜" x 10½". XC21005—Your Cost..... **$49.50**

Air Force Transmitter Set BC-375-E

Designed as aircraft liaison transmitter, and famous for its dependable operation and rugged construction. Frequency range: 200-500 KC, and 1500-12500 KC. Transmitter output 30 to 75 watts. Complete with built-in and external antenna tuning units, 7 plug-in tuning units, 24/28 volt DC input dynamotor, and all necessary connectors. 6 wall mounting metal cases for tuning units included. Other tuning unit in transmitter. Wires and cables not furnished Shpg wt. 400 lbs. Order must be accompanied by 50% deposit. Shipped by freight only. X5B9556—Your Cost..... **$34.95**

National NC-173 Receiver

Specifically designed to meet both Amateur and Commercial requirements. 13 tube superhet. 540 KC to 31 MC plus 48 to 56 MC. Separate AVC amplifier, new wide range filter with adjustable band width. Noise limiter for use on both CW and phone. Head phone and pick-up jacks on front panel. Audio tone control, 3.5 watts output at 8 or 500 ohms for speaker operation. XC21254 Your Cost..... **$179.50**

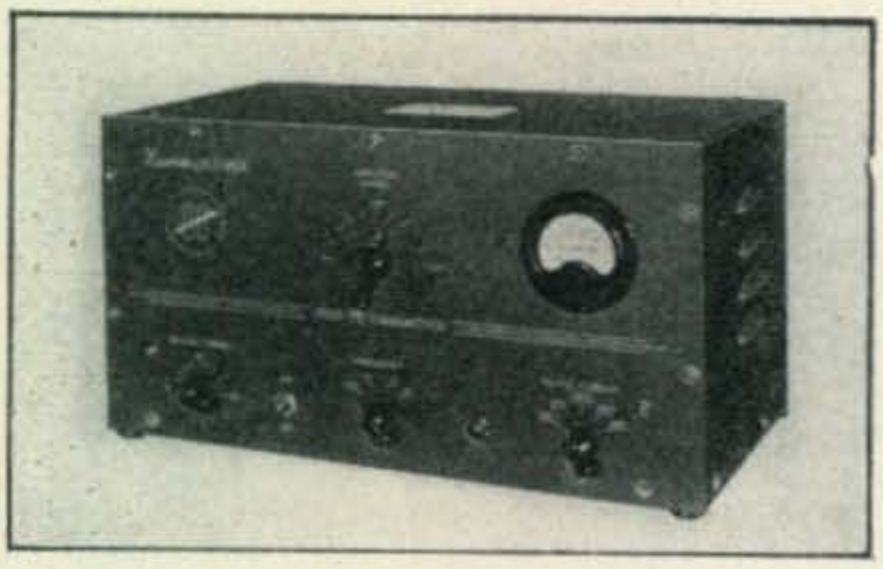
parts & products

Mono-Sequence Tuning Transmitter

The Hammarlund Manufacturing Company has placed on the market its new Four-20 Transmitter and companion unit, the Four-11 Modulator.

The new transmitter features Mono-Sequence tuning, which makes possible for the first time the tuning of four different, but harmonically related frequencies, with a single control, and without loss of efficiency.

When combined with its companion unit, the Four-11 Modulator, the Four-20 Transmitter provides a complete, highly efficient and easy to operate phone rig ready to go on any band. These features will appeal especially to the beginner. The Four-20 will make an excellent exciter that can be used in driving almost any amateur high power final. The Four-11 is also suited for use as a speech amplifier.



The Four-20 Transmitter has a 7C5 crystal oscillator, three 7C5 multipliers, and an 807 final amplifier. Power output is 20 watts. Tuning of the oscillator stage and three multiplier stages is accomplished by a single control. The meter switching arrangement provides visual indication of the performance of each stage of the transmitter. The unit includes a built-in keying relay and key click filter.

The companion unit, the Four-11 Modulator, incorporates PP 7C5s in its final stage, and has sufficient power to modulate the Four-20 Transmitter.

The revolutionary feature of the new transmitter is, of course, its ability to tune different frequencies by means of a single control. Previous attempts to accomplish this have sacrificed efficiency, but this system combines high efficiency with easy control.

Cathode Ray Oscilloscope

A new cathode ray oscilloscope featuring portability, low cost and practical design for general service applications has been announced by the Radio Tube Division, Sylvania Electric Products, Inc., 500 Fifth Avenue, New York 18, N. Y.

The new oscilloscope, weighing only 18 pounds, is mounted in a steel gray crackle finished cabinet measuring 10¾" high, 8⅛" wide and 13¾" deep. Signal frequency range from 15 to 40,000 cycles is provided with a five range selection control and a fine frequency control which permits close adjustment to any desired frequency. Visual study of wave form is provided by a 3" cathode ray tube designed for 650 volt deflection plate operation.

Sweep circuit of Sylvania type 131 oscilloscope is built around a type 884 gas triode oscillator. Tube complement includes 3AP1 cathode ray tube; 5Y3GT/G rectifier; 7Y4 rectifier; two 707 amplifiers; and the 884 gas triode oscillator. The oscilloscope is rated at 105/125 volt; 50-60 cycle; 40 watt input.

Narrow Band FM Exciter-Modulator

The Electronics Research Associates, San Francisco, are producing an NBFM exciter-modulator unit using reactance modulation.

The unit includes the careful design of transformers and balancing of circuits to give absolutely equal side-bands; factory calibration of the v.f.o. which is variable from 7 to 8 mc; an output of 2 watts, conservatively rated; link coupling for ease of output connection; temperature correction and accurate voltage regulation; a self-contained power supply; and a speech band width of 180-3600 cycles.

The modulator-exciter comes in a black-crackle finished case with a grey front panel with the power supply self-contained. Controls include a frequency control, gain control, transmit-standby switch, a high impedance microphone input, and the pilot lamp, which is actually the semi-front-mounted voltage regulator tube. The frequency control dial is large for easy reading, and is calibrated from 1 to 50 in 10ths; and a chart of factory calibrated frequency equivalents is included.

Twin-Lead a Natural for Amateur Antenna Systems

Amphenol Twin-Lead is one of those natural combinations of design and material which, together, produce maximum utility for the amateur. Originally designed to give television and FM a low cost, high-efficiency transmission line, Amphenol Twin-Lead was destined for a much wider and more interesting field of application in the antenna systems of amateur operators. Today, it is doubtful if there is an operating amateur in the world who has not heard of Amphenol Twin-Lead. In the United States, tens of thousands have purchased Twin-Lead from their distributors. With it they have designed and built efficient antenna systems with a convenience unknown before the war.

Twin-Lead Used for Folded Dipoles

Perhaps the greatest footage of Amphenol Twin-Lead in amateur station installations has gone into folded dipoles constructed thruout from Amphenol 14–056, 300 ohm Twin-Lead. Tests by amateurs, and by Amphenol, show that the folded dipole length at customary heights

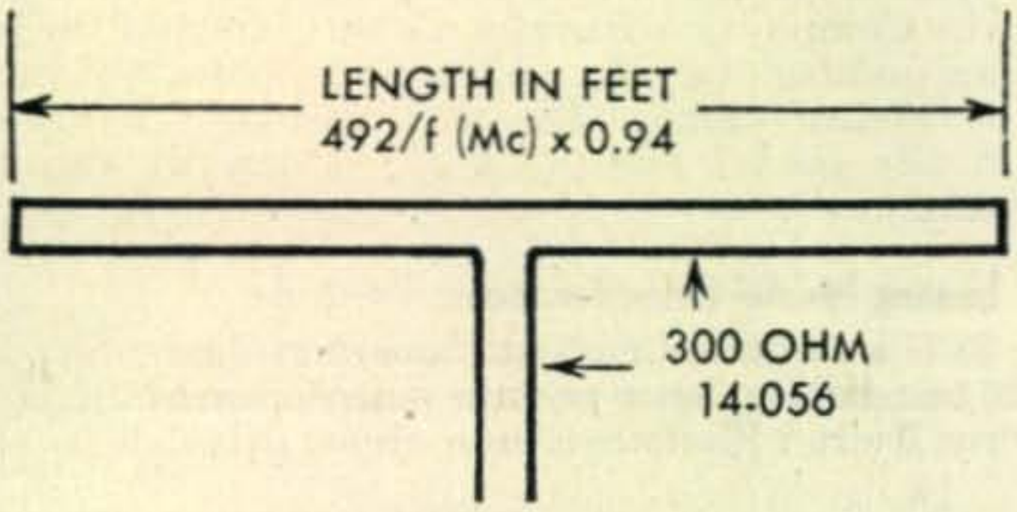


Figure 1

above ground, should be very close to that for a simple dipole, that is, as indicated in Figure I. To avoid breakage in windy weather, the ends of the folded dipole must be clamped within either plastic or metal plates which grip the polyethylene dielectric as well as the two conductors. The feeder may be molded to the folded dipole quite easily with a few scraps of polyethylene salvaged from left-over pieces of Twin-Lead. An ordinary electric flat iron may be used to supply both heat and pressure, and sticking of the polyethylene to the iron may be avoided by working with a piece of cellophane between the iron and the polyethylene being worked into the molded joint.

Figure II shows the efficient and widely used 8JK antenna made thruout from Amphenol Twin-Lead. Here, the impedance of each folded dipole is assumed (not measured) to be down to about 150 ohms because the two folded dipoles are only ⅛ wavelength apart. Consequently the feed to each folded dipole is made with Amphenol 14–079, 150 ohm Twin-Lead in equal lengths of any convenient value greater than ¼ wavelength. In the antenna of Figure II, the 150 ohm feeders to the folded dipoles do not act as matching transformers. They are paralleled and connected to the 75 ohm Amphenol 14–023 Transmitting Twin-Lead which forms the main transmission line. Note that one of the 150 ohm Twin-Leads must be twisted one-half turn to provide the 180° phase difference necessary between the two folded dipoles. Many other useful and efficient variations of the 8JK antenna, made from Twin-Lead or using Twin-Lead for

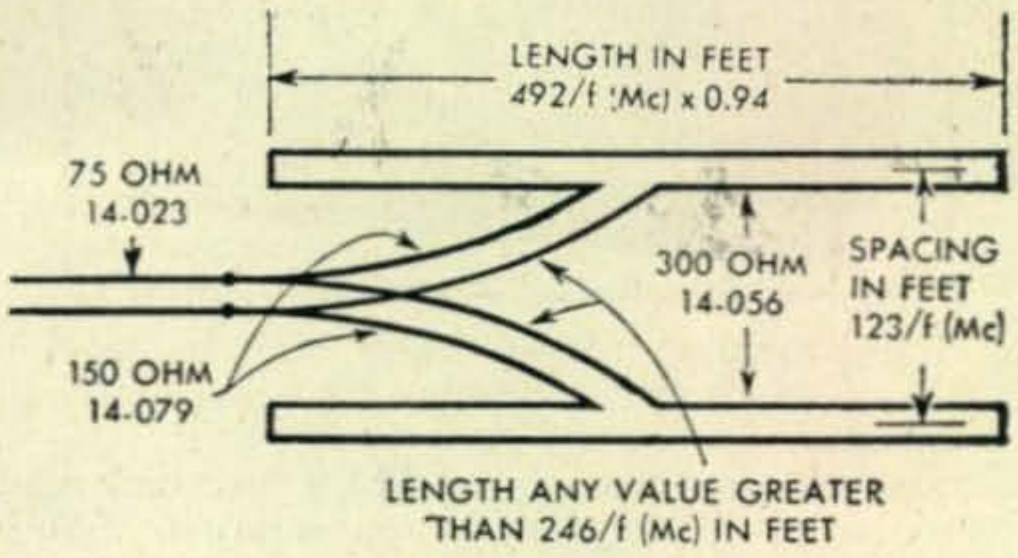


Figure 2

the transmission line, have been shown in the amateur publications. Some employ matching transformer sections to feed the folded dipoles thru permitting use of 300 ohm Twin-Lead all the way to the rig. All of them perform effectively.

Amphenol Silicone Compound Now Available

Nearly every amateur who has used Twin-Lead in a transmitting antenna system has had some experience with changes in the line impedance when the line has been coated with water. The reason, of course, is that the water film is in the dielectric field thus affecting the C factor in the impedance relationship between the inductance of the line and the capacity between the conductors. Surface water is least bothersome where the line is well matched to the antenna but its effects will be noticeable. To eliminate the formation of surface films on Amphenol Twin-Lead, Amphenol distributors are now supplying Amphenol 307 Silicone Compound. A one-ounce tube is adequate for the surface treatment of most Twin-Lead systems since the thinnest possible coating gives complete protection against the formation of a continuous film of water on the surface of the Twin-Lead. Amphenol 307 has the consistency of vaseline. It is easily applied and may be removed when desired by application of carbon tetrachloride. Amphenol 307 isn't new. It's a member of the famous Dow Corning Silicone family which Amphenol used thruout the war to moisture-proof AN electrical connectors, RF connectors and coaxial cable terminations. Only recently has the supply become adequate to permit general distribution.

See your jobber for full information about these and other Amphenol products, or write American Phenolic Corporation, 1850 South 54th Avenue, Chicago 50, Illinois.

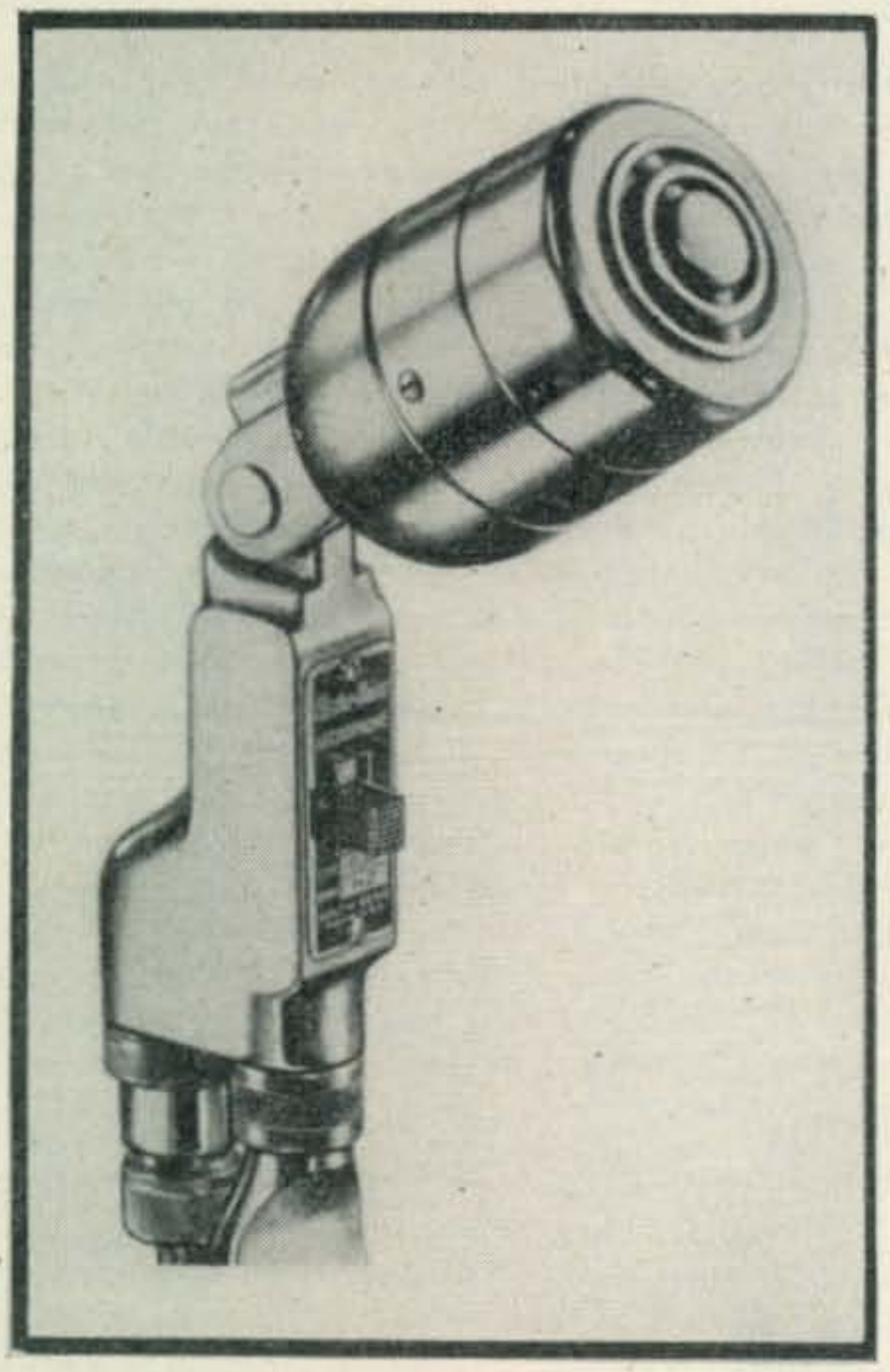
Amateur Frequency Meter

Browning Laboratories, Inc., Winchester, Mass., has announced production of the Frequency Meter model MJ-9 designed for checking the frequencies of amateur transmitters operating in any amateur band from 3.5 to 148 mc on either FM or AM. In addition the Browning Model MJ-9 may be used to furnish r.f. of known frequency to replace crystals in transmitters.

