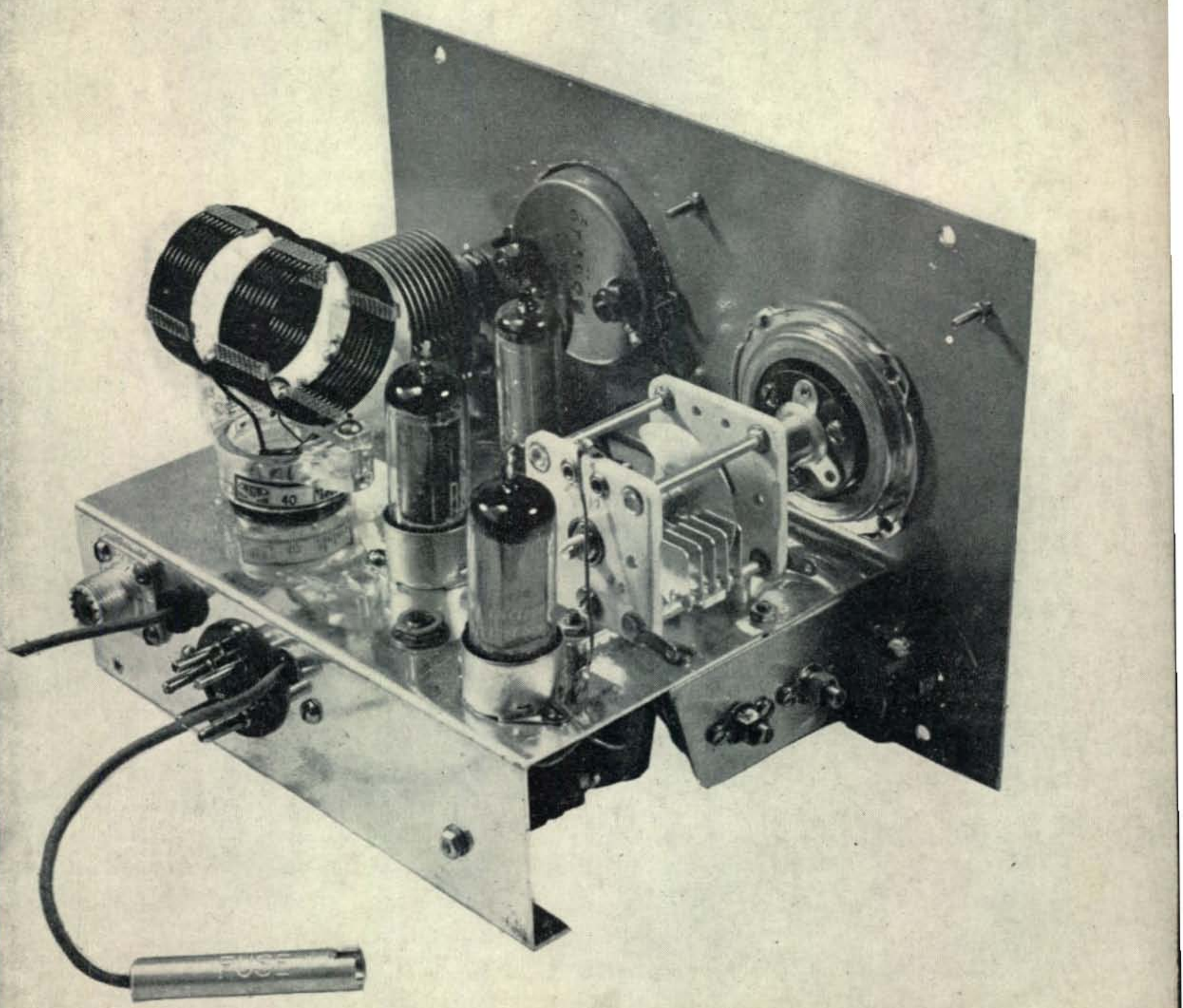
SEPTEMBER
1952

CQ RADIO AMATEURS' JOURNAL

The 'Mobileer' VFO



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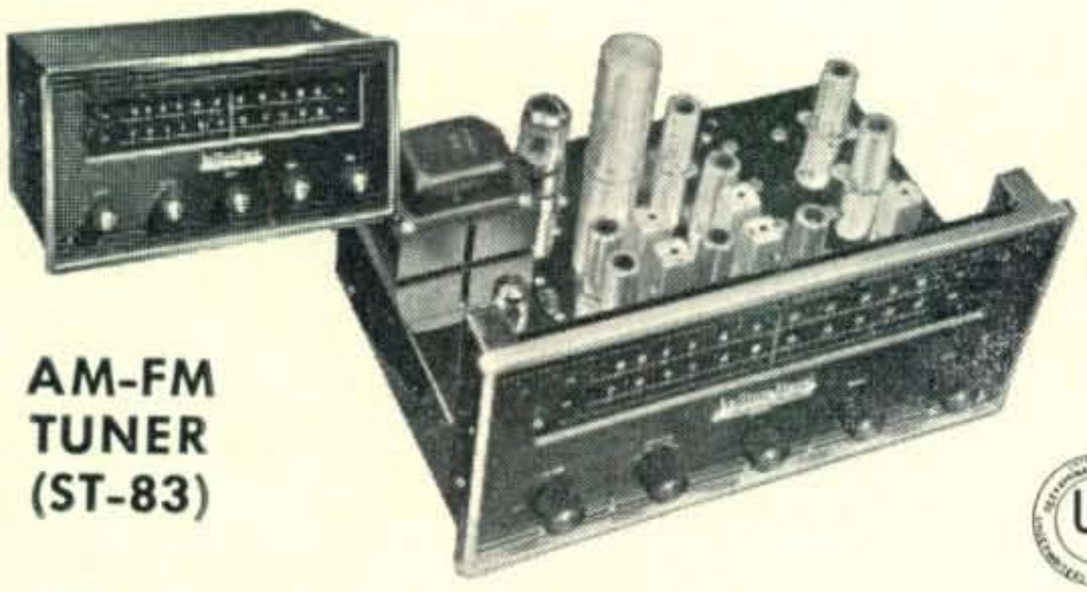
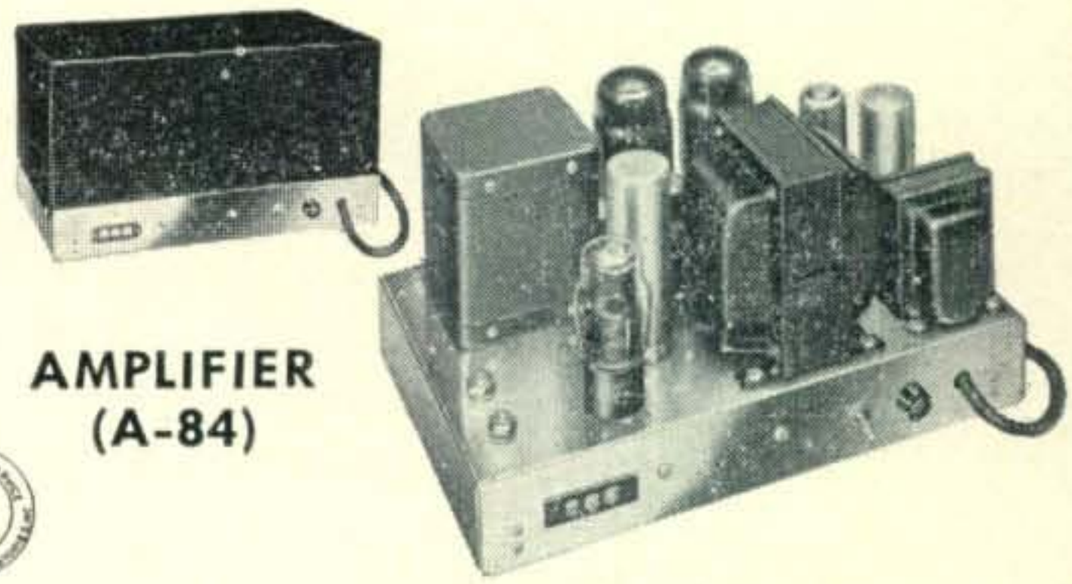


AM-FM TUNER (ST-83)



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Price $129.95

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CQ RADIO AMATEURS' JOURNAL

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FEATURE ARTICLES

Departments

Miscellaneous

Eagle's Nest Rock,
Superstition Mt., Ariz.

Deer Hon. Ed:

On a hot day in Feenix there is no cooler place than good old Eagle's Nest Rock (mainly because it are not in Feenix). I are quite comfortable and exuberate here. Having enuf food for cupple of days, cacktus jooce for longer than that, and a nice portable radio to keeping up with what going on in the world. The view from here is stewpendus. I can seeing every heat wave rising from the ground for miles around. Boy oh boy, Hon. Ed., this are the life—I could staying here the rest of my life. Come to thinking, maybe I will have to staying here quite a while, at least until Hon. Brother Itchi are cooling down. Are he mad at me. Sacremento!

It all starting when friend of mine are having TVI trubble. He going into rig, bypassing everything in sight, installing filters between stages, putting hi-price antenna filter in, and doing everything but burying antenna 6 feets underground, but still he having TVI like murder. When his neighbors start picketing his house, armed to the tooth with shoot-guns, he deciding sum drastic measures are needing, so he calling on champeen gentlefellow Scratchi to fixing things up. He knew that with my reputashon, sumthing are bound to happen. Hon. Ed., let me telling you, it did.

First of all, at his house, I disconnecting antenna and connecting my pet dummy load (beer cans filled with salt water). No dice—receiver in front room still blocks out with TVI. Next are disconnecting final stage and connecting dummy load to driver stage. Wowie!! No TVI! Oh well, it was only matter of time till my collosus intelleck solving problem. TVI are being caused by radiation from final stage. All having to do is shielding final stage. Getting some old copper screening, building wooden framework out of orange crate, putting final in box, turning on power, and BLAM! goes a fuse. Slite

(Continued on page 6)

SCRATCHI

(from page 4)

miscalculation. Tank coil touching copper screening. Quickly rectifying this by rewinding tank coil to smaller diameter.

Now, the big moment. Throwing on power, retuning final, rushing in to look at TV set. Well, I'll be a . . . . TVI still there, in fack, more so. Amchoor friend saying he tolding me so, so Scratchi deciding to take hole rig home where can work on it in pieces and quiet. I loading rig and power supply in car, driving home, and getting all set to test the rig. Drag TV set into shack, turn it on, then turn on rig. Next few seconds are really sumthing. Are heering grate noise, which sounding like Itchi's ranch are subdivision of Chicago stockyard. Such bellering and hollering. Scratchi are so unplussed I just sitting back in chair, and Hon. Brother Itchi are running in, kinda wildeyed, throwing main power switch, and running out again like furies. He also yelling sumthing but I are not understanding him. Too much QRM from loud noises of cows.

Howsomever, I understanding him well enuf to realizing that I better making myself scarcely, so running to garage and getting in car. For sum strange reason car battery are in 1/c condition, so getting car underway pronto. As I leaving, Hon. Brother Itchi come running after car, waving his fist and shouting like sixty. What I heering sound like "stoopid stunt . . . harebrained idea. . . . RF getting in milking machine circuit . . . cows knocked unconshus . . . cows better not die or Scratchi needing new home".

So here I am. If Itchi still looking for me, only place he finding me is here, as this smart fellows are not going looking for him. Golly, RF in milking machine. Whooey! I'll bet those old cows looking funny lying on floor still hooked to milking machine. Hey . . . RF in AC circuit. That are cause of TVI! All having to do is putting in line filter chokes. That is, if amchoor friend of mine ever seeing me again.

It not so bad up here, but I surely would liking to go to Joe's Tripple-Dip Hunky-Dory Ice Cream and Used Magazine Parlor and having one of his Lizard Specials. That are pint of cherry ice cream, pint of coffee ice cream, topped with candied cacktus and ground-up rattlesnake rattles, and covered with pineapple jooce. Oh, excoosing me, Hon. Ed., I not meaning to make you hungry.

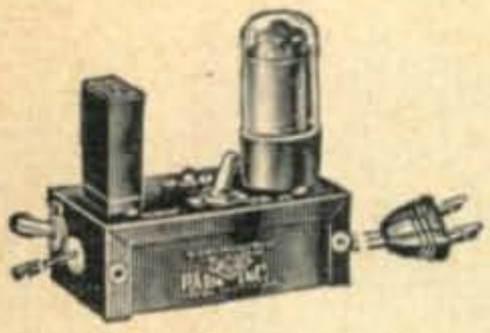
Respectively yours,
Hashafisti Scratchi

It's the Law

F.C.C. Regulation 12.135 states "the licensee of an amateur station shall provide for the measurement of the emitted carrier frequency or frequencies and shall establish procedures for making such measurements regularly . . . measurement shall be made by means independent of the means used to control the frequency generated by the transmitting apparatus and shall be of sufficient accuracy to assure operation within the amateur frequency band used."

BUD Frequency Calibrators and BUD Gimix Help You Avoid Violations

BUD Frequency Calibrator FCC-90



The elimination of drift is a vital responsibility of every amateur operator. To comply with Federal Regulations some means of accurately checking transmitter frequency must be available at every "ham" station. You can avoid a "pink ticket" for off-frequency operation by using the BUD self-powered frequency calibrator. The BUD FCC-90 consists of a 100 kc crystal oscillator that is completely self-powered. It will give 100 kc check points on all bands to 30 megacycles. This enables you to determine the exact band edges.

No extra wiring is required to install this unit. Plug the FCC-90 into a 110 volt receptacle, connect the pick-up lead to the antenna binding post of the receiver and the unit is ready for operation. An ON-OFF switch and a STANDBY switch are provided.

Price $15.69 amateur net

BUD GIMIX GX-79

Here is a multi-purpose unit, one of the functions of which is to enable you to judge whether you are operating within the assigned amateur bands. It is an absorption type wave-meter covering the 10, 15, 20, 40 and 80 meter bands. A handy switch permits easy selection. No additional coils are needed as one coil does the work on all the bands.

A pair of ear-phones plugged into the 'phone jack will convert the unit into a monitor.
It can be used as a field strength meter when link-coupled to a small pickup antenna.
When placed in the field of an amplifier the GIMIX will indicate complete neutralization.
If a milliammeter is plugged into the meter jack, the unit becomes a carrier shift indicator.

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Guest Editorial . . . .

R. V. ANDERSON, W3NL

Emergency Calling Frequencies

FCC Docket 10237 concerns two sections of *Part 12—Rules Governing Amateur Radio Service*. The first part, 12.112, a new section, pertains to the establishing of calling and answering frequency segments. The second part, 12.156, is a rewrite of the present 12.156 bringing it up to date.

The basic principles of calling and answering frequencies were established very early in radio communications with the international use of 500 kc. in the Maritime Service. This application proved so successful that calling and answering frequencies now exist at many points for various services, throughout the radio frequency spectrum. Now, by a new section 12.112, the FCC proposes to extend the provisions of a calling and answering frequency to the amateur bands.

Some amateurs may feel that calling and answering frequencies as applied to the amateur bands is an entirely new concept in amateur communications but this not true. In the past few years, the ARRL has published in *QST* a list of frequencies called "National Calling and Emergency Frequencies." The instructions for the use of these frequencies are in accord with standard calling and answering practice: "After contact has been made the frequency should be *vacated immediately* to accommodate other callers." Where conditions have permitted, these frequencies have been used by many for the exact purpose specified by the ARRL. Thus the amateurs have had calling and answering frequencies, on a voluntary basis, for some time. The new section provides for calling and answering segments on a compulsory basis.

Why?

One may wonder what the motivating influence behind the proposal could have been. For the moment let's look at amateur communications from what might possibly be the FCC's viewpoint and see if we can analyze the whys and wherefores of this proposal.

Any radio station licensed by the FCC must be in the "public interest, convenience and necessity" and one of the principles of amateur radio is "(12.0(a)): Recognition and enhancement of the value of the amateur service to the public as a voluntary non-commercial communication service, particularly with respect to providing emergency communication." Has the amateur generally been fulfilling these requirements? Apparently not completely, in the eyes of the FCC, otherwise the amateurs wouldn't have this docket.

It is common knowledge that AREC's and Civil Defense groups throughout the nation have plans based primarily on mobiles and portables, particularly pack-sets and "handie-talkies." During periods of local emergencies such as plane crashes, tornadoes, train wrecks, etc., mobiles and portables really come into their own. But what frequencies can they use, with kilowatts filling the ham bands to the brim? The answer is easy——the ARRL recommended national calling and emergency frequencies. The catch, of course, is that it simply isn't possible because it takes only a few uncooperative stations operating on these frequencies to block all possibility of making a successful emergency call and that's just exactly what's been happening.

To an outsider it surely must seem unreasonable, (perhaps inconceivable) that, with all the communications which exist on the amateur bands, there is no workable method for an instant contact in an emergency. Voluntary efforts through the amateur's representative organization, the ARRL, have had no practical success. Failure, on a voluntary basis, to provide such a necessary feature in amateur communications can only lead to regulation.

Where?

Assuming our reasoning is correct up to this point, we now come to the actual proposal. The first question is what frequencies to use. There are RACES allocations. Any calling and answering segment should be spotted on the edge of a RACES band so that when and if RACES is implemented, any calling provisions will be all set. Investigation shows that the calling and answering segments have been made to coincide with RACES allocation on all bands except 20 and 40 where no RACES exist. On these bands the ARRL national calling and emergency frequencies have apparently served to spot the segments, one additional being required on 40 since the ARRL specifies only one.

Having established the segments, there remains the specification of procedures. It perhaps would be well if only local emergency and special calling were permitted; however, this can hardly be done without complicated wording technicalities. These is an equivalent, however——open the segments to all types of calling except general CQ's. For normal contacts, the use of calling and answering segments are not as convenient as the usual methods anyway. This will permit CQ's of a geographical, directional or special nature. After a brief "teething" period in which the amateurs learn the capabilities of the segments, the basic use will be for emergencies and secial calling.

There should be a limit placed on the use of the segments by any individual station; to do this the composition of the initial call and the intervals at which it may be repeated need to be specified. Finally, to insure that the intended use of the segments is not violated, the content of the communications after contact has been established needs to be defined. These communications are limited to those necessary to re-establish the contact on other frequencies.

Right or wrong, this line of reasoning brings us in accord with the provisions of the proposed rules.

Now, let's go back to the amateur viewpoint and see if we are "fer" it or "agin" it. Much can be said on both sides and probably will be). I have tried to present this new proposal without comment from an amateur viewpoint; obviously any discussion from an imaginary regulatory viewpoint would be in favor of the proposal. It's up to each individual to form his own opinion. One caution, however.

(Continued on page 58)

Lt. Col. Fred J. Elser
in his ham shack

FAN MAIL FOR A STAR PERFORMER

COLLINS 32V-3

LT. COL. FRED J. ELSER
820 John's Road, Augusta, Georgia, 21 June, 1952

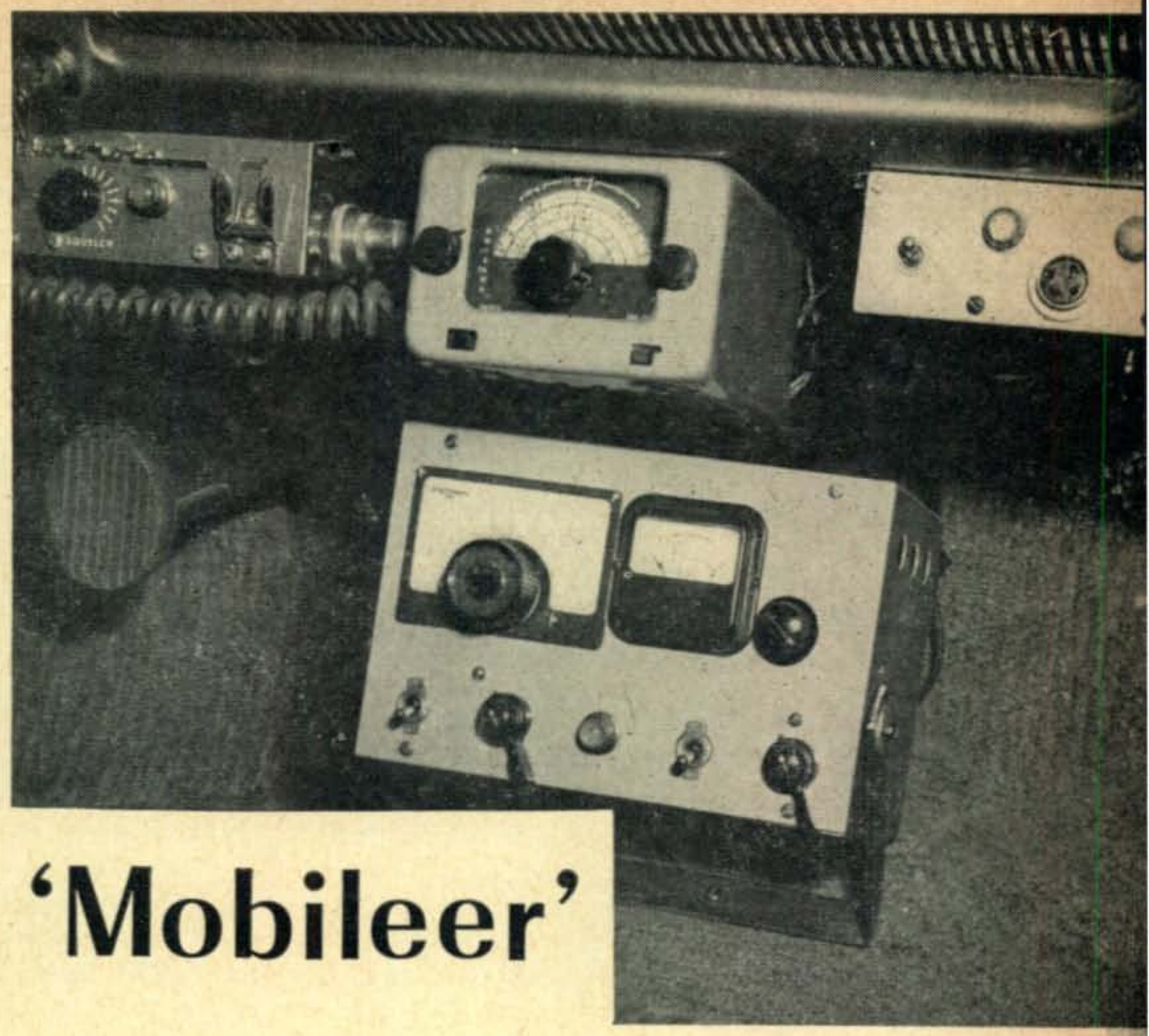
Mr. R. Bellew
Collins Radio Co.
Cedar Rapids, Ia.

Dear Dick:

I received my 32V-3 on 4 April, 1952 and connected it through my 35C-2 filter with RG8/U coax to the Harrison Antenna coupler bought for use with my old 32V-1 in Turkey. This gives me good loading to my 100′ Inverted "L" Marconi Antenna, 30′ high, on all bands 10 through 80 meters. Grounding is accomplished by means of 3/8″ copper braid to the house copper water pipe system. On Sunday, 6 April, with the assistance of W4EZU, W4HRR, and W4RVE, all also members of the Augusta Radio Club's TVI Committee, tests were performed on my neighbor's TV installation, which is a 4-stack bi-conical rotary beam, 50′ from my antenna, feeding thence into the Dumont T.V. Receiver. On no band, including 10 X phone, could my signals be detected while tuning for WSB-TV on Channel 2, or for WBT-TV on Channel 3. Each of these stations is located approximately 150 airline miles from here, in Atlanta and Charlotte, respectively. A Drake 300 ohm "Hi-pass" filter was placed in the TV antenna lead-in, but was really not necessary. I might mention that while testing on Channel 2, with full gain on the TV receiver and preamp, the WSB-TV signal was so weak that the set would not "lock" on it. A strong TV signal in this locality will only run about 50 UV.

As you know, I had complete success with your 32V-1/75A-1 combination in Turkey, and on being ordered to this location knew my 2 Kilowatt rigs (homemade) would never be satisfactory under prevailing TV conditions here. Your 32V-3 (with 35C-2 filter) and 75A2 allow me to continue my 35 years as an active ham.

Thankfully,
/s/ FRED



Viewing the unit from the front the controls along the bottom, (L. to R.) are SW2, SW1, panel light, SW3 and SW4. To the right of the meter is the tuning control C14.

The 'Mobileer' VFO

D. D. ANDREWS, WØNCV*

The need for a v.f.o. has been clearly established in mobile operation. The problem facing most hams is whether to start from scratch and build a new outfit or attempt to add an outboard unit. While the author built this v.f.o. for a transmitter having broad band stages it should be adaptable to general use in existing transmitters. —Editor.

After installing an all-band mobile station in the '51 Plymouth, the novelty of making the dash from the front seat to the trunk for the purpose of replacing crystals for frequency changing soon wore off. At this point the desire appeared for a v.f.o. (the output could be plugged into the crystal socket of the transmitter placed in the trunk.) In this way, any modification of the transmitter (which in the author's case is a *Harvey-Wells TBS-50* powered by a surplus PE-103 dynamotor) would be unnecessary. The v.h.o. described herein does the job nicely and a total of five have been built for other amateurs who also work 75, 20 and 10-meter mobile.

The Circuit

Due to their "ruggedness", 5763's are used in the oscillator and output circuits. The usual Clapp circuit is used in the oscillator with the added facility of more bandspread due to the selection (by *switch 1*) of the proper bandset condenser. Padder *C5*, is set so that *C4* tunes the range of 1900 kc. to 2000 kc. (for 75-meter phone operation) and *C6* sets the range of the oscillator from 1775 kc. to 1860 kc. (for 20 and 10-meter phone operation). The plate of the oscillator doubles by tuning *L2* to approximately 3600 kc. and tests have shown that due to the broad tuning characteristics of *L2* ample drive is also delivered to the output grid at 4000 kc.

If the crystal being replaced by the v.f.o. is of the 80 or 75 meter type, then *V2* is operated straight through. If 40-meter crystal replacement is needed (such as using the *TBS-50* on ten meters) then it is necessary to again double in *V2*. This is accomplished by tapping *L3* by *SW4* so that the output tank tunes 40 meters. Capacity output coupling is used from the v.f.o. to the crystal socket of the transmitter, therefore, the capacity of the co-ax cable connecting the two units becomes a part of the tuned output circuit, *L3-C14*. The author used about 12 feet of RG-59/U and found that using a center tapped 40-meter coil for *L3* does the job nicely. Of course, individual installations may require some pruning of the final tank circuit in order to hit resonance with the v.f.o. connected to the transmitter. Due to the high C—low L type of tank circuit the efficiency leaves much to be desired but output is adequate, both on 80 and 40 meters. Link coupling would require modification as the transmitter end so this is to be avoided if possible.

---

*114 West 8th Street, Topeka, Kansas.

A 0-50 ma. meter is used to indicate dip resonance of the output circuit and the OB2 tube furnishes regulated 150 volts for the screens of both tubes and the plate of the oscillator. The value of *R3* will, of course, depend upon the supply voltage to be used. In the various installations made using this type of v.f.o. the B plus has been obtained from separate vibrator supply, receiver vibrator supply, and a 260-volt 60-ma. dynamotor. All performed satisfactorily. *Switch, SW3,* allows the v.f.o. to be put into operation simultaneously with the transmitter, or alone for frequency spotting. In utilizing a vibrator supply with a rectifier tube, the filaments of the rectifier should be turned on with the filaments of the 5763's by means of *SW2.*

Construction and Tuning

The v.f.o. is housed in a 9" x 7" x 5" aluminum cabinet with removable front and back panels. The chassis is open ended and is formed from 1/16" aluminum so that the deck measures 5" x 7" and the back 2" x 7". A one-half inch lip is left on the front and is used for fastening the chassis to the front panel. A similar lip is left on the bottom of the back so that it rests firmly on the bottom of the cabinet and can be fastened with self tapping machine screws to avoid mechanical movement.[1]

The usual precautions concerning mechanical stability should be especially observed when mounting the oscillator components.[2] The *BUD CE2012* was chosen inasmuch as it is a double bearing condenser and rugged enough to withstand mobile use. Cheaper, single bearing condensers were tried but had to be discarded. Coil *L1,* should be well "doped" with coil cement and all other circuit components should be mounted so as to leave little chance for movement due to shock or vibration. If oscillator drift is encountered, some negative temperature coefficient capacitance paralleling *C4* should cure it. Should this be done, it is necessary to reset *C5* and *C6.* If at first the proper band spread is not produced by rotating *C4* through the full 180 degrees, turns may be added to or subtracted from *L1* until the proper band spread is obtained on both settings of *SW1.*

The oscillator plate coil, *L2,* can be properly tuned by inserting a 0-10 milliammeter between *R2* and ground. The oscillator should be set at 1800 kc. and *L2* tuned, by means of the slug, to 3600 kc. as shown by maximum grid current in the output stage. About two mils of grid current has proved to be about maximum, falling off some at 4 mc.

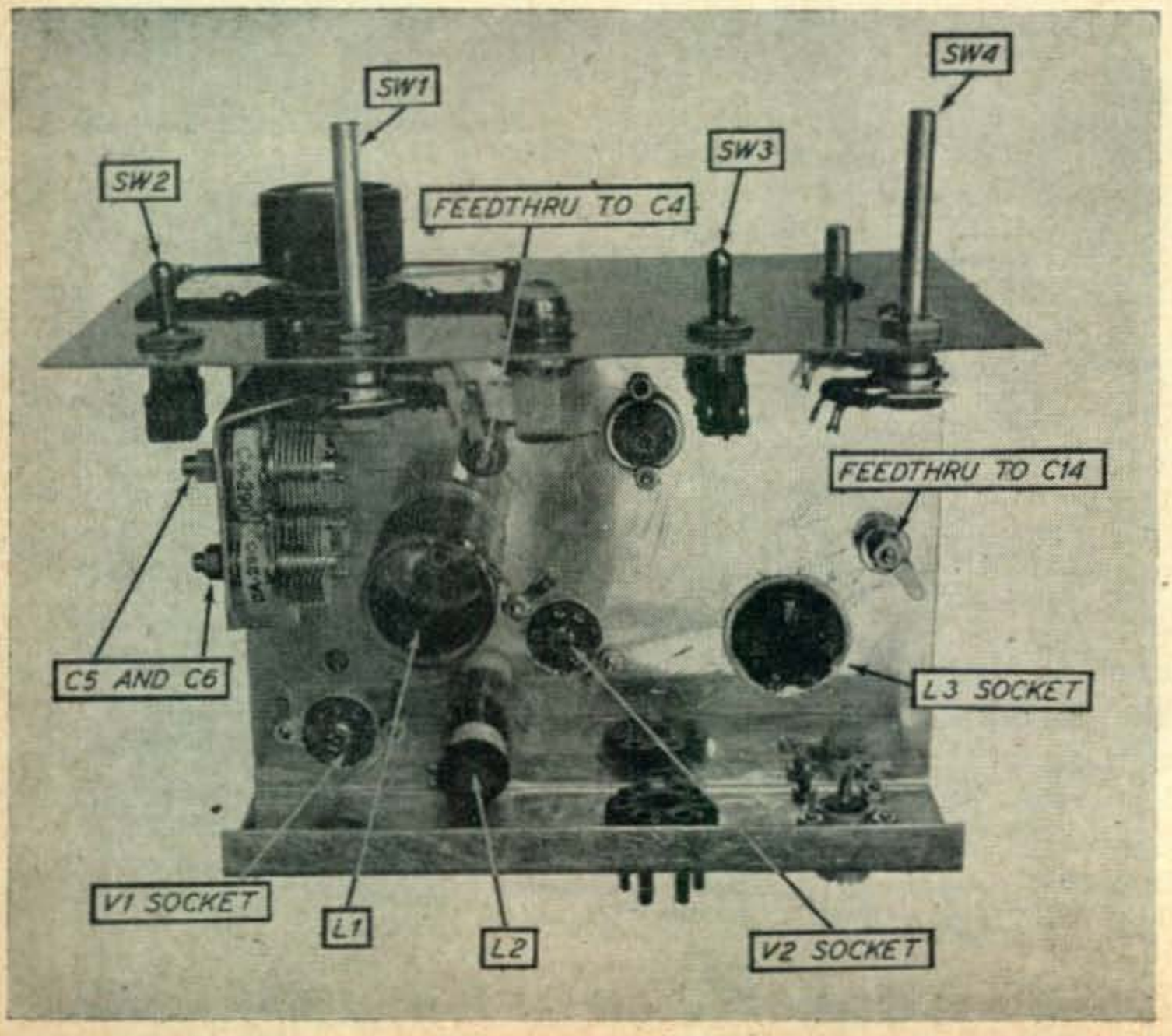
Calibration of the v.f.o. dial is left to the individual. On the dial shown it is suggested that the 75-meter band be indicated on the scale nearest the knob, followed by the 20-meter band on the second scale and the 10-meter band on the third (outside) scale. The least band spread will be found on 20 meters with 10 and 75 each utilizing a good part of the 180 degrees available.

The under chassis view shows the bracket mount for the band set condensers *C5* and *C6.* Access holes are drilled in the cabinet so that these condensers may be set by screw driver adjustment after the unit is installed in the cabinet.

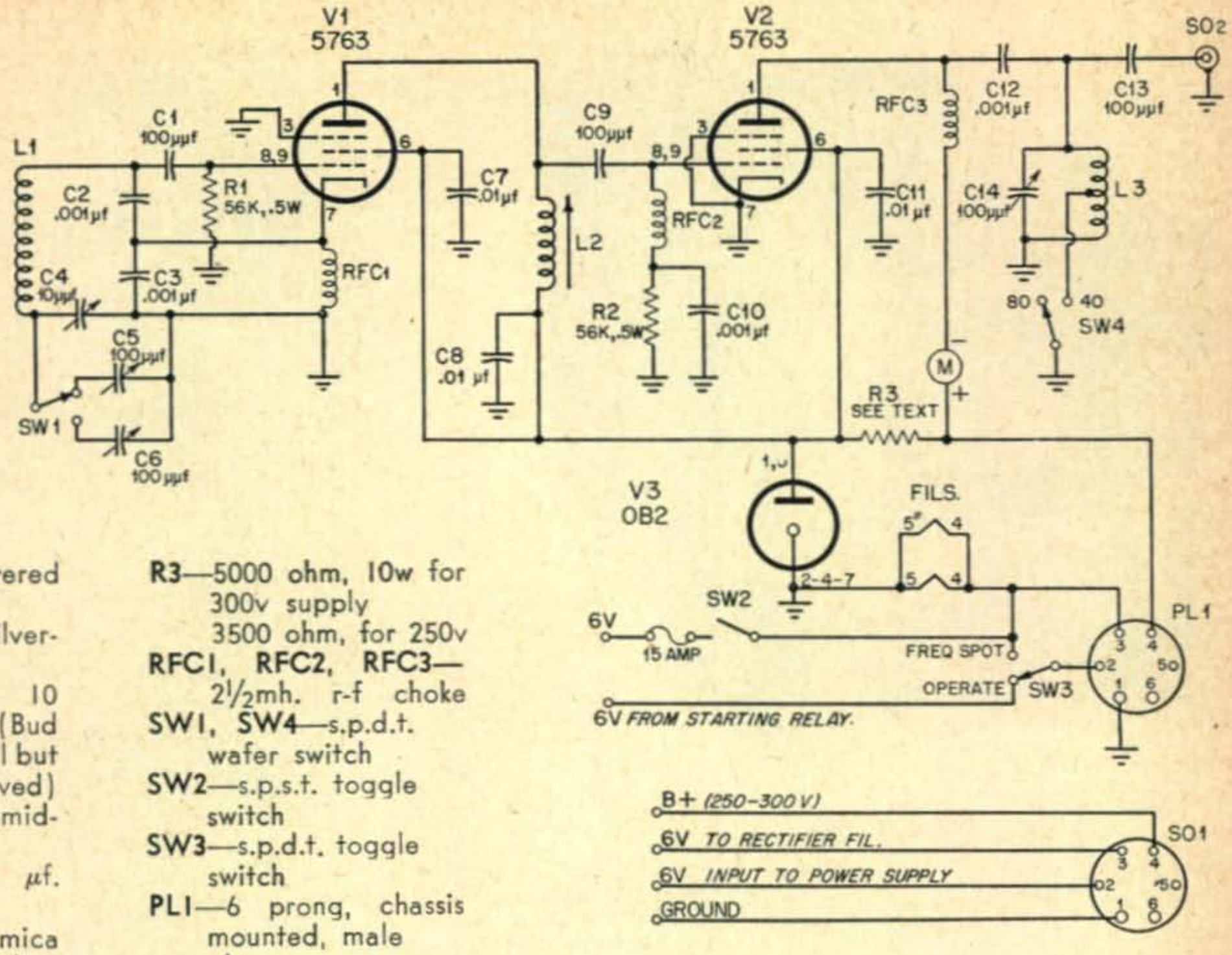
---

1 Mechanical security of the chassis mounting in the cabinet is very important. The bottom of the chassis should be fastened securely in place with screws in order to prevent ferquency shift due to vibration, or twisting of the cabinet. The absence of high resistance grounds is a pre-requisite for stable operation. —Ed.