Among the features of the MJ-9 are: dial reads directly in frequency on seven amateur bands, accuracy to .05% on all frequencies, secondary standard is 500-kc crystal whose frequency may be easily checked with WWV, audio detection of zero beat, crystal check points are marked on dial for all bands.

Dynamic Microphone

Electro-Voice, Inc., Buchanan, Mich., is now manufacturing a medium priced dynamic microphone with Acoustalloy Diaphragm which is suitable for a great variety of applications. Frequency response is substantially flat, 40-9000 c.p.s. Output level is 53 db below 1 volt/dyne/cm², open circuit. Voltage developed by normal speech (10 dynes/cm²) is .0224 volt. The new Acoustalloy Diaphragm withstands high humidity, extremes of temperature, corrosive effects of salt air, and severe mechanical shocks. Alnico V and Armco magnetic iron ore are also utilized in a non-welded magnetic circuit.



Built-in cable connector permits vertical tilting of microphone head in a 90° arc for directional or non-directional pick-up without moving cable. Built-in "On-Off" switch gives instant control and is easily accessible for reconnecting as a relay control. Standard 5/8"-27 thread for stand mounting. Finished in satin chromium. Equipped with 20 ft. shielded cable.

Ohm's Law Calculator

A new pocket-size Ohm's Calculator incorporating a number of new features has just been announced by Ohmite Manufacturing Co., 4937 Flournoy St., Chicago.

The new calculator, like the previous Ohmite calculator provides a simple and handy means of solving resistance calculations. With one setting of the slide it gives the answer to any Ohm's Law problem —reading directly in ohms, volts, amperes, and watts. It will also solve parallel resistance and series capacitance problems, and will multiply, divide, and find squares and square roots. The range covers all currents, resistances, voltages, and wattages commonly encountered in industrial and radio work.

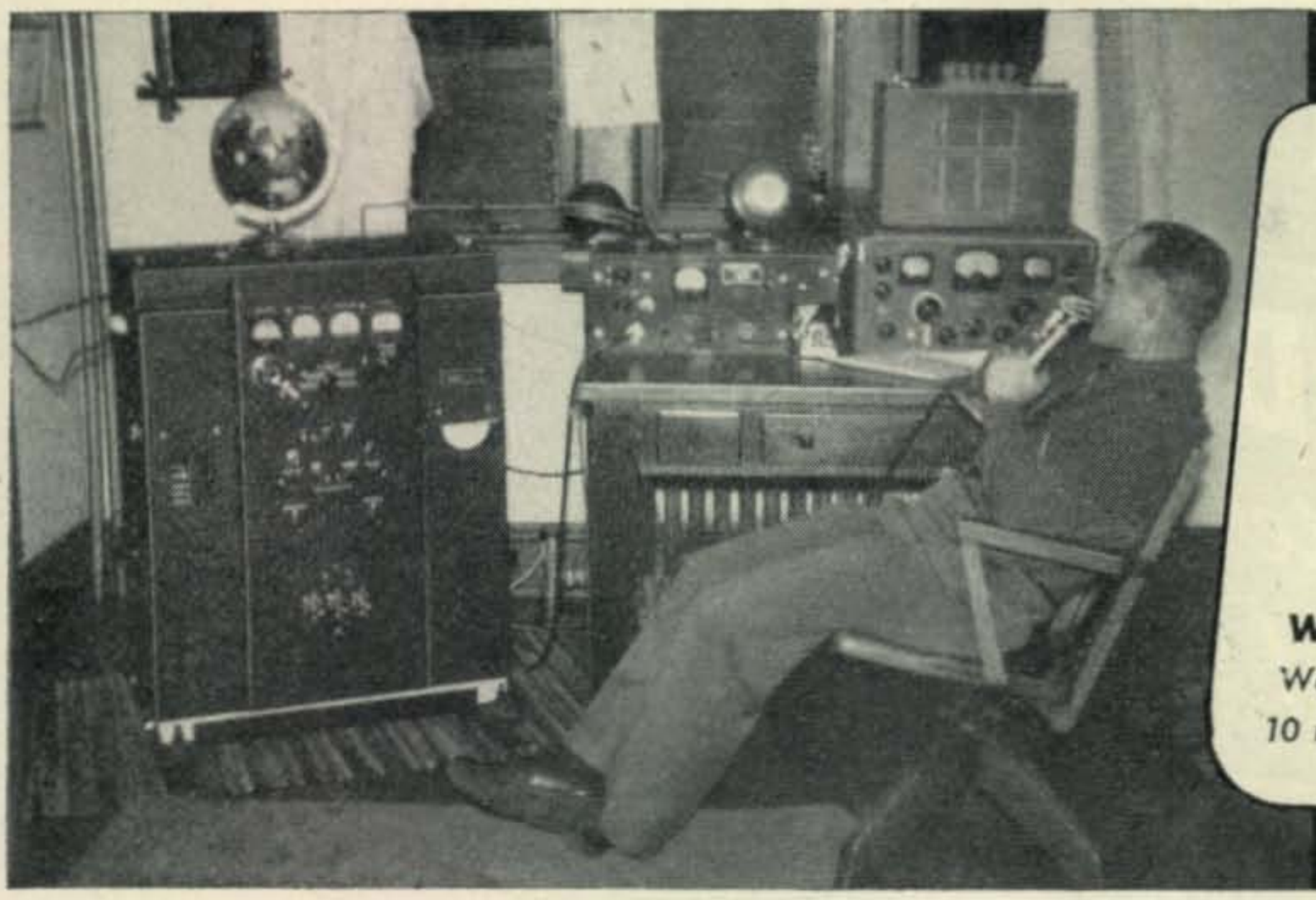
All computing scales of the new calculator are printed on one side. On the opposite side are given the Composition Resistor Color Code and the catalog number of stock resistors and rheostats of various resistance values. The new calculator is made to handy pocket size (9" x 3") of heavily varnished cardboard.

Instant Heating V-H-F Beam Pentode

The 5516 is an instant heating filamentary-type 15-watt transmitting beam pentode manufactured by Hytron Radio & Electronics Corp., Salem, Mass.

Designed for v-h-f mobile equipment, the 5516 is ideal as a Class C frequency multiplier or as a Class C amplifier requiring no neutralization in properly designed circuits operating up to 165 mc. Extremely low internal tube drop makes the 5516 highly efficient at the low plate potentials so desirable for portable and mobile applications. A tremendous saving in battery power is made possible in such applications by the 5516's instant-heating filament. When used in conjunction with other instant-heating types (such as the 2E25 and 2E30), all electrode potentials may be applied simultaneously, thus permitting the instant-heating filament to be turned off during transmitting standby

[*Continued on page 68*]



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W9CRP—*Herb Stamats of Warsaw, Indiana. Listen for him on 10 meter phone and 20 meter CW.*

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Hallicrafters S-38	47.50	RME DB-20 Presel	68.20
Hallicrafters S-40A	89.50	Collins 75A-1 Receiver	375.00

Meet Herb Stamats, W9CRP, who writes his own "Who's Who" for us: "First licensed 1930, first rig 210TNT. Then many, many tear-ups and rebuilding up to 1935—all that time on CW. At outbreak of war, everything sold to Signal Corps, so started from scratch again. Have made my WAC on ten phone and find operating the BC-610 a real pleasure. It certainly works fb. Listen for Herb on 10 phone and 20 cw. It is certainly a pleasure, OM, to deal with a house like ALLIED, and the fast, courteous service sure has been appreciated."

The pleasure is all ours, W9CRP! We got a real satisfaction out of helping you start up again. And we're proud to number you among the many top-notch stations we've equipped.

We're out to make these words—"Equipped by ALLIED"—mean something to Amateurs everywhere. We hams at ALLIED share your interests and want you to count on us always for the station supplies and equipment you need. Try us for personal service, speedy action and the kind of help you want when you want it.

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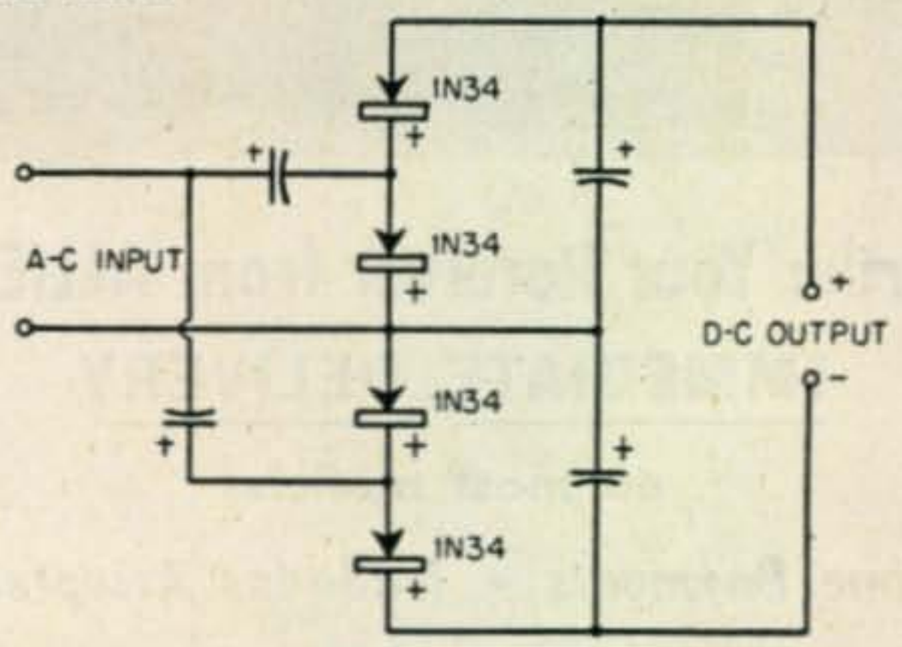
Tubeless Voltage Quadrupler

USING NEITHER TUBES NOR TRANSFORMERS, the voltage quadrupler circuit shown in *Fig. 1* will deliver a d-c voltage equal to four or more times the r-m-s value of an a-c input voltage. This device is exceedingly simple and compact, requiring only four Sylvania 1N34 crystal diodes and four 20μf 150 d. c., working voltage, midget tubular electrolytic capacitors. If desired, two type 1N35 dual diodes may be employed in place of the four separate crystal units.



All capacitors: 20μf, 150 volts d.c., working, electrolytic
Observe proper polarities of capacitors and crystal diodes

Figure 1

The maximum a-c input voltage applied to the quadrupler should not exceed 35 volts r.m.s., in order that recommended peak inverse voltages of the crystal diodes will not be exceeded.

The actual d-c output voltage for a given a-c input voltage will depend upon the amount of direct current taken from the output terminals, the voltage falling off more or less proportionately as the drain increases. At no load, the output voltage is equal to 4 times the *peak* value of the input voltage minus the drop in the diodes. This amounts to somewhat less than 5.7 times the input voltage (r.m.s.). *Fig. 2*

5 Volts r-m-s Input

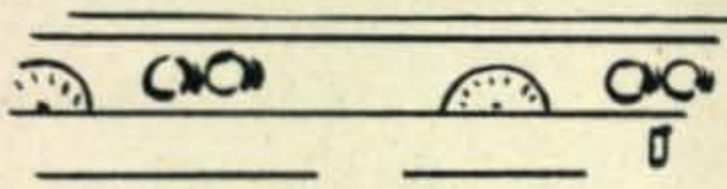
Load Milliamperes	*D-C Output Volts*
0	26
0.5	24
1	21.5
2	20
3	18.5
4	16.5
5	14.5
6	13
7	12
8	10.5

Figure 2

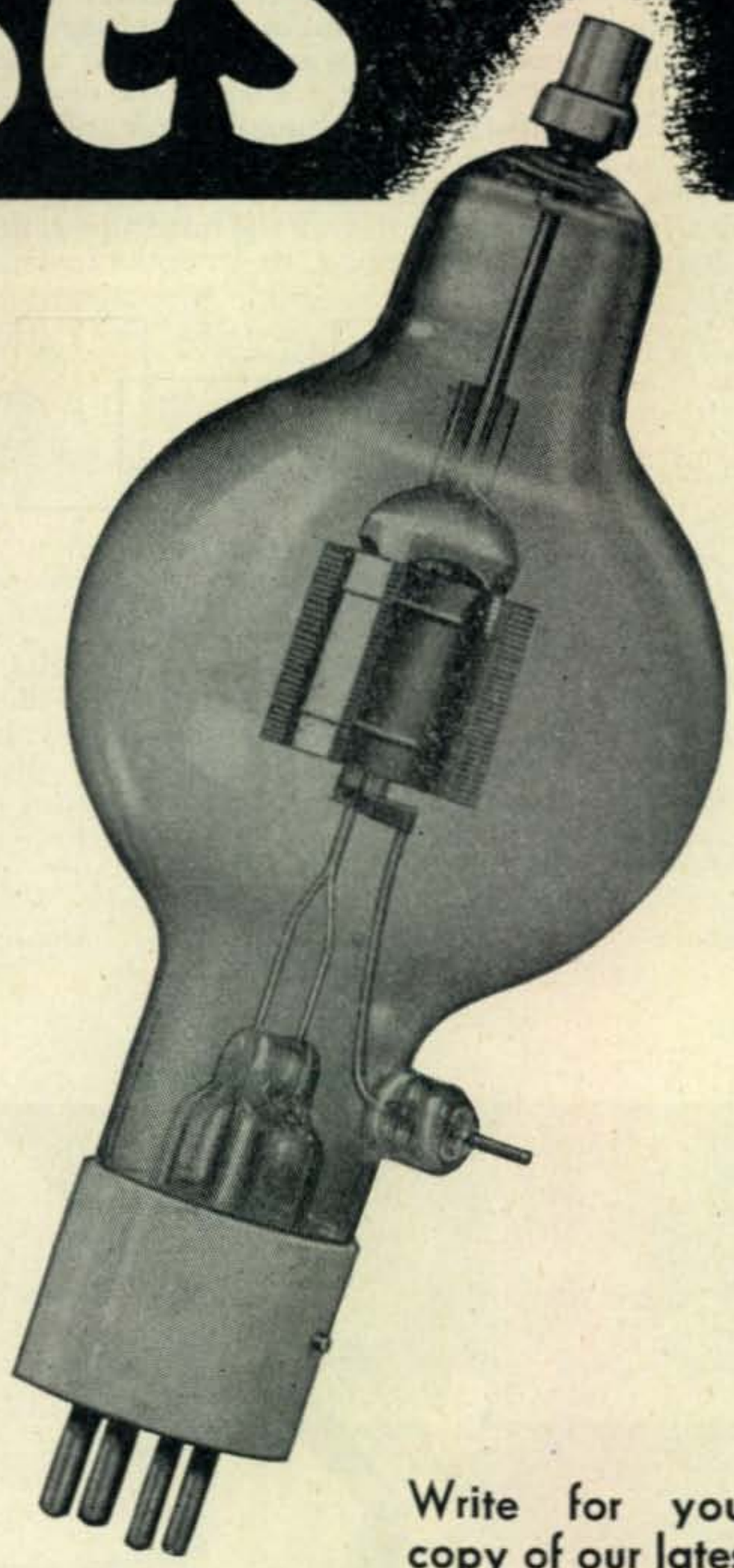
shows how the d-c voltage resulting from a 5-volt r-m-s input varies with load. Note that at zero load, the d-c output voltage (measured with a high-resistance d-c vacuum-tube voltmeter) is 26 volts for an a-c input voltage of 5.

[*Continued on page 54*]

TUBES



Get 'Em While You Can!



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The circuit was tested on a-c input voltages of powerline, audio, and radio frequencies. Satisfactory r-f performance was obtained, although we had expected the electrolytic capacitors to introduce some difficulties at radio frequencies.

The crystal quadrupler should find wide application wherever a compact unit of this type is required to boost available voltages and where it is undesirable to operate tubes or transformers or to use normal amplifiers. For example, low r-f signal voltages picked up by field strength meters, wavemeters, and similar instruments may be stepped up by a factor of 4 by employing the quadrupler, in the manner illustrated in *Fig. 3*, to drive the indicating

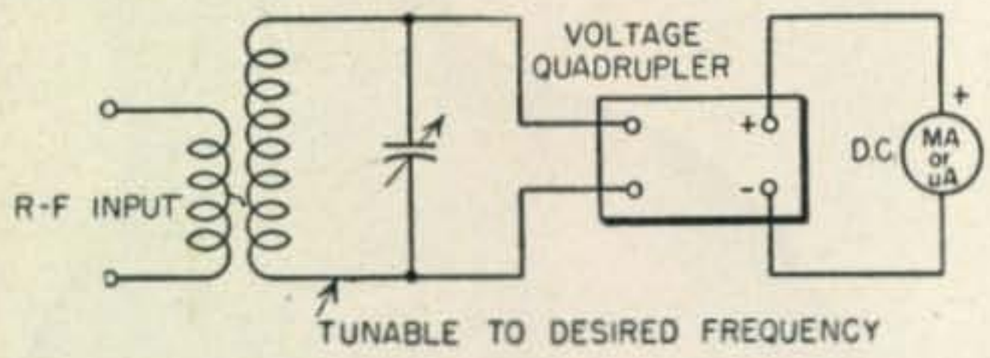


Figure 3

meter. In existing radio and electronic circuits, the quadrupler may be operated from an *ungrounded* filament or heater (see *Fig. 4*) to supply a d-c voltage equal to four or more times the filament voltage, depending upon load values. The d-c output of a quadrupler operated in this fashion may be used as fixed bias or may even be employed as plate voltage in a low-drain, low-voltage stage where voltage regulation is not too important a factor. A 6.3-volt filament or heater voltage, for example, in our tests gave nearly 20 volts d. c. at 5 ma drain. Care must be taken that the filament is not grounded (either on one leg or through a transformer center

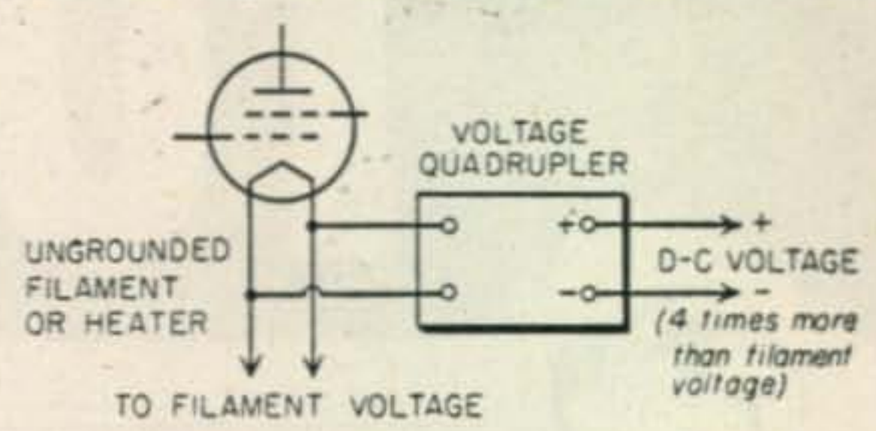
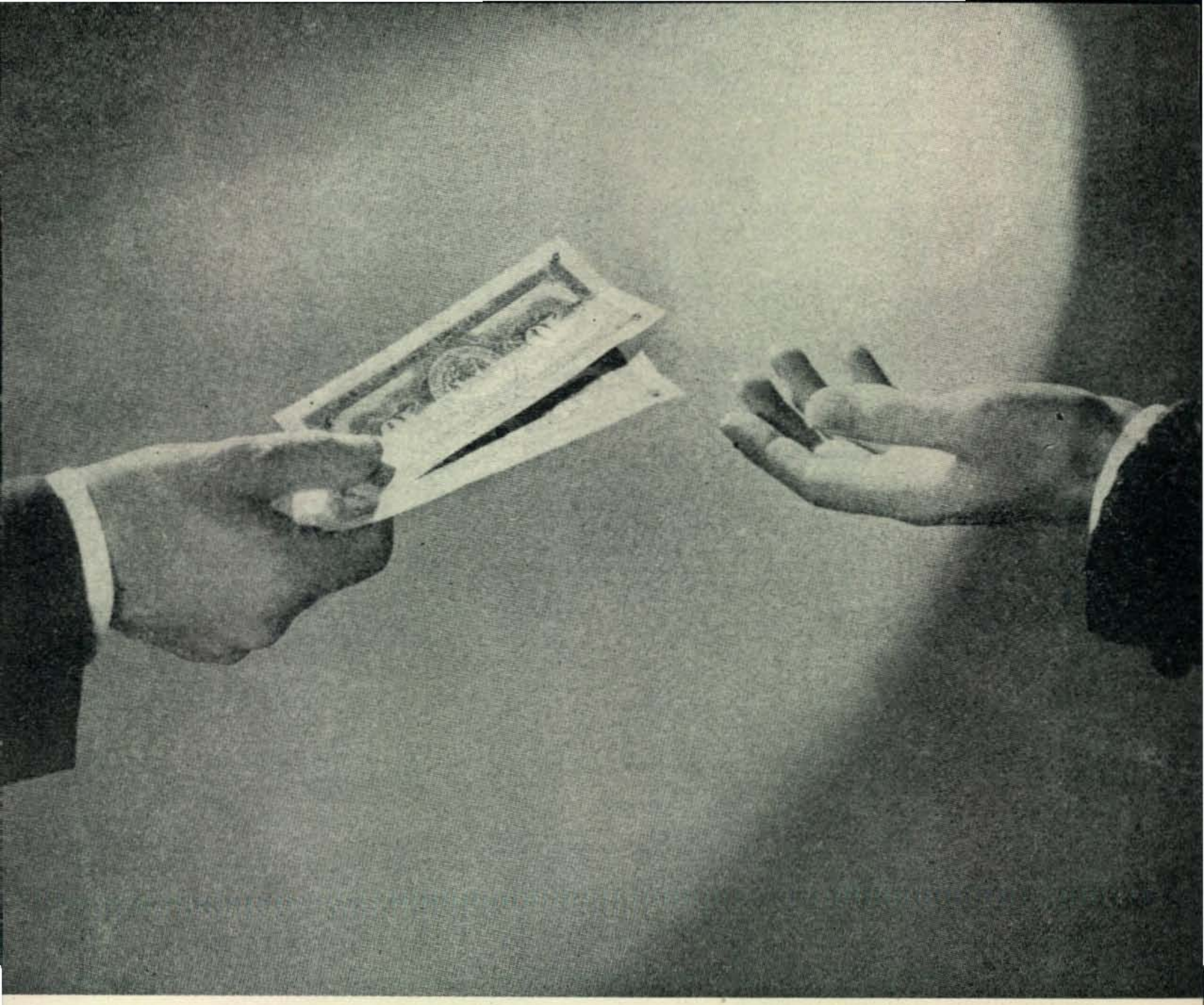


Figure 4

tap). If the filament is grounded, grounding either the positive or negative output terminal of the quadrupler output will result in short-circuiting completely one half of the quadrupler circuit. In most circuits, either the positive or negative will be grounded.

One important caution is in order: When wiring the quadrupler, the operator must be especially careful to observe the proper polarities of both crystal diodes and electrolytic capacitors. This is very important to the operation of the device. Proper polarities are shown in *Fig. 1*.

We have found the crystal diode equally as useful in voltage doubler and voltage tripler circuits. These circuits are entirely conventional, the crystal units merely replacing the usual diode tubes. Voltage regulation of the doubler is considerably better than that of the quadrupler.



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Because we pay for accepted technical material, "CQ" contains the finest available text material from outside authors.

DX PREDICTIONS

[*from page 36*]

ent no attempt is being made to ascertain the cause of sporadic-E, it may well be that the extensive interest of amateurs in 6-meter DX may provide a solution to this vexing problem. For this reason we request that either positive or negative results obtained on these days be forwarded to our V-H-F Department Editor.

The dates given are those on which long range data indicates that conditions favorable to sporadic-E short skip will occur. Several mitigating factors may alter this forecast and for this reason our V-H-F Department will soon be supplying a limited number of revised weekly forecasts to regular 6 meter reporters to the v-h-f column. A complete article giving the methods employed will be published shortly.

These are the predicted dates on which sporadic-E transmission resulting in 6-meter DX may be expected. The principal periods are listed, but do not include all possible sporadic-E openings, since this data is obtained from long-range cyclic variations of 6-meter DX activity.

June 1 - 2 - 3 - 6 - 12 - 13 - 14 - 15 - 25 - 26 - 27 - 28 - 29. July 2 - 3 - 8.

"I'm working you portable now, OM"

QSL.

Unusual QSL cards always occupy a place of honor in a ham shack and most always get replies. The following, received by Al Sonn, W2GC, Glen Ridge, N. J., more than 20 years ago, was sent by an English SWL.

"O, W2GC, whose CQs I have heard, I beg of U to QSL; oh please send me a card, for if you do not answer, it will be for your worse; I'll call the wrath of Jupiter on you in my curse. As Nelson said at Waterloo in 1826, 'Up then guards and atoms'—so shall I say of you—'Up sturbs and electrons'— and by the seven spheres may the heavens belch forth QRN, fit for Thor's own ears; May the skies be rent with lightnings and the Earth be rent with quakes, and your aerial mast be stricken, so that every guy wire breaks.

"May your radiation wither and your amps refuse to amp, may your bottles all disintergrate and your lo-loss coils get cramp, may your generator sizzle, and your meters all go fut; your condensers stop condensing, and your tuning never stay put. And so because you didn't write things turn out so bad, when this malediction comes to pass, you'll wish you had. However, if you QSL, or send a word or two, I wish you very 73s and I raise my hat to you."

W2GC did QSL! *W2GPG*

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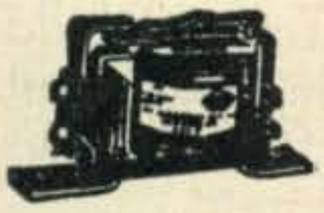
RELAYS!

Here are values you'll never beat.

TIME DELAY CRAMER—clockwork relay. 115v/60 cycle. 10 amp rating **$2.95**
Edison tube type, sealed thermal relay, 45 to 60 second delay. $10 value... **$2.95**

G. E. time delay relay, 115V/60 cycle, 10 amp rating, Type CR 2790, 1 contact SPST open; 1 contact DPDT closed..... **2.10**

G. E. Underload relay, Type CR 2810-1265. High amperage. Sturdy construction on ½ inch bakelite base. **1.50**



Telephone type DPST; 1 closed, 1 open. Contact rating 5 amps at 50V. Coil rating 3.5 ma..... **1.05**

Leach DPST
115/60c..... **1.39**
6 Volt AC DPDT Dunn..... **1.50**
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DC RELAYS

Struthers Dunn 125V DC, 3 amp Type ADBT 8. A rugged relay mounted on bakelite base. DPST. **$1.50**

Leach, Kurman, Advance and other well known makes:
SPST, 12 or 28 volts, ea..... **.50**
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Discounts on lots—100, 10%; 1000, 15%; 5000, 20%. Also 6 vdc relays in stock.

1 mf 300 vdc..	$ .20	10 mf 600 vdc.	.85
2 mf 300 vdc..	.25	1 mf 1000 vdc.	.75
4 mf 300 vdc..	.30	.1 mf 1000 vdc.	.25
4 mf 400 vdc..	.50	2 mf 1000 vdc.	.89
5-5 mf 400 vdc	1.05	4 mf 1000 vdc.	1.00
1 mf 500 vdc GE	.25	10 mf 1000 vdc	1.40
2 mf 550 vdc..	.25	1 mf 1500 vdc.	.95
.25 mf 600 vdc	.20	.4 mf 1500 vdc.	.15
.85 mf 600 vdc	.25	2 mf 660 ac/1000.....	.85
1 mf 600 vdc..	.30	4 mf 1500 vdc.	1.20
.1-.1 mf 7000 vdc G.E. Pyr.	2.00	1 mf 2000 vdc.	1.00
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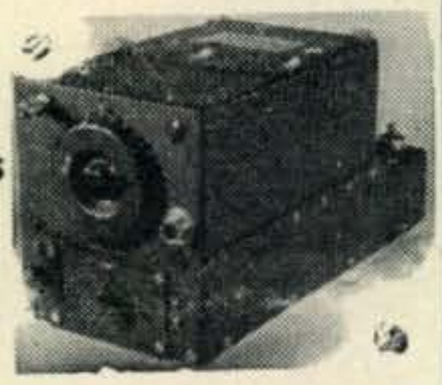

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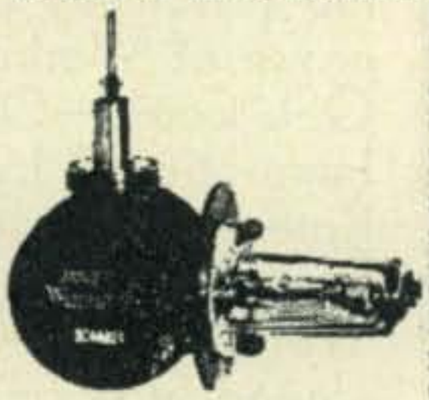

2J32 MAGNETRON is designed for 10 cm. operation. Rated at 300 kw peak pulse power. Complete information supplied. Brand new. The 2J32 is listed at $200. OUR PRICE.. **$25.00**
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10 cm. Waveguide 16' long. Per foot..... **$2.00**
3 cm. Waveguide 5' lengths. Per foot..... **$1.95**
SO radar 10 cm antenna assembly COMPLETE, includes drive motor, selsyn, rotating joints, waveguide input, dipole antenna, parabolic reflector. New..... **$90.00**
Used in good condition..... **$45.00**
Transmitter for SO Radar includes magnetron, magnet tr. box, all microwave plumbing, all tubes. Klystron. I.F. strip included, used—in good condition, including 2J-26..... Unit **$150.00**
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Audios—200 to 4000 cycle response
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Power transformer 470V CT at 60ma with two 6.3V windings at 1.65A and two 5V windings at 2A. 115V 50 to 1200 cycle Primary. Filter choke 6 hy at 50ma. Together make a fine power supply. **$1.99** a terrific buy!!!!