2 Leads to the oscillator coil and variable capacitors should be kept as rigid as possible to reduce the possibility of instability and microphonics. The author reports earlier experiments with a 6AU6 in the Clapp circuit resulted in difficulties due to automobile vibration. Substituting the rugged 5763 appeared to clear up this trouble. —Ed.



This view below the chassis shows the location of the principal major components before wiring.



Wiring Schematic and Parts List

The photograph on page 12 shows all the com- been pointed out too many times to bear repeating here. This unit is a valuable addition to any mobile installation and can be used, as previously pointed out, without any change to the transmitter now in use.

COIL DATA

L1- 70 T., #30 ENAM. CLOSE WOUND ON 1" D. FORM.

L2- 1½ LAYERS #30 ENAM. CLOSE WOUND ON ½" D. SLUG TUNED FORM, WOUND 1¼" LONG.

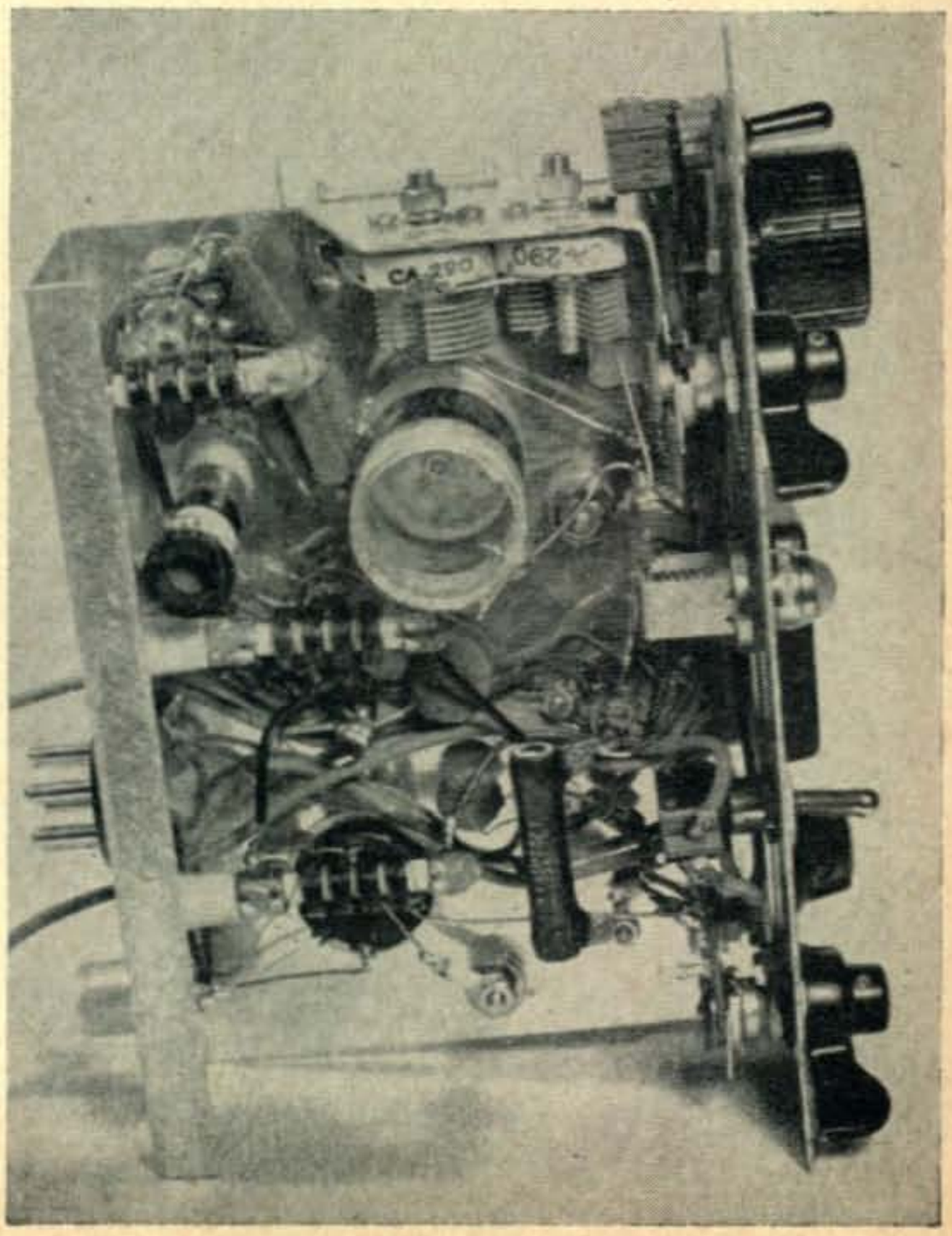
L3- 40 METER COIL, CENTER TAPPED (BUD 40 METER OLS WITH NO LINK)

C1—100 μμf. silvered mica
C2, C3—.001 μf. silvered mica
C4—Approximately 10 μμf. variable (Bud CE2012, with all but one rotor removed)
C5, C6—100 μμf. midget variable
C7, C8, C11—.01 μf. disc ceramic
C9, C13—100 μμf. mica
C10, C12—.001 μf. disc ceramic
C14—100 μμf. variable
R1, R2—56,000 ohm, ½w
R3—5000 ohm, 10w for 300v supply
3500 ohm, for 250v
RFC1, RFC2, RFC3—2½mh. r-f choke
SW1, SW4—s.p.d.t. wafer switch
SW2—s.p.s.t. toggle switch
SW3—s.p.d.t. toggle switch
PL1—6 prong, chassis mounted, male plug
SO1—6 prong female socket
SO2—female co-ax connector
M—0-50 ma d.c. meter
V1, V2—5763 tube
V3—0B2 tube

The photograph on page 00 shows all the components (except the meter) mounted prior to wiring. The band set condensers are in the upper left-hand corner mounted on their bracket. To the right is the oscillator grid coil, *L1,* with the feed through insulator leading to *C4* above. The tube socket for *V1* is in the lower left-hand corner with *L2* to the right, and the socket for *V2* is to the right and above *L2.* The 5 prong socket for *L3* is shown at the right together with the feed through insulator leading to *C14* which is mounted on the top of the chassis.

The amount of frequency changing that can be done within any given band without retuning depends to a great extent upon the transmitter and antenna loading system in use. Since the *Harvey Wells TBS 50* tunes only its pi network (using fixed, broad tuned doublers) it has been found to be fairly tolerant of frequency change. In fact all the 10 and 20-meter phone bands have been worked without returning the transmitter within the band, but only about half the 75-meter band can be covered without the transmitter final going too far off resonance.

The after wiring view below the chassis should be compared with the earlier photo on the opposite page.



the "Snooper"

C. O. BISHOP, W7HEA*

Part Two of Two Parts

This part of the article by W7HEA describes what a panoramic instrument will do and (who will believe it?) just what limitations may be expected. Originally designed for v.h.f. operation and converters with a 7 mc. first conversion frequency, the SNOOPER may be adapted for other frequencies and bands. Copies of the first part of this article describing the circuit and showing the schematic and parts list are available from the CQ Circulation Department at 35c a copy. —Editor.

We have attempted to explain what panoramic reception is, and how it is obtained with the *Snooper,* and like war surplus gear the actual value is not in what you've got, but what can be done with it after you have it. The uses of the *Snooper* are many and new ones appear constantly while using it. It is extremely valuable to the v.h.f. operator as a band monitor.[1] Any 6 or 2 meter man will tell you that many hours have been spent in twisting dials for every DX contact made. The *Snooper's* ability to scan a one-megacycle section of the band automatically and show each and every signal that appears saves lots of wear and tear on the receiver tuning equipment and the operator's nerves. Visual monitoring can be used while around the shack, or, by plugging the audio output into the phono input of the receiver, audio monitoring becomes available. If the band is empty a very distinct buzz can be heard when a signal appears on the scope. That ever present fear that while working the locals the DX might be coming in on other parts of the band is automatically removed. When signals start breaking through they are immediately visible and appropriate action can be taken without delay.

*207 E. Toppenish Ave., Toppenish, Wash.

Net operation is greatly simplified when using the *Snooper* since stations slightly off the frequency can be seen immediately and cut in during the station breaks. For Civil Defense and emergency work the necessity of the control station either using a fairly broad receiver, with its much higher noise level and poorer selectivity, or having one or more other operators watching for stations that are slightly off the frequency is completely eliminated when using the *Snooper. Control* can not only take care of everything around the net frequency, but can also watch other frequencies being used by stations taking part in the operation which are within the scanning width of *Snooper.* Several frequencies may be guarded in this manner by one operator and one receiver. We all know how hard it is to get a group of stations on exactly the same frequency but that, too, is no problem now. When *control* is guarding several frequencies his attention can be attracted by a pre-arranged break signal consisting of a number of short dashes or some other distinctive combination as a keyed pip is very evident on the *Snooper.*

The answer to that old question, "How's my modulation?" is not only a simple matter, but can be very accurately analyzed with the *Snooper.* By widening out the trace (this is done by reducing the sweep width) so that the signal under inspection occupies nearly the entire face of the scope, the signal can be completely inspected at a glance. Just reduce the gain if necessary so that the signal or pip is about half its maximum height. When the signal is modulated, lines will appear on the half sine wave produced by the carrier. Fine lines are made by the high and coarse lines by the low audio frequencies. In good speech quality with a high percentage of readability the lines will be very fine,

1 Commercially built panoramic adaptors are available from Panoramic Radio Products, Inc. who have also indicated that a limited number of their "Handbooks" may be purchased at 50c a copy. This "Handbook" contains valuable information on the operation of panoramic equipment with very complete photographs and text on the interpretation of received signals. Anyone interested in panoramic reception should make every effort to obtain this "Handbook" as a part of their library. —Editor.

with few or no coarse lines present. Very bassy signals produce just the opposite effect, that is, lots of coarse lines and few of the fine ones. It has been noticed here many times that the signals with the finer lines are much more readable when the going gets tough and after all readability is what we are after.

Percentage and linearity of modulation checks are also a simple matter. Set the sweep width control to zero and center the signal with the center frequency control until a straight line appears across the face of the scope. Adjust the gain for about half of full scale deflection. Under 100% modulation and with perfect linearity the negative peaks of audio will just touch the base line and the positive and negative peaks will each deviate an equal distance from the center line of the unmodulated carrier. Any flattening of the negative peaks at the bottom of the scope indicates overmodulation in the negative direction. This will cause splatter which we will discuss in a moment. Smaller positive than negative peaks indicate a lack of linearity and can be caused by such things as insufficient drive, flat tubes, poor match between the modulator and the class "C" stage, improper polarization of the speech and many others. Larger positive than negative peaks, within reason, are perfectly all right and could be caused by a negative peak clipper that is really working, but if they flatten out on the top, excessive audio is indicated. Of course, troubles in the class "C" stage can cause this too.

Splatter can be easily detected with the *Snooper*. It appears as a group of small pips along the base line beyond the larger pip caused by the carrier, and may appear on either or both sides, occasionally or continuously under modulation. Some signals have been noted that had splatter over 100 kc each side of the carrier, yet they sounded fine when tuned in on the nose. Occasionally signals will be radiated on more than one frequency and when the band is not too crowded these spurious signals appear as other pips that bounce in unison with the main carrier. Incidentally all signals bounce under modulation and the height of the pip should double when the carrier is modulated 100 per cent. Of course, the gain control must be set in such a manner that there is room for the pip to double its height for this to take place.

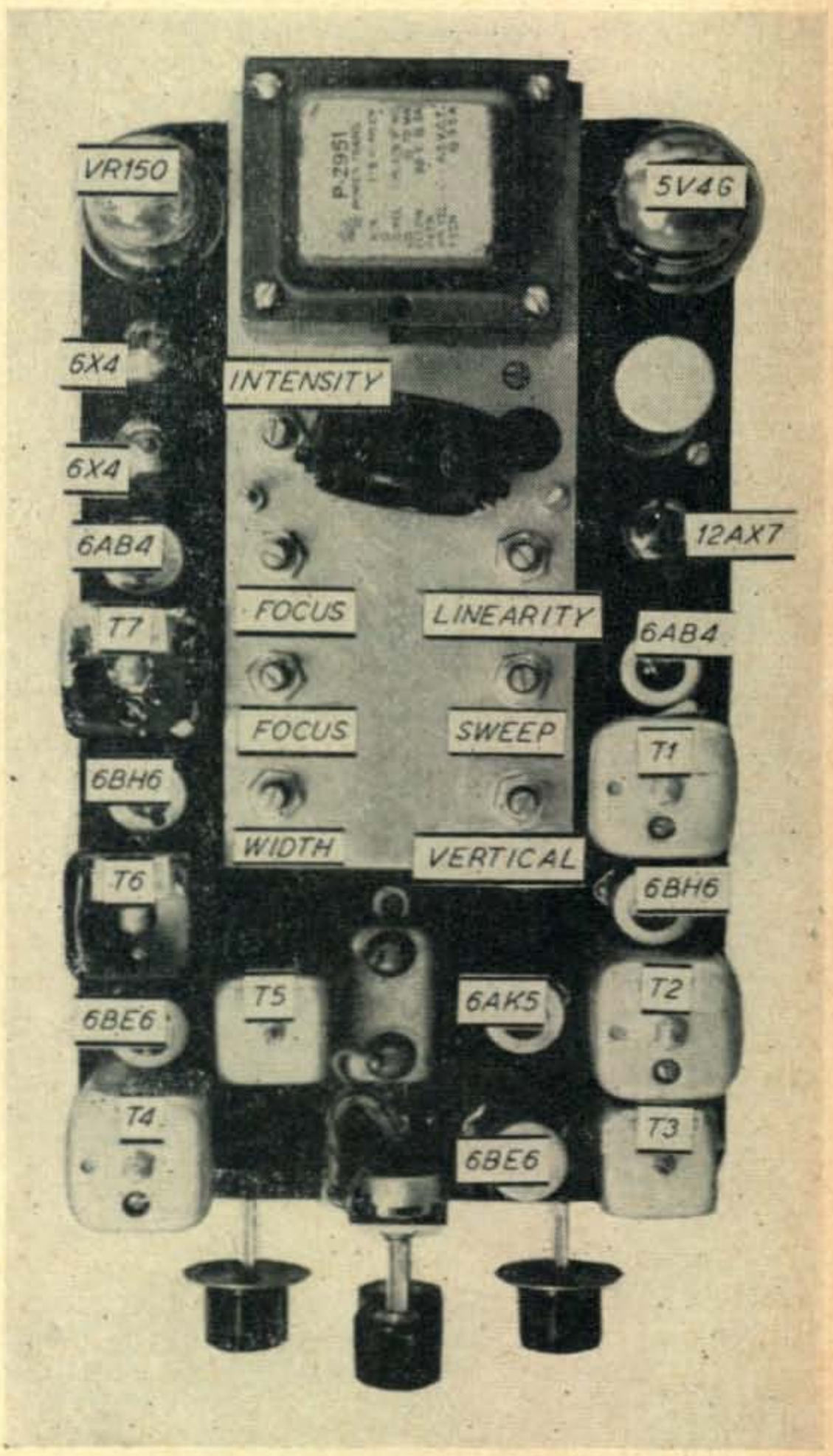
During normal operating periods on a crowded band, holes or unoccupied frequencies are readily apparent and a station can be asked to QSY to one of these without that frantic dial spinning to find a spot for him. If he makes the QSY with the power on, his pip slides across the face of the scope and can be easily followed without losing the contact. Zeroing in on another carrier is also very easy. Just turn on the VFO and slide that pip wherever you want it. No losing it in the QRM. Carrier shift on CW or fone is apparent by a side movement of the pip. It's all there before the eyes, and guess work is eliminated.

Construction

Since the photographs show the parts layout and type of construction much clearer than it is possible for us to explain with words, no bolt-by-bolt description of the construction will be attempted. Past experience has shown that Hams seldom, if ever, make a Chinese copy of a piece of equipment. Even factory production lines make changes occasionally. We will say that the little poop deck that holds the scope tube and the semi-fixed controls is made from a piece of sheet aluminum 3½" X 13", has ½" lips at each end for mounting and is 2" high. The power transformer is mounted directly behind the center of the scope socket to minimize the effect of any stray magnetic field upon the scope. Other positions caused distortion of the base line. Locations of the other parts is not critical and the final design was chosen only for simplicity of wiring.

Alignment

Alignment of the *Snooper* is simple and may be accomplished without any special equipment. All that is needed is a signal from an r-f exciter that falls in the tuning range of the converter, VHF-152, etc., and the regular communications receiver.

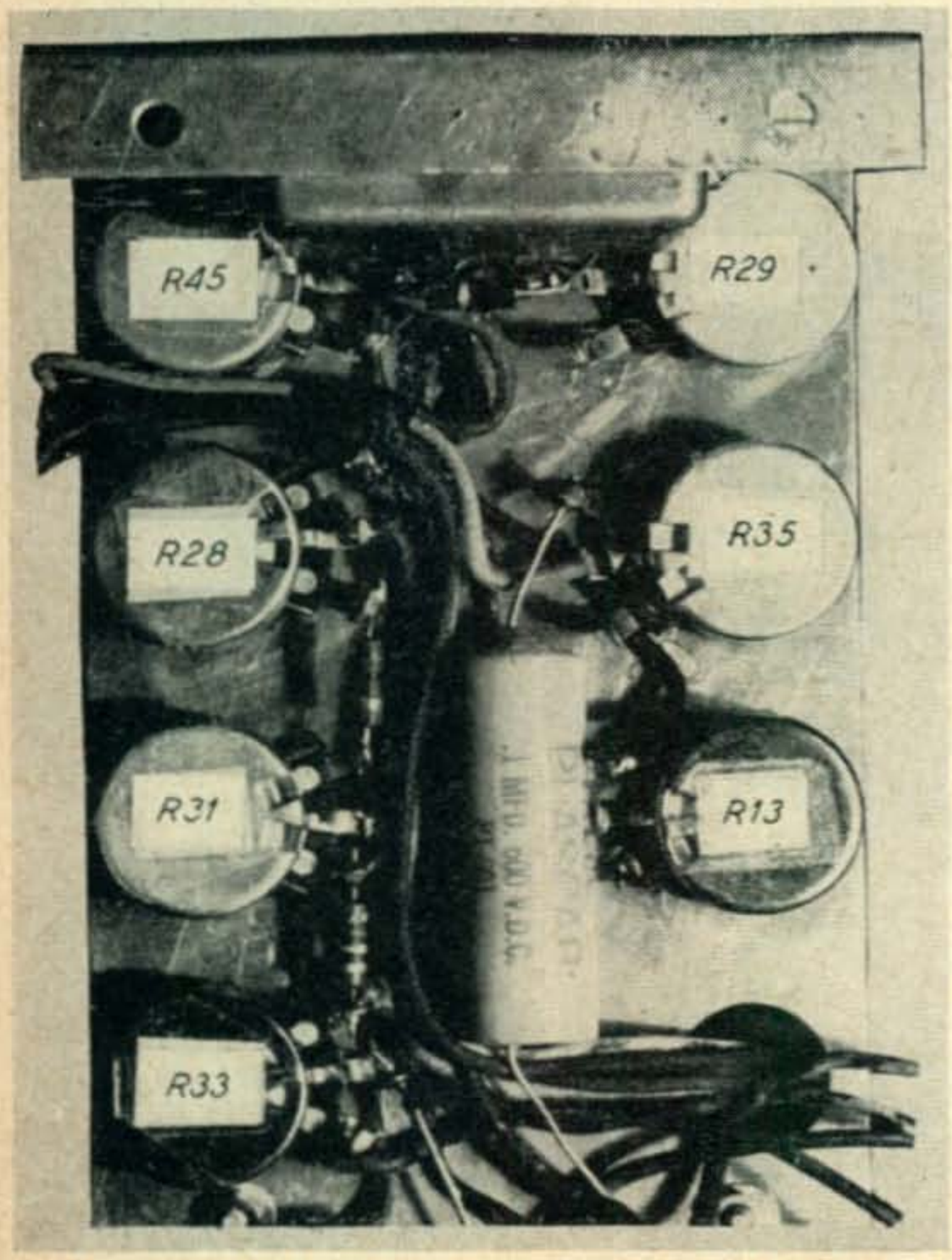


An above chassis view showing the position of the principal tubes and transformers. The cathode ray tube is plugged into the socket just visible under the "intensity" label.

Assuming that at this point the wiring has all been finished and checked and that no smoke or fireworks show up, proceed as follows.

Set the *Intensity, Focus-1* and *Focus-2* controls at about mid-point. Turn on the *Snooper* and after the tubes have reached operating temperature something should be visible on the face of the scope. If not, vary the position of the *horizontal* and *vertical centering* controls until a spot or line appears on the scope. Adjust the intensity control for a reasonable amount of brilliance. Never use more intensity than is necessary as the tube may be damaged by burning a spot or line on the face of it. Adjust the *sweep width* control until a line appears across the face of the tube. Now adjust the *Focus-1* and *Focus-2* controls until as fine a line as possible is present. These two controls interact so some juggling is necessary. Rotate the tube if necessary to get this line horizontal and level across the tube. Incidentally, *pins 11* and *12* will be at the top when the tube is in the proper position.

After a line has been established on the scope, set the remaining controls as follows, *sweep* pad and *linearity* one-quarter on, *center frequency* at mid-point, *sweep width* at minimum, and *gain* at maximum. Now listen to the communications receiver for the low frequency oscillator and adjust the slug in *T5* until its frequency is approximately 3.675 mc. Now switch to about 10.5 mc. and do the same with *T3*. Set the *sweep width* control at maximum. This will cause the 10.5-mc oscillator to be swept back and forth by the reactance modulator and a definite buzz will be heard around 10.5 mc. in the receiver. Adjust the *sweep* pad so that this buzz covers about one megacycle of the band. This finishes the preliminary adjustments.



Wiring view below the control and adjustment subpanel. The "Plascap" condenser is C26 in the sweep pad circuit.

Now attach the *Snooper* and converter to the receiver for normal operation. Warm up the exciter or a low powered transmitter. For purposes of illustration we will use 29 mc. as the alignment frequency, but any other would serve equally as well. Tune in the 29-mc signal on the converter-receiver combination in the usual manner. If you are lucky a pip will now be visible some place on the base line of the scope. It may be necessary to couple a pretty husky signal into the receiver for these first adjustments, or even increase power at the signal source, but with the trimmer adjustments of the r-f and i-f stages at about mid adjustment a pip should now be visible. As soon as a pip shows up on the scope adjust the i-f and *T4*, the interstage transformer, for maximum pip height. The pip may be brought to the center of the scope with the center frequency control. After these adjustments have been completed, align the r.f. stages as follows. Set *C4* and *C5*, the band-pass condensers, at minimum capacity. Detune the converter so that the pip moves to the left or low frequency side of the scope. Adjust the trimmers on top of *T1* and *T2* for maximum pip height at this point. Now, retune the converter so that the pip has moved to the right or high frequency side of the scope and adjust *C4* and *C5* for maximum pip height. As these adjustments are being made it should be necessary to decrease the signal being fed into the converter. Keep the level adjusted so that the pip is only about half of maximum for best results while leaving the *gain* control at maximum.

At this point it might be well to tune across the bands with the converter and see if any harmonics of either the low frequency or the modulated oscillator are being picked up. Since the low frequency oscillator is on approximately 3.675 mc. it will be possible to pick it up in the high end of the six-meter band but since that is more or less a grave yard it was thought better to have it there than down around 50 mc. If it is in the way on any band it can be re-adjusted and slightly shifted to some other frequency.

Now return to 29 mc., tune in the pip and set the *sweep width* control so that the pip is covering about one-half of the scope and adjust its height with the *gain* control to something less than maximum. Now carefully adjust the trimmers on the 175-kc i-f transformers to obtain a symmetrical half sine wave of the highest possible amplitude. Any slight mis-adjustment of these trimmers will cause dents or a lop sided pip to appear. We want a nice rounded job at this point. Re-check the adjustments of *T4*, the interstage transformer, for maximum output or pip height.

Reset the *sweep width* control at maximum sweep and check the sweep width of the *Snooper*. This is done by leaving the signal source on 29 mc. and detuning the converter, first to the low and then the high side of this frequency. Set the *sweep* pad so that this signal is visible only over a range of 500 kc. each side of the center frequency.

At this point the adjustments of the r-f trans-

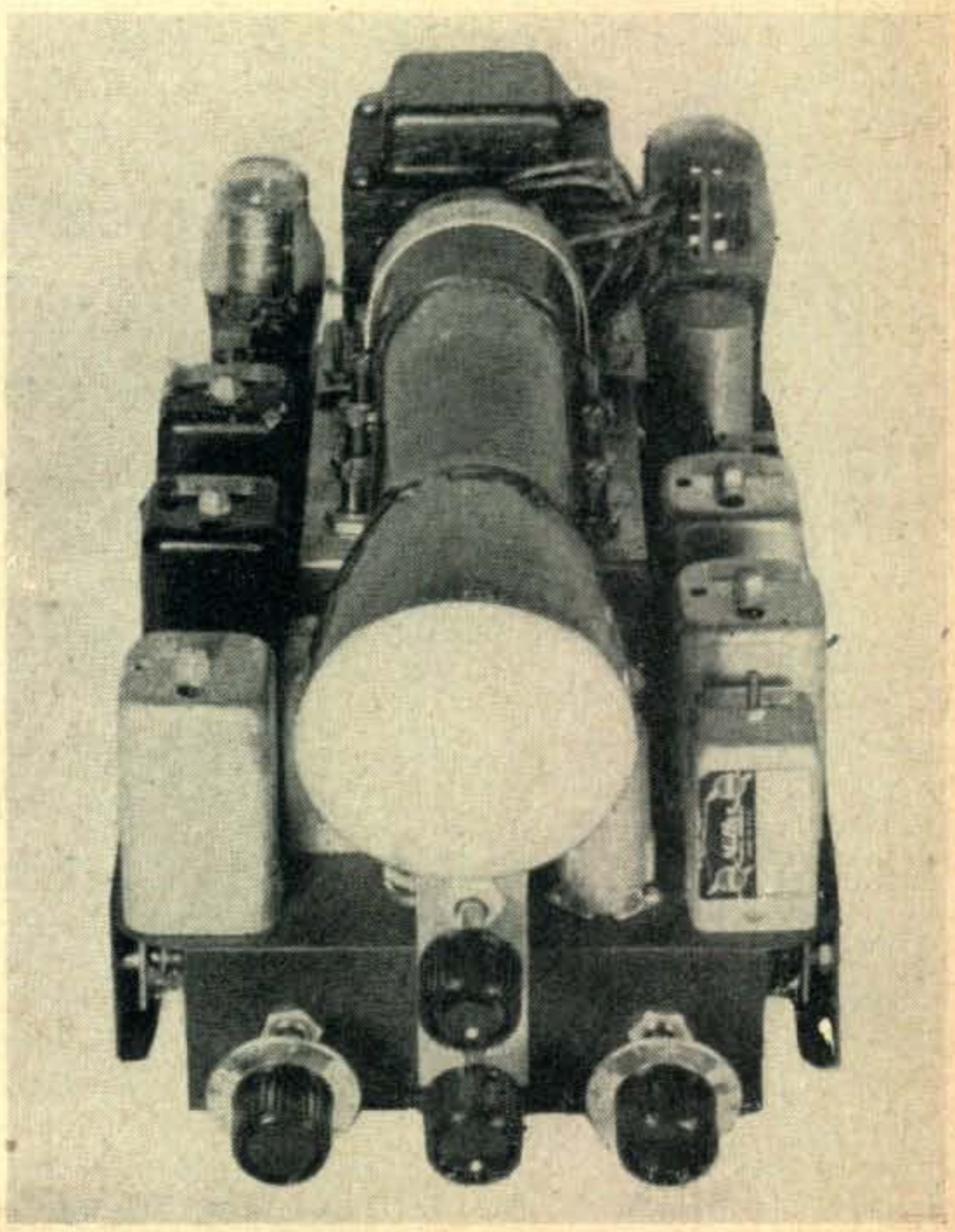
formers should be repeated and in the case of the ten-meter band, the background noise from the converter may make a decided "bunch of grass" in the center of the scope. This is due to the selectivity of the converter and its noise output on these frequencies. If ten is the primary operating band this condition may be corrected somewhat by a slight staggering of the tuning of the r-f stages until the "grass" is nearly the same height over the entire base line.

Linearity Adjustment

Adjustment of the *linearity* control is the only remaining chore and it is the most difficult of the lot. Its purpose is to center the pip frequency-wise on the base line. Return to the 29-mc signal and again tune it in as per normal use. Set the *center frequency* control at mid-position, reduce the *sweep width* control and as zero sweep width is approached the pip will probably go off scale on one side or the other. Leave the *center frequency* control at mid-position and bring the pip back to the center by adjusting the slug in the coil of the modulated oscillator *T3*. Return the *sweep width* control to about mid-point. D-tune the converter from 29 mc. to 28.8 mc., and reduce the sweep width until the pip is just leaving the trace. Leave all the controls of the *Snooper* set and retune the converter to 29.2 mc. If the *linearity* control happens to be at the proper setting the pip will now just be leaving the trace at the other side of the tube, but the odds are that that won't happen just yet.

Every change in the setting of the *linearity* control also changes the center frequency of the modulated oscillator so it is necessary to make a small change in the control setting and then again recenter the pip by moving the slug in *T3*. While this adjustment procedure is rather hard to explain it is really not too complicated. The object is to get the 6AK5 modulator operating on a linear portion of its curve. The *linearity* control is actually varying the bias and any change has a decided effect in the amount the oscillator frequency is varied, as well as its center frequency. By first centering the pip and then detuning a given amount either side of the center frequency and adjusting the *linearity* control and the slug of *T3,* eventually a point will be reached where the oscillator frequency is being varied an equal amount each side of center frequency. Since these adjustments are fairly critical, vary them only a small amount at one time and then recheck to see what the results have been. It is not imperative that the linearity be absolutely right for the operation of the *Snooper,* but it is nice to have about the same portion of the band under observation equally divided on each side of the center of the base line. Once all the adjustments have been made they will remain that way for long periods of time and need only be touched up just before the opening of the DX season or when making tube or component replacements.

Since nothing is perfect, the *Snooper* is no exception and since we have elaborated to some great length on its good points, it is only proper to devote a little space to those not so good. The main object in this unit was to obtain usable panoramic reception the easiest possible way, and to do this we have cut a few corners. The sawtooth generator and sweep amplifier along with the centering controls of the scope tube are of the simplest form possible and in the interest of this simplicity we have sacrificed some of the finer points of scope tube operation. The base line will not focus out to a nice fine line over its entire length. It remains a little fuzzy on the ends, but since pips are still visible at these extremes this was considered of small consequence. Since there is no form of AVC used in the circuit extremely strong signals will overload some parts of the circuit and multiple pips will appear on the scope. The gain control will take care of that fat one, but then the weaker ones do not show up. Since only a strong local brings on this condition tell him he has TVI and let him keep quiet hours. As mentioned earlier, converters with a high degree of selectivity will cause the pips and noise near the center frequency to be much stronger than on the outer edges even with the compensation present in the two r-f stages. We will have to bear with that one although it really is not a handicap. No doubt there are other discrepancies present but those are the main ones that come to mind at this time and we feel they are all of a minor nature when compared with the many advantages to be had by the use of panoramic reception with a *Snooper*. Some say they can't work them if they don't hear them but that has been changed around here. We can't work them if we can't see them. When we say "We'll be seeing you" we mean it.



Looking down the nose. The bottom controls are (L. to R.) gain, center frequency and sweep width. The control under the scope is for centering.

Phone Section Results

CQ's 1951 DX Contest

HERB BECKER, W6QD and ANDY ELSNER, W6ENV

The final results of the 1951 World Wide DX Contest, Phone section, are being given. Results of the CW section will be run in the October issue. Although conditions were not of the best (a slight understatement) participation was greater and average scores higher. We can't help conditions that happen to prevail and we cannot have the contest "just any ol' time you and we might want." Anyway, judging from the comments sent in with the Contest logs it appears this type of a contest is much appreciated not only from the Ws' point of view but the foreign operators too. In fact just take a peek at the number of real choice foreign stations who participated . . . as well as the quantity of overseas boys. After all, we would guess that is what you want . . . a contest where there is DX.

For those who are statistically minded I suppose some high scores set forth might prove of interest. In the Multiple-operator section MI3US, the Radio Marina Amateur Radio Club, with several operators ran up 156,128 points and they had a lot of fun doing it. Next HC2JR, John Reed with the help of his wife Teresa, HC2TR, with 147,630. G2AJ assisted by G3DAH, wound up with 96,120 while W6RRG assisted by W6NIG scored 69,832. These are all band scores.

In the single operator section we must make special mention of CE1AJ, Ida Fish. She concentrated on 28 mc. scoring 61,965 points which is the world's highest single band entry for this band. This year the world's highest all-band score belongs to PY2CK with 251,664 points. Some of the others from various sections of the world are MD2AM 209,802; VQ4RF 200,567; VP6SD 153,032; EA3HE 143,424; W4ESK 126,723; KH6IJ 107,202; CT1QG 99,345; F7AR 82,305.

Every now and then a few of the boys think too much publicity is given the high point men. There are a couple of ways of looking at it. In all hobbies or games, the man who scores the highest number of points, or comes out ahead, naturally attracts, and deserves, a large amount of attention. We would be sadly neglectful if we didn't recognize it. On the other hand there are many countries whose ham population is very small. When a DX contest comes along it is important that these countries, with few DX men, be represented. In many cases only one DX station shows up. We all know it is fellows like these that give us much sought after multipliers, or in short help make a contest a success. I might mention a few of these stations who sent in logs . . . HC2KB, VP4LZ, EA6AR, TF3SF, 3A2AG, LX1JW, 9S4AX, FA3JY, OQ5DZ, EA8AX, ZE4JC, ZS3M, EAØAC, EA9AR, ZS7C, XZ2SY, JY1XY, AC3SQ, AC3PT and TA2EFA. There are, of course, many more. Some of these out of the way DX stations were mailed log sheets and contest rules in advance thus serving as a reminder as well as assisting them.

W4ESK (left) made an all band score of 126,723 point which was tops in U. S. A. This score was made in spite of certain neighborhood difficulties. The transmitting setup uses a pair of 250THs on all bands except 20, this band taking advantage of a pair of 833As. Modulators are 304TLs. For antennas we find a 3 element for 10 meters perched 100 feet in the air, while at the 90 foot level is a 20 meter array, also 3 elements. A half wave doublet is used on 80 meters. . . . PY2CK (right) ran up the highest score with 251,664 points. He uses a pair of 810s with 1000 watts input. Receivers are HRO-5TA and NC-240D. On 10 meters a 4 element rotary does a good job while a 3 element affair is used on 20. For 40 meters it is a zepp.

CT1QG (left) finished up with 99,345 points on all bands. He runs 200 watts into a pair of HF-200s. On 10 a 4 element rotary is used while on 20 he uses a 3 element array. A long wire is used on 40 and 80. Receiver is Sondyna E506 with preselector. . . . G2AJ (right) assisted by G3DAH scored 96,120 points. Three separate final amplifiers were used; a pair of 35Ts on 10 and 20, 811s on 40, and a pair of HK54s on 80. Antennas in use were grounded planes for 40 and 80, a 270 foot long wire for all bands, 3 Lazy Hs on 20, and a 3 element rotary plus a 6 element curtain on 10. Receivers were an AR88 and an SX28.

Countries in which there has been only one participant will show the score under the All-Band section only. Certificates will be awarded in accordance with the Contest Rules, and those stations receiving certificates are shown in bold face type.

PHONE SCORES

Multiple Operator Stations

	STATION	ZONES	COUNTRIES	SCORE
United States				
All Bands	**W6RRG** (W6NIG)	48	68	69,832
	W6AM (W6KPC & W6UQQ)	40	65	57,435
	W8NGO (W8CLR)	33	57	19,980
14 mc.	**W6CYI** (W6TZD, W6BPD & W6TSW)	25	46	35,216
	W6RRG (W6NIG	24	41	25,405
	W6AM (W6KPC & W6UQQ)	23	40	23,247
	W6YX (W6TOT, W6VUW, W6JHT & W6OUU)	23	40	18,081
	W8NGO (W8CLR)	17	36	7,579
Canada				
All Bands	**VE4RO** (VE4LC)	35	47	18,532
Alaska				
All Bands	**KL7AEN** (KL7CM, KL7ADR & KL7ACS)	14	24	4,902
Denmark				
All Bands	**OZ9WS** (OZ2PA & OZ4KX)	21	66	22,620
Ecuador				
All bands	**HC2JR** (HC2TR)	40	74	147,630
England				
All Bands	**G2AJ** (G3DAH)	52	128	96,120
	G5TN (G3AWZ)	30	75	47,250
3.5 mc.	**G2AJ**	6	20	1,352
	G5TN	3	12	360
7 mc.	**G2AJ**	6	21	1,296
	G5TN	3	6	72
14 mc.	**G5TN**	24	57	33,858
	G2AJ	23	56	22,357
28 mc.	**G2AJ**	17	31	7,248
Eritrea				
All Bands	**MI3US** (MI3ZX, NA, DW, NJ, JV, SL, RH & RR)	39	97	156,128
Finland				
All Bands	**OH3OX** (OH3QB, OH3QK, OH3QL & OH3QM)	6	31	3,367
Hawaii				
All Bands	**KH6WO/KH6** (KH6ABI, AEO, AGB, AGX, AN, AS, DQ, EZ, GN, OS, PA, RU, TD, WU & ADY)	30	36	20,790
Italy				
All bands	**I1BDV** (I1ARP)	32	91	60.024
Marianas Islands				
All bands	**KG6AAY** (6 operators)	35	55	46,080

NORTH AMERICA—

Single Operator Stations

U.S.A.				
All Bands	**W1ATE**	51	116	114,562
	W1ODW	8	13	672
All Bands	**W2WZ**	19	44	12,285
	W2HCW	21	32	7,579
	W2ATE	5	11	416
3.5 mc.	**W2HCW**	4	3	133
	W2ATE	1	2	3
14 mc.	**W2WZ**	17	42	11,269
	W2VWN	17	40	9,063
	W2HCW	12	24	3,996
	W2KZE	15	22	2,405
	W2ATE	4	9	325
28 mc.	**W2HCW**	5	5	130
	W2WZ	2	2	16
All Bands	**W3DOE**	34	75	62,130
	W3LXE	16	32	3,840
	W3MFW	9	12	420
3.5 mc.	**W3LXE**	2	2	4
14 mc.	**W3DOE**	22	55	35,035
	W3BET	10	25	3,185
	W3LXE	10	25	2,520
	W3MFW	8	11	361
28 mc.	**W3DOE**	12	20	3,680
	W3PQD	10	12	1,056
	W3ZQ	12	15	945
	W3LXE	4	5	63
	W3MFW	1	1	2
All Bands	**W4ESK**	50	109	126,723
3.5 mc.	**W4ESK**	5	4	72
14 mc.	**W4ESK**	26	64	50,850
	W4PJU	18	35	5,721
	W4HA	12	25	2,701
	W4TO	5	10	450

	STATION	ZONES	COUNTRIES	SCORE
28 mc.	W4ESK	19	41	13,440
	W4QBK	17	31	5,520
	W4TAV	10	11	798
All Bands	W5ZD	22	44	8,778
	W5KC	24	37	5,734
3.5 mc.	W5KC	1	2	6
14 mc.	W5ZD	14	28	3,864
	W5KC	14	26	2,760
	W5AWT	5	7	156
28 mc.	W5ALB	17	32	5,047
	W5RDC	19	25	3,828
	W5SFW	16	24	3,040
	W5ZD	8	16	984
	W5MJD	10	14	720
	W5KC	9	9	414
All Bands	W6HX	43	66	50,467
	W6BJU	24	33	7,581
	W6CHV	27	32	7,493
	W6TJN	14	15	1,508
3.5 mc.	W6HX	4	3	98
14 mc.	W6UYX	25	36	21,655
	W6HX	23	37	16,020
	W6BJU	16	23	3,549
	W6CHV	16	20	3,060
	W6TJN	8	8	512
28 mc.	W6HX	16	26	7,644
	W6CHV	11	12	966
	W6BJU	8	10	756
	W6TJN	6	7	260
All Bands	W7DL	28	40	17,884
	W7HAD	18	17	3,465
	W7PQE	6	6	336
3.5 mc.	W7DL	5	4	189
	W7HAD	4	3	105
	W7PQE	2	2	8
14 mc.	W7DL	23	36	14,278
	W7HAD	11	11	1,716
	W7JUO	10	10	420
	W7LNG	5	5	260
	W7PQE	4	4	208
28 mc.	W7AHX	17	19	3,132
	W7OUT	16	21	2,664
	W7HAD	3	3	36
All Bands	W8JIN	48	93	55,554
	W8LIO	28	60	39,600
	W8FJR	27	37	6,528
3.5 mc	W8UKS	9	9	2,052
	W8JIN	7	6	234
	W8LIO	4	3	49
	W8FJR	2	2	4
14 mc.	W8LIO	24	57	35,883
	W8JIN	22	57	22,357
	W8GOB	18	41	13,334
	W8FJR	8	14	902
28 mc.	W8JIN	19	30	4,557
	W8FJR	17	21	2,280
	W8PM	12	10	506
All Bands	W9RBI	47	81	35,840
	W9EWC	43	80	35,301
3.5 mc.	W9RBI	8	7	360
	W9EWC	7	5	348
14 mc.	W9RBI	23	45	11,220
	W9EWC	22	44	10,362
	W9EZD	11	14	975
28 mc.	W9EWC	14	31	4,545
	W9RBI	16	29	4,095
	W9BWM	10	11	588
All Bands	WØDCB	21	31	5,512
14 mc.	WØANF	18	29	4,136
	WØTKX	15	23	2,850
	WØDCB	9	13	704
28 mc.	WØGEK	17	25	3,738
	WØDCB	12	18	2,220
	WØIUB	9	12	567
Canada				
All Bands	VE1CR	24	34	8,874
All Bands	VE2IZ	23	32	4,785
	VE2CK	12	18	1,500
3.5 mc.	VE2IZ	4	4	176
14 mc.	VE2CK	10	16	1,274
	VE2IZ	10	15	950
28 mc.	VE2IZ	9	13	594
	VE2CK	2	2	4
All Bands	VE3BNQ	25	38	9,198
	VE3HB	23	38	7,747
3.5 mc.	VE3BNQ	2	2	60
14 mc.	VE3KF	20	51	16,472
	VE3HB	9	16	1,150
	VE3QA	9	15	936
	VE3BNQ	6	7	182
28 mc.	VE3DGZ	13	31	6,952
	VE3BNQ	17	29	5,382
	VE3AKL	14	22	4,032
	VE3HB	14	22	2,916
All Bands	VE4TJ	18	21	1,716
3.5 mc.	VE7VT	5	4	180
14 mc.	VE7VO	20	33	11,236
	VE7AIH	17	20	4,107
28 mc.	VE7MS	17	21	3,268
	VE7YR	12	12	1,176
Alaska				
All Bands	KL7UM	17	20	4,366
	KL7MF	11	12	966
	KL7NXI	9	8	357
3.5 mc.	KL7NXI	4	4	128
	KL7MF	3	3	30
14 mc.	KL7UM	8	11	1,482
	KL7MF	4	4	184
	KL7NXI	4	3	105
28 mc.	KL7UM	8	8	640
	KL7MF	4	5	126

HB9LA (left) worked all bands and wound up with 51,696 points. All equipment at HB9LA is home built and the receiver uses 20 tubes, double conversion, 3 r-f stages, 5 i-f stages and built-in select-o-ject. In the transmitting department a single 813 is used with 250 watts input. Antenna for 80 and 40 is 41 meters long, east-west. On 20 a folded dipole, north-south 25 meters high, does the job. A bit of tough luck was experienced on 10 as he discovered a short in this vertical, 3 days after the contest. . . . MD2AM (right) with 209,802 points on all bands appears to be in No. 2 spot in the world. At present John is a MARS operator at K1FAJ. While in Libya his rig consisted of an HT-18 driving an 813 with about 150 watts input. Receiver was a 75A1. For antennas he had 3 element beams with a 10 over 20.

W3DOE (left) worked all bands and came up with a score of 62,130 points. Transmitter winds up with a pair of 4-250As and a Kw., driven by a 310B1. Receiver is a 75A-1. The antenna is a dual band rotary, 3 elements closed-spaced on 20 and 6 elements wide spaced on 10. Height is about 40 feet. . . . ZC4XP (right) Cyprus, scored 49,280 points on all bands. Rig at the time was a single 807 with 60 watts but now it is two 807s with about 130 watts input. Antenna in use was a center fed 67 foot wire about 33 feet above ground.

	STATION	ZONES	COUNTRIES	SCORE
Bahamas				
All Bands	VP7NM	16	24	6,360
Barbados				
All Bands	VP6SD	47	101	153,032
Costa Rica				
All bands	TI2OE	30	47	22,946
14 mc.	TI2OE	16	30	10,258
	TI2RAF	11	17	2,212
28 mc.	TI2OE	14	17	2,325
Cuba				
All bands	CO8SA	23	30	11,501
14 mc.	CO2OZ	17	43	21,840
	CO7BL	17	32	10,045
	CO2IC	13	22	4,865
	CO8SA	15	22	4,551
28 mc.	CO6OK	15	19	3,978
	CO8SA	8	8	1,504
Greenland				
14 mc.	OX3GD	6	15	3,990
	OX3WX	4	11	1,290
	OX3GG	3	3	90
Mexico				
All Bands	XE1PY	36	65	51,106
14 mc.	XE1PY	10	18	2,744
	XE1SA	6	9	255
28 mc.	XE1PY	26	47	29,784
Nicaragua				
All Bands	YN4CB	17	24	3,567
Puerto Rico				
All Bands	KP4KD	13	15	1,372
Swan Island				
28 mc.	KS4AQ	14	21	7,175
Turks & Caicos Island				
14 mc.	VP5BF	8	10	1,278

SOUTH AMERICA—

Single Operator Stations

	STATION	ZONES	COUNTRIES	SCORE
Argentina				
All Bands	LU8CW	47	76	74,784
7 mc.	LU8CW	4	7	99
14 mc.	LU8CW	24	33	12,369
	LU6AX	7	8	405
28 mc.	LU8CW	19	36	21,010
	LU8BF	15	22	4,821
Brazil				
All Bands	PY2CK	55	141	251,664
	PY2AHS	34	49	22,659
	PY4CB	19	27	5,198
7 mc.	PY2CK	4	5	45
14 mc.	PY2CK	28	69	61,110
	PY1AQT	18	25	5,289
	PY2AHS	19	21	5,040
	PY4CB	13	16	2,204
28 mc.	PY2CK	23	67	58,410
	PY2AHS	15	28	6,321
	PY4CB	6	11	629
British Guiana				
14 mc.	VP3YG	12	16	3,416
Chile				
All bands	CE3HL	36	51	28,884
	CE1CQ	30	45	17,925
	CE6AB	28	41	17,871
14 mc.	CE3HL	22	30	13,832
	CE6AB	11	11	880
	CE1CQ	6	7	299
28 mc.	CE1AJ	26	55	61,965
	CE1CQ	24	38	13,392
	CE6AB	17	30	10,293
	CE3HL	14	21	2,310
Colombia				
All Bands	HK4DT	32	38	14,140
14 mc.	HK1DZ	19	41	31,180
	HK4DT	21	28	7,889
28 mc.	HK1DW	11	14	3,800
	HK4DT	11	10	861
Ecuador				
All Bands	HC2KB	35	58	44,919
Paraguay				
14 mc.	ZP1BL	5	6	220
Peru				
All Bands	OA4DW	37	55	32,660
	OA4AO	29	43	17,064
	OA4AG	13	19	1,472
7 mc.	OA4DW	3	3	36
14 mc.	OA4DW	19	32	10,863
	OA4AO	16	25	6,068
	OA4AG	10	16	1,199
28 mc.	OA4DW	14	19	4,488
	OA4AO	11	16	2,403
Trinidad				
14 mc.	VP4LZ	9	14	6,555
Uruguay				
All Bands	CX2CO	37	58	57,665
14 mc.	CX2CO	17	20	8,103
28 mc.	CX2CO	20	38	22,504
	CX2CN	17	29	14,030
	CX3BT	16	25	6,191
Venezuela				
All Bands	YV5BZ	32	56	61,336
	YV5AC	38	65	45,320
3.5 mc.	YV5AC	3	4	462
7 mc.	YV5AC	4	4	80
14 mc.	YV5BZ	20	35	26,950

	STATION	ZONES	COUNTRIES	SCORE
	YV5AC	14	31	9,540
	YV5CI	10	18	5,836
	YV5AB	11	13	1,584
28 mc.	YV5BZ	12	21	6,831
	YV5AC	17	26	6,536

EUROPE—

Single Operator Stations

Austria

All bands	OE5CA	25	61	23.650
14 mc.	OE5CA	15	47	14.322
	OE5YL	13	42	9.955
	OE1BU	7	30	3.922
	OE6VS	4	19	1.38[illegible]
	OE7FX	6	16	[illegible]4
28 mc.	OE5CA	10	14	1,056
	OE1LF	6	9	390

Balearic Islands

All bands	EA6AR	5	9	322

Belgium

All bands	ON4PJ	34	73	28,248
	ON4SZ	32	72	24,336
3.5 mc.	ON4PJ	2	10	460
	ON4SZ	1	2	3
7 mc.	ON4PJ	4	13	459
	ON4SZ	4	10	238
14 mc.	ON4PJ	15	35	6,900
	ON4SZ	14	36	5,850
28 mc.	ON4SZ	13	24	3,663
	ON4PJ	13	15	2,128

Channel Islands

All bands	GC4LI	22	42	12,928

Czechoslovakia

All bands	OK1HI	24	55	16,195
	OK2BDV	18	37	6,215
	OK1CX	8	13	357
	OK1AW	6	9	330
3.5 mc.	OK2BDV	2	8	160
	OK1HI	2	8	150
	OK1CX	2	3	15
7 mc.	OK2BDV	3	10	286
	OK1HI	3	9	192
	OK1CX	1	2	3
	OK1AW	1	1	2
14 mc.	OK1HI	12	30	6,426
	OK1AW	5	8	273
	OK1CX	3	6	108
	OK2SL	2	6	88
23 mc.	OK3IT	12	20	2,784
	OK2BDV	13	19	2,400
	OK1HI	7	8	315
	OK1CX	2	2	4

Denmark

All bands	OZ7BG	29	67	22,054
	OZ6TJ	13	34	4,700
	OZ7G	11	21	1,188
3.5 mc.	OZ7BG	2	10	216
	OZ7G	1	3	16
7 mc.	OZ7BG	3	4	28
	OZ7G	1	3	8
14 mc.	OZ7BG	16	41	9,633
	OZ7HT	11	34	9,000
	OZ7SM	10	24	5,005
	OZ6TJ	11	32	4,085
	OZ1SP	8	14	1,056
	OZ7ML	3	12	270
	OZ7G	4	11	255
	OZ5TZ	5	5	200
28 mc.	OZ5KP	11	14	1,325
	OZ7BG	8	12	760
	OZ7G	5	5	130
	OZ6TJ	2	2	20

England

All bands	G2MI	13	27	2,880
14 mc.	G2LS	23	43	17,556
	G2VJ	11	37	7,296
	G2AJB	8	24	2,112
	G2MI	7	20	1,512
28 mc.	G2MI	6	7	208

Finland

All bands	OH1NK	8	31	3,198
	OH3NY	7	27	2,040
	OH6NR	5	12	374
3.5 mc.	OH3NY	2	6	56
	OH6NR	2	3	10
7 mc.	OH1NK	3	9	228
	OH3NY	2	6	40
14 mc.	OH1NK	5	22	1,70[illegible]
	OH3NY	3	15	86[illegible]
	OH8OB	3	9	252
	OH6NR	3	9	240
28 mc.	OH2SE	8	12	780

France

All bands	F7AR	45	110	82,305
	F9RM	15	46	8,479
	F8OD	19	35	7,830
	F3FA	18	25	3,182
	F3PW	16	20	2,088
	F8BO	9	21	1,110
3.5 mc.	F7AR	2	12	350
	F9RM	1	8	81
	F8BO	2	4	30
7 mc.	F7AR	3	15	396
	F8BO	3	10	260
	F9RM	1	7	64
14 mc.	F7AR	26	64	37,350
	F9RM	11	28	4,407
	F8OD	9	25	3,196
	F3FA	11	18	1,537
	F9ND	6	16	814
	F3FC	3	9	180
	F3PW	4	6	90
	F8BO	2	5	42

EA3HE (left) wound up with an all band point total of 143,424. In the final an 813 is used with around 250 watts input. 3 element rotary beams are used on 10 and 20 while dipoles do the trick on the low frequency bands. Receiver is a Breting 12 (1935) with a homemade preselector. . . . HC2JR (right), assisted by the xyl, Teresa, HC2TR scored 147,630 points. Transmitter is a 32V2, 100 watts, and the receiver a 75A2. The antenna setup consists of two 3 element beams for 10 and 20. On 40 they used a single wire fed half wave.

VP6SD (left) scored 153,032 points which was about double of his last year's score. Syd runs 500 watts into an 813. Antennas: 10 and 20 meters 3 element beams are used and now he has added one for 15 meters. All are on a 75 foot mast. Receiver is an Eddystone 680. . . .KH6IJ (right) scored 107,202 points on all bands. Wait! What about this picture? Is this in a DX contest? It happens that MGM was making a movie in Hawaii and the photo shows Esther Williams and Howard Keel of MGM at KH6IJ . . . . presumably keeping a sked with home. (So says Kay). KH6IJ swears this was taken during contest and Esther was "helping." In spite of it he made 107,202 points. Hummph!!

	STATION	ZONES	COUNTRIES	SCORE
23 mc.	**F8XP**	**19**	**25**	**5,060**
	F7AR	**14**	**19**	**2,277**
	F3PW	**12**	**14**	**1,274**
	F8OD	10	10	1,020
	F3FA	7	7	294
	F9RM	2	3	45
	F8BO	2	2	24
Germany				
All bands	**DL3DO**	**44**	**114**	**80,422**
	DL1FK	**46**	**99**	**44,370**
	DL1FI	**37**	**77**	**29,754**
	DL1AU	33	79	28,336
	DL7BA	26	65	14,560
	DL3VZ	24	43	10,050
	DL1JY	6	11	391
3.5 mc.	**DL1AU**	**2**	**15**	**459**
	DL3DO	**2**	**13**	**360**
	DL1FI	**2**	**13**	**300**
	DL1FK	2	6	56
	DL7BA	2	7	54
7 mc.	**DL3DO**	**5**	**19**	**1,344**
	DL1FK	**5**	**15**	**480**
	DL7BA	**3**	**13**	**368**
	DL1AU	3	12	315
	DL1FI	4	7	165
14 mc.	**DL4WC**	**22**	**57**	**37,640**
	DL3DO	**23**	**57**	**26,960**
	DL1FK	**20**	**46**	**10,560**
	DL1FI	18	39	9,177
	DL1AU	12	31	4,945
	DL7AD	9	28	2,590
	DL7BA	6	20	1,118
	DL3VZ	6	16	770
	DL4SL	6	14	600
	DL3JR	4	11	540
	DL1JY	5	10	345
28 mc.	**DL1FK**	**19**	**32**	**5,865**
	DL3VZ	**18**	**27**	**5,175**
	DL3DO	**14**	**25**	**3,588**
	DL7BA	15	25	3,520
	DL1AU	16	21	3,330
	DL1FI	13	18	2,015
Iceland				
All bands	**TF3SF**	**8**	**10**	**432**
Italy				
All bands	**I1CNE**	**36**	**80**	**51,156**
	I1YW	**37**	**92**	**49,794**
	I1AMU	**16**	**47**	**8,253**
7 mc.	**I1YW**	**4**	**14**	**468**
	I1AMU	**2**	**10**	**216**
14 mc.	**I1CNE**	**23**	**62**	**31,110**
	I1YW	**18**	**48**	**15,246**
	I1KE	**10**	**35**	**6,480**
	I1AMU	9	30	3,744
	I1BFP	2	8	160
28 mc	**I1YW**	**15**	**30**	**5,705**
	I1CNE	**13**	**18**	**2,325**

	STATION	ZONES	COUNTRIES	SCORE
	I1AMU	**5**	**7**	**204**
Luxembourg				
All bands	**LX1JW**	**15**	**25**	**3,720**
Monaco				
All bands	**3A2AG**	**10**	**46**	**10,920**
Netherlands				
All bands	**PAØVB**	**12**	**31**	**4,773**
	PAØJA	**11**	**18**	**1,537**
3.5 mc.	**PAØJA**	**4**	**8**	**204**
	PAØVB	**2**	**4**	**24**
7 mc.	**PAØVB**	**1**	**5**	**42**
14 mc.	**PAØVB**	**9**	**22**	**3,100**
	PAØJA	**7**	**10**	**612**
Norway				
All bands	**LA7R**	**10**	**24**	**2,958**
14 mc.	**LA7R**	**3**	**14**	**799**
	LA5S	**2**	**11**	**221**
28 mc.	**LA7R**	**7**	**10**	**680**
Portugal				
All bands	**CT1QG**	**50**	**129**	**99,345**
	CT1FM	**37**	**87**	**40,548**
	CT1CC	**15**	**42**	**6,897**
	CT1LP	17	38	6,606
	CT1MB	18	34	5,200
	CT1TK	10	21	1,395
3.5 mc.	**CT1QG**	**3**	**12**	**270**
	CT1LP	**1**	**4**	**50**
7 mc.	**CT1CC**	**5**	**16**	**630**
	CT1QG	**3**	**13**	**320**
	CT1TK	**3**	**9**	**180**
	CT1FM	3	7	110
	CT1MB	3	8	110
	CT1LP	3	6	63
14 mc.	**CT1QG**	**23**	**64**	**24,200**
	CT1FM	**18**	**50**	**13,668**
	CT1CC	**10**	**26**	**3,276**
	CT1LP	6	18	2,452
	CT1MB	3	8	154
28 mc.	**CT1QG**	**21**	**40**	**14,762**
	CT1FM	**16**	**30**	**5,290**
	CT1MB	**12**	**18**	**2,280**
	CT1TK	7	12	370
	CT1LP	7	10	310
Roumania				
All bands	**YO3RI**	**23**	**63**	**26,095**
	YO3RF	**22**	**62**	**20,584**
7 mc.	**YO3RI**	**3**	**15**	**874**
	YO3RF	**3**	**8**	**187**
14 mc.	**YO3RF**	**12**	**43**	**11,440**
	YO3RI	**9**	**33**	**9,724**
28 mc.	**YO3RI**	**9**	**12**	**798**
	YO3RF	**6**	**9**	**345**
Saarland				
All bands	**9S4AX**	**8**	**24**	**1,728**
Scotland				
All bands	**GM2DBX**	**20**	**59**	**14,062**

	STATION	ZONES	COUNTRIES	SCORE
14 mc.	GM2UU	13	37	6,450
	GM2DBX	6	30	2,484
28 mc.	GM2DBX	14	29	4,687
Spain				
All bands	EA3HE	58	134	143,424
	EA4CM	38	79	51,246
	EA7BB	16	55	15,762
	EA4CK	14	22	2,664
	EA7CP	9	19	1,288
	EA3FG	7	17	840
3.5 mc.	EA3HE	2	7	72
7 mc.	EA3HE	3	12	480
	EA7BB	2	12	308
14 mc.	EA2CQ	25	68	57,288
	EA3HE	31	79	55,770
	EA7BB	14	43	11,400
	EA4CM	15	38	8,957
	EA7DJ	11	33	5,676
	EA3HS	11	26	3,478
	EA3FN	9	29	3,268
	EA4CK	12	21	2,244
	EA2CL	4	17	1,953
	EA2CK	10	20	1,620
	EA3GG	6	20	1,300
	EA3FG	6	16	704
	EA1DV	3	14	697
	EA7DH	4	11	210
	EA7CP	2	4	24
28 mc.	EA4CM	23	41	17,216
	EA3HE	22	36	11,542
	EA7CP	7	15	924
Sweden				
All bands	SM3LX	25	60	24,225
	SM5ARL	17	42	8,083
	SM5APA	18	32	5,300
	SM7ACO	10	35	4,140
	SM6ID	11	26	2,442
3.5 mc.	SM5ARL	2	5	70
	SM7ACO	1	3	12
	SM6ID	1	1	4
7 mc.	SM3LX	3	8	154
	SM7ACO	2	7	72
	SW5ARL	3	3	48
	SM6ID	2	4	24
14 mc.	SM3LX	12	38	11,000
	SM5AUP	12	36	5,856
	SM5ARL	6	27	3,234
	SM3ACP	5	24	2,813
	SM7ACO	7	25	2,592
	SM5TF	7	26	2,112
	SM6ID	8	21	1,740
	SM5APA	8	19	1,674
	SM4HJ	4	18	924
	SM5YT	6	12	648
	SM7TQ	5	11	288
	SM7YO	6	6	168
28 mc.	SM3LX	10	14	1,224
	SM5APA	10	13	1,012
	SM5ARL	6	7	273

	STATION	ZONES	COUNTRIES	SCORE
Switzerland				
All bands	HB9LA	42	102	51,696
	HB9MS	39	74	36,838
3.5 mc.	HB9LA	2	14	608
	HB9MS	2	10	156
7 mc.	HB9LA	3	15	666
	HB9MS	3	4	63
14 mc.	HB9LA	24	53	16,555
	HB9MS	18	40	10,672
	HB9JK	5	16	966
	HB9MU	4	10	392
28 mc.	HB9MS	16	20	4,320
	HB9LA	13	20	2,277
Yugoslavia				
14 mc.	YU1AG	6	25	3,193

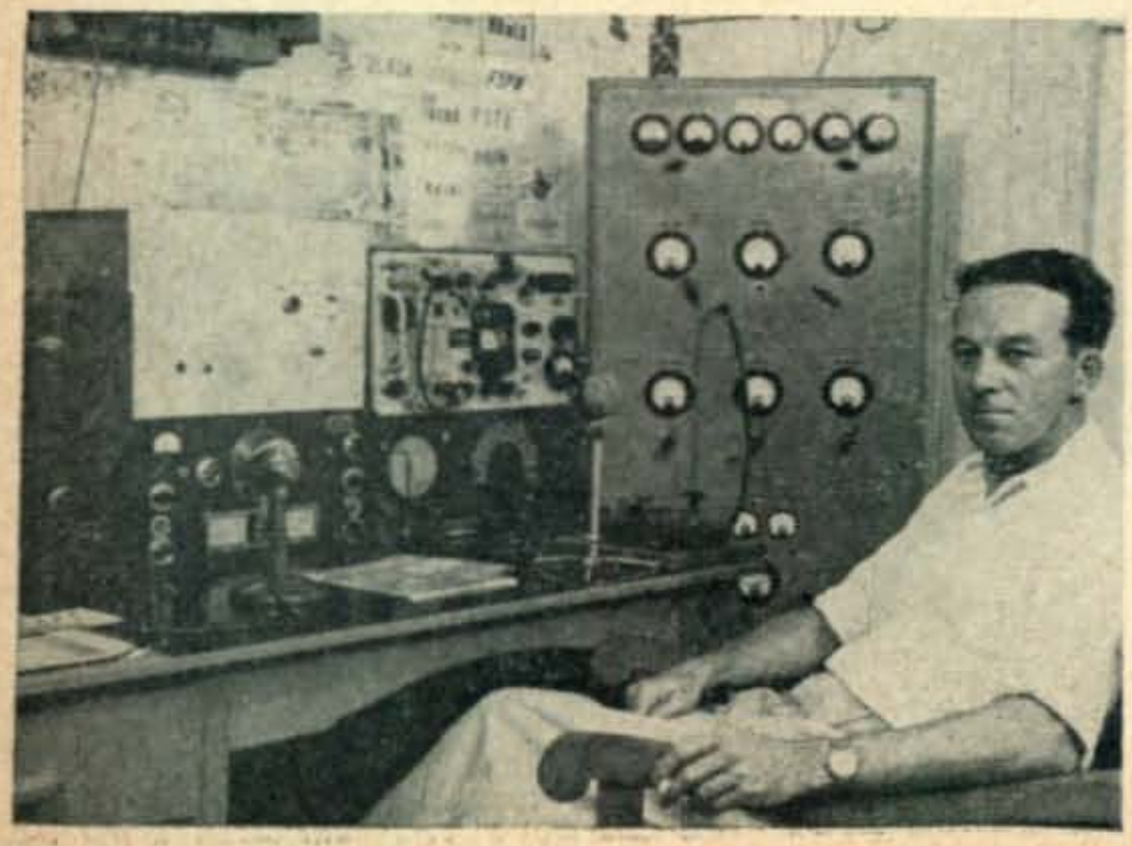
AFRICA—

Single Operator Stations

Algeria				
All bands	FA3JY	36	44	14,220
Belgian Congo				
All bands	OQ5DZ	25	54	24,727
Canary Islands				
All bands	EA8AX	19	42	24,217
Kenya Colony				
All bands	VQ4RF	50	117	200,567
	VQ4AQ	37	93	111,150
	VQ4BU	30	65	35,340
7 mc.	VQ4BU	2	4	18
	VQ4RF	2	4	18
14 mc.	VQ4RF	27	62	48,526
	VQ4AQ	21	55	48,336
	VQ4BU	13	30	7.396
28 mc.	VQ4RF	21	51	47,808
	VQ4AQ	16	38	11,826
	VQ4BU	15	31	9,062
Libya				
All bands	MD2AM	38	108	209,802
Northern Rhodesia				
All bands	VQ2GW	16	34	9,250
Southern Rhodesia				
All bands	ZE4JC	12	20	2.208
Southwest Africa				
All bands	ZS3M	17	29	6,118
Spanish Guinea				
All bands	EAØAC	13	26	5,382
Spanish Morocco				
14 mc.	EA9AR	15	36	17,697
Swaziland				
All bands	ZS7C	19	27	5,290
Tangier Zone				
14 mc.	KT1PU	8	25	9,900
	KT1DD	10	27	8,399

(Continued on page 64)

VQ4AQ (left) made an all band score of 111,150 points. He ran 140 watts into a pair of 35ts. Receiver is an HRO-5 and the antenna was an 8 wave Vee beam. . . . YV5BZ (right) made an all band score of 61,336. Transmitter winds up with a pair of 813s running 500 watts input. Modulators are 810s. For a receiver an HQ-129X does the job. A close-spaced 3 element rotary is used on a 20 while folded dipoles are used on 10 and 40.



A Teletype Receiving Adaptor

J. N. BROWN, W4OLL*

Teletype enthusiasts are aware that three different ideas have been developed for receiving adaptors. For the uninitiated this is the part of the circuit that separates the received signal into the "mark" and "space" frequencies. In this article the author describes the second of these circuits that has appeared in CQ. —Editor.

In the post-war years amateurs have taken on new and, I am sure to many, strange means of transmission. Among these is amateur radioteletype which has attracted considerable attention. The interest has reached such proportions that *CQ* has seen fit to initiate a bi-monthly teletype column to better acquaint the brethren with the why's and wherefore's of the art.

In the face of all this activity the author decided to build a gadget that would operate a teletype machine from the signals currently available on the air. These included stations sending frequency shift keying (FSK), audio frequency shift keying (AFSK), and make-break keying (MBK). Since the standards had previously been decided by the commercial stations and international standards organizations, it stood to reason that the amateurs would probably be required to comply with these established standards.

Standards and Requirements

For frequency shift keying (FSK) the established practice is for the transmitting station to transmit the *mark* signal as the higher of the two signaling frequencies. How much higher? The standard is 850 cycles higher than the *space* signal. The question always comes up as to whether the assigned frequency of a commercial station is the *mark* or the *space* signaling frequency. The answer is neither —The licensed frequency is the mid-point between the two, so actually the assigned frequency is never transmitted as such.

This mid-frequency assignment should be kept in mind especially by those amateurs who intend to operate on the newly authorized MARS teletype frequencies. The standards for audio frequency shift keying (AFSK) are as follows: The *space* frequency will be 2975 cps., and the *mark* frequency will be 2125 cps. You will note that they are spaced by 850 cps.—the same spacing as the two radio frequency signaling frequencies set up for FSK. This was no coincidence. You may ask, "Why pick 2125 and 2975 cycles per second?" The reason is good. They are not harmonically related to each other, nor are they harmonically related to the difference frequency, 850 cps.

* *Box 303, Herndon, Va.*

This is the outfit at the Author's Shack. The Receiving Adaptor is in the top of the Cabinet (indicated by the arrow).

When copying an FSK signal the receiver b.f.o. is used to produce the two beat notes of 2125 and 2975 cps. Consider this a moment and you will see that it will be necessary to have the b.f.o. on the high frequency side of the received signal in order to have the *mark* signaling frequency transmitted turn out to be 2125 cps. and the *space* to be 2975 cps.

The make-break keying standards are not as rigidly set as those for the two mentioned above. This is because there is so little MBK teletype used that depending on the user's preference, he may use either *space* or *mark* as the carrier-on condition. As explained by W2NSD in his first column[1] MBK is definitely inferior to either of the other two means and has never been adopted for wide use.