Combination pair of selsyns and sunchro-capacitor — special price..... **$9.50**

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Postscripts

MASSACHUSETTS STATE CONVENTION

The Framingham Radio Club is sponsoring an A.R.R.L. Massachusetts State Convention on June 21, 1947. It will be held at the Nevins Memorial Hall, Framingham, Mass., with registration to begin at 1 P.M. Program will include 2-meter treasure hunts, technical talks, code contests, demonstrations, displays, etc. Special entertainment for the Yls. Prize drawing. Registration, $2. Banquet and registration, $4. All Ham stores in the area will have tickets for sale, or write Eddie Parsons, Sr., 29 Pitt St., Natick, Mass.

CQ DX

[*from page 39*]

much unless you look at a map, and discover this is in Zone 23. There is also C8YR on phone in Zone 23, which should be a good one to salt away. Oh, yes, the frequency of C8KY is approximately 14,155. By the way, if you hear any stations with the prefix LB, that is supposed to be a portable LA. At least, that's what they tell me. W6OBD, down San Diego way, is getting fired up on this DX situation. It's about time somebody in San Diego was doing a little DX.

KL7AD is located at Tanacross, Alaska on the Alaska highway, 368 miles north east of Anchorage, and 202 miles south east of Fairbanks. KL7HX is located there too, and will soon be active, while KL7CZ is active there now. KL7AD runs 500 watts into a pair of HK54s. In 11 months time, beginning with May 20, 1946, which was when he received his new call, Fill has had 9,079 QSOs. It is interesting to see KL7AD's slant on working DX. He has a couple of gripes which I think are certainly justified, looking at it from his point of view. For example, when some guy is working him, and keeps yapping on how many other stations are waiting to QSO him, then he keeps gurgling along, leaving the boys who are waiting high and dry, while KL7AD starts fading out. Another thing that gets him is the guy who runs a kilowatt to a "72 element" beam, and who knows he can get through even in the worst conditions but blasts right into the middle of a flock of low power boys who are trying to get through for their first little QSO with a KL7. He contends that most of them do it just to show off to all the so-called little fellows who happen to be listening. Fill very seldom answers stations of this kind, and he hopes some day that they will learn to give short calls off the frequency of the DX station. He calls these fellows "messer uppers". The antenna is a half-wave Zepp, on 80, and is also used for all bands. W6TI and W6TT have both worked ZC6DD, which is a good one to bag. A couple of others for W6TI are FA8BG and YS1DS, as well as KV4AA. W6VFR has picked up a few new ones in HS1AL, FK8VB, YJ1AB, KS4AC, and CR10CB. This gives him a total of 144C. W3JNN has added HP4Q, VP6YB, VQ4KTH, KS4AC, ZD1KR, ZE2JI, UB5AC, and FT4AN. This brings the total for W3JNN up to 127C.

Phone Gossip

W2DYR sends in his list of zones and countries worked on phone which are 33Z and 83C. Eric runs 600 watts to a pair of T-125s, the antenna is a 10-20 meter rotary, 3 elements on 20 and 6 on 10. The whole thing being on top of a 60′ metal tower.

W6DI, ex-W6NNR, is over the century mark for countries. He now has 35Z and 103C. His latest are YJ1AB, YS1JR, SU1HF, ZB2A, and GI3ZX.

W1JCX tops the phone boys in this month's Honor Roll. Some of his latest include EA9AI, K6ETF/KC6, OQ5BW, KZ5NA, EK1AS, and EK1MD. Incidently, in March "CQ", we listed the station as "EK1ND", it should be EK1MD, and his XYL is EK1DM. Getting back to K6ETF/KC6, when you address QSL's to him % CAA, Canton Island, be sure you add "Phoenix Group," otherwise, it may wind up in Canton, China. W1JCX worked C8YR, and has just received a nice photo QSL from him, and, of course, we cannot overlook the most important part, and that is, C8YR is in Zone 23.

W2NSD has worked HH5PA this year on 3 bands; 10, 20, and 75. J7ELS told 2NSD that very soon, J7AAA, AAB, and AAD will be on the air. Other recent contacts for him are EK1AS, EA1D, and ZB1AC.

W1GKK works 20-meter phone, and has hooked some pretty good ones lately . . . C1YCF, CN8EE, OQ5BW, SV1AH, TR1P, TG9RV, VQ4ERR, XU6GRL, YJ1AB, and YS3PL. He has a flock of zones and countries, as you will see in the Honor Roll.

[*Continued on page 62*]

Zone and Country Honor Roll

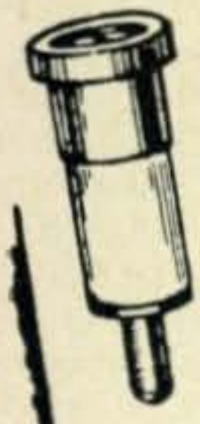
To enter the Honor Roll, it is necessary to submit a list of Zones and Countries worked. We are not asking you to send in your confirmations, but suggest you do not count any Zone or Country until you are sure the station is genuine. We reserve the right to exclude any stations on your lists which are known to be pirates. Confirmations are required from those who are eligible for the W.A.Z. certificate.

Here's how to make your list. In order to facilitate our handling of the Zone and Country lists, we would like them to be somewhat standard in form, and, where possible, typewritten. The information we require on the Country list: (1) Name of country, in alphabetical order, in accordance with the new postwar Official Country List, (2) Call of station worked, (3) Date, (4) Time. Zone list: Use separate page, number zones 1 to 40, down the page. After Zone worked: (1) Call letters of station, (2) Date, (3) Time. These lists will serve as master lists in our file; and once your totals are entered, when additional zones and countries are worked, submit information on the new ones at one time, and by the 15th of each month.

Sequence in the Honor Roll will be determined by the number of postwar Zones worked. After the zone total will be the number of postwar countries worked. We will then show, on the same line, the "all-time" totals of zones and countries. No one can enter the Honor Roll with "pre-war" totals only.

The "C.W. and Phone" portion of the Honor Roll will contain the totals of those who operate both, while the "Phone" column will contain totals of "Phone-to-Phone" only contacts. Be sure your lists denote whether they are to be classified as C.W.-Phone or Phone only.

NEWARK HAS MORE RADIO BARGAINS THAN EVER BEFORE



CRYSTAL DIODES

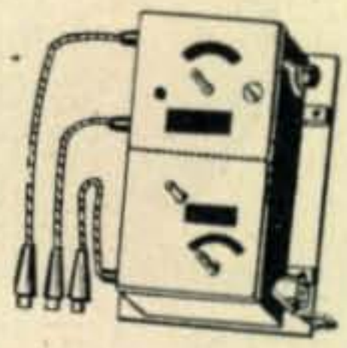
Now you can afford to experiment with wonderful new crystal Diodes. Used in noise limiter circuits, as second detector, and general rectifier applications. Maximum reverse voltage 3 volts, Max. 5 mils. Plug-in type. IN21, General Purpose. IN27 Video Crystal.
Your Cost, ANY TYPE..... 20¢

Great Dynamotor Bargain!

A fortunate buy enables us to offer this Power Supply at a sensational price. Brand New, delivers 500 VDC at 160 mils from 6-12 volt source. Switches, noise filters. 76 lbs. Only..... **$9.95**

DUAL CONTROL BOXES

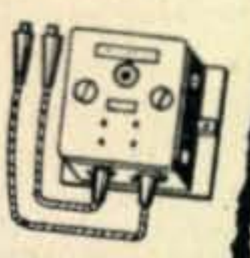
2-Channel box for intercom. PA, Ham work. Parts alone worth many times the price! 3-12 pt. rotary switches, 1-double deck, 2-triple deck, 12 pt. recessed male connector, pilot light, socket and bulb with translucent red cover, ¼ watt resistor, 3 pointer knobs, 3-3 ft. cables, 5 pt. female terminals. All in dual metal box 10 x 4 x 2".
A hot buy for only..... **49¢**



SINGLE CONTROL BOXES

5 x 4 x 2". Two 3-deck, 12 pt. rotary switches, pilot light, 2-12 pt. recessed male connectors, 3 ft. 5-wire cable. With 2 bakelite knobs.
Great Value! Only..... **39¢**

SINGLE BOX, as above, but with one rotary switch, 2-3 ft. 5-wire cables. Only..... **39¢**

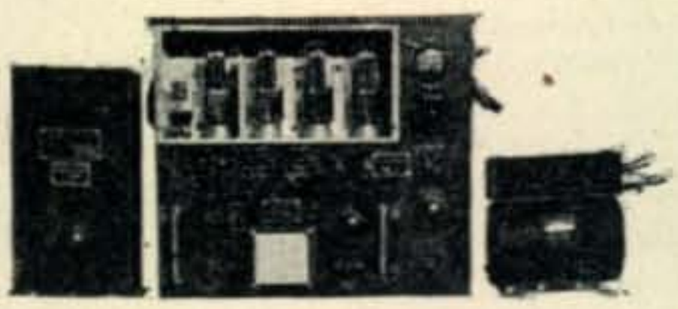


SINGLE BOX — Push Button, high frequency buzzer, 2-3 ft. 5-wire connectors and several terminal strips. Parts alone worth twice as much. Only **39¢**

WAR SURPLUS TRANSMITTING and SPECIAL PURPOSE TUBES

1C21 .. $ .75	6J4 ... $1.50	250TH . $9.00	808 ... $3.00	830B .. $5.25	872A/872 2.25	958A .. $ .75
1N21A . .20	10Y ... 1.50	304TH . 12.00	809 ... 1.50	832A .. 4.05	884 ... .75	959 ... .75
1N23 .. .20	35TG .. 1.95	304TL . 3.75	810 ... 2.63	836 ... 1.50	921 ... .75	1616 .. 3.00
2AP1 .. 2.25	75TL .. 2.25	715C .. 33.00	811 ... 1.95	837 ... 3.38	922 ... .73	1619 .. .75
2C40 .. 2.63	VR90 .. .75	800 ... 2.25	813 ... 6.75	838 ... 3.75	923 ... .45	1624 .. .90
2C44 .. 1.50	100TH . 4.13	801A .. 1.73	814 ... 4.50	843 ... .75	927 ... 1.05	1625 .. .75
2D21 .. .60	VR105 . .75	802 ... 1.58	815 ... 2.25	845W . 3.75	931A .. 1.88	1626 .. .60
2X2/879 .90	VR150 . .75	803 ... 9.00	816 ... .60	860 ... 3.00	954 ... .75	1629 .. .27
3AP1 .. 3.00	204A .. 60.00	804 ... 6.75	826 ... 2.25	861 ... 90.00	955 ... .75	2051 .. .90
5AP1 .. 9.00	211 ... 1.13	805 ... 3.75	828 ... 9.00	864 ... .60	956 ... .75	8005 .. 3.15
6AK5 .. .90	217C .. 7.50	807 ... 1.05	829B .. 3.00	865 ... 1.50	957 ... .75	8016 .. .53

75 WATT PHONE RIG



BC-375 E AAF XMITTER

A complete transmitting outfit for CW or phone operation. Cost over $2,000 to make. You pay less than 50¢ a watt . . . while stocks last!
You Get . . . 7 Tuning Units, 200-12000 kc; 24 volt Dynamotor (can be converted to 110 volt operation) with Relay, Filter, and Fuses; Antenna Tuning Unit BC-306A; Complete Set of Tubes. Electrically Perfect and Guaranteed — removed from unused aircraft. Wgt. about 400 lbs. A wonderful buy for any Ham! **$32.50**

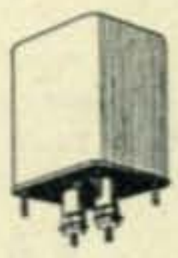
All-Purpose 2-METER RIG

SCR-522 RECEIVER TRANSMITTER $34.95

By all means get this swell VHF Transceiver . . . one of the finest and most economical 2-Meter rigs you can buy today. Now available for a small fraction of the original cost.
Consists of 10-Tube Superhet Receiver with squelch circuit, 7-Tube XMitter, Remote Control Box, 28 volt Dynamotor (can be converted to 110 volt operation). Complete outfit with 17 Tubes, 4 Crystals. Perfect and Guaranteed—removed from unused aircraft. About 100 lbs. All for one Bargain Price.

WONDERFUL FILTER CHOKE BUY!

1.5 Henrys, 275 MA. Rect. can 4" H x 2½" x 2". DC. 50 ohms resistance. Porcelain standoff insulators. Breakdown voltage to ground 2000 volts. While they last.... **59c**



475 OHM CHOKE

Rectangular can 2¼ H x 1¾ Sq. 5 henrys at 60 mils. 475 ohms DC resistance. 2400 volt insulation. Limited Quantity, Only **39¢**

20% DEPOSIT REQUIRED WITH ALL C.O.D. ORDERS

SEND FULL AMOUNT SAVE C.O.D. CHARGES

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SEND ORDERS TO
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CHICAGO 6, ILL.

New York City Stores: 115-17 W. 45th St. & 212 Fulton St

Miscellaneous

Once more, we do a little snagging from G2MI's column in the "RSGB Bulletin." Here's what it says . . . G2AXG recently worked W6FMO, who was using only 2 watts. G2AXG, however, was really QRO using 3 whole watts. The QSO was on phone on the 28-mc band. CN8ED is W4IJW, and QSL via ARRL. CR4AA is a phoney, and is not known in Cape Verde. VU2PB on Andaman Island should be VU5PB. Keep an eye open for VU7AA, and if you work him, he is J. A. Faithful, % Cable and Wireless, Bahrein Island. ME5AA, 5AB, and 5AC are genuine. They are Army personnel in the Suez Canal zone . . . the ME, no doubt, standing for Middle East. Incidently, on c.w., do not confuse the "ME" with "G." ME5AA is G4KV; and QSL via RSGB. Thanks to G2MI for the above.

W2VND has mailed over 500 of his QSL cards, since the war ended, and, in return, has received a grand total of 78. Ozzie has been doing quite a lot of work on 40 lately, working such stuff as YU7KX, I1AG, EI9N, OX3BF, GC4LI, and a flock of other Europeans, including HZ2BY.

W6ENV says that VS4JH is now back in England and is G2FSR.

It looks as though old Peter Bach, W2GWE is topping the WAZ Honor Roll with 39Z and 149C, his last two being ZD1KR and ST2AM. PY1DH sent in a nice list of zones and countries for the Honor Roll. He has been on the air since 1935, and has progressed from 2 watts into a 201A up to 200 watts into a 75TL. His receiver was a Schnell . . . one bulb, and now it's an HQ129X.