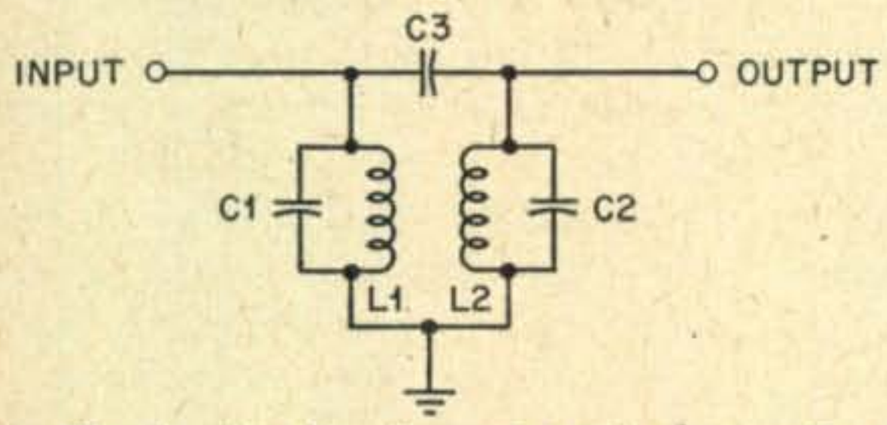


Fig. 1. The basic circuitry of a single section, high impedance, bandpass filter.

From the above we can set down our requirements for the receiving adaptor. It must discriminate between two audio tones 850 cps. apart, namely 2125 and 2975 cps. and convert these two separated signals into d.c. signals to operate a teletype relay such as the *Western Electric type 255A or 215 relay.*

Our big problem is to effectively filter out all but the particular signaling frequency in which we are interested. The author tried a couple of different types of filters. The first was not selective enough, and the second was too complex for the average amateur to build with normally available equipment, and was only slightly better than the one finally decided upon.

The Filter

Since vacuum tubes would have to be used for amplification in any case, it was thought that they could also serve the purpose of coupling elements for the filter. *Figure 1* shows the schematic of a single section high impedance filter. The circuit is simply two parallel tuned circuits coupled by a relatively small capacity, *C1.* For one tuned circuit the response curve is similar to *Figure 2(a).* For the two coupled circuits, *Figure 2(b)* applies. The double peaked curve is produced by the over-coupling effect of *C1.* This broader pass-band is desirable from the standpoint of receiver or system drift and the sharper skirt selectivity rejects everything outside the desired limits. If two of the sections are used for each signaling channel the pass band remains the same, but the skirts drop off more sharply and improve the off-frequency selectivity. This could be carried on indefinitely but two sections of the filter shown in *Figure 1* are sufficient for the purpose.

[1] Radioteletype, by Wayne Green, CQ Magazine, December, 1951.

The coils, *L1* and *L2,* of *Figure 1* are perhaps the only strange components to most amateurs. They are wound on toroidal coil forms which are made of special high permeability, high Q, material. These coil forms are doughnut shaped and for this reason present the only problem in the construction of these filters. They are not easily wound with wire to produce the necessary inductance. The wire must be passed up through the hole in the center and wrapped around the body of the form and once again up through the center hole. This operation must be repeated (ad infinitum, it would seem) until the necessary number of turns of wire have been wound on the form.

Toroidal forms are available commercially, but occasionally war surplus[2] produces a few toroids from some of the mysterious radar network "black boxes." If commercial toroids are purchased the *Western Electric type P476930* is recommended, or its equivalent, which is manufactured by various concerns under the same nomenclature.

If surplus toroids are available a test must be made to determine if the core has a sufficiently high Q at the frequency in which we are interested. An audio oscillator, a vacuum tube voltmeter or cathode ray oscilloscope and an assortment of paper condensers are necessary to make this test and to make final adjustment on the coils.

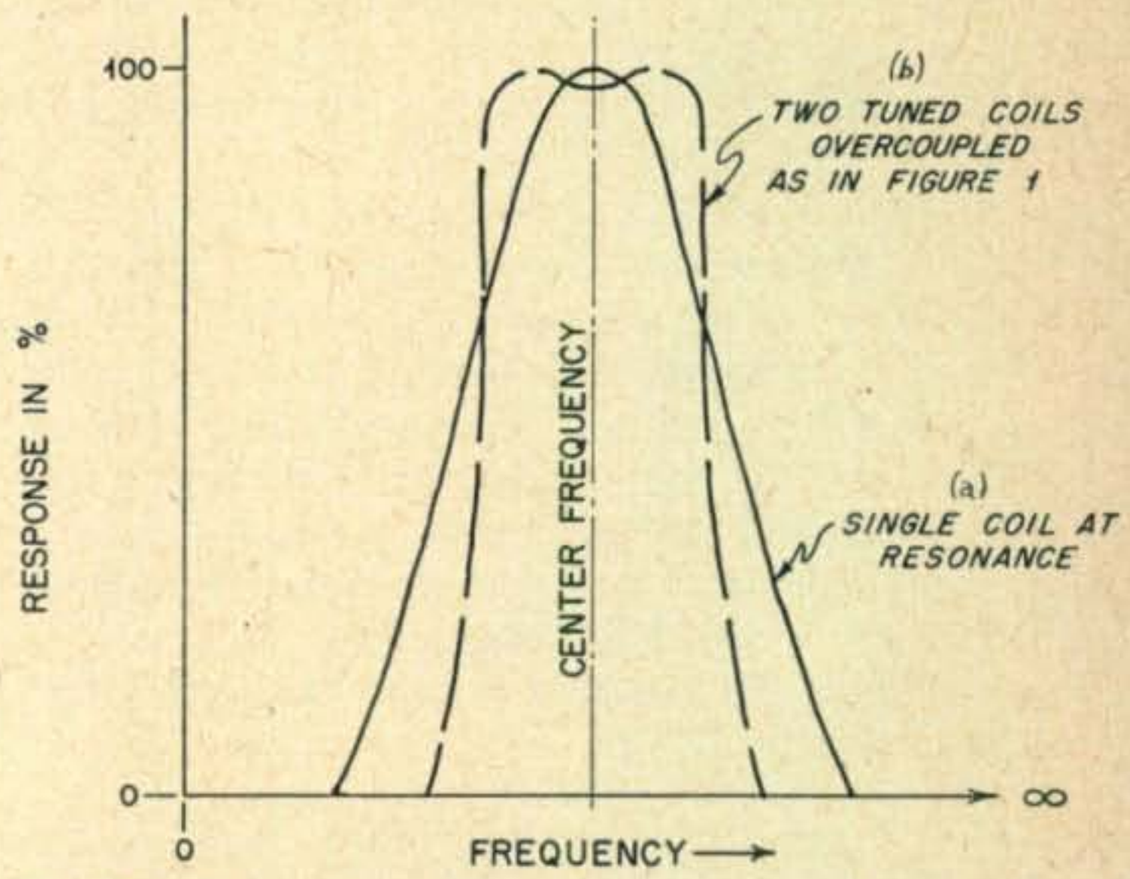


Fig. 2. Typical toroid coil response when employed in parallel resonance.

The first step is to obtain (usually from the junior op.) a popsicle stick or similar flat stick (about 4" by ⅜") to use as a bobbin for winding the toroidal coils. Cut a "V" shaped notch in each end of the flat stick and wind the stick full (lengthwise) with *#28 Formex* or *Formvar* insulated wire. Plain enamel coated wire is not usable because of its easily punctured insulation. Now, wind exactly 100 turns on the toroid form and stop. This is our sample winding.

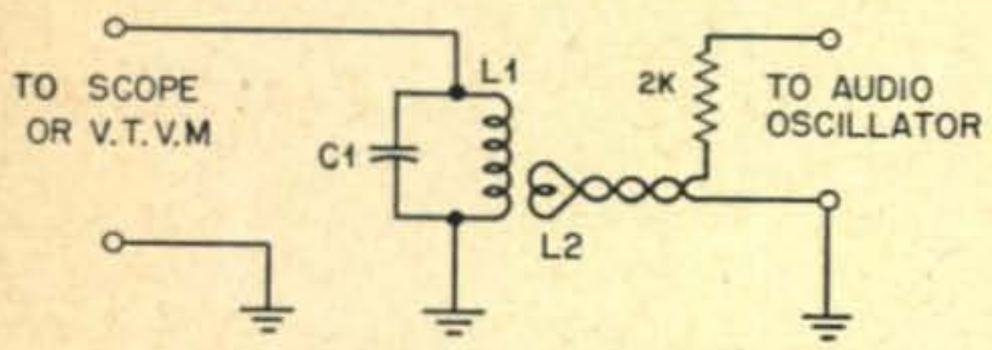
Connect the toroid and test equipment as shown in *Figure 3.* The condenser, *C1,* should be chosen

[2] The one source of supply of surplus molybdenum permalloy toroid cores known to the author is Fred M. Berry, WØMNN, 1200 East 49 Terrace, Kansas City 4, Missouri. Prices range from $2 downward per core depending on whether the cores already have windings on them or not.

so that the toroid and *C1* will be resonant somewhere between 2000 and 3000 cycles per second. Resonance is indicated by a maximum voltage indication on the scope. Note carefully the resonant frequency and then slowly detune the audio oscillator lower in frequency until the voltage amplitude is 0.7 of the value at resonance. Note this frequency, and detune the oscillator to the high frequency side of resonance until the 0.7 value is again reached on the v.t.v.m. Note this frequency and subtract the two frequencies obtained at the 0.7 amplitude points. This difference is the bandwidth of the tuned circuit. The Q of the tuned circuit is given by—

$$Q = \frac{f}{BW}$$

where f is the resonant center frequency, and BW is the bandwidth just obtained above. If the Q is over 30 the core will be satisfactory.



L1 = TOROIDAL COIL UNDER TEST.
L2 = TEMPORARY ONE TURN WINDING PLACED ON TOROID FOR TEST PURPOSES

Fig. 3. This is the arrangement for checking and aligning toroid inductances.

The inductance of the coil circuit may also be calculated approximately if the value of the test condenser *C1* is known. Use the marked value of *C1* if it is an ordinary paper condenser.

$$L = \frac{1000}{39.5 \times f^2 \times C}$$

where L is in millihenries, f is in kilocycles, and C is in microfarads.

To estimate the number of turns necessary to obtain the 22.5 mh. for the mark channel filter, for example, we use the simple ratio:

$$\frac{22.5 \text{ mh.}}{L} = \frac{N^2}{100^2}$$

This indicates that the inductance is proportional to the square of the number of turns on the toroid. The final form of this ratio is:

$$N = 100 \sqrt{\frac{22.5}{L}}$$

or in a more general form,

$$N = 100 \sqrt{\frac{\text{Desired Inductance}}{\text{Inductance per hundred test turns}}}$$

where N is the approximate number of turns necessary to give the inductance L in millihenries.

With what is known now you can go ahead and wind the coils. You might as well resign yourself to a lengthy session making like an old-maid aunt with her tatting. I suggest that 20 or 25 extra turns be wound on the form just to allow for adjustment with the usually available paper condenser.

Filter Alignment

The filter alignment is the next step. First check your audio oscillator calibration against the 600 cps. WWV modulation. Checks should be made on the 3rd, 4th, and 5th harmonic relationships, that is at 1800, 2400, and 3000 cps. This should serve to place the settings for 2125 and 2975 cps. accurately enough. Use the test lay-out in *Fig. 3* for tuning up. Take the toroids wound for the *mark* channel and select appropriate condensers so that they tune as follows: For a pair of coils (one section) one of the parallel tuned circuits should be tuned slightly higher than the 2125 cps. *mark* frequency. About 100 cps. higher is usually enough. The other one of the pair should be tuned to 2125 cps. This was determined experimentally and, as it turns out, if both are tuned to the *mark* frequency the pass band will not be symmetrical about the 2125 cps. frequency, but will be displaced downward. When the individual parallel tuned circuits are tuned up as described, the .005 μf, coupling condenser added, the overall bandpass should be carefully checked. Use the scheme in *Fig. 4* for final checking. The total bandpass should be about 200 cps. distributed evenly about the desired center channel frequency. The same procedure follows for the *space* frequency filters. One of the two tuned circuits of a filter section is tuned to 3075 cps. while the other is tuned to 2975 cps. even. The toroids may be mounted in any convenient manner. See photograph for a typical arrangement. They may be spindled on a common mount as there is no coupling between adjacent toroids. *Caution—do not have any shorted turns created by the mechanical mounting scheme.*

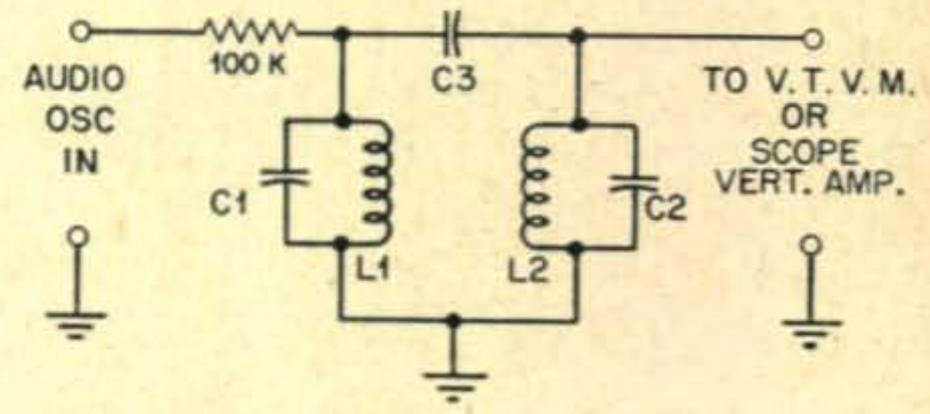


Fig. 4. Schematic of the test layout for final filter alignment check.

The author would like to point out that the exact values of inductance specified in *Table 1* need not be met, but values near these are usable. The only requirement is that the parallel resonant circuits must be tuned to the frequencies specified regardless of the size of the inductance.

Circuit Operation

There are no particular precautions about layout and wiring that should be followed. The theory of operation is quite simple and conventional. The selective amplifiers separate the two signaling tones and amplify them to about the 100 volt level at the secondary winding of *T2* and *T3*. The a.c. voltages

are rectified by the 6H6 diodes and appear at the grids of the 6L6 relay amplifiers as negative biases. These 6L6's, *V5* and *V6* in *Fig. 5*, are normally conducting and if the potentiometer *R23* is properly balanced without signal input into *T1*, the current flowing in the two relay windings is zero and the relay armature is in the mid-position between the *mark* and *space* contacts. When, for example, a *mark* signal is transmitted and received as a 2125 cps. tone, *V5* will be cut off by the negative rectified signal voltage and the balanced plate circuit is disturbed and current flows in such a direction in the relay windings so as to pull the relay armature over to the *mark* contact. The reverse happens when a *space* signal is received.

Table I

Figure 1	Channel	
Component	Mark	Space
C1	0.25 uf	0.15 uf
L1	22.5 mh	19.1 mh
C1-L1 Resonant Frequency	2125 cps	2975 cps
C2	0.25 uf	0.15 uf
L2	20.5 mh	17.8 mh
C2-L2 Resonant Frequency	2225 cps	3075 cps

Alignment

The first step is to adjust *R23* so that the zero-center meter in the 6L6 plate circuits reads zero. Second, connect the output of a communications receiver to the input transformer, *T1*, and initially set the channel gain controls *R1* and *R2* for minimum. The following is done with a.v.c. on. After the receiver has warmed up with the b.f.o. turned on, detune the b.f.o. frequency about 2 kc. to the high frequency side of the receiver center frequency. If you are one of the unhappy individuals whose receiver a.v.c. and S-meter system will not operate while using the b.f.o., you have no choice but to operate without a.v.c. Using a signal generator or the transmitter v.f.o. tune it to the receiver center frequency as indicated by maximum S-meter deflection. This should give an audio beat note of about 2000 cps. Advance the *mark* channel gain control, *R1*, slightly to allow some signal to come through. With the earphones plugged into the monitor jack on the adaptor unit and the monitor switch set for "Mark," slowly tune the receiver until the tone is heard plainly in the phones. Note the pitch of the tone and determine if it is the same as the one coming out of the receiver itself. If you are tone deaf, call your XYL, if no XYL, just go back to work and be thankful for small troubles. The point is that the signal going into the adaptor might be a subharmonic of what you are hearing coming out of the filter channel. This is caused by too great a level coming into the adaptor and for initial tests the gain should be run at low levels. When the tone is heard in the *mark* channel the d.c. output meter should have deflected from its zero center position to one side or the other. This side is the *mark* position of the meter and should be so marked. With low gain settings carefully set the audio tone coming from the receiver to the middle of the *mark* channel filter pass band. This can be seen on the output meter. The slight dip in the filter bandpass characteristic should be visible if you tune slowly. Now, advance the *mark* channel gain control slowly until the meter reaches approximately full *mark* deflection. Do not go all the way, however. Leaving all receiver gain controls set as they are, detune the receiver slowly higher in frequency until the beat note falls within the *space* filter bandpass. Carefully adjust the *space* channel gain control for the same amount of deflection of the d.c. output meter only in the opposite direction. What you have just done is equalize the gains of the *mark* and *space* channels and also taken into account any slight differences that there might be in your receiver response between the two carrier frequencies involved. Note the setting of the b.f.o. knob and use this setting when tuning in conventional FSK signals.

The thing to do now is to try your hand at tuning in a few FSK signals. Only one tip will make life easier. Develop a definite tuning procedure. The author always approaches an FSK signal from the

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R1,R2—50,000 ohm potentiometer
R3,R4,R9,R10,R15,R16—30,000 ohm, 2w
R5,R6,R11,R12—100,000 ohm, 2w
R7,R8,R13,R14,R17,R18—10,000 ohm, 1w
R19,R20—50,000 ohm, 1w
R21,R22—1,000 ohm, 10w
R23—5000 ohm, 4w potentiometer
R24,R27—100,000 ohm, 1w
R25,R26—10,000 ohm, 2w
C1,C2,C5,C6,C7,C8, C11,C12,C13,C14,C19, C20,C21,C22—0.1 μf, 600v
C3,C4,C9,C10,C15,C16—1.0 μf, 600v metalized paper
C17,C18—0.025 μf, 600v
T1—500 ohm to grid trans. or reversed plate to voice coil output transformer—depending on whether communication receiver has 500 ohm or 8 ohm output.
T2,T3—Plate to grid audio transformer—use so that ratio is 1:3
SW1A-B—Double pole, triple throw, monitor switch
SW2—Single pole, triple throw output switch
RY1—Western electric 215A or 255A relay
M1—1-0-1 ma., Model 321 Triplett zero center meter shunted to read full scale on Mark or space signal.
V1,V2,V3,V7—6SN7 tube
V4—6H6 tube
V5,V6—6L6 tube

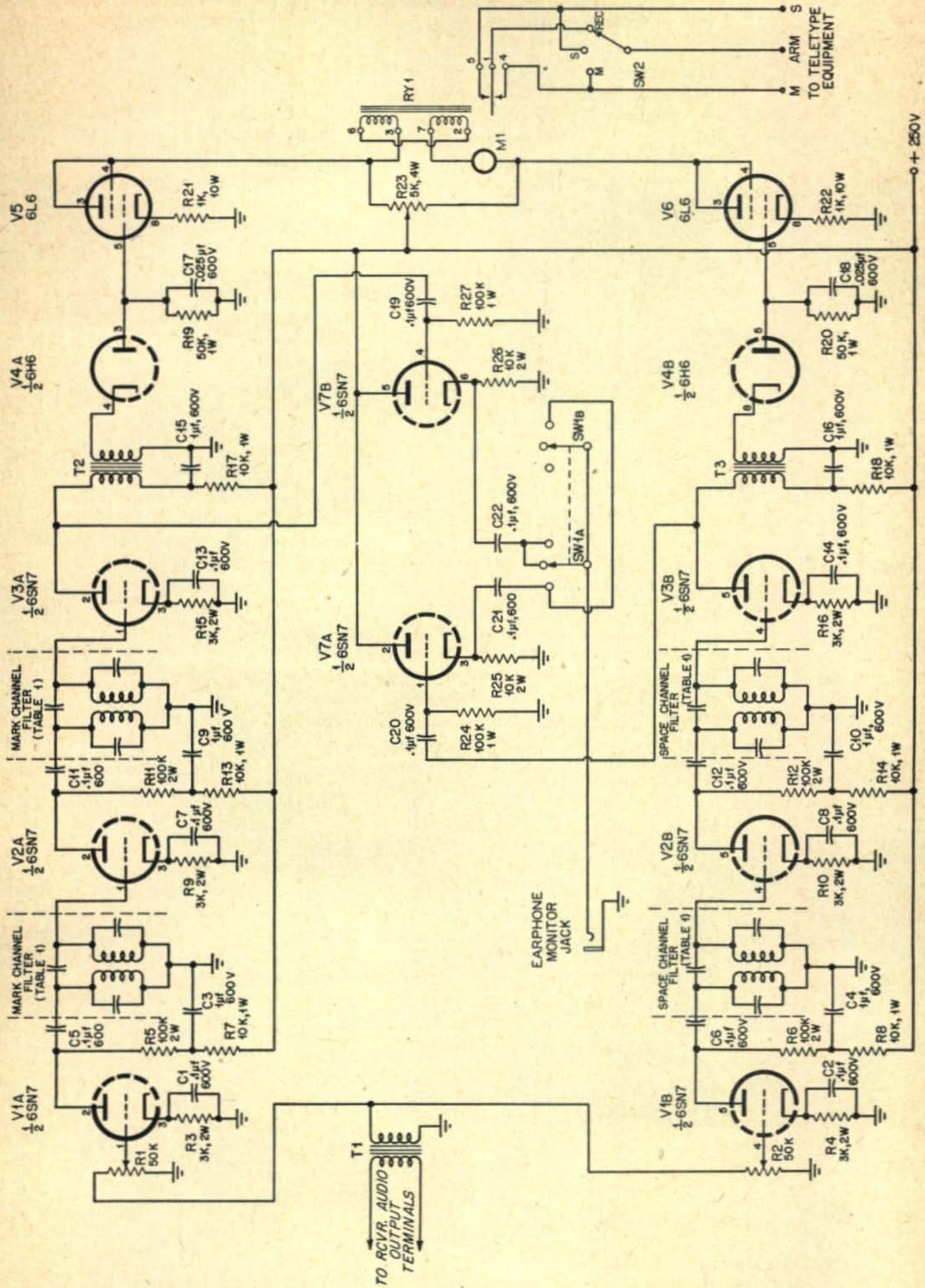
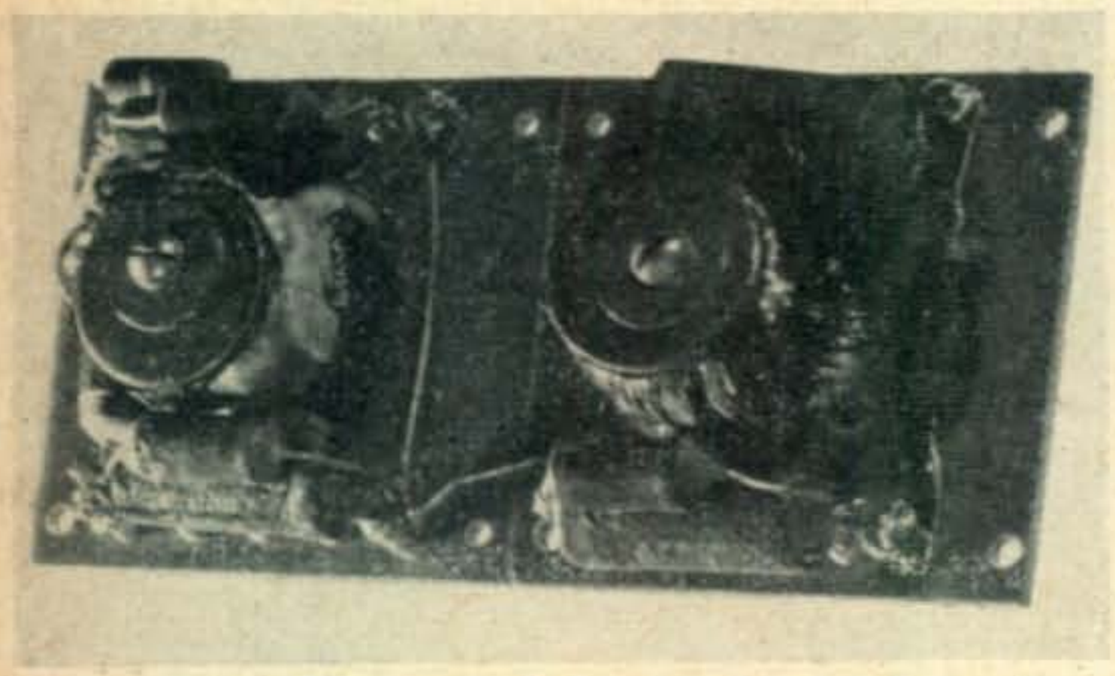


Fig. 5. This is the wiring schematic of the teletype receiving adaptor using the toroid coil filter arrangement. Note that the two channels are fed in parallel from transformer T1. The channel at the top of the drawing is for the mark frequency channel of 2125 cycles. The channel at the bottom of the page is for the "space" frequency channel of 2975 cycles. A complete parts list for this schematic is at the bottom of page 28.

high frequency side and monitors the *mark* channel in the adaptor. The first keyed tones that fall within the *mark* channel should be the marking tones—if the transmission is conventional and is not "turned over." Less than ten per cent of the commercial RTTY stations are suffering from "turnover," that is, having their *mark* and *space* signals interchanged.



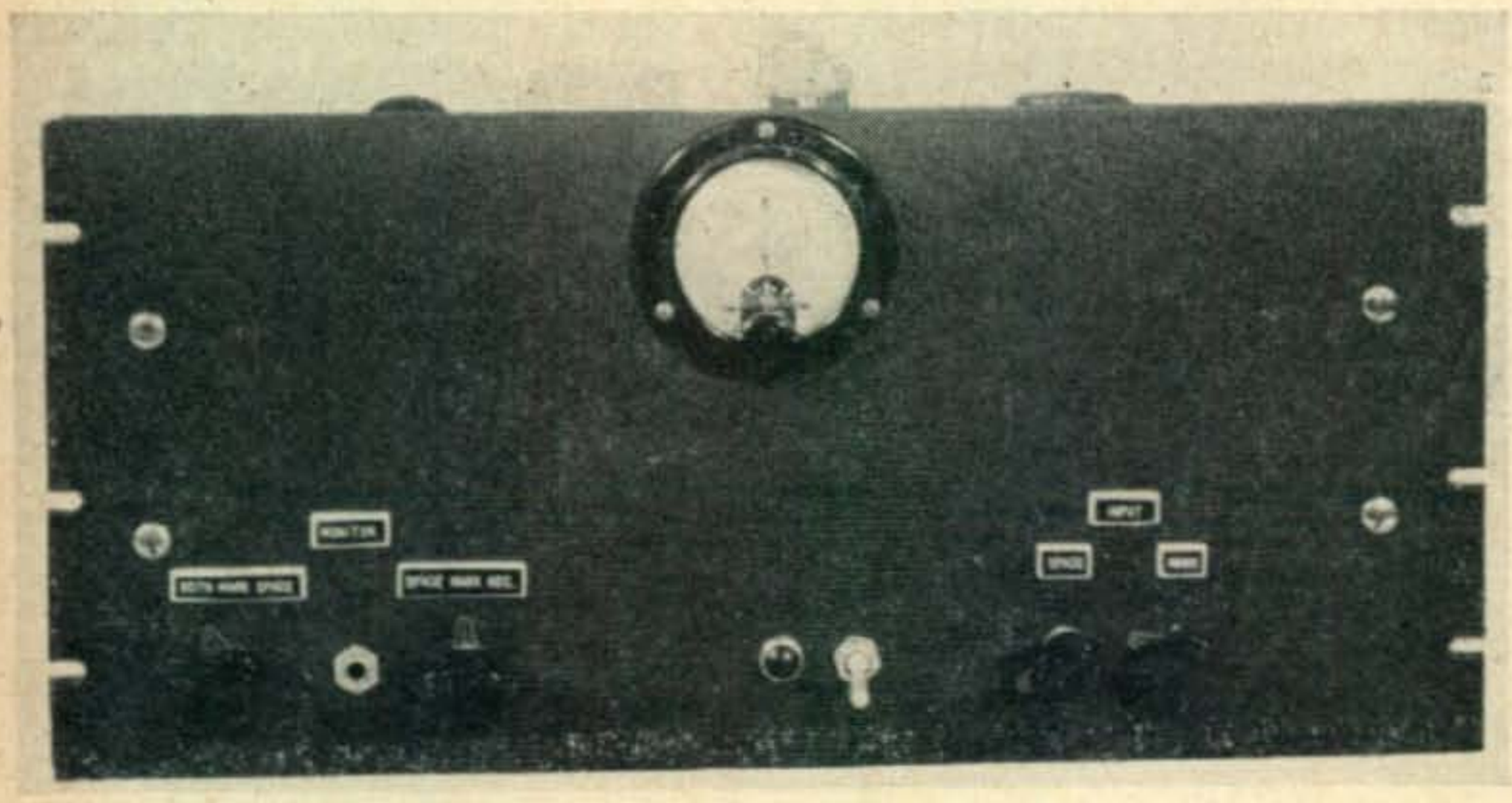
The toroidal filters must be hand wound on forms that maybe purchased commercially or obtained from certain war surplus units described in the text.

There will be many teletype signals that you will not be able to print. Among these are the ones with greater or less than 850 cps. spread. With the filters described you should be able to handle spreads between 650 and 1050 cps. Other signals will be transmitting enciphered traffic that regardless of anything you can do will still come out as garble. Still others will be transmitting time-division multiplex or "MUX" and can be easily identified by their rhythmic synchronizing signal.

To copy AFSK signals on the adaptor, the receiver should be operated in the conventional manner used to copy AM signals. The two tones on the received tone-modulated signals will key the adaptor without any hair splitting receiver adjustments as for FSK.

The following adjustments must be made on the adaptor to copy make-break keying: If the *mark* signal is the carrier-on condition, turn the *space* channel gain control, *R2,* to zero. Adjust *R23* so that the output meter is deflected half-maximum to the *space* side. Now find out if a tone in the *mark* channel deflects the meter half-maximum to the *mark* side. If the two deflections are unequal for a no-signal to a *mark*-signal change, adjust *R23* so that the deflections are equal. When operating MBK adjust the audio level into the adaptor while receiving RY test signals so that the meter hand oscillates evenly about the zero-center position as in FSK operation.

Thus far, nothing has been mentioned about the use of limiting in the system just described. It is a fact that in any system limiting will in effect destroy the dynamic range of the tone selecting filters. If you use 20 db of limiting you bring the undesired out of passband signals up by the like amount of 20 db. Granted, a moderate amount of limiting is needed, but too much can easily undo all that your filters have done. Limiting takes place in the described adaptor in the cut-off bias characteristic of the 6L6's. In other words, once the tube is cut off, you can't cut it off anymore. This is where the limiting should take place and not as clipping in the audio waveform by the characteristics of the audio amplifiers. Clipping in the audio section produces distortion and creates harmonics of the incoming undesired signals which might fall within the filter bandpass.



The complete unit may be built on a single standard rack mounting panel and chassis. The controls at the left are for "audio" monitoring. Those at the right control the levels into the two channels.

PRESENT and PROPHETIC

Tri-State Hamfest

The Tri-State Amateur Radio Society of Evansville, Indiana, has set the date of its annual Hamfest as Sunday, September fourteenth. This hamfest, which has grown steadily in popularity and scope, will be held on the Servel Picnic Grounds, southeast of Evansville.

Numerous contests have been scheduled, with the c.w.-phone game as the main event, and many valuable awards will be distributed. The Hamfest Committee has also provided for refreshments; however, they ask that you bring your own lunch, A transmitter on 29.6 mc. will be available to guide you in if you're mobile, and signs will be posted at highway junctions. All you need bring is a lunchbox, your family and friends, and a dollar apiece for registration . . . don't miss it!

A Monthly Department Edited by LOUISA SANDO, W5RZJ*

What amazing results can be produced by a little enthusiasm on one's own part! For years we've been hearing the cry—there aren't enough young people getting started in ham radio—how can we get them interested. . . . Now we have dramatic evidence that it is possible to interest the youngsters—just by being really interested oneself.

The *Milwaukee Journal* recently carried a series of pictures and story of a classroom project to train school children in radio. The fourth grade teacher of the Browning School in the town of Granville, Wis., happens to be W9MGT, Lenore Zavodnik. Her OM is W9BPR. Together Lenore and Martin have been holding two radio classes, one that meets days for children of the 4th to 8th grades, and another that meets evenings for children and adults. One of the *Journal* pictures was of some 25 of Lenore's pupils actually taking their Novice exams—that must have been a busy FCC inspector!

Equipment for the radio classes has been donated or bought by the district school board. With their new licenses the students will get on the air with a school station from one of the best locations in Milwaukee County with what is believed to be the first ham radio station to be operated by an elementary school.

FB, Lenore and Martin! Guess we need more school teachers who are hams, or have more hams become school teachers. . . .

Convention News

Conventions are all in the news this time of year, and plenty of YLs have been getting together for personal QSOs at the big gatherings from one end of the country to the other. First was the New England Division Convention at Springfield, Mass., on June 14th, with these YLs attending: W1BCU, FTJ, GQT, MCW, MJE, MUW, QON, FOF, OME, RYJ, TRE, UBL, UBM, UET, UKR, UPK, UQA, VHN, VMF, WN1UPZ, WN1UTX, W2BTB, and W8ZGT.

A YLRL meeting was held with W1BCU as MC. Following it the YLs gathered at the Blue Grotto for luncheon, where W1UKR welcomed them, W1QON and W1BCU said a few words, and W1FTJ presented the new W1 DC, W1RYJ, with a YLRL pin. Before closing, gifts to the YLs coming from the greatest distance were presented to the XYLs of PK2DA and HC2OT. Youngest YL at the convention was W1UBL, Doris, 14 years old. W1RTB, Nell, editor of *Harmonics* for the past year, had to miss the convention, for a very good reason—her jr. YL chose that day to make an appearance in this world. Congratulations, Nell and Don!

Next on the calendar was the West Gulf Division Convention held at Corpus Christi, Texas, on June 28-29. Though in our own division we were unable to make it, but lots of the YLs did, including, W5SFT, VMR, RMH, NCH, TSE, EUG, UKT, TYX, QXR, BKG, PWN, KQG, DUR, and KZ5AC. A YL breakfast was held on Sunday morning in the

**Address all letters and correspondence to 959C-24th Street, Los Alamos, New Mexico.*

YLs attending the picnic of the Los Angeles Council of Radio Clubs. Left to right, front row: WN6DQD, WN6OBZ, W6JMC, WN6-JCA, W6KOY. Standing: WN6JBB, W6LMQ, WN6-QEC, W6CEE, W6WRT, W6NLM, W6JMS, W6-CQV.

YLs enjoying the special breakfast during the West Gulf Division Convention. Left to right: W5PWN, BKG, KQG, DUR, KZ5AC, and W5QXR. Photo by N. G. Morris.

Cottonbowl Room at the White Plaza Hotel, with W5QXR, Marge, and W5BKG, Ethel, co-hostesses. Aprons with each YL's call were given as place favors. W5KGQ, Fran, won the prize of an electric clock.

The Pacific Division Convention was held at San Francisco on July 4-6. YL and XYL registration was 111, of whom these were licensed YLs: W6ZTJ, PCR, ALL, LAD, MFW, FEA, FKY, CBA, PCN, GQZ, WN6MWW, WN6PIR, and W7QYA. No special programs were arranged for just the YLs since in the three San Francisco ham clubs the only two licensed YLs are W6PCN and WN6CSJ, so they had no group around which to plan such activities. However, W6PCN and the XYL of W6UEV, who were in charge of the women's program for the convention, arranged plenty of activities for the XYLs generally and there were many pleased comments afterwards from those who were pleasantly surprised at the plans made for them—too many have had bitter past experiences of spending the whole convention time sitting in a hotel room or lobby being bored! In addition to bus sight-seeing trips on Friday and Sunday, there was a boat trip of the Bay, luncheon at Fisherman's Wharf, a theater party, card party, and at the banquet there were special prize drawings for the XYLs.

In the regular drawing lucky tickets were held by W6ALL, Wendy, who took home a pair of 866As, and WN6PIR, Mary Ellen, who won a Handbook to help her toward her General ticket. The prize for the YL code speed contest held just before the banquet was won by W7QYA, Flo, for a speed of 37 wpm. Though she didn't win it herself, it was as good as doing so, for W6PCN's OM won the surprise grand prize—the preview model of the new National HRO-60, which had been rushed through just for the Convention. When she sent news of the convention Peggy was still way up in the air—and who wouldn't be!

Club News

The Los Angeles YL Club held its installation-of-officers meeting in June with these YLs attending: W6NLM (president), KER (secretary), WN6PJU (treasurer), W6CEE, AVF, TDL, UHA, NZP, WRT, JMC, JMS, CQV, MFP; WN6s, JCA, OBZ, JBB, QEC, QDG, WN7RBA, ex- VE3QL, and several guests. Following the ceremony, gift of a gavel was presented to outgoing president W6CEE, ceramic jewelry to the other officers, and hankies embroidered with the YLRL emblem to the chairwomen. The new prexy appointed W6CQV as raffle chairwoman, W6WRT to handle publicity, WN6JCA as L.A. Council delegate, and W6CEE as social chairwoman.

Many of the YLs turned out for the L.A. Council of Radio Clubs picnic—see photo. W6UHA, Maxine, won the main prize of an S-76.

First news of YLs participating in Field Day comes also from the Los Angeles club which operated under the call of W6CEE at Big Pines, Calif. W6NLM, UHA, CEE, LBO and KYZ operated the Field Day set-up with transmitters on 2, 10, 20 and 75 phone, and 20 and 40 c.w. Of course, the gals give credit to the OMs—W6CPU, HWM, IQM, UTZ, and LBO's OM—who assisted in the way of technical matters and took care of the jr. ops.

Here and There

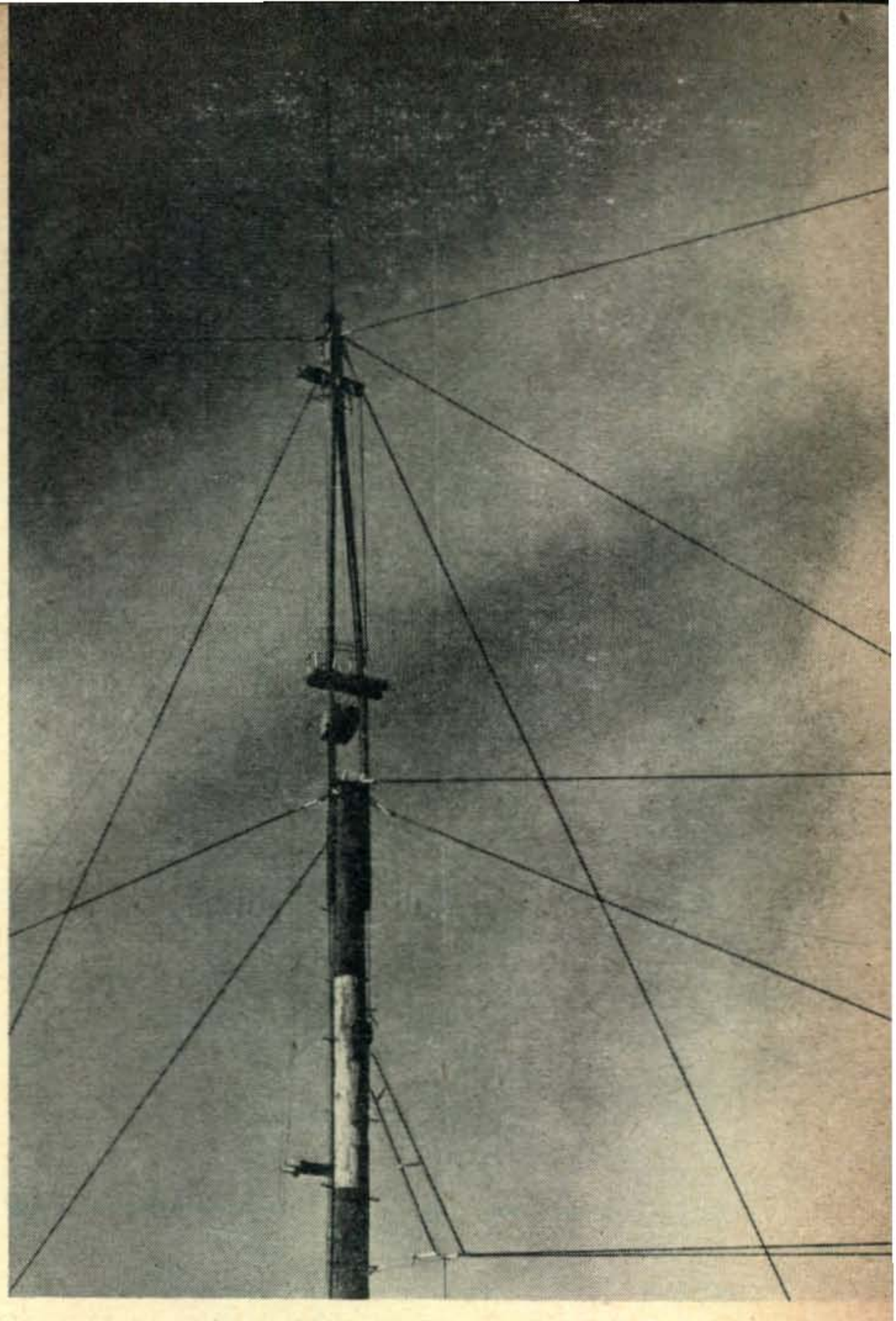
Our deepest sympathy to W8UDA, Dot. We have learned that her OM, Paul, died on July 4th.

From WØCCK, Maxine, comes an invitation for any YLs in the vicinity to attend a ham picnic to be held at Phelps Grove Park in Springfield, Mo., on Sunday, August 31st. It is a basket dinner affair and registration is 50c for women.

Maxine is now Advanced Class and is operating on 75. She also writes of another new YLRL member in Springfield in the person of WØHOD, Ethel, who is most active on 10 phone.

33—W5RZJ

YLs at the New England Division Convention. Left to right, front row: W1-BCU, FTJ, RYJ, VHN, UBM. Back row: W1QON, MCW, UQA, VMF, GQT, 2BTB, 8ZGT, 1MJE.



This is a closeup of the upper section of the center support. Small box mounted on the telephone pole near the top contains d.p.d.t. relay used to switch feed line from "V's" to "J".

Photo by W. J. Spicer

A 'V' Array with Controllable Directivity

R. F. SEILKOP, W8VBG*

"V" arrays are not new, but W8VBG's, combining reflectors for increased gain with rotatable directivity, is worthy of more than passing attention of the amateur who has the available space and is looking for a comparatively simple method of obtaining high power gain and directivity from his antenna system.—Editor.

The need for an efficient antenna system at W8VBG became very apparent after the war, if I expected to hold my own on 14-mc phone. After consulting several radio handbooks and textbooks and after making a series of experiments, I decided the "V" antenna would best meet my requirements, because of its efficiency and simplicity.

Having room to spare, I would support the apex of the "V" and slant the open ends towards the ground. Then, by varying the length of wire beyond the open-end insulators, I could regulate their height above ground. This construction would allow maximum economy, because, besides the pole, my only expense would be for insulators and wire, which could be iron guy wire. Slanting the wires downward would also increase low-angle radiation from the open ends and decrease it from the apex, tending to make the array unidirectional.

Figure 1 shows the first array constructed along these lines. With the switch in the upper position, *wires No. 1* and *No. 2* are excited, producing maximum radiation in the direction of the upper arrow. With it in the other position, *wires No. 2* and *No. 3* are excited, producing maximum radiation in the direction of the second arrow.

This arrangement worked very well, but it was inconvenient having to run out on the back porch, often around dawn on frosty mornings in my pajamas, to change the main lobe azimuth. Being restricted to two directions also had its obvious

*R. R. 1, Loveland, Ohio

disadvantages; therefore I gave considerable thought to designing a more-conveniently controlled array that would cover all continents.

According to my reference books, a "V" 4 wavelengths long produces maximum gain when the included angle between its legs is approximately 52 degrees. A circle contains 360 degrees, and would permit seven 4-wavelength "V's" to be equally spaced around a central support. Such an

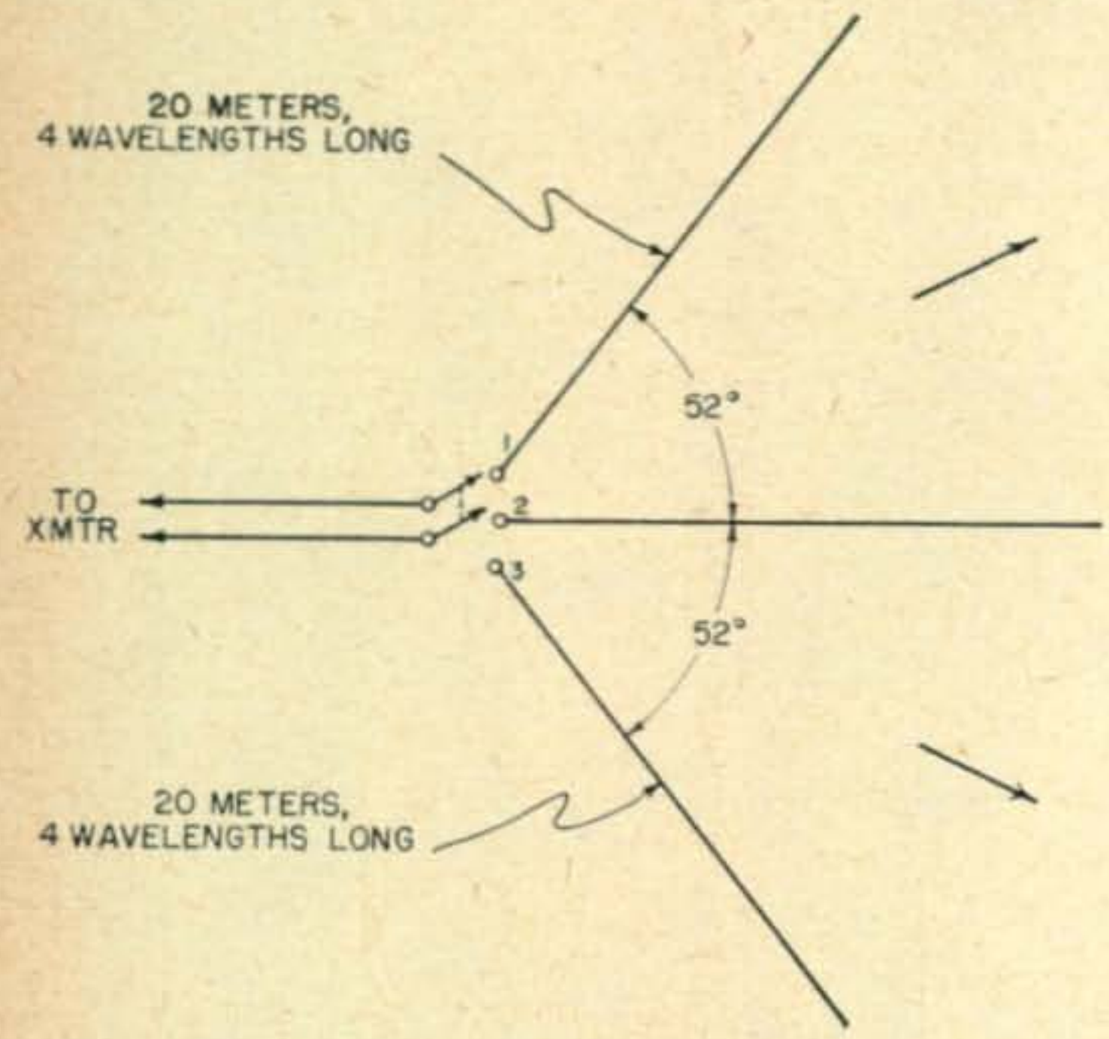


Fig. 1. This is the first "V" array used by W8VBG.

array would give excellent coverage; therefore one was constructed. Seven relays, mounted near the top of the center support and controlled from the operating position, permitted instant choice of any pair of adjacent radials to form a "V."

Several months later, I added a reflector system, consisting of a "floating" wire, 3½ wavelengths long, parallel to and ¼ wavelength below each radial, to the array. (Suggested by reading Terman's *Radio Engineering*.) The addition increased forward gain appreciably. It also decreased signal pickup from the rear when using the array for receiving.

I was running many "phone patches" between men in the Armed Forces stationed in Europe and Asia and their relatives in the States at this time, and I wanted all the gain I could get in those directions. Consequently, I doubled the lengths of the appropriate radials, obtaining a further increase in gain. At last I was satisfied, and *Fig. 2* shows the final arrangement. A vertical antenna rod is used for local contacts.

Construction

The heart of the array is the center support. It consists of a 50-foot telephone pole supplemented by an "A"-frame extension, making the total height approximately 67 feet. The "A" frame *(see photograph)* is constructed entirely of 2 X 4's, bolted together and to the telephone pole with ½-inch steel bolts. Although the frame easily supports my 190 pounds when all radials are in place, all constructional work was completed before the pole was set in the ground.

Antennas and reflectors are supported by means of holes through the flanges of angle-iron frames. One frame is bolted to the top of the "A" frame and the other 17 feet 2 inches below. Angle irons are also used to support the base insulator of the vertical antenna. Insulators on two pairs of cross arms, one pair just below the antennas and the other pair just above the relay box, keep the wires between the antennas and relays tight and uniformly spaced 6 inches apart. These wires become part of the matching system; therefore, make their lengths all the same.

Figure 3 details the relay-switching and feed system. *Surplus NB5* relays are used here, but any

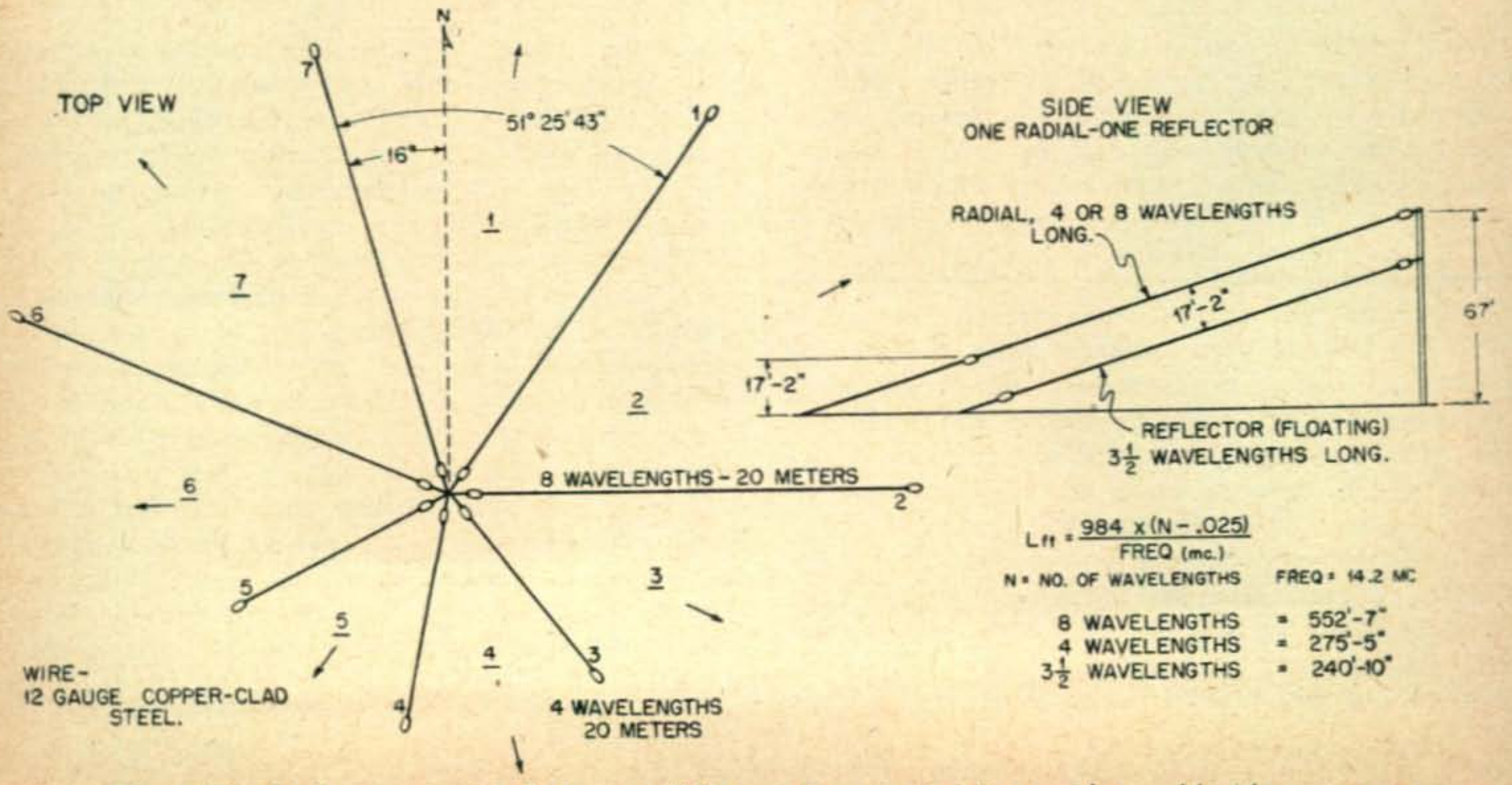


Fig. 2. The final array consisted of seven "V" arrays so oriented to provide world-wide coverage.

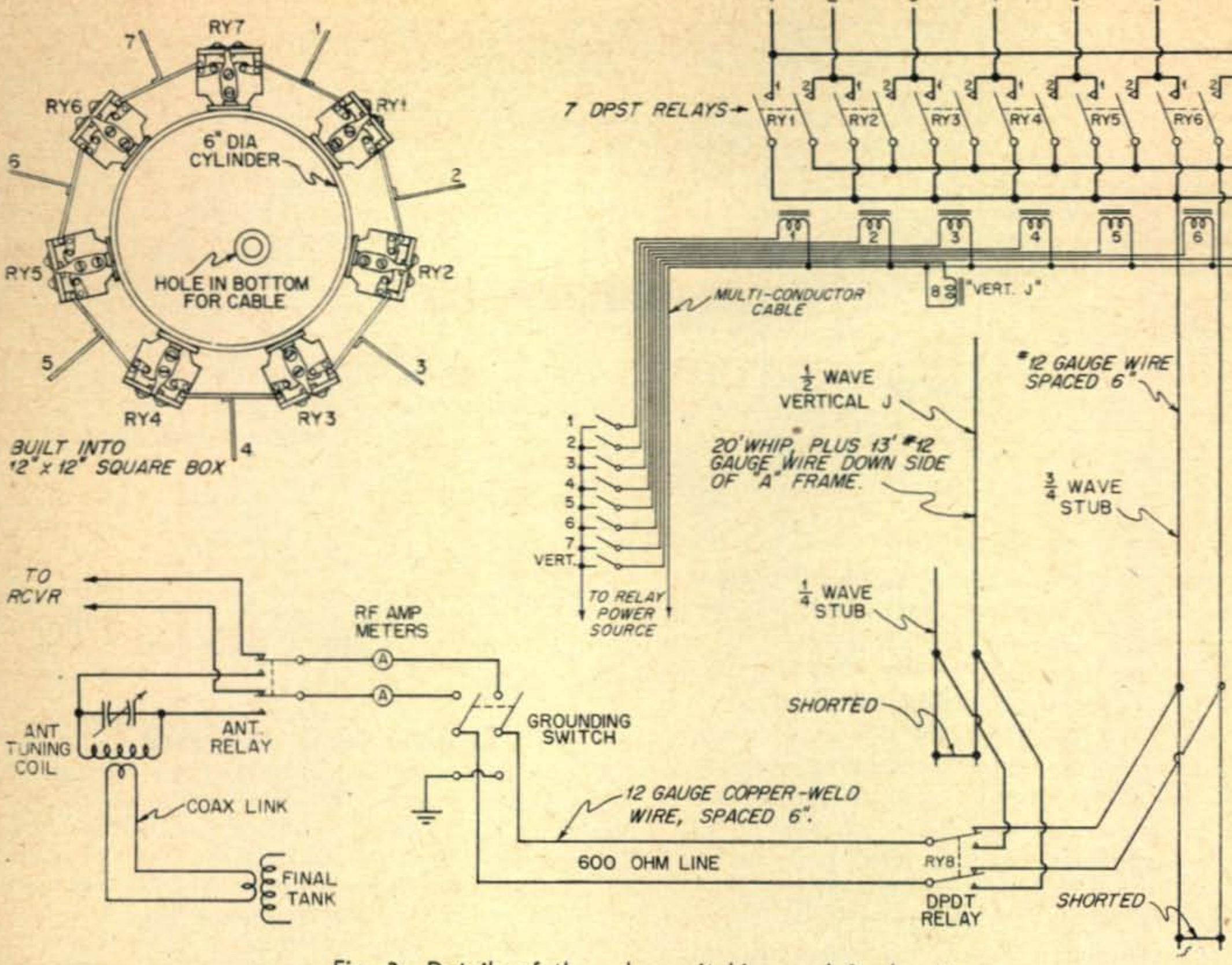


Fig. 3. Details of the relay switching and feed system.

well-insulated d.p.s.t., (n. o.) relays may be used. They are mounted in a circle. One movable contact of each is connected to one conductor of the matching stub, and the other movable contact of each to the other conductor through ⅛-inch copper-tubing rings. Adjacent fixed contacts of the relays are connected together and to the appropriate radial, thusly: *contact No. 2* of the first relay is connected to *contact No. 1* of the second relay and to *radial No. 2. Contact No. 2* of the second relay is connected to *contact No. 1* of the third relay and to *radial No. 3,* and so forth, until the circle is completed by connecting *contact No. 2* of the seventh relay to *contact No. 1* of the first relay and to *radial No. 1.*

The relays are protected from the elements by a 1-foot square galvanized iron box, and external r-f connections are made through feed-through insulators. A shielded multi-conductor cable carries the control current to the relay coils. In wiring, take care that no strain is placed on the ceramic insulation of the relays; otherwise, jars and bumps while setting the pole may crack it. After the box is assembled, seal it with several coats of waterproofing material, paying especial attention to cracks and seams.

Either separate s.p.s.t. switches or a multi-position rotary switch may be used to control the relays. The former allows instant selection of the desired direction, but presents the possibility of an r-f short across the stub, if two of the switches are turned on at the same time.

Feed System

Feeding the array caused considerable concern, because the pole is 400 feet from the house. 600-ohm line (12-gauge wire spaced 6 inches) was chosen, because it has the lowest losses and is the least expensive of available lines. Another point in its favor is that, by using copper-clad steel wire, enough tension can be placed on the line to eliminate the need for a support between the pole and the house.

A shorted ¾-wave stub matches the line to the "V's". Another ¼-wave stub is used with the vertical "J."

Tuning The Array

Tuning the array is necessary to obtain maximum directivity, especially on receiving. The best tuning procedure found here was the following: Feed r-f power to a ½-wave antenna strung temporarily between a couple of trees to excite the array. Substitute an r-f galvanometer for the shorting bar on the matching stub. Disconnect the feed line from the stub, but connect a "V" to it by exciting one of the relays. Slide the galvanometer up and down the stub until the point of maximum meter deflection is found. Replace the meter with the shorting bar. *(A 60-ma pilot bulb may be substituted for the galvanometer if the latter is un-*

This table is a composite average of S-meter reports showing the "V" array number and the reported signal strengths when the arrays were switched from one to another.

	1	2	3	4	5	6	7
GREENLAND	9+50	9 10	5	3	4	3	7
ENGLAND	9+5	9+60	8	4	4	3	5
SOUTH AFRICA	N. S.	2	9+30	3	N. S.	N. S	N. S.
BRAZIL	2	2	7	9+30	8-9	4	N. S.
NEW ZEALAND	N. S.	N. S.	N. S.	2	9+20	8	N. S.
AUSTRALIA	N. S.	N. S.	N. S.	2	8-9	9+30	6
JAPAN	6	N. S.	N. S.	N. S.	2	5	9+30

N. S. - No Signal Audible

available—Editor.) Normally a ¼-wave stub for 14 mc is approximately 50 feet long, but the loading effect of the relay-switching system in this one reduces its length somewhat.

Next, tap the feed line on the stub approximately 6 feet above the shorting bar, feed power into the line, and vary the point where the line is tapped on the stub for minimum standing waves on the line. Then, very carefully readjust the position of the shorting bar for a further reduction in line SWR. The galvanometer, connected to a pickup coil, or any of the methods outlined in the handbooks, may be used to measure the SWR.

After the above adjustments are completed, adjust the reflectors for maximum forward gain as indicated by a field strength meter several wavelengths in front of each "V." Finally, touch up stub adjustments for lowest line SWR. This final step made very little difference in this installation.

Comments And Results

A pair of the 8-wavelength radials were respaced to produce a "V" with the theoretically-correct 36 degree included angle between legs. So little additional gain was obtained that it did not seem worth the effort that would have been required to respace all of them and add new ones, plus relays, to retain all-continent coverage. There might be some advantage in extending the lengths of the appropriate reflectors to 7-½ wavelengths, although this has not been tested.

The "V's" with unequal legs have gains somewhere between the gains of the larger and smaller "V's." No opinion has been formed as to how much —if any—the unbalance distorts their radiation pattern.

The *Table* shown above is based upon the signal strength reports of my signal as reported by amateurs in Greenland, England, South Africa, Brazil, New Zealand, Australia and Japan. It is fairly indicative of the way the array works on 14 mc. Note how the fellow must suffer who has only one array and tries to work a little off the main lobe.

The array works well on 4 and 28 mc, when the shorting bar is removed from the matching stub. Directivity and gain are not as high on 4 mc as on the higher frequencies, but is still appreciable.

Inside the Shack and Workshop

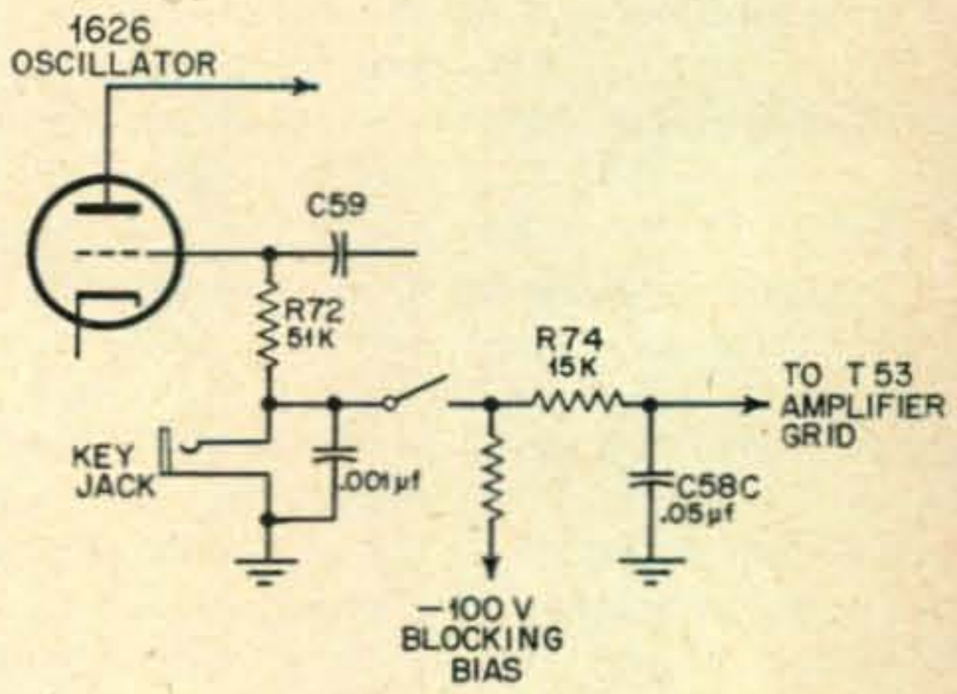
Grid-block Keying

A suitable keying method, involving a minimum of complications is a very desirable feature in the conversion of the popular war-surplus Command type transmitters. The simplified diagram shows a method of applying grid-block simultaneously to both oscillator and amplifier stages in these units.

Free the connection between the oscillator coil and the oscillator grid resistor. Then open the connection between the amplifier grid resistor and ground. Mount an insulated lug to anchor the free end of the oscillator grid leak. Finish wiring as shown in diagram.

Be sure to use a well-regulated source of amplifier screen voltage. Note that the switch permits the operator to throw on just the oscillator to spot his frequency. No r.f. chokes are necessary, and the by-pass condenser across the key is strictly a precaution—no change in performance was noted when it was out of the circuit.

E. R. Syphrit, W3LWN



MORE S & W MATERIAL ON PAGE 40.

Don't forget to send the nifty stunts that you have found useful around your shack to the S & W Department Editor, c/o CQ Magazine, 67 West 44th Street, New York 36, N. Y.

The author makes a 75-meter field strength measurement.

How's Your Geology?

P. LICASTRO, W3PKE*

Every so often we read of a laboratory or scientific organization employing amateur radio as a means of furthering their studies. The following material is a portion of a problem entitled, "Use of Radio Frequencies in the Study of Geologic Structure." Amateur techniques were used throughout and the results indicate wide possible variations in the ground wave range of a 75-meter signal.

—Editor.

To you who enjoy operation on the lower frequencies and have at one time or another been plagued by such factors as power, antenna placement, etc., we offer something that further complicates the problem of ground wave transmission in the vicinity of the transmitter. This is the geology of the area, and though little can be done as a remedy, it may be of interest in shedding light on some heretofore unexplained phenomena.

A short discussion of the theory for propagation of electromagnetic waves is necessary to show how and why they should be affected by geology. Radiation from an antenna takes place by virtue of the expanding magnetic and electric fields created by the current flowing in the antenna. A radio wave is a combination of magnetic and electrostatic fields, the energy being divided equally between the two. The paths that these waves follow as applied to conventional transmission are divided into two main groups: sky waves and ground waves.

The sky wave, which is used for long distance transmission at high frequencies, travels outward and upward into space. In the ionosphere it may be refracted by the ionized layers of the upper atmosphere. The action of this wave is controlled chiefly by the ionosphere.

The ground wave, which is more likely to be affected by geologic features, can be further subdivided into an air wave and a surface wave. The air wave is the result of two components, a direct wave which travels directly from the transmitter to the receiver and is attenuated at nearly the same rate as a wave in free space, and a ground reflected wave. When the transmitting and receiving antennae are at the earth's surface, these two components of the air wave are almost equal in magnitude and opposite in phase, thus canceling each other. Such being the conditions, the surface wave is left as the only important component of the ground wave.

The surface wave travels along the boundary between the earth and the air. As the wave passes over the ground a part of the energy is continuously fed into the earth in the form of induced currents. These currents radiate in the same manner as the current in an antenna, adding to the reduced field above the earth. Thus while the wave exists in the space immediately above the earth, it is controlled by the conductivity of the earth. If the surface of the earth were a perfect conductor, surface wave transmission would be ideal, since energy would not be consumed in overcoming resistance. The only decrease with distance would be due to the spreading of the waves. In the practical case, however, the amount of signal that actually ap-

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*School of Mineral Industries, Pennsylvania State College, State College, Pa.

pears at any given receiving antenna is appreciably less than would be expected if only spreading effects occurred. This added loss is due to the electrical characteristics of the ground over which the wave passes.

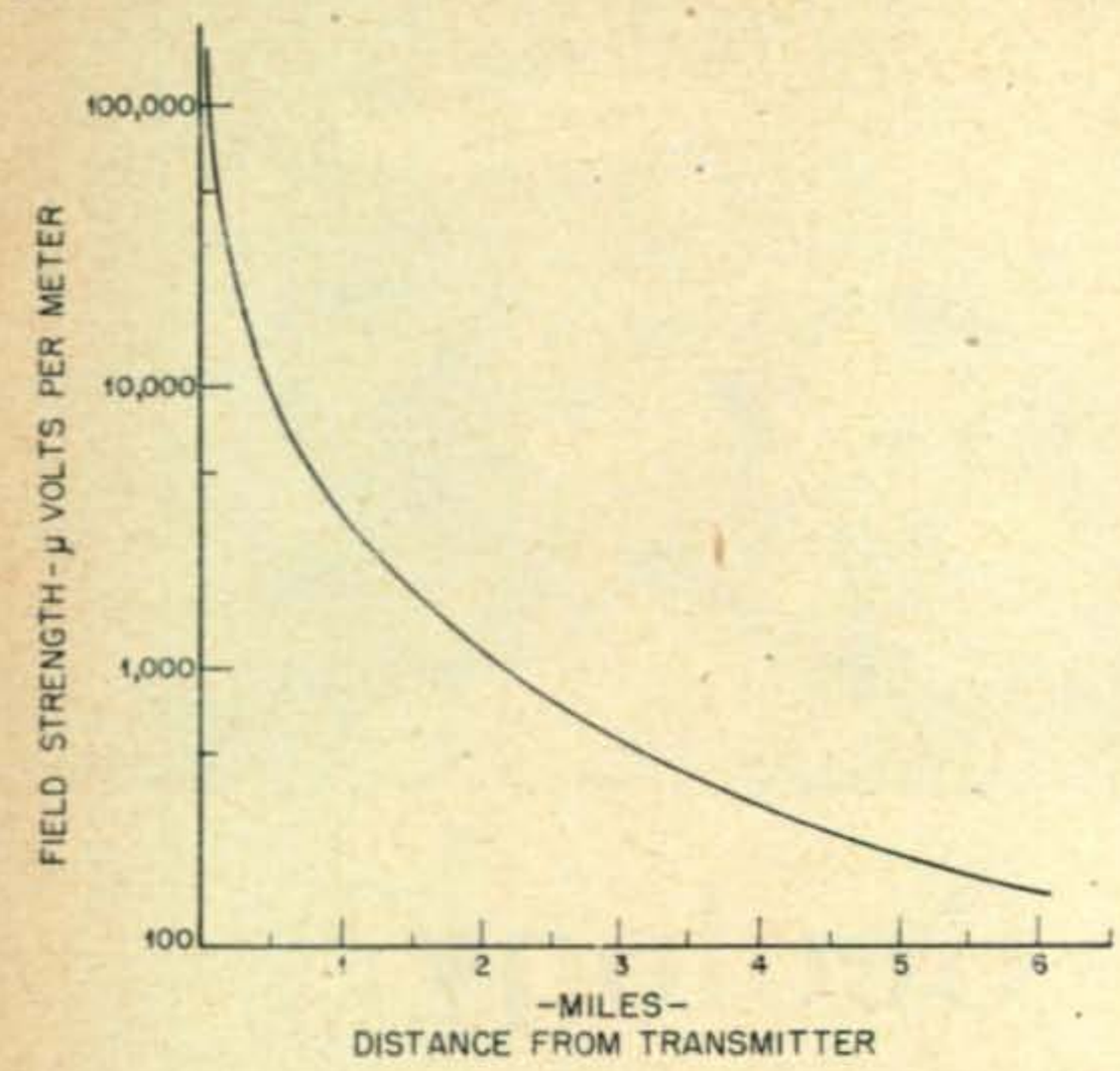


Fig. 1. This is the field strength of a quarter wave along the traverse labelled O-A. The measurements were made on 3.6 mc. The azimuth was about 45° east of north.