We are going to grab a few lines out of G6QB's DX column in "Shortwave Magazine", published in London. VU7JU, Bahrein Island, is now on the air. He is S. G. Abbott, Officers Mess, R. A. F., Bahrein, Persian Gulf. He runs 35 to 40 watts c.w. on 14 and 28-mc bands. XABX is in Athens, and mentions how tough it is for them to get any radio gear with which to build their rigs. At present, he uses a 6½ watt German tank outfit, and when he punches the QRO button, it jumps up to 10 watts. "Shortwave Magazine" is going to begin running a WAZ Honor Roll for "G" stations. This, no doubt, will stir up a little more activity in England, and we, of course, will republish them when we receive their lists of zones and countries. More from G6QB's column . . . ZD4AB is Tom Hall, located at Koforidua, Gold Coast. He has been giving lots of people a new country with his 25 watts into an 807. 4AB relates that 4AE and 4AG are both in Accra, but not active. ZD3AF is GM3AFG, operating in Nigeria.

I had better not let off too much steam about zones and countries, because W6QD certainly doesn't show up too well in the Honor Roll. I'm thinking of taking up this DX racket very seriously, and if any of you fellows have any suggestions regarding DX operating technique, I would like to get in on the secret. Especially would I like to obtain a formula on how to work new countries, when I an out of town. Oh, well, it's a lot of fun reading what all you guys are doing, anyway.

Now I'm going to get commercial. By the time you read this, we will have our book "CQ DX" off the press. This little handbook will contain useful information for the DX man; something that has been needed for a long time. Here are a few of the chapters: Technique of Working DX; DX Predictions; QSL Cards; QSL Bureaus of the World; Standard Time Tick and Frequency Services; International Postage Rates; WAZ System; Zone List;

• COMMERCIAL AIR LINES • AIR CHARTER PLANES • YACHTS
• HOME RADIOS • FISHING VESSELS • AIR FREIGHT • HAM OPERATORS

Brand New Automatic Direction Finder

RADIO COMPASS SCR-269-F

$75.00 COMPLETE WITH COMPONENT PARTS

The radio compass SCR-269-F was designed to be the primary radio navigation compass for the United States Army and Navy Air Forces. Constant reception is possible day or night so that fixes can always be made to establish the plane's or ship's location.

The azimuth Indicator is divided into 360 degrees and is connected to the loop antenna, therefore making it possible to navigate the ship in any direction as preset on the dial.

Plotting fixes is accomplished by selecting two or more stations and plotting these on the navigation map. The point of intersection of these lines indicates the location of the craft.

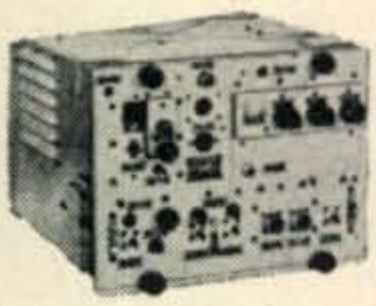
This equipment comes complete with 17 tubes superheterodyne receiver which is tunable from 200-1750 KC in three bands. A complete instruction book for operation and maintenance accompanies this equipment.

COMPONENT PARTS

Quantity		S. C. Stock No.
1	Radio Compass Receiver BC-433-F	2C3016 F.1
1	Radio Control Box BC-434-F	2C3324 F.1
1	Mounting FT-213-A	2Z6721-213A
1	Mounting FT-224-F	2Z6721-224F
1	Loop LP-21-F (Includes Dehydrator)	2Z1921 F.1
1	Cord CD-365-A	3E1365
1	Indicator I-81-F	2Z5381F
1	Relay SW-172	2Z7672F

Quantity		S. C. Stock No.
1	Plug PL-112	2Z7212
1	Plug PL-118	2Z7218
1	Plug PL-122	2Z7222
1	Dehydrator Hose, Fitting & Clamps 10 foot lengths	2Z8727
1	Operating & Maintenance Handbook	
1	Coupling MC-136	2Z3266
1	Tuning Shaft MC-124 (300°)	2ZA124-300

Quantity		S. C. Stock No.
1	Insulator IN-79	3G579
1	Insulator IN-81	3G581
1	Shaft Casing and Spline Drive	2ZA124/1&/4
1	Shafting F/MC-124-(300°)	2ZA124/1
5	Nut F/MC-124	2ZA124/2
5	Spline F/MC-124	2ZA124/4
5	Sleeve F/MC-124	2ZA124/5
1	Transformer C289AS-R16-T	



TRANSMITTER & RECEIVER

$14.95

The famous boat anchor, widely used on 144 MC band. Shipping weight 100 lbs. Your price, less tubes and power transformer.....$14.95

MODULATION TRANSFORMER 1KW $14.95

RCA modulation transformer is conservatively rated at 550 Watt audio to modulate that new KW rig. Really rugged construction with protective flashover gaps, which are adjustable. Terminals and gaps are mounted on a "Mycalex" terminal board. The laminations that make up this transformer are of high audio quality and are extremely thin, making it impossible for the core to "chatter or talk".
Audio Watts—550 Sec. #1-450 Mils Sec. #2-80 Mils Turns Ratio—Pri: Sec. #1-1:1 Pri: Sec. #2-5:1 Pri: Sec. #2 Tap-25:1.
Impedance Ratio—Pri: #1-1:1 Sec. Pri: Sec. #2-25:1 Pri: Sec. #2 Tap-625:1.
DC Resistance—Pri: 135 ohms Sec: #1, 112 ohms; Sec. #2, 99 ohms.
Transformers insulation tested: Pri. 8000V.; Sec. #2-2000V. to the rest of the coils and core. Primary center tapped for Class "B" modulators. Secondary #2 will carry 80 Mils to modulate screens of beam power or screen grid tubes. Primary will match any Class "B" tubes up to 10,000 ohms plate to plate, such as 810's, 75T's, 8005's, ZB120's, 203's, HY51Z's, 211's, 813's, 828's, 805's, 2037's.
Size 9½" wide, 7½" deep, 7¼" high. Heavy channel iron mounting brackets. Weight approx. 40 lbs.

BUTTERFLY CONDENSERS

Type B—frequency range 300 to 1000 megacycles Cat. No. BC-2 **95c ea**

Power Transformer

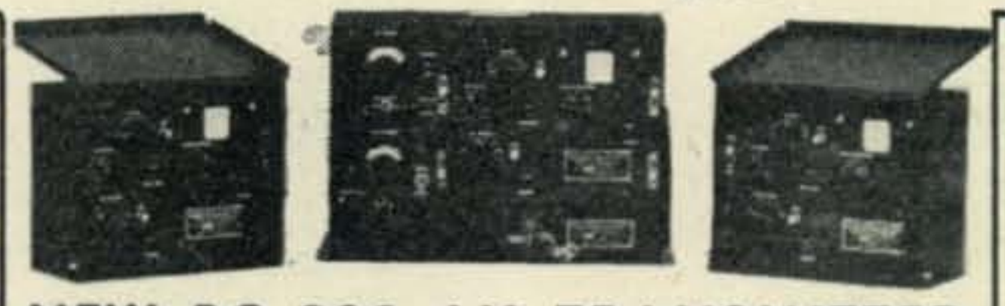
Pri. 115 v 60 cy.
Sec. 1.255/255 80 MA.
Sec. 2 63 v. 3.8A
Sec. 3 5 v. 4A **$1.29**

BC 191 TRANSMITTER Less tubes and tuning units. **$14.95**

RECEIVER & TRANSMITTER Complete with tubes—used— **$29.95**

BC 654 TRANS. & REC. Complete with tubes. **$19.95**

Ass't mica condensers, Cat. No. C-12 per 100	1.95
Wafer sockets, 4-5-6-7 and 8 prong. Cat No. WF-4—per 100	2.95
12" Utah P. M. Speaker, Alnico #5 with 6F6 output transformer. Cat. No. ST-100	6.95
Ass't knobs push on wood and plastic. Cat. No. KP-100—per 100	1.95
6J4.....$ 1.50 6J6.....	.95
Johnson sockets #210-25W. Cat. No. JS-210	.49
9004 tubes... .65 955 tubes....	.65
Sockets for acorn tubes. Cat No. AT-10.	.19
8-8 MFD 350 WVDC, 20 MFD 150 WVDC, round can. Cat. No. RC-88	.69
A 144 MC Radar Osc., uses 15 E or Hy 75. Enclosed silver plated tank with variable coupling. Complete less tube	3.95
Jacks PL 55, PL 68	.15
Powdered iron slug with Isolantite coil form to match, ideal for broad tuning E.C.O.	.25
Powdered iron ⅜ slug	.10
1 Meg. Shallcross Acra—Ohm wire wound resistors MICA CAPACITATOR .002 MFD 3000W VDC. Cat No. RT-101	.49
IF TRANSFORMER Mounted in aluminum shield can 1500 KC, with air trimmer, impedence coupled type. Cat No. T-19	.95



NEW BC 223 AX TRANSMITTER

801 Oscillator and 801 Power Amplifiers, 2-46 Modulators and 1-46 Speech Amplifier 4 Xtal Frequencies and Master Oscillator on selector switch. 10 to 30 watts output. Tone Voice or C.W. Mod. Ideal for 80 meter band. Comes with 3 coils TU 17A 2000-3000 Kc. TU 18 3000-4500 Kc. TU 25 3500-5250 Kc. Black wrinkle case. Includes 2 separate cases to store extra coils. Frequencies chart and tubes included, packed in original cases, less crystals at this low price. Cat. No. MT-100 **$29.95**

20% DEPOSIT REQUIRED ON ALL C.O.D. ORDERS
F.O.B. DETROIT **$2.00 MINIMUM**

FILAMENT TRANSFORMERS

Thordarson 6.3 V-4 amps., 6.3 V-4.5 amps., 9.7 V-.5 amp., pri. 110 V AC 25 or 60 cy.—Cat. No. FT-11	1.95
Thordarson pri. 110 V 60 cy.—sec. 6.3 V 6 A, CT—Cat. No. FT-12	1.49
Thordarson 8 HY 150M choke, Cat. No. FC-201	.95
Thordarson 12 HY 25M choke, Cat. No. FC-203	.39

CONDENSERS

Cat. No.	Cap. MFD.	Working Volts	Your Cost
C110	1	5000 Oil	$3.95
C111	3	4000 Oil	4.95
C112	1	1000 Oil	.44
C114	8	600 Oil	.95
C115	2	600 Oil	.49
Westinghouse 1 MFD 6000 volts WVDC			$7.95
Westinghouse 2 MFD 6000 volts WVDC			10.95
Westinghouse 1 MFD 10,000 volts WVDC			12.95

TUBES

813.....$	5.45	829.....$	2.45
814.....	4.95	872A.....	1.95
RK60.....	1.25	211.....	1.45
VT127.....	2.95	VR150.....	.69

Write for FREE Bulletin

HRC

Hershel RADIO COMPANY
5249 GRAND RIVER • DETROIT 8, MICH.

Michigan Sales add 3% Sales Tax

Zone Map; International Time; Official Country List by Country; Official Country List by Prefix; World Time Chart; International Amateur Codes; Miscellaneous Useful Information; including eight or ten charts centered on principal cities including Chicago, which, of course, is of great interest to me, being the center of the W9s.

Of course, you fellows know we now have the four color Zone Maps ready, and if you can't pick up one at your favorite radio jobbing house, just send a buck along to "CQ" in New York, and I am sure Larry will see that you get it PDQ. Likewise, if you want a copy of the Official Country List, which is printed in four columns, and on one side of the paper, all you have to do is send a self-addressed, stamped, #10 envelope to "CQ", and you'll get one by return mail.

KS4AC Swan Island

By now every DX man knows KS4AC is on the air. A swell letter from F. A. Griffin, KS4AC gives some facts which should interest the gang. KS4AC generally tries to work as many stations as possible so he hasn't had an opportunity to pass out much of this information on their setup.

Grif tells us that to date there have been only three KS4 calls issued. KS4AA issued to James R. Patterson was used to some extent before his departure from the island last September. KS4AB was never used and it is understood that the call is now being cancelled. The present transmitter runs about 800 watts, while the receiver is a commercial superhet. KS4AC will be operating on 14,035 kc for probably two months, after which time operation may be confined to 80 meters. (Stop grabbing for the coils men!)

F. A. Griffin is ex-W5HDF and has been a ham since 1935. At sea during most of the period until 1941 when he joined the CAA, Grif has a wife and two sons living in Texas. As Chief Overseas Communicator for the CAA he expects to be on Swan Island for at least six months.

One part of KS4AC's letter poignantly states the case of all DX stations. We quote: "There seems to be a difference of opinion on whether I should stay on one frequency to QSO everyone. If I leave my receiver tuned to my own frequency they all come in right there and QRM each other, something awful. Now and then, for the benefit of the boys that can't change their transmitter frequency, I tell them that I am tuning my receiver up to 14,200 and starting down. However, I think this is the best way to give everyone a chance to QSO me. Am trying to give them all an equal chance. We QSO everyone that we can possibly get around to (until I'm about to drop off asleep), and refuse to answer calls for 2nd QSOs. We are trying to give them all a chance before we start around the 2nd time! So far, I have not lacked any stations to QSO. In fact, I generally have to tell them I'm going to bed and leave the rest of them holding the bag.—or I should say "beating their brains out."

Swan Island is located in the Western Caribbean and is not on most ordinary Atlas or geography maps. The island is about 2¾ miles long by ¾ miles wide. There is a U. S. Weather Bureau station located on the island and the CAA maintains a station to handle the radio work. Most tropical hurricanes form in this area, hence the reason for the weather station. There are a total of ten U. S. Government employees and about 15 or 20 natives from the British island of Grand Cayman.

[*Continued on page 66*]

Bill Wayne has been keeping the log for KS4AC and is shortly applying for his own ticket so another KS4 will be on the air. Everyone who has QSOd KS4AC will receive a QSL as soon as they are printed. In the interim a list of the stations QSOd goes out in each mail (about every two weeks) to the ARRL, so country credit can be claimed for any special reason.

This month's column is necessarily brief, because the guy who wields the whip in New York insists on bringing out the magazine earlier each month, thus, has advanced the deadline. In another month or so, the deadline dates will be equalized so we will get full measure in each issue. I know you are going to like the magazine better when you can get it nearer the first of the month. Keep up the good work, you fellows, and let's hear from you.

Now for my weekly quota of 9s. 73

YL FREQUENCY

[from page 44]

flood, and one for the East Ohio gas fire disaster. It was teamwork that counted in winning those awards, and my part was no larger than that of any one else.

"Think I have a 35 w. p. m. certificate around. By the way, the OM got his old call back a while ago. He is now W8UJ, and is he pleased! He went out and got his auto license changed to 8UJ, too! We never have been on fone, though we are both Class A."

YL-DX gets a "turn for the better" with a report from W2PMA, who's just QSOd FA8DX, Algiers, with 20 watts on 10 fone. Lillian's also on 11 meters these days. Says at the time of one of her 11-meter QSOs a Sinclair Oil salesman was in the shack.

"Try to get somebody out West," he suggested, "and let me talk to an oilman."

Lil's first call brought in W7AYG, of Montana Standard Oil!

YL of the Month

If you happen to QSO W4HWS of Atlanta, Georgia, take our advice and type your QSLs. For W4HWS, Jerry Stock, happens to be a "grapho-analytical psychologist." Which means—we discovered—that, as a graduate of the American Institute of Grapho-Analysis, she can read character from handwriting. Jerry really applies her science to QSLs, and enjoys tying in memories of the QSOs with her opinion of the writing. So beware!

Despite her fondness for analysis, Jerry is a singularly uncritical person, with a pleasant manner that immediately puts you at ease. You can spot this naturalness even in her fone voice on ten meters, where she spends most of her operating time. Jerry's next favorite band is 40. She divides her QSOing' between these two—*when* she's able to get on.