Sommerfeld (1928) introduced a solution to the transmission equations for surface waves as follows:

$$\text{Field strength} = k/d\ A$$

where k = a constant determination by the strength of the field radiated along the horizontal by the transmitting antenna.

d = distance from transmitter.

A = factor taking into account ground loss.

k/d represents the decrease in field strength with distance that would normally take place in free space. This decrease in field strength is caused by the fact that energy in the wave has to spread out over larger and larger spheres as the distance from the source is increased. The factor A depends in a complicated way upon frequency, dielectric constant, conductivity of the earth, and distance. This equation shows that any change in conductivity or dielectric constant of the earth would be reflected in the strength of the field.

The resistivity and dielectric of rocks are, in a large part, controlled by the amount of moisture and the manner in which it is present in the rock. Rock formations of different lithologic character, i.e., limestones, shales, sandstones, etc., all differ in the amount of and manner in which they hold moisture.

Earth resistivity varies greatly under these conditions, ranging from a hundred ohms per centimeter for wet clays and moist loam to values of the order of a million ohms per centimeter for dry rocks. The dielectric constant of earth ranges from 5 to 40, with the low values tending to go with dry soils of poor conductivity and the larger values with moist conducting earth. The values of conductivity and dielectric encountered by radio waves have been found to be averaged to depths of over 50 feet (*Terman* 1943). As a result the moisture from a single rainfall has little effect on the strength of the radio field.

Geology

Let us for a moment digress from radio and consider a few simple geologic concepts and their relationship to the present land surface of mother earth. Millions of years ago the present day sedimentary rocks we see were being deposited in shallow broad ocean basins similar to the Gulf of Mexico. The material for these rocks was brought in by streams eroding distant land masses or by the chemical precipitation of carbonates in the water. Thus through geologic time there was formed in these basins a series of flat lying sheets (strata) of sediments (limestones, dolomites, sandstones, shales) of large lateral extent. The composition and thickness of these sheets lying one on another varied depending on the type of material being brought into the basin at the time.

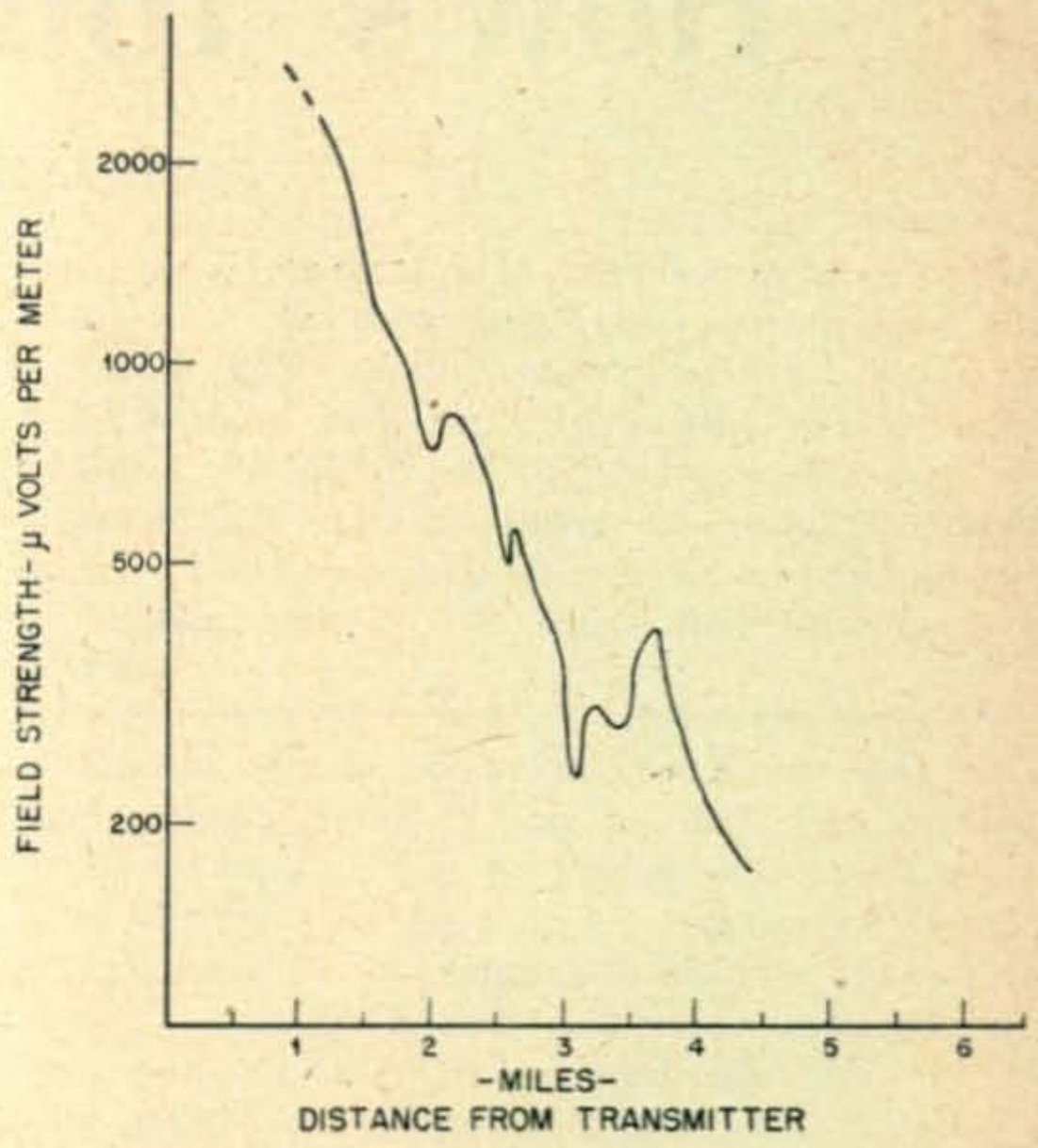


Fig. 2. On traverse O-B which ran on an azimuth of about 45° west of north the field strength varies as a function of distance as shown above.

In some areas the strata formed in the basins were later warped into great folds by tremendous lateral forces. These uplifted folds, resembling the wrinkles of old age, were exposed to the elements and eroded, leaving the surface of the earth much as we see it today. Thus the surface, though it may be covered by a thin veneer of soil or debris, represents in many places the truncated edges of sediments which have been upended and eroded. In many places too, this picture has been modified by volcanic activity, and in others the sediments are yet flat lying, having been little disturbed since their deposition. Now that we have become geologists of the first water, let us return to the problem; the effect of geology upon the amateur.

Making the Measurements

In order to determine how geology affects the power of a received wave, a 30 watt transmitter was set up in the vicinity of State College, Penna., an area of complex but known geologic structure. A Pierce type crystal controlled oscillator with a 6AG7 was used. The output stage was a conventional 807 power amplifier. The use of inductive coupling between stages, the filtering of all d.c. power leads, and the shielding of the entire unit prevented radiation from the transmitter other than through the antenna. Plate and filament voltages were supplied by a full wave rectified, choke input power supply with a voltage stabilizer at the input. To comply with FCC regulations the continuous emission from the transmitter was monitored every ten minutes by an automatic keyer which sent out the call letters, W3PKE. It should be pointed out here, that only small variations in field strength were expected due to the geology of the area, and therefore, all possible precautions were taken to avoid change of radiated power at the transmitter.

A vertical quarter-wavelength grounded antenna supported on a 66-foot wooden mast and fed by a 72-ohm coaxial line was used. The electrical ground consisted of a section of iron pipe driven into the earth, which was kept moist in the vicinity by saturating with a salt solution to lower the ground resistance. In the radio shack a ventilator controlled by thermal relay kept the temperature constant to within a few degrees. The transmitter was operated for a period of at least an hour before field strength measurements were made, as the initial heating effects of the tubes and transformer caused a small drift in antenna current during the first few minutes of operation. While field intensity measurements were being made an operator at the transmitter recorded the antenna current in case of drift. The above precautions were not in vain for, in periods of more than 6 hours, it was found that there was no detectable change in antenna current.

For measuring field strength a commercial field intensity meter, type 308, manufactured by RCA was used. This instrument employs a shielded, unbalanced loop, and is capable of measuring signal strengths from 200 microvolts to 20 volts per meter. All possible precautions in measurement were made. The meter was standardized before each measurement, calibrated at the frequency used, and all measurements were made in fields away from power lines and fences.

Now coming to the point, using the transmitting and field strength equipment described, two traverses were completed. Traverse *O-A* was wholly on a dolomite and ran parallel to the general direction of the structure of the area. Field intensity measurements were made at approximately half mile intervals and as nearly as possible along the center of the formation outcrop. This was to reduce the influence of adjacent formation of different electrical characteristics on the radio field. The resulting curve of field strength plotted as a function of distance is shown in *Fig. 1.* Since the curve shows only small deviations of field strength from the values that would be expected over homogeneous earth (*Terman* 1945), it was used as a reference from which attenuation was later calculated.

The second traverse, *O-B,* was run at right angles to the first and across the geologic structure of the area. This traverse crosses outcrops of limestone, sandstone and dolomite in addition to such structural features as faults and folds. The measured field intensity along *O-B* plotted as a function of distance is shown in *Fig. 2.* This curve shows a great deal of variation in the rate of field strength decay.

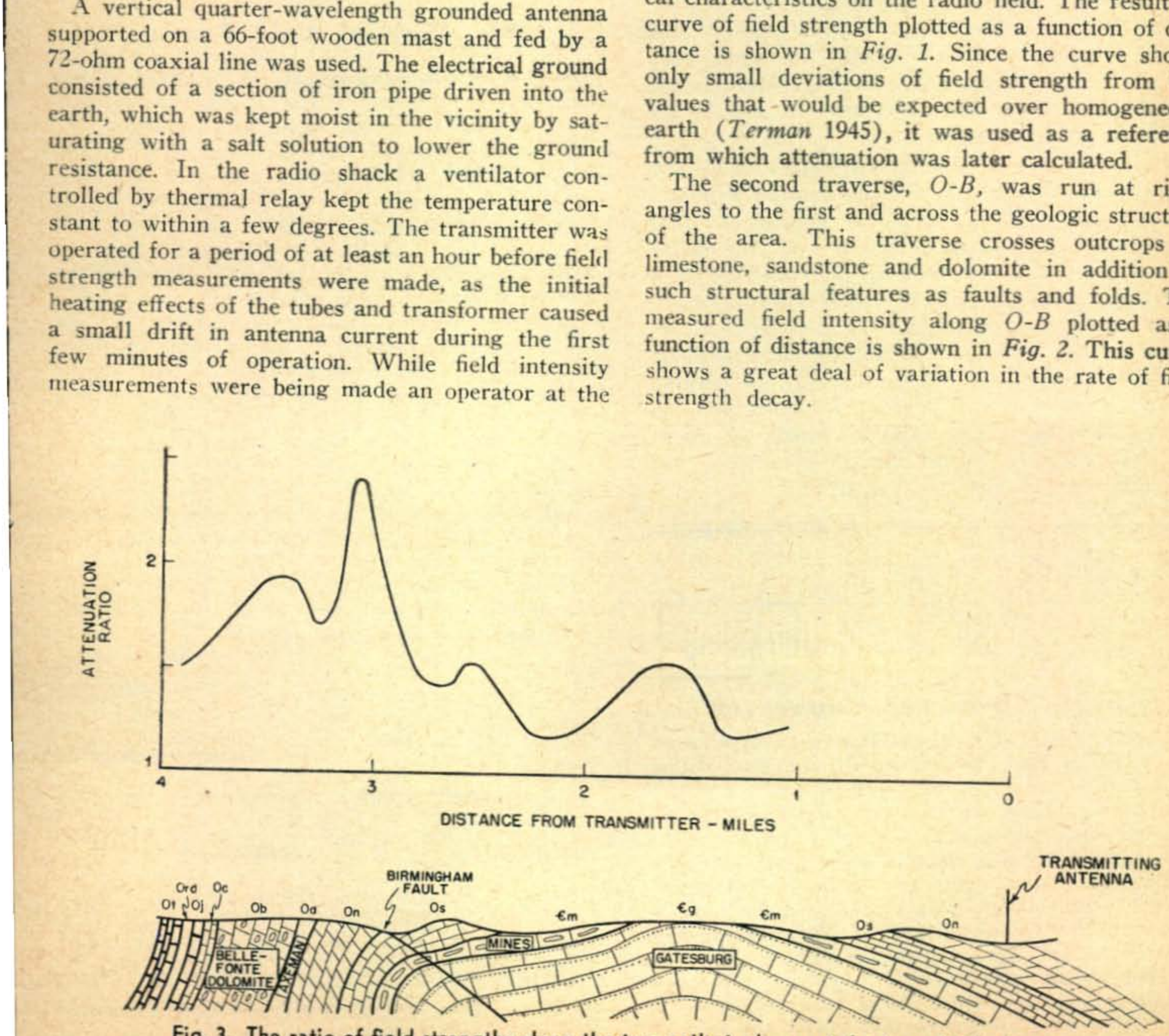


Fig. 3. The ratio of field strengths along the two paths is shown at the top. At the bottom we see a cross-section of the geological structure along traverse O-B. Traverse O-A ran along structure labelled "On" perpendicular to the page.

The Results

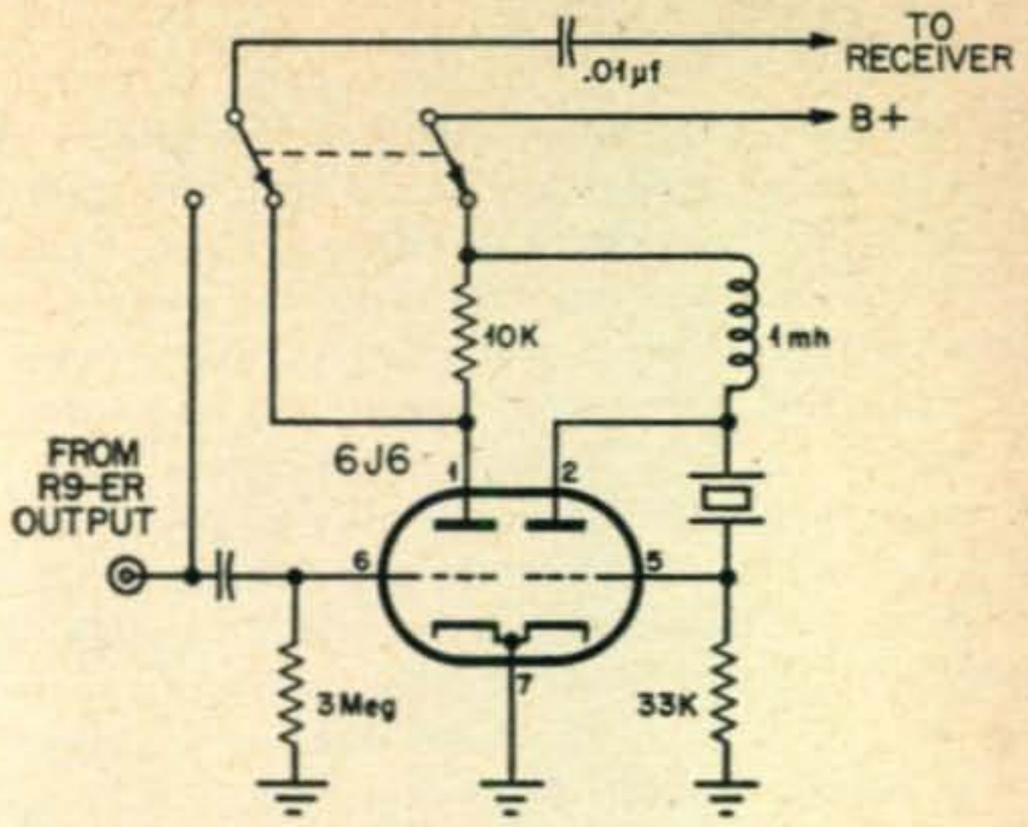
To place the results in terms familiar to radiomen, the attenuation of the wave attributable to geologic conditions was found by using traverse *O-A* as a reference. The ratio of these field strengths to those taken along traverse *O-B* is shown in *Fig. 3,* along with a geologic cross-section of the area.

There appears to be a distinct correlation between attenuation and the geologic outcrops and structure. The greatest peak of attenuation appears over what is locally known as the Birmingham fault. Geologically, faults are large fractures on either side of which there has been relative displacement of the once continuous beds. Such structures are often marked by stream flow, either at the surface or underground, and therefore produce an area of low resistivity and high dielectric.

High attenuation is found over the Gatesburg and Bellefonte dolomite. The Gatesburg weathers to a loose sandy soil, that has a relatively low resistivity and moderate dielectric. The Bellefonte dolomite weathers to a tawny soil that is quite thick in places with resistivity and dielectric comparable to the Gatesburg formation.

The two formations with low attenuation, the Mines dolomite and the Axeman limestone, have thin rocky soils. As a result their resistivities are considerably higher and their dielectric lower than those previously mentioned.

In many areas of the country the underlying geology is not evident since it is covered with soil or other debris, but it should be pointed out that the physical characteristics of the overlying materials are truly a reflection of the geology. The ability of the near surface materials to retain moisture and the amount of moisture held are characteristic of the strata and it is these factors which control the resistivity and dielectric which play an important part in the degree of attenuation. In addition to this the material of which the rocks are composed play some part in controlling the electrical characteristics of the strata.



switch is used to connect the R9-er directly into the receiver while switching off the converter power. The input condenser may be any value from 50 to 250 $\mu\mu$f.

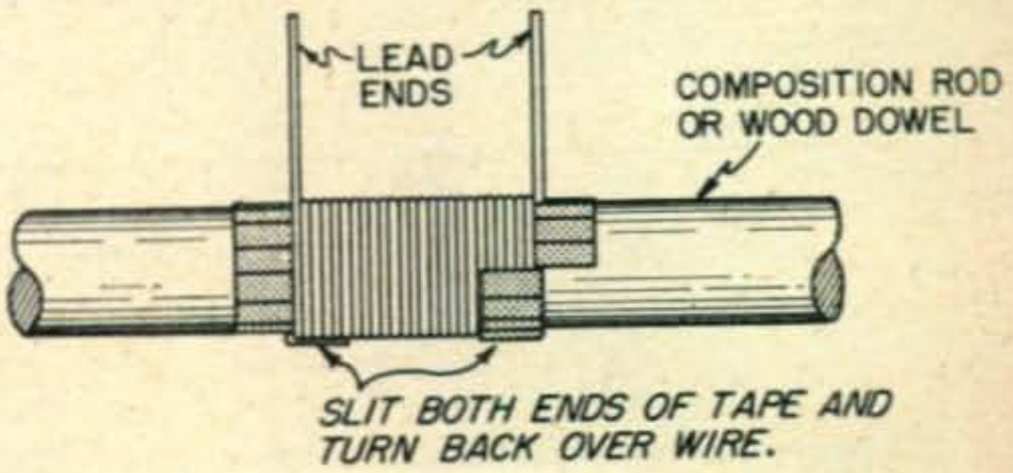
One word of warning—make sure that the lead from the converter to the receiver is thoroughly shielded and properly grounded to the chassis.

R. E. Gross, W2OXR

Air Wound Coil Form

Here's a trick in making small RF chokes for heater leads, etc., that provides sturdy construction with even fine wire. Use wood dowel or composition rod of the desired size as a winding form. Wind several layers of Scotch transparent tape around the form, *with the sticky side out,* winding not too tightly because you're going to slip it off later. Make this layer a quarter of an inch or more wider than the length of the choke winding will be. Then wind the choke over the tape using only enough wire tension to wind evenly. Now, with a razor blade slit the Scotch tape from the end of the winding outwards, making the slits ⅛" or so apart all the way around the circumference of the tape wrapping. You will now have strips you can lift up from the winding form and turn back on top of the wire coil. Since the sticky side of the tape is out it will adhere to the wire. Do this for both ends. Then, wind over this several more layers of Scotch tape (sticky side in, of course) covering the entire length of the coil. When you slip the winding off the form you have a compact, sturdy, self-supporting air core choke with the turns and leads held firmly in place by the Scotch tape both inside and outside.

R. L. Douglas



Inside the Shack and Workshop

Simple 10-meter Converter

This is a little 10-meter converter that I have found very useful. I have it working between my Millen R9-er and a BC-779B which only tunes to 20 mc. The R9-er supplies the r.f. stage an 28 mc. so all I needed was a mixer and oscillator stage.

The circuit shown in the schematic is mounted on a chassis with just enough room to hold a miniature socket, crystal socket, and d.p.d.t. switch. This is attached to the back of the R9-er. The power comes from the R9-er power plug to the receiver.

I used a 10-mc crystal so that I can tune the entire 10-meter band by swinging the main tuning dial from 18.0 to 19.7 mc. Actually almost any crystal will work and if the fundamental is not high enough, use a harmonic as the oscillator is aperiodic The

MORE S & W MATERIAL ON PAGE 36

Each S & W item is worth $2.50 in cash, or a year's subscription to CQ (new, or extension). When sending in your ideas don't forget to specify which method of payment you would prefer.

Ionospheric Propagation Conditions

Forecasts by GEORGE JACOBS, W2PAJ*

DX Contest Analysis—Part I:

With Fall almost upon us, it's time to be giving some thought to DX Contests. CQ's World Wide DX Contest will be held during the last week-end of October and the first week-end of November. The "Ionospheric Propagation Conditions" for October will be devoted, as it was last year, to a special analysis of conditions for the contest periods, including data and information that can help considerably in building up scores.

Last year many of our overseas readers, because of the time lapse necessary for delivery of CQ, did not receive the special contest information until after the contest was over. To remedy this situation, overseas Propagation analyses for the contest period are included in this month's column in addition to the regular September USA forecasts. The overseas analyses are centered on Europe (London), South America (Paraguay) and Australia (Sydney). The Propagation Tables can be used by CQ readers in Europe, Central and South America, Africa, Asia and Australasia to determine optimum times and the amateur bands to use in order to work the greatest number of countries and zones. It is suggested that a "work plan" be drawn up similar to the following typical example for a European QTH.

The equinoctial month of September is usually associated with numerous ionospheric disturbances. Most likely dates for disturbances are Sept. 3, 12-16, 19-21, 24-26, and 28-30.

This typical operating schedule indicates the band that has the best possibilities of providing QSO's with the most Continents and Zones for any hour of the day. Similar operating plans can be devised for other areas, and for any time or band simply by referring to the Propagation Tables.

For the past two years, ionospheric disturbances occurred during the Contest period. It is a little too early to determine with any degree of accuracy just what conditions may be like during this year's Contest period. It is suggested that WWV propagation transmissions be monitored for determining actual radio conditions as well as a 12 hour forecast. These transmissions are broadcast on 2.5, 5, 10, 15, 20 and 25 mc., at 19 and 49 minutes past each hour. Refer to August *Ionospheric Propagation Conditions* for a more detailed description of this new service. If conditions are disturbed (WWV rating W 1, 2, 3 or 4), concentrate on working paths that do not pass near or through the Auroral Zones. During disturbances, North-South paths usually remain in on 80, 40 and 20 meters, while East-West paths are workable on 40 and 80 meters.

Next month this analysis will continue for the three major USA areas.

All forecasts appearing in this month's Propagation Tables are based upon basic propagation data appearing in the National Bureau of Standards CRPL-D Series, as well as valuable reception data supplied by I1ER, G3CEU, W2ZVS and W2ESO.

Forecasts are based upon an assumed effective radiated c.w. power of 100 watts or approximately 1 kw. effective radiated AM phone power. Remember that effective radiated power is equal to the power into your antenna multiplied by the gain of the antenna, with a horizontal half wave dipole being considered as the reference unity gain antenna.

With the inclusion of the 15 meter band, space limitations do not permit 80 meter openings to be shown in the Propagation Tables. Eighty meters will open, generally, during the same hours as forty, though its reliability rating will generally be at least 1 less. For example, if the tables show 40 open to an area as follows:

0200-0630 (2)

then 80 will probably also be open from 0200-0630 but with a rating of (1).

Typical CQ DX Contest Work Plan
For European QTH:

Time Period GMT	Recommended Band	Continents	Possible Zones
0200-0700	40 or 80	N. & S. America Africa, Asia	2-13, 33-39 20-21, 14-17
0700-1000	20	S. America, Africa Australasia, Asia	6-13, 33-39 16-17, 20-32
1000-1300	15	S. America, Africa India, Australasia Asia	6-13, 33-39 26-30, 32 20-23
1300-1500	10	N. & S. America, Africa India, Australasia Asia	2-13, 33-39 20-22, 28-30, 32
1500-2100	20	N. & S. America Africa, Asia Australasia	1-13, 33-39 20-30, 32 15-17
2100-0200	40 or 80	Africa, Asia Australasia N. & S. America	2-13, 33-39 20-21, 14-17

General Propagation Conditions — September, 1952

Associated with the Equinox that occurs about September 23, the day that the sun crosses the Equator in its travels from Northern to Southern skies, is a noticeable change in radio propagation conditions in the Northern Hemisphere. Atmospheric noise levels, ionospheric absorption, and nighttime usable frequencies decrease, and, conversely, daytime usable frequencies increase.

EUROPE:

Ten meters should open by early October. Some good Fifteen meter openings are expected to all parts of Europe, with conditions on twenty about the same as they were in August except that the band will close about an hour earlier. Improved conditions on forty and eighty.

SOUTH AMERICA:

Good DX conditions expected on all amateur bands, ten through eighty meters.

(Continued on page 66)

**Address all correspondence to 3620 Bedford Ave., Brooklyn 10, N. Y.*

EAST COAST TO: (Centered on Washington, D. C.	10 Meters	15 Meters	20 Meters	40 Meters
		ALL TIMES IN G M T		
Scandanavia	Nil	Nil	1100-1900 (2) 1900-2100 (3)	0000-0600 (2)
Great Britain & Western Europe	Nil	1700-1900 (0-1)	1030-1200 (2-3) 1200-1800 (2) 1800-2200 (3-4)	2300-0630 (3)
Balkans	Nil	1700-2000 (1-2)	1030-1830 (1-2) 1830-2200 (3)	2300-0530 (2)
Central Europe	Nil	1700-2000 (1-2)	1000-1900 (2-3) 1900-2200 (3-4)	2200-0430 (3)
Southern Europe & North Africa	Nil	1300-1800 (1-2) 1800-2000 (2-3)	1000-1900 (2-3) 1900-2300 (3-4)	2300-0700 (3-4)
Central and South Africa	Nil	1500 2000 (1-2) 2000-2200 (2-3)	1100-2000 (0-1) 2000-0100 (2-3)	0130-0430 (2)
Near East	Nil	1600-1900 (1-2)	1000-1800 (0-1) 1800-2200 (2-3)	0000-0230 (2)
Central America & Northern South America	1900-2100 (2)	1300-0000 (3-4)	1130-2130 (3-4) 2130-0200 (4-5)	0000-1000 (4)
South America	1730-2230 (2-3)	1200-2100 (2) 2100-2330 (3-4)	1100-2100 (1-2) 2100-0200 (3-4) 0200-0700 (1-2)	0000-0900 (2-3)
Hawaii	Nil	1800-0000 (1) 0000-0100 (1-2)	1500-1800 (2-3) 1800-0100 (1) 0100-0400 (2-3)	0400-1200 (2-3)
Australasia	Nil	2200-0030 (1-2)	1300-1530 (2) 2000-0200 (0-1) 0200-0330 (2-3)	0700-1130 (2-3)
Guam	Nil	Nil	1300-1600 (2) 1900-0130 (0-1) 0130-0300 (2-3)	0700-1130 (2-3)
Japan	Nil	Nil	1330-1530 (2) 1930-0100 (1) 0100-0230 (2-3)	0800-1030 (1-2)
India	Nil	Nil	1300-1600 (1-2)A 1500-1830 (1)E 0200-0400 (1-2)A	2330-0030 (1)
Philippine Islands & East Indies	Nil	Nil	1200-1600 (1-2) 2100-0000 (0-1) 0000-0100 (1-2)	Nil
West Coast, USA	Nil	1900-2100 (1)	1500-1800 (2-3) 1800-0000 (1-2) 0000-0200 (3-4)	0300-0800 (3-4) 0800-1200 (2)

CENTRAL USA TO: (Centered on St. Louis, Mo.)	10 Meters	15 Meters	20 Meters	40 Meters
		ALL TIMES IN G M T		
Great Britain & Western Europe	Nil	1800-2000 (0-1)	1130-1900 (2) 1900-2230 (3-4)	0000-0630 (2-3)
Central Europe	Nil	1800-2000 (0-1)	1200-1900 (2) 1900-2200 (3-4)	0000-0630 (2-3)
Southern Europe & North Africa	Nil	1400-1700 (1-2) 1700-2030 (2)	1100-2000 (2-3) 2000-2300 (3-4)	0000-0630 (3)
Central America & Northern South America	1830-2200 (2-3)	1330-0000 (4)	1130-2200 (3-4) 2200-0300 (4-5)	0100-1000 (4-5)
South America	1730-0030 (3)	1300-2230 (2-3) 2230-0100 (3-4)	1100-2300 (2) 2300-0300 (3-4) 0300-0800 (2-3)	0100-0930 (3-4)

CENTRAL USA TO:
(Centered on St. Louis, Mo.)

	10 Meters	15 Meters	20 Meters	40 Meters
		ALL TIMES IN G M T		
Hawaii	Nil	1700-0000 (1-2) 0000-0200 (2-3)	1500-0100 (2) 0100-0500 (3-4)	0400-1230 (3-4)
Australasia	2200-2330 (0-1)	2130-0130 (1-2) 0130-0300 (2-3)	1330-1530 (2-3) 2000-0200 (1) 0200-0500 (2-3)	0700-1200 (2-3)
Japan	Nil	2200-0130 (1) 0130-0300 (2)	1330-1600 (2) 2000-0230 (1) 0230-0530 (3)	0930-1200 (2)
Philippine Islands & East Indies	Nil	Nil	1330-1800 (2) 2100-0130 (0-1) 0130-0300 (1-2)	1000-1200 (0-1)
Central and South Africa	Nil	1300-2000 (1-2) 2000-2230 (2-3)	1100-2030 (0-1) 2030-0130 (2-3)	0200-0430 (2)
India	Nil	Nil	1300-1830 (2-3)A 1600-1830 (1)E 0130-0400 (1-2)A	0830-1130 (1)

WEST COAST TO:
(Centered on Sacramento, Calif.)

	10 Meters	15 Meters	20 Meters	40 Meters
		ALL TIMES IN G M T		
Europe	Nil	Nil	1400-1900 (1-2) 1900-2200 (2-3)	0200-0800 (1-2)
South Africa	Nil	1700-2300 (1-2)	1300-2000 (1) 2000-0300 (2-3)	0230-0500 (2)
Central America & Northern South America	2100-2330 (2)	1600-2200 (2-3) 2200-0100 (3-4)	1400-2300 (3-4) 2300-0300 (4-5)	0200-1200 (4-5)
South America	2000-0030 (2-3)	1500-2200 (1-2) 2200-0200 (3-4)	1300-0000 (1-2) 0000-0400 (3-4) 0630-0900 (2)	0230-1000 (3-4)
Hawaii	Nil	2100-0300 (2-3)	1600-0000 (3-4) 0000-0400 (4-5)	0500-1400 (4-5)
Australasia	2200-0300 (1-2)	1900-0300 (1-2) 0300-0500 (3)	1800-0400 (1-2) 0400-0700 (3) 0700-1100 (2)	0700-1300 (3)
Japan	Nil	2200-0200 (1) 0200-0500 (2)	2000-0300 (2) 0300-0700 (3-4)	0900-1200 (2)
Philippine Islands & East Indies	Nil	1700-1800 (1-2) 2200-0500 (2)	1600-1900 (2) 2100-0600 (1-2) 0600-0800 (2-3)	1130-1230 (1)
Marshall Islands	0000-0300 (1)	1930-0300 (1 2) 0300-0500 (2-3)	1800-0400 (1-2) 0400-0700 (3-4)	0700-1400 (3)
Guam	2300-0100 (1-2)	2000-0300 (1-2) 0300-0500 (2-3)	1500-1630 (2-3) 1900-0500 (1-2) 0500-0800 (2-3)	0900-1300 (3)
India	Nil	0130-0330 (1-2)	1530-1800 (2-3) 0000-0430 (1) 0430-0600 (1-2)	1200-1400 (1-2)

Advance October Forecasts For Overseas Users

WESTERN EUROPE:
(Centered on London)

	10 Meters	15 Meters	20 Meters	40 Meters
		ALL TIMES IN G M T		
Central America	1300-1800 (1-2)	1200-1800 (2) 1800-2100 (3-4)	1000-2000 (1-2) 2000-2300 (3-4)	2300-0800 (2-3)
South America	1200-1700 (1-2)	0900-1100 (2) 1100-1700 (1) 1700-1900 (3)	0800-1000 (2) 1000-1800 (1) 1800-2200 (3)	2230-0800 (2-3)

WESTERN EUROPE: (Centered on London)

October — ALL TIMES IN G M T

	10 Meters	15 Meters	20 Meters	40 Meters
South Africa	1000-1600 (3-4)	0700-1300 (2) 1300-1800 (3-4)	0600-1500 (1) 1500-2130 (3)	1800-0330 (2-3)
Central Africa	0930-1400 (3-4)	0800-1700 (4)	0600-0730 (2-3) 0730-1430 (1-2) 1430-1930 (4-5)	1730-0500 (4-5)
Northeast Asia	Nil	1100-1300 (0-1)	1000-1400 (1-2)	1700-2100 (0-1)
India & Southeast Asia	1030-1430 (1)	0930-1600 (2-3)	0600-1400 (1) 1400-1900 (2-3)	1800-0030 (1-2)
Australasia	1030-1330 (1)	1000-1400 (1-2)	1300-1500 (1-2) 1500-1800 (2-3) 0700-1000 (1-2)	1700-2200 (1)
Middle East	1000-1400 (2-3)	0900-1500 (3)	0600-0800 (3) 0800-1400 (2) 1400-1800 (4)	1700-0500 (3-4)

SOUTH AMERICA: (Centered on Paraguay)

October — ALL TIMES IN G M T

	10 Meters	15 Meters	20 Meters	40 Meters
Europe	1200-1700 (1-2)	0900-1100 (2) 1100-1700 (1) 1700-1900 (3)	0800-1000 (2) 1000-1800 (1) 1800-2200 (3)	2230-0800 (2-3)
South Africa	1100-1700 (3-4)	0900-1600 (2-3) 1600-1800 (3-4)	0800-1000 (2) 1000-1700 (1) 1700-2100 (3)	2100-0600 (2-3)
Middle East	1200-1530 (2-3)	0500-0700 (1-2) 1100-1800 (1-2)	0500-0800 (2) 1000-1900 (1) 1900-2200 (2-3)	0000-0500 (1-2)
India	1200-1700 (2)	1000-2200 (1-2)	0900-1900 (1) 1900-0100 (2) 0200-0700 (1)	2300-0100 (0-1)
Northeast Asia	2300-0300 (1-2)	2100-0500 (1-2) 0900-1100 (1-2)	2000-0600 (0-1) 0600-0800 (2) 0900-1300 (1)	0700-1000 (1)
Australasia	Nil	2100-0100 (2-3)	1900-0000 (0-1) 0000-0600 (2-3) 1000-1200 (2)	0800-1000 (1)

AUSTRALIA: (Centered on Sydney)

October — ALL TIMES IN G M T

	10 Meters	15 Meters	20 Meters	40 Meters
Europe	1030-1330 (1)	1000-1400 (1-2)	1300-1500 (1-2) 1500-1800 (2-3) 0700-1000 (1-2)	1700-2200 (1)
South Africa	0600-0730 (0-1)	0500-0730 (1-2)	0600-1100 (1) 1100-1300 (1-2)	1600-2000 (1-2)
India	0100-0800 (3)	0000-0700 (2-3) 0700-1000 (3)	2300-0800 (1) 0800-1200 (2-3) 1200-1730 (3-4)	1200-2200 (1-2)
Northeast Asia	2300-0700 (3-4)	2000-0600 (3) 0600-1000 (4)	1900-2300 (2-3) 2300-0600 (1-2) 0600-1600 (3-4)	0900-1900 (2-3)
Middle East	0400-0800 (1-2)	0200-0800 (1) 0800-1100 (2)	0100-1200 (1-2) 1200-1900 (2-3)	1500-2000 (1-2)

Symbols for Expected Percentage of Days of Month Path Open:

(0) None (1) 10% (2) 25% (3) 50% (4) 70% (5) 85% or more

Gathered by DICK SPENCELEY, KV4AA*

Our most sincere congratulations go to the following in achieving WAZ:

No. 280 W5FNA Bill Case

We also welcome a newcomer to the Honor Roll,

W5AWT 35-123

No stranger to the DX fraternity is Dr. Gerhard Baz, DL7AB. Doc is DX Editor of DL-QTC and a ham since '27. His DX stands at 40-200.

At Time of Writing

Several DX "Expeditions" are projected at this time which we hope will have matured to a successful conclusion by the time this column is read.

VS5ELA, VS5ELZ, VS4ELA: This jaunt, beset by more than its share of troubles, is now scheduled to leave Hong Kong on July 25th. It was originally scheduled for operation on July 10th but on June 23rd WØELA was forced to return home from Anchorage, Alaska due to the unfortunate passing of his father. Further delay was encountered when the box containing the transmitter was lost enroute and Clyde's search carried him back to Tokyo. Operational plans, with many "ifs" connected, call for a three day stay at Brunei using the call VS5ELA. Should permission be granted the rig will be set up in Sarawak under the call of VS5ELZ. After a further three-day period he will set up shop for a one-day stay at Labuan, Br. North Borneo with VS4ELA. Forty and twenty meters will be used. (For info, tkx to WØYXO, G3AAM, VS6AE, VS6CG and W6SN)

4W1MY, Sana, Yemen.: Mrs. McKercher's boy Dick, HZ1MY, FL8MY, W6MLY can run for President on the ham ticket upon his return, that's for sure! Operation at 4W1MY took place on July 10/11/12 and resulted in a new one for most of us. Out of many, the following contacts were reported: W8BHW, W9GIL, W3JTC, WØYXO, W8PQQ, KG4AF, W5KUC, W2CTO, KL7PI, W6VFR, W6AM, OZ7BG, OQ5RA, W6TI, W5ASG and W7BD. Dick plans a return perormance at FL8MY, on popular request, July 25/26. On August 28/29 he hopes to be on at VQ6MY (Br. Somaliland). HZ1MY, the third station to operate, legally, in Saudi Arabia, received permission from Prince Talal who operates HZ1TA.

W5AGB/FM: Via G4CP W3AS and W8UPN we hear that W5AGB/FM is operating on Fletchers Ice

Aboard the S. S. Cefalu, bound from Honduras to New Orleans we see, from left to right, none other than our ex-editor, Herb Becker, W6QD, Bob Berger, HR3RB, and Elvin Fiege, W6TT.

Island, 100 miles south of the North Pole. Fred uses a BC610 and is with the USAF. We take the "FM" to mean "Floating Maritime".

FP8AM, FP8AL, FP8AN, being WØFNO, WØAIW and WØUQV respectively, operated from St. Pierre, Miquelon from July 8th to 17th A1/A3. Xmitter was a 32V2 and receiver a 75A2. Antenna, an end fed long wire. Mobile operation was maintained to and from FP8 running 50 watts. QSL's go to WØAIW.

ZA3KAA, Tirana, Albania (?) showed up on July 19th running 30 watts and a T7 signal. Con-

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**A monthly department. Address all correspondence to R. C. Spenceley, Box 403, St. Thomas, Virgin Islands. U. S. Air Mail rates apply.*

tacts were noted with W1FH, 4X4RE, W8BRA, TI1TG, W8HGW, W4BPD and KG4AF. Let's hope this is, at long last, a good one. 14074.

PX1BB plans round the clock operation from Andorra commencing Aug. 1st. QSL via F7BB or REF.

LZ1KAB, Sofia: LZ1DP writes us that LZ1KAB is on the air daily from 1500z to 2000z and is manned by the following operators: LZ1DP, LZ1MN, LZ1DW, LZ1LM, LZ1HI, LZ1AN and LZ1PT. QRG 14000/14050. See QTH's.

Clipperton Island: We hear from W6KYG that there are distinct possibilities that Jose de la Vega, XE3BL, and himself may make the trip sometime around next January. Arrangements for boat from Acapulco, and necessary clearances for personnel and radio gear are being investigated. From W6KYG's description of Clipperton we think that this place shouldn't have been allowed to happen. It is a small atoll, a mile and a half in diameter, uninhabited, except for a few birds and pests and is wave swept during the summer months. Best weather occurs during Nov., Dec. and Jan. . . . At present we have no further word on HB9AW's plans in this direction.

Monaco: F9RS reports that the 3A2AH, recently active, is a 'pirate' much to the disgust of the legal holder of 3A2AH who plans activity shortly . . . 3A2AM is a student in Paris who will be on 7-mc phone after July . . . On July 18/19 and 20, 3A2AK, consisting of F8BS and F9LQ will be active on 7 and 14 mc. running 18 watts . . . G2KU and G3DIV plan 3A2AL operation July 8/9/10.

ZD7—: Just a reminder that a ZS expedition to ZD7 planned to leave for ZD7 on or about Sept. 23rd.

PJ2AD, ex PJ5FN advises us of eight active, licensed, stations in PJ land as follows:

Aruba	PJ2AA	S. J. Heeringa
	PJ2AB	C. Abendanon
	PJ2AC	A. Kooiker
	PJ2AD	J. A. Kelkloom
Curacao	PJ2CA	S. Reitsma
	PJ2CB	J. L. Sterke
	PJ2CC	Klien
	PJ2CD	——

QSL Bureau, Arubra, Box 80, San Nicholas, Dakota Airport.

Deeds

KG4AF goes to 167 with VP5EF (Caicos). . . . **W6NZW** ups to 97 from Mar. 1st. . . . **WØYXO** made it 243 with ZC2MAC. . . . **W8NBK** reaches 236 with EA9DC and VS1DC. . . . **OY3IGO** helped W6AMA to 231. . . . **W6AM** timed his European jaunt nicely getting EA9DC before leaving and 4W1MY on return. Don spent some operating time at HB9MS. . . . **W8BHW** nabbed No. 233 in 4W1MY. . . . **4X4RE** looks for S. Dak. for WAS and one more American for WAA. JY1AJ put Egon on 210. . . . **F8BS** reached 227 with KC6DX. . . . **K2BU** recd DXCC and went on to add TA3AA 5A3TA and EL2R. . . . **W4FIJ** nabbed HI6TC on cw. 080, for TC's first W cw QSO. . . . **W2BJ** added EA9DC, VK9XK and KJ6AR to reach 196. . . . **W7GUI** finally pulled in FR7ZA for No. 224. . . . **W5VSS**, ex-W6UBV, now operates from Tulsa, Dale reached 71 in first three months at new QTH. . . . **VP5BH** (Caymans) seeks to complete his WAS with Del., Iowa, Nev., West Va., N/S. Dak. and Utah. 007 2330z. . . . **W6VE** goes to 211 with EAØAB EA9DC OD5AB and VS2CR. . . . **W6RLQ** ups to 154 with EA9DC and VS1QB while DLIFF makes it 213 with such as EA6AM KX6AL and HE9LAA. . . . **XE1AC** recd cards from FI8AA, FI8AB and FI8AC and A3'd with I5GO. . . . **W1RAN** goes to 129 with ZK2AA and YI3BZL. . . . **G6ZO** ceilings to 240 with FL8MY and ZC2MAC. . . . **W1GKK** comes up with a list of nine to put him on 210. . . . **W6RLN** nipped EA9DC for 198. . . . **W2GVZ** advances to 168 with FL8MY. . . . **W9ANT** moves 45 miles to appear with the call of W8KIA. Glenn adds VS2CE and EA9DC to hit 229. . . . **W9AND** recd the following certif's: WASM, WAA No. 34, WAP No. 42, WACE No. 339. Wes says that FY7YB has modified his tx and is on 250 A3 and 7 mc cw. . . . **W6MX** ups to 230 with VP2GH, EA9DC, OY3IGO, LZ1RF, ZC2MAC and FB8ZZ. . . . **W1ZL** ups to 195 with EA9DC and VS1BJ. Carl also nabbed VP2GH on 7 mc. . . . **W6FXL** adds zone 22 with VU2NB putting him 39-93. . . . **W9MEM**, age 14, nabbed EL1DFX, KJ6AR, ZL2NT and VP9OO. John runs a pair of 807's but plans a 600 watt 812A rig in the near future. . . . **W5ASG** reaches 232 with 4W1MY. . . . **F8BS** captured the first European WAP, No. 45 and WAA certif. No. 59. . . . **W7BD** still hopes for QSL's from FY8UD, EA6EG, VS9AN, HH5PA, EP1AL and VK9NR. . . . **W1MCW** A3'd with 4W1MY and 9S4AD. This puts Mrs. Lou on 192 phone only!!. . . . **W4GG** ups to 207 with EAØAB EA9DC and VS2CH while W6ENV soars to 243 with

(Continued on page 66)

Jim Elgin, CT3, USN, WØCMU, traffic manager, Navy Mike and Key Club, Far East, operating the club station, JA2KW. The station consists of a 32V2 driving a BC610E on 14 mc. On 28 mc. the 32V2 is used by itself.

W. A. Z. HONOR ROLL

CW & PHONE — WAZ

W1FH	248
W6VFR	247
W3BES	244
W6ENV	243
WØYXO	243
G6ZO	240
W3GHD	239
W6GRL	237
G6RH	237
W6SN	237
W6ADP	236
W6MEK	236
W6AM	236
W8NBK	236
W3CPV	235
W6SYG	235
W2BXA	235
W3KT	234
W3EVW	234
W8BHW	233
W8JIN	232
W2AGW	231
W6AMA	231
W6MX	230
VE4RO	229
W8BRA	228
W6EBG	227
CE3AG	227
W6PFD	226
W3JTC	224
PY2CK	224
W7GUI	224
VK3BZ	223
W3LOE	222
W6FSJ	222
G4CP	222
W6DZZ	222
VK2ACX	222
W6MVQ	221
W7BD	220
W6ITA	219
W6TT	218
WØNUC	218
W6PQT	218
G2PL	218
WØPNQ	217
W9DUY	217
LU6DJX	217
W6TS	216
W9NDA	216
W6GDJ	216
W2PEO	215
W7AMX	215
W3JNN	215
ZL2GX	215
KH6IJ	215
W6SAI	215
W3IYE	214
PY1DM	214
ZS2X	214
KH6BA	214
W6OEG	213
W4AIT	213
KH6CT	213
VK4HR	213
G6QB	213
W6DLY	213
DL1FF	213
W6HX	212
VE7HC	212
W6NNV	211
WØDU	211
W8HGW	211
W6VE	211
W6BPD	210
W6MJB	210
W6PB	210
W9VW	209
W6RW	209
W6EFM	209
W6TI	209
W2AQW	208
ZL1HY	208
W6SC	207
VE7VM	206
W4BPD	206
W6RBQ	206
W6KRI	205
W6ZCY	204
W6DI	204
W6PKO	204
VK2DI	204
W6AVM	204
DL7AA	204
W4CYU	203
ZL1BY	203
W6RM	202
W6OMC	202
W6AOA	202
G8IG	201
W5GEL	201
WØELA	201
W6EPZ	201
W9KOK	200
VK5JS	200
W7OY	200
PY1GJ	199
W6RLN	198
W6SRF	198
W2IOP	197
KH6QH	197
W6BAX	197
PY1AJ	196
W6WB	196
G2FSR	196
OE1CD	196
I1KN	196
W6UCK	195
W5KC	195
OK1FF	194
W6GAL	193
W6EHV	193
WØSQO	192
G3DO	192
VK2NS	191
W6SRU	190
CE3DZ	190
VK3JE	189
ON4JW	189
WØNTA	188
W8SDR	186
VK6RU	186
W6DFY	186
W2CZQ	185
W1AB	185
W6BUD	185
W6IFW	185
W6SA	184
KH6VP	184
W3GAU	183
W2JVU	183
LA7Y	182
W6LN	181
W6SR	180
W6UHA	179
PY1BG	179
W9VND	178
W6NGA	178
W7DG	177
WØUOX	177
VE6KW	177
W6UZK	177
CX1FY	176
W6IBD	176
KH6CD	176
VK4EL	176
W6LDD	176
PK4DA	175
W8HUD	175
W6WKU	174
W6CIS	174
W7FZA	174
W6PCS	174
W6KUT	174
W4CYY	174
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W6VAT	110
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W2AYJ	133
W4EPA	133
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W4DIA	129
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W9LNH	122
W6YX	117
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OH3OE	112
W6AX	110
WØFWW	108
W7PK	104
W8HSW	104
W2BLS	99
W6WWW	99
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W2OST	163
W3MZE	150
I1IT	140
WØCU	139
F9RS	139
W3AYS	137
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KG4AF	167
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W5FXN	146
W4DHZ	132
W9CKP	132
W1MRP	130
W1RAN	129
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W5AWT	123
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W6ZZ	121
W9RQM	119
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ZL3CP	117
W9GDA	115
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VQ4ERR	213
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W6DI	192
W6VFR	177
PK4DA	175
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38 ZONES

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W9BZB	139
W9HP	139
W8AUP	131
W8PDB	130
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W4INL	129
W1FJN	128
GGBW	127
VE7HC	123
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W8CYL	112
W3DHM	96
W6SA	92
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35 ZONES

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W4HA	162
W5ASG	159
W3EVW	154
W9RNX	153
W6PCK	148
W9BVX	148
W2GHV	137
W2RGV	136
WØANF	136
W6CHV	135
WØPUE	135
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G8QX	123
W8ZMC	122
W6YX	110
W5LWV	108
W4DM	106
W3PA	105
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34 ZONES

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W5JUF	148
I1AXD	130
YV5AB	129
LU8CW	129
W2ZVS	128
W5KC	125
W4LZM	124
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A Monthly Column Edited by HERB BRIER, W9EGQ*

Keying a transmitter is apparently a simple matter. All it consists of is slapping a telegraph key some place in the radio circuit to break up the emitted signal into dots and dashes. Actually, some amateurs do just that, and their signal sounds good locally and at a distance. Most of us who try this approach have different results. We have clicks locally in the broadcast and television bands and clicks, chirps, or both on our signal in the amateur band.

This is the businesslike station of Jim Campbell, W9OZN. In addition to the "Tank Transmitter," and other "Surplus" equipment, Jim also utilizes a Lysco transmitter and a Hallicrafter S40 receiver, both of which can be easily identified here.

As it turns out, there is more to good keying than first meets the eye. Some of the problems involved are discussed in the following paragraphs. Most of the transmitters used by Novices use cathode (or B—) keying. It is simple, has the advantage that one side of the key is always grounded, and gives results equal to other methods when properly used. As a result, this method will form the basis of the discussion. The principles involved, however, are the same for other methods.

Definition Of Key Clicks And Chirps

A *key click* is produced when the r-f output of a transmitter goes from zero to maximum and back to zero instantaneously when the key is pressed and released. It is a result of the extremely rapid buildup of the fields around associated conductors and components.

A *chirp* is the opposite of a click. It is the result of a small but slow (comparatively speaking) change of frequency or too slow a build up and decrease of output during keying.

When the key is up the output is zero watts at zero cycles. When it is down, the output is maximum at the desired frequency. If the change occurs instantaneously, there is no audible chirp, but there is a click. Obviously, producing clickless, chirpless keying requires balancing two diametrically opposed requirements. If the keyed stage is stable enough, the keying pulse can be shaped sufficiently to eliminate clicks without producing a chirp by using a simple keying filter. However, if its frequency is affected by voltage changes, such shaping is sure to cause or accentuate a chirp.

Which Stage to Key

Other things being equal, oscillator keying, either alone or in conjunction with one or more amplifier stages, has much to recommend it. With the key up, the transmitter is off the air; with it down, it is on the air. Unfortunately, oscillator keying is seldom as good as amplifier keying, because of a tendency to chirp, even when keyed "raw."

Although amplifier keying will produce better results, most crystal oscillators may be keyed satisfactorily on 3.5 mc. and 7 mc., if active crystals are employed. On 14 mc., and higher, the chirp is usually too severe to be tolerated, making amplifier keying necessary.

The Key Filter And Its Use

Figure 1 shows the click filter. Not all installations will require all the components shown. It is divided into two parts, because it must combat clicks generated in two ways. In addition to the click radiated with the signal. every time the key is manipulated,

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Convenient and attractive operating position of Novice WV4AZ, Christiansted, St. Croix, Virgin Islands. Although Cedric reports inability to raise WN's, his QSL cards indicate that his fifty watts do get out.

a spark develops at the key contacts. This spark, in conjunction with the key leads, functions like a miniature spark transmitter. Its interfering range is limited to a few hundred feet, but it is capable of causing severe clicks in nearby broadcast and television receivers.

Similar clicks are heard in nearby receivers whenever a wall switch is snapped, a telephone is dialed or almost any other electrical circuit is made or broken. They must be eliminated first; otherwise, it will be impossible to tell at your location how your signal sounds at a distance. Doing so is extremely simple.

Connect a resistor and milliameter in series between the B+ terminal of a small power supply and the hot key lead, and connect the other key lead to the B— terminal. Choose a resistor that causes the normal amount of keyed current to flow. Knowing the current and voltage, the necessary resistance is easily calculated from:

$$E = IR \text{ and } W = EI,$$

where E is voltage, I is current in amperes, R is resistance in ohms, and W is power in watts.

For a 300-volt supply and a 100-ma current, a 3000-ohm, thirty-watt resistor is indicated. As the current does not flow continuously, a smaller wattage resistor may be used.

Listen to the click in your communications receiver, and add components to eliminate it. In my experience, substituting a shielded keying lead for an unshielded one is often all that is necessary. Light coaxial cable or crystal-microphone cable is excellent for the purpose. Avoid microphone cable with a tinsel center conductor. If additional attenuation of the click is required, add *C1*, *RFC*, and *C2* as necessary. Exact values must be found by experiment, but will be within the range indicated in *Fig. 1.*

Shock Protection

Place the components of the r-f filter right at the key. Cover them to protect them from damage and yourself from shock. The latter is quite important, because the voltage across the key, with the key up equals the d-c plate voltage. An excellent idea is to fit a small metal box with a slot cut in it, to accommodate the key arm, over the key and filter.

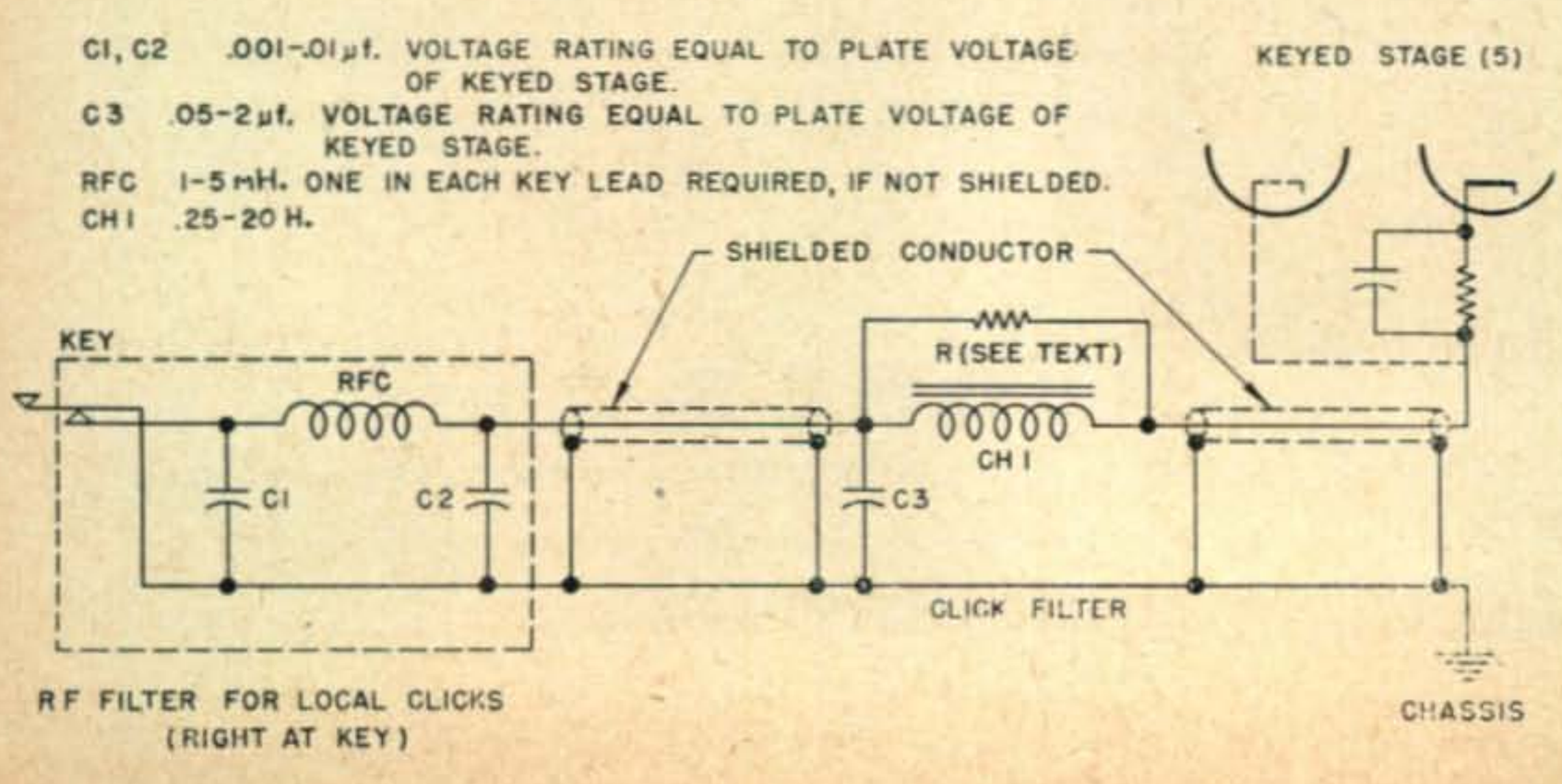
Alternately, a keying relay operating from a filament winding may be installed to remove the voltage from the key. The noise it makes may be deadened by mounting the relay on a piece of sponge rubber cut from a dime-store kneeling pad. Note that if a relay is used, both the key and the relay must be treated to eliminate all local clicks.

Working On The Radiated Clicks

As stated earlier, the clicks radiated along with the transmitted signal are caused by too steep leading and trailing edges of the keying pulse. Their severity is accentuated by poor voltage regulation of the power supply feeding the keyed stage(s). It is not unusual for the output voltage of some supplies to drop fifty per cent or more each time the key is pressed. As a result, not only does each dot and dash start off abruptly, it starts out as if it belonged to a much higher-powered transmitter. This gives one the dubious honor of having a low-power signal with high-power clicks.

Anything that will decrease the variation of voltage with keying will make click elimination easier. Almost perfect voltage regulation may be obtained with VR tubes or electronically-regulated power supplies, but it is not necessary to go that far. Increasing bleeder current to the maximum the power supply will stand will help. For example, if the keyed current is 100 milliamperes and the no-load bleeder current is ten milliamperes, the current variation is ten to one. Increasing the bleeder current to fifty

(Continued on page 59)



Schematic of the simple key klick filter. Design parameter are discussed in the accompanying text.

the VHF news

Edited by
W. E. "BILL" McNATT, W9NFK/5*

W5FEK, W5FAG and W5DFU Awarded Plaques for VHF Performance

On June 28th, at the Corpus Christi convention of the West Gulf Division, Director A. David Middelton, W5CA, announced the awards of beautiful gold plaques to W5FEK, Waldo Townley, Houston Texas; W5FAG, James H. Harrell, Jr.; Socorro, New Mexico; and W5DFU, Warren J. Weldon, Tulsa Oklahoma, "for the most outstanding overall performance on (amateur) frequencies above 144 mc. in the West Gulf Division during the year 1951."

W5FAG and W5DFU received their awards in absentia; although the gang would have liked to applaud them personally. Judges were W1HDQ, Ed Tilton; W5CA, Dave Middelton; and W9NFK/5, Bill McNatt, who evaluated the candidates on the basis of information they submitted on forms provided by the originator of the idea, Dave Middelton, W5CA. The v.h.f. minded director, we believe, has made a new v.h.f. "first" by being the first director to arouse this form of recognition for his v.h.f. constituents.

Waldo Townley, W5FEK, winner of the V.H.F. plaque award presented by A. David Middelton, W5CA, West Gulf Division Director, at the Corpus Christi Convention.

420 Mc.

On the night of June 15, 1952, W9MBI, Coleta, Illinois, heard the *third* harmonic of W9MAL, W9LF and W9BPV, Armington, on the 432-mc band. W9BPV is 110 miles from W9MBI, and was running 20 db. W9MAL, Peoria, was worked using the 432-mc receiver, transmitting his signal on the two-meter band. Clare had Brad rotate his beam and it showed a four leaf clover pattern, the maximum signal (40 db) being with the array 45 degrees off Coleta.

All work at W9MBI has been at a standstill, due to a broken collar bone and a crushed nerve which resulted in a useless right arm and hand! (Best wishes for an early recovery, Clare! *VHF Ed.*)

W2QED, Seabrook Farms, N. J., says that activity picked up in early June. The latter part of the month, however, things were below normal. During June, fewer openings occurred than the month usually produces. Conditions were unstable, producing heavy QSB on the longer hops. The best opening at night came on June 10th when Ken worked W2BQK, Bergenfield, N. J., and W2AOD, Flushing, L. I. This was the first time Ken had ever worked W2AOD though he had heard him every summer since W2QED got on the band. The month also produced a very excellent morning opening on June 14th when W2QED worked W1HDQ with very good signal strength both ways over the 210 mile path.

W2BLV now has a tripler working on 420 mc. using an AX9903. His frequency is 435.96. On the night of June 10th, W2FH, Collingswood, N. J., worked W2AOD, Flushing.

W3BSV has been heard by some of the boys in Elkton, Md. although no two-way work has been done, yet, because of the low power used by the boys in Elkton. A 6J6 modulated oscillator just doesn't have enough "stuff," even when the band is open!

W2QED's 420-mc score for June was 13 different stations in 6 states. Three stations over 100 miles distant, and one over 200 miles distant. Total, 55 contacts for the month. Stations worked were W2BLV, W2EH, W3BSV, W3GGR, W3OWW, W3SZS, W3RKQ, W2HEK, W3TOM, W2BQK, W2AOD, W3AIR and W1HDQ.

Ken Billings, ex-W9FKI, is now located at Big Spring, Texas, with the Field Maintenance Squadron, Webb Air Force Base. "I have been pretty inactive since coming here," says Ken, "but W5ZZF and I are preparing to do some 420-mc work. I also expect to be on six before long, whenever the converter I have on order arrives." Ken's new call is W5VKF.

On July 1st, W5ONS, Victoria, Texas, heard W5BDT, Austin, carrier on 420 mc. Herb, W5ONS is using a converter BC788. The distance covered was about 150 miles.

**Address all letters and correspondence to 2515 LaBranch, Houston, Texas.*

220 Mc.

The 220-mc project at **W2QED** was at a standstill in June, but Ken thinks he will be able to get the transmitter built during July. . . . **W8WRN** worked Jerry, W8WJC, on "220" so Jerry could be "up" with Margaret. Ken won't be able to get the antenna up any higher, until he is situated in the new shack. He will also have more power, about same as on 2 and 6, so he can use the same power supplies and modulator system. The night that Jerry was worked, conditions were much poorer than the time W8BFQ was worked, but channel 13, Toledo, was running 20/S9. You guessed it: no one was on, there. Paul, W8DQR gave up, and Dick, W8DX, Detroit, is not ready. No word, lately, from W3NKM. W8WM has a "220" rig on the boat, and Jerry, W8WJC, has worked him for a nice haul along the lake. . . . **W5TFW reports that** W5QIO, Beaumont, Texas, has a 220-mc beam up, and also has a converter working. Now, he'll be able to hear the signals when they are coming through. Here's hoping conditions will pick up in the near future.

The VHF luncheon of the Corpus Christi Convention, was attended by 125 hams among which were (left to right), W9NFK/5, "Pop" Hoskins, W5ON, and Harry Harrison, W9LLX.

Six Meters

W7HEA, "Bish", reports from Toppenish, Washington, that on June 14, 1853, PST, W6VES came through and from then until the band closed at 1930, W6NOV, W6TMI, W6BHR and W6BJI were worked or heard. Signal strengths averaged about S6. June 16, 1845, W7HEA worked W6ABN; then the band opened to W7HUV, Tuscon, and then out. On the 17th, 1823, worked W6DSO, and again the opening swung to the east and W5LFH, New Mexico. On the 18th, 1848, Bish heard W5SFW at Amarillo, Texas. On the 19th, at 1839, he worked W6NAW, then W6CDQ. The band folded at 1856. Next night at 1840, W7HEA worked W5KWP. The opening went west and, from 2004 to 2035 Bish worked W6DSO, W6TMI and W6CDQ. Dead band at 2035. On June 21, 1953 to 2035, W7FGG, W7QNC and W7OFA worked W7HEA. "Arizona night!" Hi! The 24th of June, 1912, WØYXS beacon was heard very weakly. At 1918, W5SFW, and—at 2005—WØVIK were worked. Dead band at 2050. June 27, 2000, Bish worked WØLIY, North Dakota. At 2015, W7JRG, Montana showed up. 2027, W5SFW, Texas, and at 2051, WØVIK, Denver, worked W7HEA. "Lots of acreage, but not many stations. Hi!", says Bish. Next night, 1903 to 2005, W5MYI W5KWP and W5MYJ were worked for "Santa Fe," New Mexico, night!

July 1: Weak signals were heard from the east at 1932, and from 1942 to 2153, W7HEA heard or worked WØQIN, WØGPQ, WØTJF, W4CVQ (now in Raleigh, N. C.,) and W9VZP. July 2, 1854, W7HEA worked W6TMI, then east to W5KCP, W5SFW, W5MYI, W5MJD, and WØVIK. Band died at 2154. July 4, 1629, W6WSQ worked; band dead at 1639. His was the only signal heard at W7HEA, that day. On the 5th, 2050 to 2114, W5SFW, only signal heard. Bish had a nice personal visit with W7GBI, Bud, of Great Falls, Montana, just back from Korea after 16 months of flying **troop transports**. He is now stationed nearby at Mases Lake Air Base, and has plans for both six and two as soon as possible. Bud is an old 5 and 6-meter man. Active on the 6th, from 1832 to 2024, W7HEA heard or worked W6GQF, W6BJI, W6EIB, W6NIO, W6AFC, W6ZHU, W6NLZ, W3CIR/6-mobile, Vallejo, and W7QAP. July 7 to 12: VHF conditions very poor with dead bands due to "heavily ionized layer" blanketing the country, and originating in the Chicago Stockyards area!

Ken, **W2QED**, says his 6-meter activity is still waiting to get started. He has a beam ordered but doesn't seem to be able to get delivery, yet. He hopes it doesn't take too much longer as he hears there have been some good openings already.

German VHF Report by W6YHI

V.H.F. news from over here, on 2 meters, and also the last news from the operator of DL4CK!

"Time, tide and rotation have caught up with me and I will be in the USA by the time you read this, on a new assignment at Andrews Field, Md. So, it seems that there will be a new 2-meter station near Washington in the near future. Wonder what it will be like to be located in an area of fairly high v.h.f. activity, and not have to sit hour after hour searching for S1 signals of any kind?!

"As of June 20, I'd been hoping to be able to at least equal the old ex-DL4XS record of 8 countries on 2 from here, but Jo will still be the top dog unless something radical happens in the next few days. Looks like I'll close my log, showing 7 countries and 7 West German states on 2 meters. I have about 113 different stations logged during the past 3 years. The DX, all on 2, amounted to G, PAØ, ON4, F, HBI, OE7 and, of course DL. I have heard a report from GM3MNJ but didn't get the QSO, darn it! I have been sweating blood over OK1AA, Prague, for a couple of months, but it seems that he is too weak in the receiving department and just keeps on teasing us with his "blamed" signal! I have been able to confirm all 7 countries, so there will be a choice spot on the wall of my future W3 station!

"Am sure wondering what it will be like to be back where you can get new parts and not have to splice pigtails on old parts, etc., not to mention designing your gear, for the most part, around what you either have or can make. The thought of resistors or condensers with more than ⅛" of lead is beyond my imagination at the moment. I am bringing my gear back, but know fully well that the "one-eyed monster" (TV) has certain demands which the r.f. section of this rig is not prepared

Typical VHF "bull-session" at the Corpus Christi Convention included W5HD, Ft. Worth; W5QIO, Beaumont; John Naff, W5TFW, Port Neches; W5PMM, and W5ON, Houston, Texas.

to meet. Therefore, I am planning on a completely new r.f. unit at the outset. I'll also be up on 6 as soon as the time permits. It will take several months for my stuff to arrive from here, and for the stuff that I have still stored in California to reach me, so there'll be much to do when it all reaches me!

"The DX gang here has been doing pretty fair on 2, although no "G" signals have yet come through this year. We are hearing PAØ's almost nightly. The ON4s are coming through, but the F-gang seem to be sleeping for the most part. DL6BU at Wurzburg has run daily noon skeds with PE1PL at The Hague and has heard him about 19 out of 20 times; the QRB is about 450 kilometers. I ran tests, hourly, at night for a week, with DL4FE portable near Berchtesgaden (atop a 4500' peak) and copied him every schedule with S1-3; the QRB is 425 km. For this test, I'd zeroed in my modified BC-221 and had the converter waiting before his first call, got

him on the first call on the first sked. And, his beam was on the floor of his hotel room, between the beds, and being kicked around while his XYL unpacked their bags! 4FE was using a BC-625 and 5-element Yagi. He later poked the beam out of his hotel window which overlooks DL6MH in Straubing near Munich now has a super beam; Sepp has been patiently working away on antennas for a year or so and has just raised a 48-element array in which he has invested over 2,000 Deutsche Marks ($500); it sure made a walloping difference in his signal. DL3VJP (the letter P added on the end of a DL call means "portable") has been running tests from Herford, northern Germany, to PE1PL. The return to the U.S. of DL4CK will end 2 years of schedules on 2 with DL1DA, Stuttgart, 110 miles and a mountain range away; we've QSO'd at all hours of the day and night; never have been unable to make it, and average S8-9 signals in phone both ways. The DL gang have been watching my schedules with 1DA and also 1CS in Stuttgart at 2100 on Tuesdays and Thursdays and using them to spot the St_ttgart gang, check signals, etc.