Her ham activities read like a litany of woes.

By getting her license in June '41, Jerry had only six months of operation before Pearl Harbor. Trouble began in earnest when she resumed right after V-J day.

First her landlord objected to a roof antenna, and for a year Jerry had to make-do with an inside wire or none. Naturally her QSOs were largely local. When finally the landlord relented, 4HWS happily piled up states for WAS (just completed) and had almost daily skeds with Puerto Rico.

[Continued on page 68]

"TAB"

NEW GUARANTEED ***ELECTRONIC PARTS***

That's A Buy

GE or equal Vacuum Condenser 100 mmf 7500V/24Amp/28mc's.... List Price **$12.00**
Dimensions 4-9/16"x1⅝"Dia-9 16"D "TAB" special **$4.95** @..... Two for **$8.95**
GE or equal Vacuum Condenser 50 mmf 7500V/20A/32 mc..... List Price **$10.00**
50MMF/20000V JENNINGS VC50 ($18) $6.95 ea.....2 for **$12.95**

OIL CONDENSERS

4mfd/50WVDC	Ten for	2.00
10mfd/600WVDC	Two for	2.50
20mfd/600WVDC	Two for	4.95
4mfd/600WVDC TLA	Two for	1.25
Tubular 0.1mfd/600WVDC	Ten for	1.90
Tubular 0.1mfd/800WVDC	Ten for	2.20
Tubular 0.1mfd/1500WVDC	Ten for	1.50
3mfd/330VAC/1000WVDC, GE	Ea.	1.25
4mfd/330VAC/1000WVDC, CD	Two for	2.98
15mfd/330VAC/1000WVDC, GE	Ea.	2.95
6mfd/1500WVDC	Two for	4.50
2mfd/2000WVDC, AVX & WST	Two for	4.25
3mfd/2000WVDC, AVX & WST	Two for	5.00
2mfd/3000WVDC	Ea.	3.60
4mfd/3000WVDC	Ea.	5.00
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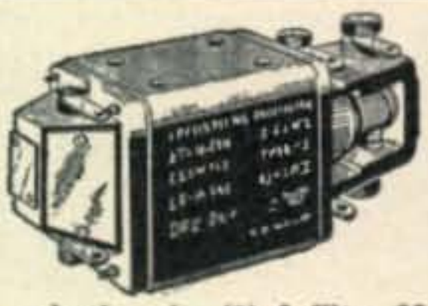

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35L6, 50L6, 35Z5, 12SQ7, 12SH7.....Two for **1.80**

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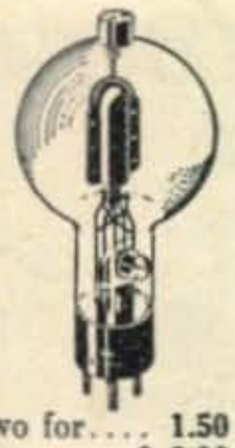

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CW3 Receiver Relay Rack mtd 3½" x 19", fixed Tuned Xtal SUPERHET, Uses 6K7RF&IF, 6K8 Mixer osc, 6K7IF, 6C8 Det & Outpt, 6SN7BFO, 80 RECT, 115V/60 cy Pwr, Case, Coils, Tubes, NO XTAL, use as converter VFO
Complete with manual & Tubes Special..... **$13.95**
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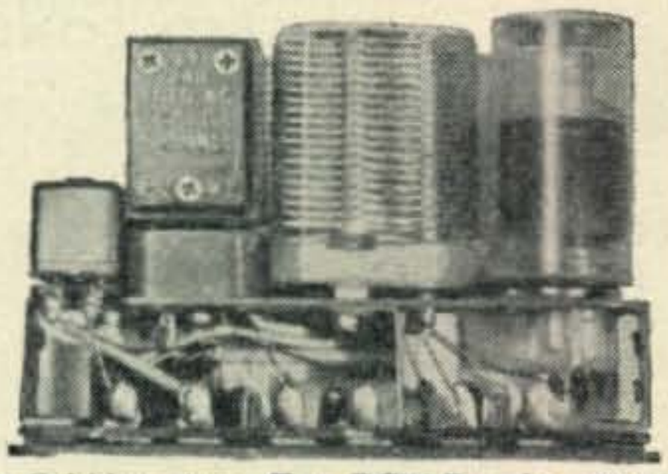
BC-746-B DUAL CRYSTAL TUNING UNIT

Contains Two Plug in CRYSTALS FT243/BT Cut & coils, Variable Cond. 140mmf. xtal socket complete $1.25



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WE 32A Transmission Meas Set & 51A Osc..... **150.00**
WE1N21-22-23 Crystals Boxed New.....3 for **1.25**
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* * * * CORNER OF CHURCH & LIBERTY STS., ROOM 200 * * * *

Trouble reared its head again in the form of BCI. Today Jerry is spending much of her time devising wave traps to eliminate it, and answering FCC notices on the subject.

All's fine, otherwise—except for constant auto noise from the busy thoroughfare she lives on—plus interference Jerry attributes to diathermy from a hospital 200 yards away, all playing havoc with ten-meter reception.

Yet with all this, Jerry says her discovery of ham radio put an end to her hobby-chasing. Before she became an amateur, her hobbies ran the gamut from humorous portrait painting—for which she has a definite talent—to photography and flying.

The holder of a private pilot's license since 1940, Jerry has spent many vacations making cross-country flights. This experience proved valuable during the war, when she became a Link trainer instructor, teaching instrument flying to Naval aviation cadets. Jerry also served as code instructor and pilot in the Atlanta Civil Air Patrol.

Today Jerry holds a clerical position with the Bureau of Internal Revenue. Her OM, Ray, is a production supervisor at an automatic pencil factory in Atlanta. Though not yet licensed himself, Ray enjoys talking over the air, and does most of the building and repairing of equipment. Jerry hopes he'll go down for his own ticket soon.

Present rig: HT9 transmitter, SX28 receiver, single wire, 130 ft. antenna.

Awards: ORS, RCC, Fourth District Chairman of the YLRL, awaiting WAS certificate.

How did Jerry get started in radio? "A few hams were motoring to a picnic spot one day," she remembers. "The drivers QSOd each other in code with their auto horns. To think they could talk to each other that way amazed me so . . . I immediately decided to learn code myself."

And that's how it all began . . .

PARTS AND PRODUCTS

[*from page 50*]

periods. Filament of the 5516 is rated at 6.0 volts. While the 5516 is primarily adapted to mobile equipment, all ratings are for continuous commercial service (CCS) and are equally suitable for fixed station use.

The 5516 has several constructional advantages. Zirconium-coated plate, gold-plated control grid, and carbonized screen grid enable maximum possible v-h-f ratings, despite compact size. A special, rugged filament suspension avoids short circuits and burnouts in rigorous mobile applications. Three separate base-pin connections to the filament center tap provide for the lowest possible cathode lead inductance. The dishpan stem and compact structure give short, heavy leads with low inductance and capacitance.

ABSOLUTE MAXIMUM CCS RATINGS

		*Mod.**	*Unmod.*	
D-c plate potential	80 mc	475	600	Volts
	135 mc	395	500	Volts
	165 mc	355	450	Volts
D-c plate power input	80 mc	30	45	Watts
	135 mc	26.5	40	Watts
	165 mc	23.5	35	Watts
Dic plate current		75	90	Ma
D-c screen potential		250	250	Volts
Plate dissipation		10	15	Watts

*Carrier condition with max modulation percentage of 100.

V.H.F.-U.H.F.

[*from page 43*]

corner, horizontal, giving 10-db gain over a dipole. He has under construction, 8 half-waves in phase, horizontal, with 8′ x 15′ screen, of metal. The receiver is a converted SCR-522, with 12 mc i.f. and 5-kc selectivity, and a 6J6 grounded grid amplifier.

Band conditions from his location show 50 miles to be good anytime. 100 miles is average with peak of S-8 while 150 miles show an average of S-1 and a peak of S-4. This is the signal strengths under various band conditions and were obtained during the winter with no assistance from inversion. Of course this assumes reasonably good receivers and antennas at both ends.

Herb and the boys around Erie are expecting records to fall when the bending starts and would like schedules with the lads around Chicago, if any of you are interested in making these tests, Herb would be glad to hear from you. His QTH is, 1412 Delaware, Erie. It appears that c.w. would be the best bet, so how about some of you with good superhets and a b.f.o. getting in on these tests and keeping us advised.

W4KMK, of Greenville, S. C. is on 144 mc, and says that there are about eight more of the gang on there. Mack uses a 522 transmitter into a coaxial antenna and a VHF-152 for receiving. Wonder what distance you are covering, Mack?

Up in Watertown, S. Dak. WØBJV has been working WØTI at 40 miles and WØAZE in Minn. at 50 miles quite regularly.

W6CLV took a jaunt to San Francisco and says W6EUL is on in the Bay area and puts out a good signal. He has two new contacts in W6YCL and W6CKS. Lloyd also has rumors the W6RBQ is back on 144 mc. The boys around Sacramento are still working into the Bay area around 100 miles very nicely and i.c.w. is becoming more popular.

From San Francisco W9OAW/6, W6BYS, BPV, YDU, BVK and W6YLO are all making the hop into Sacramento, and some of them are working north into Willows and Corning, while the southern hauls are into Stockton and Rippon, all these stations being around 50-85 miles from W6OVK. Yet Jim says that he can work them rain or shine. One night W6OVK worked W6BLP of Sacramento who was using his 1 watt walkie-talkie a distance of 130 miles. It sure takes high power for these v-h-f bands.

235mc Notes

Again the report is from W6OVK, who says that he and W6NNS have a repeater relay service on 235 mc, about 14 miles apart. They rebroadcast W6LSX and W6BVK to each other as they can't make the hop on 144 mc. Also on for company is W9OAW/6 and W6WQN.

W1BBM Reporting 1250 mc

Bernies Bates, W1BBM our explorer of the centimeter waves now has stretched his coverage to 3 miles when he worked W1ARC in W. Harwich, Conn., at 1830 EST, April 7th.

W1ARC uses a 2C40 transceiver to a small horn inside of his house. W1BBM has the same rig with 5-watts input and a 30″ dish with waveguide and coax feed. Bernie says the signals were tremendous the boys have high hopes of making a new record here soon.

ZERO BIAS

[*from page 11*]

means of obtaining information concerning reception of United Nations broadcasts throughout the world. The amateurs will handle only that type of written material which would not otherwise be handled by international or domestic commercial facilities, such dissemination and collection of information being without prejudice to the amateur code of serving without pecuniary interest.

This Agreement is for one year with provision that it may be renewed annually both parties consenting thereto.

—*W2IOP*

CONVERTER PRESELECTOR

[*from page 34*]

S-Meter

The S-meter has a twin triode bridge type V.T. voltmeter in which the 1000-ohm wire wound adjustment balances the two 7F7 (or 6SL7) plate currents for zero current thru the 0-1 milliammeter with no signal input. A half-megohm input potentiometer permits a calibration adjustment which will give full scale deflection for a very strong input signal of 1 or 2 millivolts. A signal generator was connected to the preselector and the meter calibrated from S-1 at one microvolt, up to S-9 in 6db steps, and +6, +12, and +18 db markers above S-9 on the meter face.

The extra toggle switch shown in the second converter front view, is not indicated on the circuit diagram of *Fig. 2*. The purpose of this switch was to cut the plate supply on and off for the converter and receiver as a "send-receive" switch since the receiver did not have this feature.

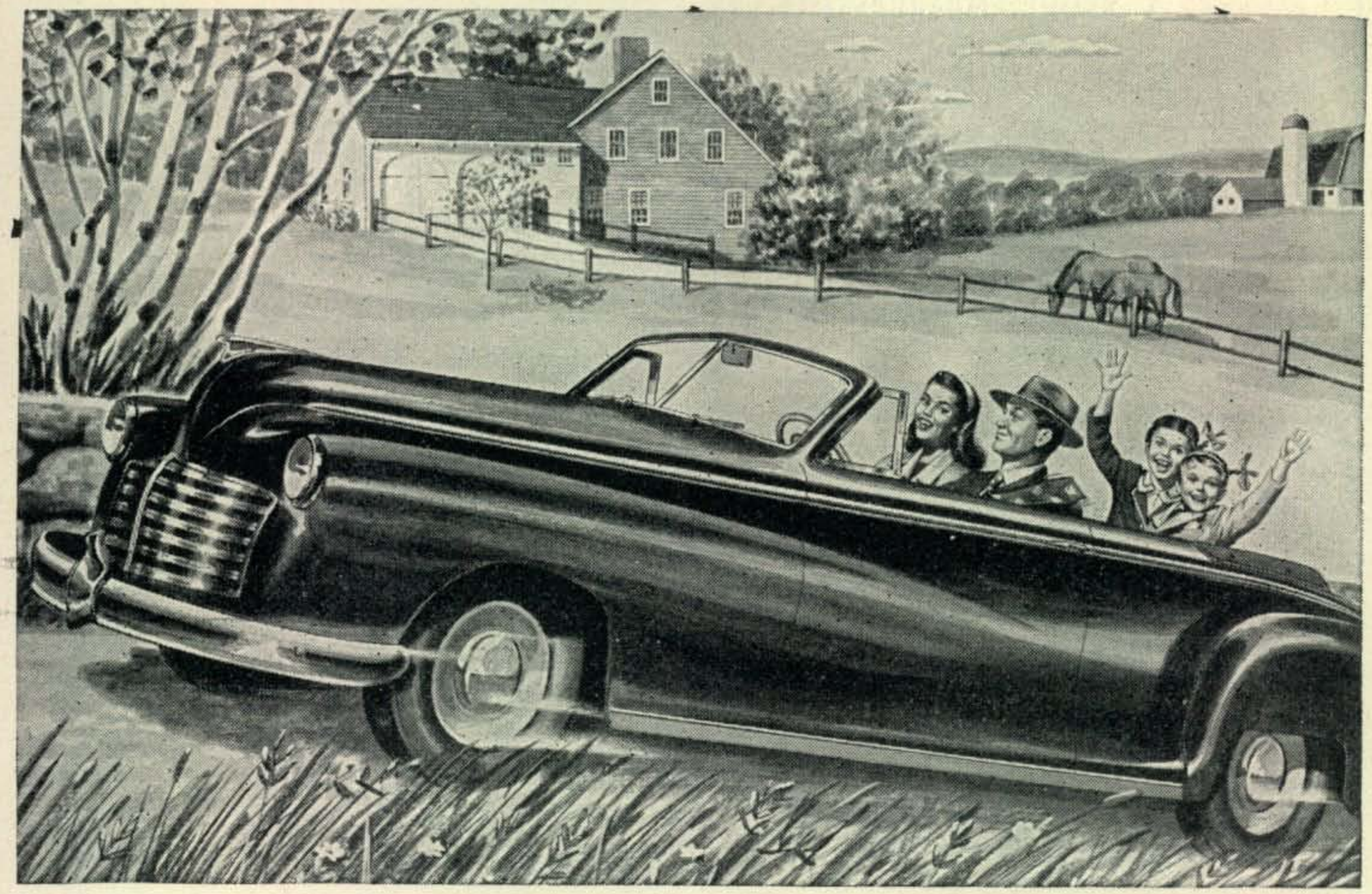
Noise Limiter

The noise limiter added to the BC-224H receiver consisted of a diode 1N34 crystal and a few small parts. The circuit is shown in *Fig. 3*. It greatly reduces ignition noise interference in the 50 and 28-mc bands at relatively small expense and installation work. The circuit would be more effective if the a-f volume control had been moved over to the grid of the audio amplifier tube (single stage a.f. in the BC-224H receiver).

1068 CONVERSION

[*from page 26*]

to read approximately *1*. Leave the *OSC* dial set at *1* and tune the *ANT*, *R.F.* and *DET* for maximum rush level in the speaker and maximum closing of the magic eye. Loosen the i-f transformer adjusting screws with glyptol solvent and back out the #3 tuning slug until the magic eye



This car is running with an "EMPTY" gas tank!

EVEN AFTER the gas gauge says "empty" a modern car can keep going for a good many miles. Here's why.

Automobile manufacturers know human nature. They figure that, sooner or later, we'll get careless, or misjudge how far we have to go. So the gas gauge is set to show "empty," while there are still a couple of gallons left in the tank.

This reserve supply is a swell idea that has kept many a family from getting stuck.

It's an even better idea for a family's budget!

A reserve supply of dollars is a lifesaver in case of financial emergency. It will keep your family going if sudden illness strikes, or unexpected expenses show up.

And one of the easiest ways to build just such a cash reserve is *buying U. S. Savings Bonds on the Payroll Savings Plan!*

Millions of Americans have discovered that *automatic* Bond buying is the quickest, surest way of saving money. What's more, the money you save in Bonds buckles right down and starts *making more money*—in just 10 years you get back $100 for every $75 you put in today.

So keep on buying Bonds on the Payroll Plan. Buy all the extra Bonds you can, at any bank or post office. And remember, you're helping your country as well as yourself—for every Bond you buy plays a part in keeping the U. S. strong and economically sound!

Save the easy way..buy your bonds through payroll savings

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shows the maximum gain. Repeat procedure with #5 tuning slug. These transformers are now tuned to about 13.0 mc.

After removing the cover plate of the r-f section, tune in a signal about 146.0 mc. It should appear at about *3* to *4* on the *OSC* dial. Spread the oscillator coil until the 146-mc signal is received at dial setting *1*. Spread or squeeze the antenna (r-f stage) and detector (mixer) coils to make all dials read approximately the same as the *OSC* dial setting. If the antenna coil or the detector coil will not resonate near point *1* on the dials it may be necessary to add a small padder condenser across each coil. When the r-f section has been adjusted for maximum gain, peak the i-f transformers starting with the #2 transformer. It is not necessary to retune i-f transformer #1.

For convenience at W3GQS the *R.F.*, *DET* and *OSC* have been ganged. This has been accomplished by cutting on a lathe three lucite knobs as illustrated in *Fig. 2* and installed as shown in the accompanying photographs.

THE DADIT

[*from page 17*]

relay will leave little doubt as to the particular type that is used and may further serve to convey some idea of the approximate contact spacing. In the initial adjustment, loosen both upper and lower contacts until it becomes possible to seat the armature flat against the laminated pole pieces passing through the center of the relay coil. Adjust the upper contact (the one that would normally contact the armature when the latter was in the relay-energized position) until positive contact is made with the armature. Unscrew the *lower* contact until the space between the armature and the *upper* contact is about one sixteenth inch (on the model unit, .055″ or equivalent to about 20 interior pages of *CQ* Magazine). Owing to the fact that the armature in the idle position is at a considerable angle with relation to the contact surface of the upper contact, do your measuring at the *closest* point. Generalizing, one should use the widest possible spacing that will still permit the dash speed to be reduced by the controlling resistor, to a minimum of 20 wpm. Too-close spacing will result in excessive dash speed and lack of adequate space between dash characters. Too-great spacing will produce erratic and sluggish operation. Once the spacing has been properly set, the remaining adjustment is made with the relay tension spring. Listen to the monitor and adjust this spring for the sharpest, cleanest sounding dashes. Tendency for the dashes to run together will generally be traceable to improper contact spacing and/or

spring tension. Incorrect spring tension can also result in armature "bounce" which effect will be evidenced by a fuzziness at the end of each dash. As a strict matter of fact, one should do a bit of practicing on the Dadit, using the monitor, before he can really be competent to judge proper adjustment. Set it up as close as you can to get started—if you haven't used an automatic key before the first few tries will be more than discouraging and you may produce some results that are not the fault of the keyer. After a bit of practice one can soon tell where the fault lies and make further relay adjustments should this be deemed advisable. Don't worry about the Dadit impairing your manual sending, these automatics require a nicety of touch that will *improve* your manual paddling. As to whether the automatics are worth while, listen in on W6MUR or WØZAR some night and be converted. However, there are no half-way measures possible with an automatic; you either send perfect code or you send gibberish! The Dadit for all its simplicity of design can keep pace with any of its more complex "electronic" brothers and it is our hope that it may serve as a stimulus to many to perfect themselves in the grand old art of fast, clean code operation.

The writer wishes to express his appreciation to F. D. Wells, W6QUC for his technical assistance and to Jean Pera, W6DOT for his excellent photography.

AMATEUR NEWCOMER

[*from page 30*]

receive and hold a charge is called *capacity*, and this quantity is determined by the size of the plates, the separation distance between them, and other factors.

The capacity is measured in terms of the *farad*. Again, as in the case of the inductor, the unit is too large for radio work, and more common use is made of the *microfarad*, abbreviated μf, which is 1/1,000,000th of a farad, and the one one-millionth (1/1,000,000th) of a microfarad unit, or *micromicrofarad*, abbreviated μμf.

We have seen that, as a condenser takes on a charge, the crowding electrons resist the arrival of more electrons. If we can visualize a condenser connected to a voltage source and alternately charging and discharging many many times per second, we can see that, each time the condenser discharges, a following rush of electrons occurs in an effort to replace the departing electrons. Thus, as the capacitor or condenser takes on a charge, it resists against further charge; as it loses a charge, it tries to replace the loss by taking on another charge.

This behavior is very similar to that which was noted in the case of the inductor. The inductor

had a tendency to smooth out or average the current flowing through its turns of wire by virtue of its property of inductance. The condenser has a tendency to smooth out or average the voltage by virtue of its capacitance.

These tendencies are known as *reactance*. They are a property of reacting against change. In the case of the inductor, the property is known as inductive reactance; in the case of the condenser it is capacitive reactance.

One more point should be made, and that is the effect of frequency on reactance. The inductive reactance of a coil *increases* as the frequency of the alternating current is increased; the capacitive reactance of a condenser *decreases* as the frequency of the alternating current is increased. In both cases it is assumed that the inductance and capacitance remain constant and only the frequency varies to produce the variation in reactance.

When an inductor and a capacitor are connected into a circuit into which are being fed a number of different alternating current frequencies, it is possible to make the combination *resonate* at each of the several frequencies in turn, either by varying the inductance of the coil or by varying the capacity of the condenser (usually, as we have said, the latter.) This constitutes tuning of a resonant circuit.

The inductance-capacity circuit is said to be *in resonance*, or to resonate at a given frequency when the inductive reactance and the capacitive reactance are equal at that frequency. In the parallel-connected circuit, with which we are here concerned, this means that the parallel-resonant impedance of the circuit is then at its highest. The *impedance* is the measure of the circuit's ability to hinder the flow of alternating current.

Because we can change the capacity of the condenser by rotating it, thus making the relationship between the plates change, it is possible to make the inductive reactance of the coil (which remains constant) and the capacitive reactance of the condenser (which varies) equal for each of the several frequencies in turn, thus tuning the circuit to each of the several stations capable of being received within a given band of frequencies. It should also be pointed out that the range of frequencies to which the combination is capable of tuning is fundamentally determined by the value of inductance in the coil and the minimum and maximum capacity of the condenser. As these are made lower in value, the circuit tunes to higher frequencies, and vice versa.

As mentioned above, when the circuit is tuned to the frequency of a given station, its impedance is at its highest for that frequency, but comparatively lower for other frequencies. These unwanted frequencies thus pass through the circuit

and to ground. The wanted frequency, however, being unable to pass down through the circuit to ground, is passed along to another part of the receiver. In the simple receiver, this next part of the set is the detector.

The Detector

There are many different types of detectors, or rectifiers, as they may be called. The choice of which type to use depends in general upon the particular application. The vacuum tube is one such type of detector; it is applicable to many different functions, and is more generally employed than any other type.

In our case, however, the detector is required to be capable of passing but a minute amount of current, hence we may economically employ a small metallic rectifier. This rectifier has the property of passing current in one direction only. Since the rectifier prevents the passage of alternating-current reversals, it effectively converts the alternating current into unidirectional current.

The signal current, alternating at a radio frequency as determined by the tuned circuit, is passed on from the tuned circuit to the detector or rectifier. Since the current is permitted to pass in but one direction, it becomes a direct current in the detector. At the time the signal was emitted from the transmitter, voice or music had been impressed upon the radio-frequency wave, altering its amplitude. This process is called modulation. When the signal is detected, or demodulated, the alternating wave form, with its impressed modulation, has been reduced to direct current, varying in intensity as it has been varied by the modulation, and with its amplitude exactly proportional to the originally impressed modulation. It is then fed to some sort of a reproducing device.

The Reproducer

The reproducer is a device of some sort designed to convert a varying electrical current into mechanical motion so that it may be heard as sound. Ordinary headphones are among the most sensitive of such devices, responding to relatively minute changes in current.

If you remove the cap from one of your headphones you will discover that it contains a metal diaphragm, which is very thin, and which is made of some metal capable of responding to magnetic force. Below it are a pair of small electromagnets, set at a right angle to the diaphragm, with their cores very close to the diaphragm.

When a current is passed through these small electromagnets, the varying current intensity results in a variation in the magnetic field. This variation in the magnetic field causes a movement in the diaphragm, which sets in motion the

air column directly in front of the diaphragm. The motion of the air column is received by the human ear and interpreted as sound.

In the headphone it will be observed that the magnet is very small and that it is wound of many turns of fine wire. This is because the current is small. We saw earlier that the magnetic field was governed in its intensity by the product of the current passing through the coil and the number of turns of wire in the coil. Thus, if the current is small, a large number of turns of wire must be employed to set up a magnetic field strong enough to actuate the diaphragm.

The diaphragm is held in place by the non-magnetic cap, which is perforated to permit the passage of air forming the column actuated by the diaphragm.

If we had been able to provide a stronger current to pass through the magnets (that is, if the current had been amplified in some manner) it would have been possible to use a device with fewer turns of wire. When this is achieved we may employ a loudspeaker. In this device, the heavier current permits fewer turns of wire to be employed, and also provides for a much more powerful magnetic field. It is thus able to actuate a heavier and larger diaphragm, setting in motion a much larger column of air.

TELL ME THESE THINGS

[*from page 24*]

call it every time you hear him, whether he is actually in QSO, calling another station or even calling "CQ no W, please" (They do that occasionally for the fun of it). A few experts even advocate calling DX stations all the time they are transmitting, especially if you are on the same frequency, because the resulting QRM might prevent other stations from hearing it. Personally, I don't advise this, because many DX men who can't copy an S9 station with traffic through S2 QRM, can copy S2 DX through S9 QRM.

This thing of calling DX which you haven't heard is completely logical. Your true DX man automatically flips on his transmitter and calls all DX he hears anybody calling. You never can tell; he might raise it, and he could find it. He knows he won't have far to look; the DX will be either a few kc out of the band, or under the biggest pile of stations calling it. And suppose he can't find it? He has only increased QRM a little, and wasted a bit of time.

To check how general this blind calling is, just recently I picked a call at random —YP9BS— and called it. When I stood by, I counted three other optimists calling YP9BS too. I didn't wait to see who raised him.

In connection with calling DX, a schedule that

Classified Ads

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

SELENIUM RECTIFIERS, half wave 5 ampere $4.25, 2¼A $2.25, 1½A $1.85. Full wave 1A $2.50. ½A $1.85. McMurdo Silver amateur and test equipment stocked. Catalog free. Bursma Radio, R5, Grand Rapids 4, Mich.

QSL s . . . Samples for Stamp . . . Henry L. Carter, Jr. . . . . W2RSW, 747 S. Plymouth, Rochester 8, N. Y.

AMATEUR radio licenses. Complete code and theory preparations for passing amateur radio examinations. Home study courses: American Radio Institute, 101 West 63rd Street, New York City.

BEAM ANTENNA. All aluminum. High efficiency with minimum weight and torque. 2 to 20 meters. Write for information. W2KMQ, 956 Paulding Street, Peekskill, N. Y.

QSLs on kromekote cards. W1KMP, P. O. Box 219, Cambridge, Mass.

AMATEUR LICENSES: Have your license incased in plastic for durability and permanence. Send ticket and 50c to S. C. Houston, W6ZM, 3164 Bona Street, Oakland 1, Calif.

QSL CARDS, ham stationery, samples, Turner, Box 308, Petersburg, Va.

HROW complete with extra 20 meter band spread coil and noise limiter. Slightly used. $250 or best offer. W1DAU, Worcester, Mass.

KW power supply Thordarson CHT; Kenyon T line, including UTC varitron; 600v supply; bias supply; 350v regulated supply; 40 meter v.f.o. 5 3" round Weston meters; 500w PA B&W, National, etc., PP 35Ts, extra set HK54s; 6' rack. Should be rebuilt to conform to postwar designs. $150 takes everything. Brand New panadaptor, $65. Millen 50 watt exciter, $25.00. Howard Langerman, W2LBJ, Harbor Acres, Port Washington, L.I., N.Y.

SEVERAL new experimental phone transmitters for sale at approximately $1 per watt, complete with tubes and coils for all bands. Power amplifier input ranges from 200 to 350 w. F. C. Jones, 2037 Durant Ave., Berkeley 4, Calif.

SELL: 50 watt CW transmitter, coils, cabinet, nearly new, $25.00. W9MZW, Kingston, Illinois.

BOOKS FOR HAMS supplied by mail. Operating, math, UHF, television—all latest titles. Postcard brings free illustrated catalog. D. B. Nephews Publishing Company, Dept. R6, 300 Pacific Street, Brooklyn 2, N. Y.

SUPER PRO, Army model, rack mounting, with power supply; less speaker, perfect—$195. W20XR, 71 Crosshill St., Staten Island, N. Y.

SELL: 200 watt fone CW transmitter 813 final TZ40 modulators has dual power supplies, 80, 40, 20, 10 coils rack and panel four sides—$160. W7HZ, Puyallup, Wash.

TRADE OR SELL: Meissner signal calibrator model 9-1076 for good record changer, typewriter, Rider manuals or $40 cash. W9KHF, 912 W. 151 St., E. Chicago, Ind.

SELL complete station—New York area only—200 watt phone transmitter, HQ120X, Freq. Meter, $250. Call Olinville 2-8892 evenings.

FOR SALE: R44/ARR-5 receiver. 27 to 145 mc. FM and AM. Similar to Hallicrafters S-36A. No power supply. $75. W7BCU, 1509 N. 16th St., Boise, Idaho.

BT XTALS—low drift. Stocked 4,500 to 7,500 kc, 8,000 to 9,700 kc. Calibrated plus or minus 1 kc. Mounted in 5 pin or octal holder—75c. Unmounted—30c. Holders 40c. Money back guarantee. James McCarty, 7301 Ibsen Street, Chicago 31, Illinois.

ATTENTION OPERATORS using speed keys: special pad prevents any bug from walking on any tabletop. Long-lasting, endorsed by many enthusiastic users. Two postpaid fifty cents. Howard Severeid, 2924 Station Street, Indianapolis.

QSLs—samples for stamp. Pearce Press, Danbury, Conn.

New BC312 receivers $44.50; GR No. 200-CMH 500-watt Variacs $15.75; Thordarson T-19P57 transformers 2150v CT @ 125ma and 1015v CT @ 150ma $5.95; Code practice oscillator, bakelite case with key, tubes, speaker, AC power supply $6.95; BC654 transmitter-receivers new $29.50; PE103 dynamotors new $12.75; BC223 75-80 meter phone-CW transmitters new $16.95; Supreme 542 Volt-ohmmeter $14.75. Write for bulletin. W5EAL, 1110 Winbern, Houston, Texas.

QSLs? SWLs? Samples 20c. Bliley Crystals? Sackers, W8DED, Holland, Mich. (VHF-152, RME-45, RME-84).

FOR TRANSMISSION OR TELEVISION lines it's 1/4" RG59/U—73 ohm coaxial cable @ 7c/ft. 3E29 (829B) @ $7.50 pair, 832 @ $6.00 pair, 12A6 @ $1.10, 12C8 @ $1.25, dual 6 mfd—400 wv oil, metal can filters @ 85c, SCR-522 receiver #212 combination filter @ $1.00, 12 mc IF transformer @ $1.00. Order SCR-522 parts by numbers and send your lists to Castle Radio Supply, 677 Euclid Ave., Brooklyn 8, N. Y.

NEW 80 & 40 M. ECO, buffer & 807 final CW & push-to-talk phone; superhet communication receiver; 240 mc 4 tube 5 watt transceiver; 5 watt amplifier, operates on 6 v.a.c. & 500 v.d.c. Complete with 15 new tubes, large schematic, all $39.50. Z. T. Bogar, Rt. 1., Box 286, Laurel Maryland.

SALE OR TRADE: U.T.C. 2000v transformer S-46—$10. Dynamotor PE-73-C 1000v 400 ma output—$15. Assorted quality mica condensers and transmitting variable condensers. All guaranteed new. D. Victorson, 255 E. Pkwy, Brooklyn, N.Y.

FOR SALE: 300 watt Collins transmitter, $400. Les Sparhawk, 4616 Douglas Ave., Des Moines, Iowa.

TWO 861s factory crated—$75 each, $125 pair. New 803s $7.50 each, $21 for three. Kilowatt final, pair 4-250As. Plate, screen, grid & filament meters. 19" panel, filament xformer, B&W swinging link with panel control. 6L6 doubler will drive it. Used ten hours. $120.00. L. E. Street, W7DJY, Box 851, Seaside, Oregon.

CRYSTAL KIT: Includes 4 finished, highly active "BT" crystals; state preferred frequencies in 3500 to 8500 kilocycle range; 2 holders, abrasive, instructions, treatise, $1.00. Breon Laboratories, Williamsport, Penna.

FOR FIELD DAY AC-DC battery portable S-39, original cost $110, sell $85 less batteries. Write for photo, details. Gates, 214 Chicago House, Ann Arbor, Mich.

SELL: Power supplies, rack mounting, commercially built. Formerly powered a 750 watt transmitter. George Kravitz, 7919 20 Ave., Brooklyn, N. Y.

BC-312N complete with speaker converted to 110 AC, $45. Don Cross, Creighton, Nebr.

OK2HX and W6CUH had before the war comes to mind. The schedule was on approximately 14,390 kc (a mistake right from the start, because at that time, 90% of all c-w stations on 20 meters operated between 14,386 and 14,399.9 kc.) OK2HX would call W6CUH and stand by. 20 or 30 stations would be calling OK2HX. After this happened a few times, they got wise and CUH called first. Did that solve the problem? Well only 15 or 20 stations would call OK2HX with him. Finally neither mentioned OK2HX's call until contact was established. This stratagem worked fairly well, except for those who knew about the schedule, or recognized OK2HX's fist.

Call DX *s-l-o-w-l-y* and *l-o-n-g*, and drag out the dots until they are as long as the dashes. Fading and "skip" and "echo" effects have a tendency to make the dots sound longer, and it is perfectly obvious that if you make dots longer to begin with, they won't be as long after they have been lengthened as they would have been if they were shorter. You may have to read that statement over a few times, but it will become perfectly clear when you take the effects of the ionosphere into account — I think.

If you are only interested in phone and think it's a gyp that you can't work "20" or "75" for a year, don't fret; your novitiate on "10" and "11" gives you a chance to get a few good phone habits firmly ingrained.

First, always remember that ham radio is a serious business, and you should no more laugh over

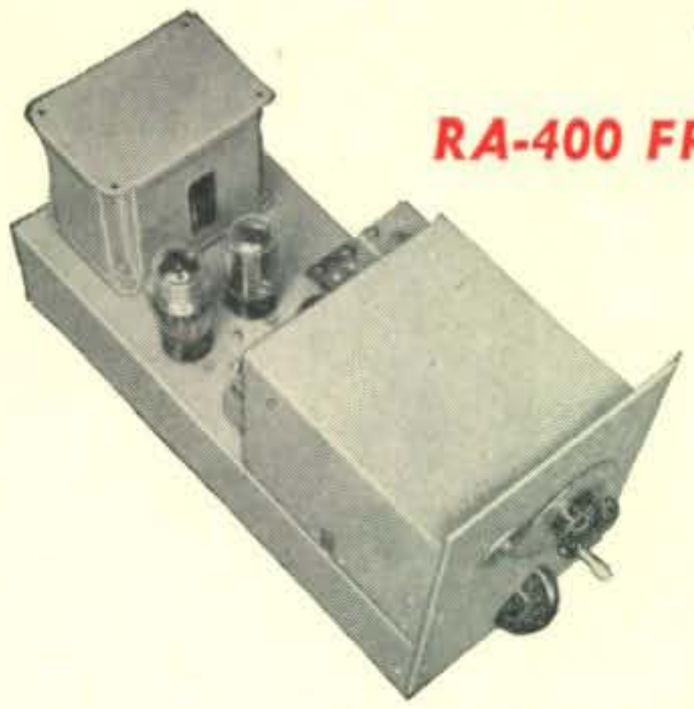
a microphone than at your grandmother's funeral. If you say anything funny, stifle the impulse to laugh and say, "Hi, hi," instead. Secondly, never use an English word when a "Q" signal or a c-w abbreviation can be used. Interference is always "QRM — M, Montana." Static is "QRN — N, Nevada" and your wife is always the "OW" or the "XYL". If you constantly practice these rules, and always call CQ, never "any amateur station" and sign off with "diddle-de-bump-de-bump," no one will be able to tell you from the hoariest of old-timers on any band.

Well, OM, hope this helps you, hi. Best 73's, and lots of DX. This was a swell QSO, OM, hi, hi, Om. Hope to C U when condx R btr, OM, hi. 73 and diddle-de-bump-de-bump. AR and SK, OM, QRZ?

CQ Ad Index

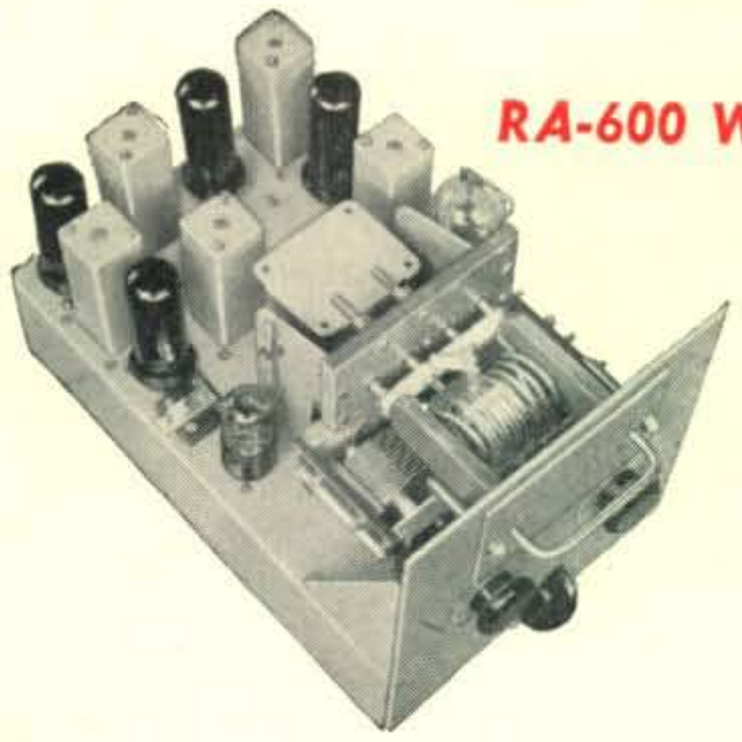
Here they are! TEMCO'S NEW Series R A BASIC *Transmitter* UNITS

Can be bought individually or in any combination as required



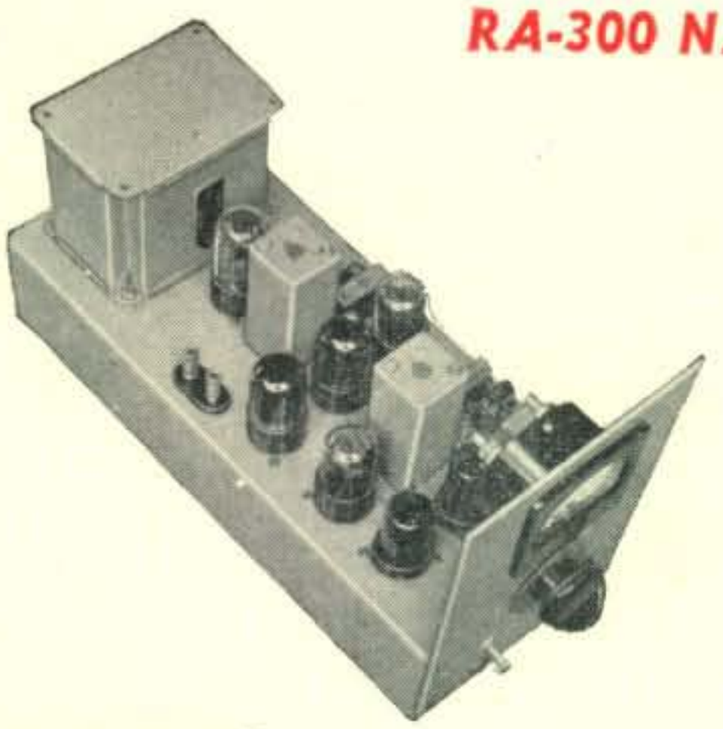
RA-400 FREQUENCY METER TYPE VFO & CRYSTAL OSC.

This unit consists of a highly stable, temperature compensated Variable Frequency Oscillator followed by a class A isolator and a wide band frequency doubling stage, with complete voltage regulated power supply for all stages. By means of a selector switch, the wide band frequency doubler functions as a crystal oscillator with provisions for two crystals. Approximately 40 volts rms output is obtained from both the VFO and crystal oscillator; more than ample to drive succeeding frequency multipliers. Frequency coverage is continuous from 3.3 to 4.2 mcs. VFO frequency stability is comparable to that obtained from direct crystal control. Resettability is within 100 cycles at the fundamental frequency. Approximately 2000 dial divisions are available for the 900 KC range of the VFO. Plug-in type chassis with all controls mounted on front panel.



RA-600 WIDE BAND MULTIPLIERS & POWER AMPLIFIER

The series of amplifiers and frequency multiplier stages preceding the final power amplifier, require no tuning adjustments within a single band of frequencies. Bandpass action is accomplished by coupled circuits, which, once adjusted, require no further tuning. Panel switch for band selection. Final amplifier stage (with either 150 or 250 watt input ratings) employs a panel inserted plug-in inductor. Tuning and vernier loading by panel controls. Frequency range: 3.5-4 mcs, 7.0-7.3 mcs. 14-14.4 mcs, 21-21.5 mcs, 27.1-29.7 mcs. Output impedance range: 50 to 1000 ohms, balanced or unbalanced loads. Those interested in only one or two bands may economize by buying only required sets of coils. Automatic RF input and output connections.



RA-300 NARROW BAND FM SPEECH AMP.-MODULATOR

This NBFM unit employs phase shift modulation of crystal controlled oscillator by means of balanced modulators which substantially eliminate even order harmonics. By the use of a 6 db per Octave PM/FM network, the following overall audio response is obtained: 300 cps-6 db, 500 cps-2 db, 1000 cps—0 db, 3000 cps-2 db, 4500 cps-6 db. Its RF output is 40 volts rms with provisions for both high and low impedance connections. Its deviation is fully adjustable from 0-5 KC at 28 mcs for 1000 cycle input. A built-in frequency deviation meter provides for proper deviation adjustment. This meter is also employed as an indicator of drive to balanced modulators. Accommodates four crystal holders selected by panel switch. All power connections emerge through rear chassis plug. Automatic RF output connection.

Write for Series RA Catalog. *See these chassis on display at your dealer. Other units available include AM Speech Amplifier-Modulators and Universal Low & High Voltage Power Supplies.*

SERIES RA TRANSMITTER CABINET with 6 Basic TEMCO CHASSIS UNITS plugged into position ready to operate. These cabinets are universally wired for all combinations in 150 and 250 Watt input ratings.

TEMCO
RADIO COMMUNICATION EQUIPMENT

TRANSMITTER EQUIPMENT MFG. CO., Inc. 345 HUDSON STREET NEW YORK 14, N. Y.

Handles more watts for your dollar than any other beam transmitting type

RCA-813

AMATEUR NET PRICE *ONLY* $14.50

Compare these facts about the RCA-813

- **It takes full input with a plate voltage of only 2250 volts.**
- **It takes full input *without* forced air-cooling.**
- **It takes full input up to 30 Mc . . . with full plate-circuit efficiency.**
- **It takes full input with less than 5 watts of grid-driving power.**

NOW! THE RCA-813 IS RATED FOR CLASS AB_2 MODULATOR SERVICE.

A pair of 813's will fully modulate a one kilowatt rig. Typical data follows.

	CCS		ICAS
DC plate volts	2000	2250	2500
DC grid No. 2 volts*	750	750	750
DC grid No. 1 volts	−90	−90	−95
DC grid No. 3 volts	0	0	0
Peak of grid No. 1 to grid No. 1 volts	230	230	235
zero-sig. dc plate ma	40	45	35
max.-sig. dc plate ma	315	315	360
zero-sig. dc grid No. 2 ma	1.5	1.5	1.2
max.-sig. dc grid No. 2 ma	58	58	55
effective load resistance (ohms) plate-to-plate	16000	18500	17000
max.-sig. watts drive (approx.)	0.10	0.10	0.35
max.-sig. watts output (approx.)	455	515	650

*From source of good regulation.

FOR high-power work using fewer stages . . . for full input at reasonable plate voltages . . . for normal operation with natural air cooling, RCA-813 is your tube. Under ICAS ratings it will take 200 ma at 2000 volts for class C 'phone, and 225 ma at 2250 volts for class C telegraphy . . . more than 34 watts per dollar. And driving power? One RCA-6L6 doubler will more than handle a pair of 813's at 800 watts input on 'phone and a full kilowatt on cw . . . with power to spare.

Designed by RCA from plate cap to base pin, the 813 features a heavy 50-watt filament, a hard glass bulb, an oversize graphite plate, short internal leads. *In well-designed circuits the tube needs no neutralization.*

Complete information on the RCA-813 is yours for the asking. See your local RCA Tube Distributor or write RCA, Commercial Engineering, Section M-39F, Harrison, N. J.

Have you seen HAM TIPS? There's a copy waiting for you at your local RCA Tube Distributor.

THE FOUNTAINHEAD OF MODERN TUBE DEVELOPMENT IS RCA

TUBE DEPARTMENT

RADIO CORPORATION of AMERICA

HARRISON, N. J.