"Guess that it won't take me too long to quit saying "Allgeme in Anruf von DL4CK" and relearn to say "This is W3—calling CQ". It has really been fun working over here because the German hams were just learning of stabilized signals, etc., when I got here in '49, and it has been nice to make friends with some of them and help them along and then to see the student outdo the teacher. There is some very fine equipment in use here, now, and a lot of "know-how" has been gathered. The "DL QTC", monthly magazine of the DARC, came out with a VHF section. I've been gathering the Hessian VHF news and relaying it to DL1DA to meet his deadlines for a long time. So, I got in on all of the news as it happened.

"The 2nd Annual IARU 2-Meter Test was held on 5-6 July. Dern it, I stepped aboard a plane for the U. S. at that time! They speeded my return up several weeks and sure let me down, as I was anxious to fight through one more big DX-fest before I left. I think that "CQ" is on the exchange list with the "DL QTC", and you may find some interesting dope in the "UKW Rund-Schau" (VHF Roundup), edited by DL1DA, which is a monthly feature of that magazine now. By the way, the Deutsche Post (German communications branch of the government) is now running experimental TV. The Frankfurt station is putting out daily test programs using 196 mc. for the picture and 201 mc. for the sound. I don't know their scanning rate.

"DL4FE, near Frankfurt, has seeded the Feldberg Mountain top with about 100 dipoles tacked in trees, etc., and is carrying on some reflection and reradiation tests along a proposal of mine to W2PAU, some time back. It works, too! I can get him better that way than on the direct path."

Two Meter Topics In Texas

John Naff, **W5TFW**, reports that the VHF contest showed lots of activity but conditions were not as good as they could have been. They were able to work into Houston, but that was about all. Austin stations were heard, very weakly. W5JBW really went to town during the contest. From June 12th to the 20th, conditions were very favorable on 2. Since then, activity has been more or less local. . . . The Gulf Coast Emergency Net still meets every Tuesday night and generally has a fair turnout with W5AVW, W5QME, W5QIO, W5DSB, W5JBW, W5AOA, W5GIX and WN5UJP reporting in.

W5TFW says, "I certainly enjoyed meeting all the VHF operators at Corpus Christi and renewing old acquaintances. Operators present with best v.h.f. DX-worked scores were: W5DCV, who tied with W5QIO with 800 miles on two meters. W5FSC took tops on six with 10 countries and 44 states. Newcomer, WN5VDA, took the novice prize with 2 states on 2 meters. W5HAA had the high score of 10 states worked on 2. 'Pop' Hoskins, W5ON, a 6-year winner for the 'oldest ham' prize, did it again at age 79!"

(**VHF Ed. Note:** Apologies to W5FEK, W5HAA and W5TFW for omission of their usual, fine reports in our last issue. A combination of "yours-truly" not quite making a deadline, along with "vacationitis" at the printers loused things up. Sorry, fellows. As for the shortness of this column, several reporters must also have had "vacationitis", or possibly "conventionitis".)

W5FEK, Houston, says that the entire VHF gang in Texas cordially invites any VHF ham, or SWL, located outside the 5th call area to telephone them, collect, at any time positive identification of a Texas station is made on 2 meters, or higher frequencies. Herb, W5ONS, Victoria, Texas, especially emphasizes this in view of an unjustifiably-late report via the "grapevine" that his 2-meter signals were heard at a station located very near to Chicago, last summer!

VHF at 1952 National Convention

If Waldo Townley, W5FEK, VHF Committee Chairman, for the 1952 National Convention, to be held in Houston, has his way about it, the VHF Program will be the most comprehensive ever presented at any ham convention in the states. In order that this may be accomplished, your ideas, comments and suggestions are solicited, now. Please write to Waldo Townley, W5FEK, 4307 Alba Drive, Houston, Texas.

In and Around Chicago

Last minute dope from **W9ZHL** indicates that there would be a very nice attendance at the Turkey Run VHF Picnic. Even Ken Billings, W5VKF, (ex-W9FKI) now of Big Spring, Texas, was expected to be there, as also was Bud, W5FSC, from Houston. W8CPA, WN8HPB, WN8BAX and XYL from the Columbus, Ohio, area planned to attend, also. As for activity around Terre Haute, W9ZHL reports that nothing new or unusual has been going on. But, 12 operators now have six-meter mobile units, and are working on home stations; six meters has been very good, almost daily. W9FVJ, Toledo, Illinois, is back on 2. W9JMS, home at Cory, Indiana, for the summer, is also back on 2 meters.

In Chicago, **WN9OKF**, Leo Heuer, reports that activity on 2 is very good. The Chicago Area VHF gang is going to have a picnic on Sunday, August 24, grove 12, Thatcher Woods. It will be up to the individual to bring his own food. . . . New novices on 2 include WN9TOY (W9ENK's XYL) and WN9QHN, Hammond, Indiana. Active regulars are W9DRN, W9CX, W9NVK, W9LF, W9BPV, W9BFY, W9VNW, W9KDX, W9LJV, W9TQ, W9GJE, W9JGA, W9ENK, W9HDB and many others. W9FOO, Dick, in Des Plaines, works a lot of stuff with a folded dipole. It would be pretty hard to list all of the stations worked this month; as of June 30, WN9OKF had worked 87 different stations and W9JGA has about 95 different ones to his credit so far. WN9OVL, WN9QHN, WN9RNE, WN9REM, WN9QHK, WN9OOL, WN9PUO, WN9PUW, WN9QEP, WN9OTU and many other Novices are heard just about every night, including WN9SSI, WN9SHH, WN9RXS and WN9QXP.

"As for myself," says WN9OKF, "the thing that bothers me most these days is that my novice ticket is rapidly approaching the end. July 17th!! And I'm still in a cast and can't get out until July 27! Then, I get a walking cast for six or eight weeks. With any kind of luck, I might get back to work by January 1st!"

The 147.5-mc net continues to roll along, according to Bob Hajek, **W9QBH**, who reports that W9NRU now has a beam and that W9QGG, W9TGI, Glenview, and others also plan on using beams in spite of the original philosophy of omnidirectional coverage by the net for best advantage during emergency conditions. W9IGH, Mishawaka, Indiana, wants to make tests of vertical versus horizontal polarization with W9QBH. (**VHF Ed. Note:** Here we go, again! It has been proved by government agencies, research laboratories, and even by VHF amateurs that horizontal generally has a slight advantage—perhaps 3 db on the average—over vertical polarization for long-haul communications. Conversely, it has been shown that—for local area coverage in terrain having hills and "shadows" caused by natural terrain or by buildings—vertical polarization offers some advantages over horizontal, especially where omnidirectional operation—such as mobile—is of prime importance.)

Some interest is being aroused in a similar FM fixed frequency net on the six-meter band, according to W9QBH, who adds that the frequency will be 53.4 mc. Added to the 2-meter party line net roster is Norm White, W9EWO, Lebanon, Indiana. Also, some activity is expected in Indianapolis, before long. It is rumored that W9TKL, Waukegan, will be on the net, soon.

W8WRN Reports from Ohio

Jimmy, W4OXC, has been in Columbus since the 19th of June, and has been staying with us. In a recent letter from home, his mother told him that Floyd, W3SLI, ex-W4FBJ phoned to say he was back in Louisville to stay, and was looking for a house. Sure will be nice to hear the ole boy on again down there. I don't think Jimmy will be too active from here, while going to school. He has operated, some, here, both on 2 and 6, but not much—the shack has been too hot, over 90 for a few days.

(Continued on page 59)

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GUEST EDITORIAL

(from page 9)

Don't "read" things that are not in the proposal. A few have erroneously assumed that *all* calling and answering should be done in these segments. It doesn't state, or even imply, that this is required. Operation in all portions of the bands not concerned in this proposal is unaffected.

The second part, the proposal 12.156, requires very little comment since it is a modernization of the present 12.156, setting up frequencies in all bands rather than in just two, as at present, and simplifying the procedure for the declaration of a communication emergency in an area. Comparison of the proposed regulation with the present reveals liberalization of procedures in favor of the amateur performing the emergency service. It is not believed that any comment is necessary upon a regulation which concerns "communications essential to the protection of life and property or the alleviation of human suffering and need."

PRESENT and PROPHETIC

The New Hampshire Hamfest and ARRL Convention

On Saturday, September 27th, at Pulaski Park, Nashua, New Hampshire, the annual hamfest of the Nashua Mike and Key will take place. There will be plenty of activity for the mobile enthusiasts, with hunts organized on 2, 10 and 75 meters. An excursion has also been planned to the famous Benson Wild Animal farm, and a secial program for the YLs, lectures, meetings and FCC exams will complement the day. There'll be dancing and prizes to round out the recreational program, and, if you find time to settle down, there'll be plenty of eats and refreshments available. (Incidentally, we're told that the prize committee went "all out" for some really worthwhile prizes.)

So bring your friend, come early, and stay as late as you please. Don't worry about the weather; the Committee has adequate indoor facilities at their disposal to make it a gala day come rain or shine. You can purchase advance tickets at $3.00 until September 17th; after that they'll cost $3.50 Write P. O. Box 94, Nashua, N. H.

SUMMARY of DOCKET 10237

Establishing Calling and Answering Band Segments and Emergency Bands for Disaster Communication

1. Reserves specific frequency bands within the regular ham bands to be used only for initial calling and answering:

   These bands are as follows:

160 meter band	1800-1807 kc.
	1993-2000 kc.
75-80 meter band	3500-3510 kc.
	3990-4000 kc.
40 meter band	7095-7105 kc.
	7290-7300 kc.
20 meter band	14040-14050 kc.
	14220-14230 kc.
10 meter band	29.63-29.65 mc.
6 meter band	50.35-50.37 mc.
2 meter band	145.17-145.19 mc.
1¼ meter band	220.0-220.5 mc.

2. Allocates somewhat wider specific frequency bands within the regular ham bands to be cleared of all other amateur traffic whenever the Commission determines that a "state of communication emergency" exists (applicable either nation-wide or in a given area).

   These bands are as follows:

160 meter band	1800-1825 kc.
	1875-1900 kc.
	1900-1925 kc.
	1975-2000 kc.
75-80 meter band	3500-3550 kc.
	3950-4000 kc.
40 meter band	7075-7125 kc.
	7275-7300 kc.
20 meter band	14000-14050 kc.
	14200-14250 kc.
10 meter band	28.5-28.8 mc.
	29.4-29.7 mc.
6 meter band	50.0-50.8 mc.
	53.2-54.0 mc.
2 meter band	145.0-146.0 mc.
	146.5-147.5 mc.
1¼ meter band	220.0-225.0 mc.

3. Indicates that the Commission will arrange an expeditious method through the Commission's Regional Manager of declaring when a state of "communication emergency" exists.

OTHER:

a. Specifies that an "initial call" (or answer) shall consist of the call signs being repeated not more than four (4) times. However, phonetics, directional and geographic area calls may be made.

b. Commission may designate certain amateur stations to guard, monitor and otherwise assist in the maintenance of the restrictions outlined above.

c. Interested amateurs, clubs and parties may file comments on or before September 19, 1952. The Commission now requests an original and four carbon copies of each comment.

(from page 56)

"Two has been about normal with no good ones here. The band did open to Minnesota on the 12th of June, with stations as far south as Mansfield in on the deal Where was WRN? At work D. . . . it! W8BAX missed it also. . . . **W8CPA** doesn't have the 4-65A's going as yet. Will use them on CW only. Needs some more states he says. . . . **W8NBM**, "CO", who used to be on some years past from Cambridge, is again on from Findley. . . . **W8LPD** has been quiet. John must have something cooking. . . . Ross **(W4JDN)** and Mildred moved to Struble Road which is north of Cincinnati towards Hamilton. Ross says the elevation is the same as before, but it is out in the clear country where he will be able to hear the weak ones. . . . **W4PCT** has been keeping Kentucky on the map during Ross's absence. When not working the evening trick at WLW, he has skeds with Margaret at 7:30 PM EST.

WN8JAB informs the column that "we have a herd of 2-meter stations in Flint, Michigan." A 2-meter net is active every Wednesday night at about 8:30, with W8WXO, WN8HIT, W8ITZ, and many others. Net control is exercised from W8ACW, the station of the Genesee County Radio Club. Even though there is some activity around Flint, the gang would appreciate it if the fellows in the Jackson area would try to raise them on the air, or arrange schedules via mail. WN8JAB can be contacted by writing to Howard Nack, 1611 Elmwood Avenue, Flint, Michigan.

"Nassau County Insulting Net"

Frank Schnupp, **W2KAC**, Valley Stream, L.I., N.Y., reports that on every Saturday night, at 2250, the following stations are on the Nassau County Insulting Net for an hour and a half. Plenty of fun is had, and all "insults" are over at midnight. The usual roll-call consists of W2KFV (net control), W2KAE (YL), W2KEB (XYL), WN2IPX, W2VL, WN2AZA, W2GLU, W2IBQ, WN2KDI, WN2BFN, W2RZ, and W2KAC, Secretary. All of these stations are consistent, 2-meter operators working at least one contact each day for the last 3 months. All propose each other for listing in "The Faithful Few on VHF" roll.

(VHF Ed. Note: Dear fellows, I got in the dog house last month for being both late and having too much copy. So, I have to "pull the switch" before editor Perry spanks me again. Please send your reports promptly, so as to arrive at my address on or before the 18th of the month. We're happy—but extremely busy—in Texas. It's a great state!)

NOVICE SHACK

(from page 50)

milliamperes will reduce the load variation to two to one, resulting in quite an improvement in voltage regulation.

Many power supplies will not permit an appreciable increase in bleeder current. Even then an improvement in voltage stability is possible if more than one stage is operated from the supply by keying only one of them. The steady current drawn by the unkeyed stage(s) will act as a very effective bleeder.

The actual click filter consists of an iron-core choke and a fixed condenser. Referring to *Fig. 1*, the larger the inductance of *Ch1*, the less the click on the "make." The larger the capacity of *C3*, the less the click on the "break." The inductance of *Ch1* affects the optimum capacity required at *C3*. Start out with a capacity that reduces clicks on the "break" appreciably, determine the best inductance at *Ch1*, and make further adjustments of the capacity at *C3* as necessary.

Too much inductance at *Ch1* will produce a mushy chirp at the start of each character. Too much capacity at *C3* will put tails on the signal. Try all

the iron-core inductances with sufficient current-carrying capacity around the shack at *Ch1*. Do not ignore the windings of small transformers or a-c/d-c filter chokes. If just the right inductance cannot be found, use the closest larger one. Resistors across its terminals will then reduce its effective inductance. Warning: do not hold the resistor across the choke terminals with your bare fingers while experimenting. You may be unpleasantly surprised at the inductive "kick" across them.

The exact placement of *Ch1* and *C3* is not important. Right in the transmitter is a good spot, if there is room there.

Checking Your Progress

How do you know that you have clicks? And, if so, how can you determine if your efforts are successful? Clicks in nearby broadcast receivers are proof enough that you have at least the first type of click described above. Beyond that, the easiest way to evaluate your signal is to operate another local's station while he operates yours. This reveals the worst immediately.

Lacking a cooperating local for making tests, you may use your own receiver, especially if it has a crystal filter. There are two musts in using your own receiver. First, you must eliminate the click caused by the spark at the key contacts completely. This is easy to do. Next, you must eliminate all receiver overloading. This may be more difficult.

As a start, disconnect the antenna from the receiver, short circuit the antenna and ground terminals, detune the front-panel antenna trimmer—if any—and retard the r-f gain control. If the transmitter still overloads, pull out the r-f amplifier tube and move the receiver further from the transmitter.

Once the overloading has been eliminated, turn off the receiver BFO, and advance the audio gain control well on. Then tune in the signal and adjust the r-f gain control to the point where a clearly audible, yet not loud, rushing sound is heard. At this setting of the control, slight clicks within the rushing-noise range are acceptable, but none should be audible when the receiver is tuned either side of this point. Next, turn on the BFO, leaving the other controls as before. No click should be audible beyond the beat-note range of the signal. The crystal filter should be on for these tests.

If you are keying your oscillator, do not be surprised if eliminating the clicks is only achieved at the expense of a noticeable chirp. Also an adjustment that is excellent for one crystal may be very poor for another one. Crystals vary greatly in activity and keying characteristics. One may oscillate as soon as the oscillator plate voltage reaches a few volts. Another may not start until the voltages reaches 100 volts or more, when it will start with a severe thump. Note too that if the signal has a chirp without the click filter, it will have a chirp with the filter.

Effects Of Parasitic Oscillation On Keying

It may seem like a dirty trick to mention it now; but all the above assumes that the keyed stage(s) and those following it are free from parasitic oscillations of all kinds. No stage of a truly stable transmitter will emit r-f output on any frequency, even momentarily, when the crystal is removed or the oscillator otherwise disabled. Many transmitters that will not pass this fairly severe test perform well enough under normal operating conditions. However, erratic operation and clicks that do not respond to treatment should lead one to suspect very

strongly the presence of a parasitic oscillation. It may be constant or only triggered into oscillation momentarily by the keying pulses.

The means discussed in the many articles on TVI elimination for stabilizing a stage will often work wonders in these cases. An often unsuspected cause of clicks is a low-frequency parasitic, caused by r-f chokes in the plate and grid circuits of a stage. If it is impossible to eliminate one of the chokes, make their inductance as different as possible, say a 1-mh choke in the grid circuit and a 2.5-mh one in the plate circuit.

Is all this work necessary? Possibly not, if you are satisfied with a signal that just gets by. Remember, however, that excessive clicks or chirps can earn an F.C.C. citation.

Letters And General News

A gremlin got into the July column and cut about two lines of an item about Ben, **W9DUD.** Ben is a high school teacher in Martinsville, Ind., and he was a vital help in getting three of Martinsville's four WN9's SSQ, SWC, SWM, and SYG, on the air. Question: which one is not Ben's pupil?

It takes an r-f current 0.5/Freq. (cycles) seconds to travel ½ wavelength, not 0.5/Freq. (mc.) seconds.

Lastly, I said arguments over the best antenna polarization on 146 mc. resembled those over the relative beauty of blondes and red heads. "The figures cited are interesting." This provoked a postal card, postmarked Gary, and signed "An uninterested reader," demanding to know "What is wrong with the 'relative beauty' of brunettes?" Nothing, absolutely nothing!

EV, **W8NAF,** writes, "Put me down for extending Novice c-w privileges. I get a distinct pleasure out of working them, as I remember back in 1934 when I was a beginner. Then, with our sloppy fists, it was sometimes hard to get a QSO on Eighty, unless someone took pity on you. Now, the picture is reversed. There are just too many piled up between 3.7 mc. and 3.75 mc." Ev also reports there are over twenty-five Novices in Dayton, Ohio.

Howard, **WN8JAB,** writes, "Regarding forty—, fifteen—, and six-meter Novice operation, I'm not for it. The Novice license was founded as a training license, not as a full-fledged Ham license. I think one band in each of the low, high, and very-high bands is enough."

W1JR takes a similar view. Rien says a Novice can take a General-Class examination any time he wants to operate on those bands. What are your views?

Travis Edens, 211 N. Lee St., El Paso, Texas, asks for Novice "pen pals." He says, "Most grown-up Hams don't like to discuss things with kids, because of the age difference; so I would like to exchange letters with Novices any place in the United States or in foreign countries. I would especially like to hear from a YL Novice, but I will write to anyone who writes to me."

Jim, **WN4UZP,** and Bill, **WN4UZQ,** were featured in the **Callaway Beacon,** La Grange, Ga. A picture of WN4UZP adorns the cover of the paper. Jim's five-year-old son likes to "operate" daddy's equipment, and Bill has his son and daughter-in-law studying for tickets. Bill describes his being a ham as a new and thrilling experience that has changed his life almost completely . . . Bob, **WN1UWU,** is in a tough situation. Shortly after getting his Novice license, he had to return to a hospital for extended treatment. He is not permitted to have even a receiver there! The Millford, Conn., Radio Club and W1LLM helped Bob greatly, but now that he is seventy-five miles from home at Norwich, Conn., they can do little for him. Is there any Ham around Norwich who could give Bob a hand in getting a Technician-Class license? He admits he "doesn't know beans about radio." Bob's address is: Robert Obert, Uncas-On-Thames San., Box 711, Norwich, Conn.

Jack, **WN3TMZ,** W3TMZ, has a record of some sort. He took his examination on March 28, and got his license through the mail April 9. It was dated April 3! Although Jack's folded dipole is broadside to the WN1's, he finds it very difficult to work them. . . . Dave, **WN6QNJ,** received his license June 30, sixty-six days after taking the exam. He feeds 21.9 watts into a 6V6, which, in turn, feeds a ½-wave doublet, thirty feet high. He must have accurate meters. . . . Toby, **WN9QQK,** reports that when he was operating portable from New Era, Michigan on his vacation, many Novices did not know that ". . — . — — — — . ." after his call meant he

was operating "portable" in the eighth call area. He also notes a reluctance of some Novices to request QRS (Send Slower) when working a station sending faster than they can copy.

Bob, **WN8IKS**, runs forty watts input on 3725 kc., and does most of his operating in morning, before going to work to avoid night-time QRM. "There are quite a few early birds like myself, but we can always use a few more. Tell your readers to come on in; the conditions are fb." Bob enclosed a sample of his very-attractive home-made QSL cards. It is on a government postal card, with the call letters drawn in with the aid of a stencil, offset to produce a three-dimensional effect. The lettering is done free-hand with the air of a ten-cent plastic ruler. Bob did not say where he got the stencil.

Recalling how some of my home-made cards used to look (and still do, unless the unfortunate recipients were smart enough to burn them), I compliment Bob on his.

Question Box

In answer to the many pleas for help in learning to draw diagrams, and the flat statements that the writer just could not learn to draw them, the following suggestions are offered. The first is suggested by **WN9OTH.**

"I had great difficulty in learning how to draw schematic diagrams. Finally, I carefully made a large copy of each diagram I was trying to master, carefully cut it into pieces, and worked it like a jig-saw puzzle. After solving the puzzle several times, I found it possible to draw the diagram from memory: **WN9OTH.**"

The second method requires a good supply of paper and a pencil. Study the diagram you wish to learn to draw for about two minutes. Put the diagram to one side and attempt to duplicate it from memory. After you have gone as far as possible, compare your drawing with the original. You will probably discover many mistakes and omissions. Do not worry about them. After comparing the two diagrams, put aside your copy. **Do not refer to it again.**

Study the original diagram for another two minutes, put it aside, and again attempt to duplicate it from memory. In a surprisingly short time, you will find yourself able to draw any diagram.

Station and operator of WN6QNB, Dave Drath Kentfield, California. Transmitter uses a 6V6. Antenna: ½-wave doublet. Receiver: an S-77, and a BC-454 for a monitor completes the station.

The important part of this method is to start fresh each time, without attempting to correct a previous effort. By study, drawing, comparing, and repeating, you automatically concentrate upon the section of the diagram that gave you trouble the last time.

Large and complicated diagrams should be broken down into sections for study at first, then combined into one after you can draw the individual sections without error.

See you next month. 73. Herb

Present and Prophetic

Cincinnati's Annual Stag Hamfest

You and your friends are invited to attend the Stag Hamfest, which is presented Annually by the Greater Cincinnati Amateur Radio Association. To be held at Ash Grove, Cincinnati, Ohio, during September fourteenth, this party will be a lively one that you can't afford to miss. Admission at the gate will be two dollars, with eats and drinks, of course, included.

The Cleveland Hamfest for '52

Those of you in the Cleveland area who enjoy hamfesting will be interested to note the plans made by the Cleveland Area Council of Amateur Radio Clubs for their annual Cleveland Hamfest.

Scheduled to be held in the Cleveland Gray's Armory, at East 14th and Bolivar in Downtown Cleveland, during October 4, and ostensibly lasting from twelve noon till midnight, the party's agenda, is, in order, as follows:

At twelve noon the Main Exhibit Rooms will open, and here you will see displays of ham equipment by many national and local manufacturers; CD and military communications organizations will also feature exhibits, along with those of the Cleveland Area clubs, and FCC-Council anti-TV displays.

From two until four p.m. there will be discussions of interest to all classes of Hams, held in the adjoining classrooms. Following these discussions, there will be a two-hour auction period, for which you are urged to bring any saleable gear. Your appetite, by this time, should be ravenous, and the Council has scheduled the forte of the evening, the buffet supper, to follow hard on the heels of the auction, with food to tempt your palate specially prepared by the McNally Doyle Catering service. Then, at 7:30, after you've been consummately well fed, the council asks you to relax and enjoy their main program of entertainment, and a C.D. movie which has been scheduled for nine p.m.

The Grand prize drawing at 9:30, will be the climax of the evening, with the three grand prizes of a receiver, transmitter and converter, each by a leading national manufacturer, and other prizes to numerous to mention. The advance ticket sale at $3.50 will be from August 20th to September 30th, and gate admission will be $4.10. Procure your tickets from Cleveland Area club members, Cleveland and Akron wholesale electronics jobbers, or by check or money order from Julius Mosonics, W8PZM, 7715 Newport Ave., Parma 9, Ohio.

DX CONTEST SCORES

(from page 24)

	STATION	ZONES	COUNTRIES	SCORE
Union of South Africa				
14 mc.	ZS6JS	25	41	20,978
28 mc.	ZS6VR	12	21	2,244

ASIA—

Single Operator Stations

Burma				
All bands	XZ2SY	29	40	20,424
Cyprus				
All bands	ZC4XP	23	65	49,280
Hongkong				
All bands	VS6BJ	9	9	450
14 mc.	VS6BA	13	19	5,536
	VS6BJ	5	5	120
28 mc.	VS6BJ	4	4	104
Israel				
All bands	4X4CW	23	56	35,866
	4X4AK	17	50	19,363
	4X4DE	16	44	18,840
7 mc.	4X4DE	3	8	242
	4X4CW	2	3	60
14 mc.	4X4DK	19	48	25,460
	4X4DE	13	36	14,308
	4X4CW	10	24	6,018
	4X4AK	7	26	5,511
28 mc.	4X4CW	10	28	10,060
	4X4AK	10	24	4,148
Japan				
All bands	JA2DS	20	21	7,954
Jordan				
14 mc.	JY1XY	5	10	855
Malaya (Signapore)				
14 mc.	VS1DU	7	7	530
Sikkim				
14 mc.	AC3SQ	11	17	1,260
	AC3PT	5	8	364
Turkey				
28 mc.	TA2EFA	10	17	3,780

OCEANIA—

Single Operator Stations

Australia				
All bands	VK2AMV	28	42	15,170
	VK6RU	11	12	828
14 mc.	VK2AMV	18	32	8,300
	VK3LN	18	22	4,880
	VK3HL	12	15	2,133
	VK4DO	12	15	1,458
	VK5LC	8	8	832
	VK6RU	5	5	120
28 mc.	VK2AMV	10	10	1,020
	VK3ABA	7	8	345
	VK6RU	6	7	312
Hawaii				
All bands	KH6IJ	44	58	107,202
	KH6MG	42	55	44,812
3.5 mc.	KH6IJ	6	5	635
	KH6MG	6	5	297
14 mc.	KH6AEX	23	39	25,482
	KH6IJ	20	27	17,860
	KH6MG	19	27	12,052
	KH6BA	15	20	3,920
28 mc.	KH6IJ	18	26	26,972
	KH6MG	17	23	6,920
Marianas Is.				
14 mc.	KG6AAE	27	51	33,368
New Zealand				
All bands	ZL1MQ	35	46	23,247
7 mc.	ZL1HY	2	3	75
14 mc.	ZL1MQ	23	35	13,688
	ZL3LL	22	25	6,016
	ZL2AI	18	20	4,907

PROPAGATION

(from page 41)

AFRICA:

No ten meter openings expected, except possibly from Northern and Western Africa to W4 after September 15th on excellent propagation days. Some openings expected on all other bands.

AUSTRALASIA:

Some activity expected on 15 through 80 meters, with some 10 meter openings possible to the Pacific Coast.

ASIA:

No 10 meter openings expected. All other bands open during good days both to the Middle East and Far East, but conditions generally only fair.

September's forecast is based upon a predicted smooth sunspot number of 44 and October data on a sunspot number of 43.

DX AND OVERSEAS NEWS

(from page 46)

4W1MY. . . . **DL7AB** went to 199 with 4W1MY who also helped OQ5RA make it 200 and W6TI, 209. . . . Andy, **OQ5RA**, recd WBE and BERTA certif's while sewing up WAS with card from W7PGS. . . . **ZL1HY** added FP8AM. . . . **G4CP** nabbed W5AGB/FM and OQ5CZ (Ruanda Urundi). . . . **W4BRB** still awaits cards from LX1JW, HZ1KE, VP8AI, ZM6AK and EA9AP for that DXCC on 3.5 mc.

Here and There

From XE1AC we hear that **EA9DC/EA8AW** had very bad luck returning home, from Ifni, losing most of his equipment. He is now QRT minus a receiver and exciter. In Ifni Crescencio made a total of 3,911 QSO's in 82 countries. First contact was KP4ES. EA9DC's QSL's should be out by now and he reports that only 28 were received with a 'contribution'. . . . W8ACE is advised by I1OJ that the **I5A** heard on 20 c-w is ng. The legal I5A operated on 28-mc phone only. See QTH's. . . . **W4JUJ**, who has used xtls only since 1926, has now acquired a Viking VFO. Charlie stands at 36-120. . . . **XE1SA** tells us he will now handle all XE QSL cards. See QTH's. Manuel also says that XE1AP, active during ARRL contest, is unlicensed and all cards will be returned to senders. All XE4's and XE5's are 'pirates' with the exception of XE4PB and XE4PK who are now inactive. . . . Stan Crow, G3DFH/VQ4SGC is now **VP5SC** in Kingston, Jamaica for the next three years. Visitors are welcome and may contact him at address given in QTH column.

VQ4RF visited England and we hear some unconfirmed rumors of his going to ZD8. . . . **G3IHQ** is ex-ZE3JJ, and hopes to be back in ZE by end of year while **ZB2L** turns up as G3IHI. **ZE3JQ** is now SU3JQ QRP. We hear that operation in SU is now banned by military order. . . . **KG6GD**, after some difficulty, has got his old W6ATB call back. Pete offers to help out any 'homest to goodness' DX stations with their QSLing. . . . From **CE3AG** we hear that all CE7Z- stations are located on the Palmer Peninsula, Antarctica (ARRL recently allowed DXCC credit for these along with LU-Z's). Operators are changed once per year, Dec/Jan, and there is no mail service during the rest of the year. See QTH column. . . . G6XQ recd QSL from **JY1AJ**, Mafraq, Jordan. Same town that ZC1AL operated from. This convinces him that JY1 and ZC1 are not separate.

OH2RY advises that the island of Aaland, 50 miles off Finnish coast, has separate Govt and he is investigating possibilities of making a separate one out of this. . . . **G2MI** tells us that Ruanda Urundi is a Trust Territory exactly like VQ3 and says this qualifies it as a separate country. Belgian Congo officials are in agreement with this. Ruanda Urundi is located directly east of the Belgian Congo and is inhabited by OQ5CZ and OQ5DZ who are both anxious to have RU made sep-

(Continued on page 68)

(from page 66)

arate. . . . **ZA2AB** has been active again giving QTH as Box 35, Tirana. Has anyone recd a QSL yet? . . . I5PR, It. Somaliland, has been heard 046 1945z. See QTH's. . . . From **FI8AB,** via W6SAI we hear that FI8 licenses are delayed due to government red tape. . . . **SV1CFX** and **SV1SMX** are Greek ships. Apparently the 'X' stands for /MM. . . . GM6MD, QSL Mgr. has written to GM3AFG, ex-**MP4BAO,** offering to answer the stacks of QSL's now held for him. It is not known if GM3AFG is at home at present. . . . Via W2QHH we learn that **HB9MQ** planned to operate from the rare Swiss canton of "VS" from Aug. 1 to 13. . . . One **EH5IF** has been heard. According to G3GUM this is the SS Bonaventura bound for Montreal from Sydney.

W8WV and XYL dropped in on KV4AA recently. . . . **G6YQ** vacations in GW land. . . . **GM3CSM** spent some operating time at OZ7BG on recent vacation. . . . **WN5UTE,** now W5UTE QSO'd KG6ABJ/KGØ on 7 mc. Anyone know the QTH? . . . **W6NZ** advises he has all logs for VP7NZ if any QSL's needed. . . . **VE7VO** visited VE8AW. . . . **W6IBD** sports new beam. . . . **W6ZF/3** nabbed EA9DC and operates from Andrews AFB, Washn DC. . . . **W9PQL/KV4,** SS Alcoa Puritan, QSO'd in Fredericksted, St. Croix, V.I. reports /MM conditions on 28 mc. very low. Dick runs 35/50 watts to an 807. . . . **G6ZO** was active from TA4U, TA3QZ and TA3AF on recent two month stay in Ankara.

Adding to an earlier item VE3KF, via W5ASG, advises us that **VQ4RF** will operate at ZD8RF for two days. Date unknown. . . . From the **WG Bulletin** we are informed that the following are now active on Macquarrie Island: VK1RG, ex VK5RG Bob Carr. VK1EM, Eric Macklin and VK1RR, Roy Arnell. . . . From the Tanger **Radio Club** we hear that licenses have been granted from CN2AA through CN2AZ. Cards may be sent to TRAC, French P.O. No. 150 (7, Rue Vermeer) Tangier Int. Zone. Individual QTH's will appear October CQ. . . . From Nat Harrington, an ardent SWL, we hear that the new call for ZP4BB is now **ZP5BG.** . . . W1GKK says all **FP8BX** QSL's are now out except for a few for which he has no address.

QTH COLUMN

I5PR	Galkaio Post Office, Italian Somaliland. Af.
KH6MF/KB6	"Harry" c/o C.A.A. Canton Is.
VP7NJ	Harry Albury, Harbour Is. Eleuthera, Bahamas. B.W.I.
W5AGB/FM	Fletchers Ice Island, North Pole. via Box 143, Oakdale, Ia.
KH6ADY/2	Ted Sharpe, Naval Ammunition Depot, Earle, Red Bank, N.J.
ST1CB	Box 64, Khartum, Anglo-Egyptian Sudan.
KX6AR	Navy 824, Box 3, FPO, PM, San Francisco.
PJ9VDZ	Peter J. Vanriet, Marno 44901 Marines, Camp Suffisant, Curacao, N.W.I.
ALL XE	Via "L.M.R.E., A.C. QSL Bureau, c/o XE1SA, Arcos de Belem 13, Mexico 1, D.F.
VP5SC	Stan Grow, c/o Cable and Wireless Station, Stoney Hill P.O. Kingston, Jamaica.
LZ1KAB	LZ QSL Bureau, Box 830, Sofia, Bulgaria.
I5A	(28 mc A3 only) c/o Mina Via 'A', Poerio 56, Rome, Italy.
KM6BD	"Bert" Box 4009, Honolulu T.H.
TG9AQ	Manuel de J. Lima, 16 Avenue Sur No. 20-A, Guatemala City, Guatemala.
	Box 372, Tripoli, Libya.
5A3TA	Box 512, Asuncion, Paraguay.
ZP5AY	Terry Lillevik, Tromsoe, Norway
LB6XD	Georges Louvet, 132 Blvd de la Somme,
FI8AA	Saigon, Viet-Nam. Fr. Indo China
	c.o Distrito Postale, Mogadiscio, It.
I5GO	Somaliland. Af.

Thanks to W4SAT, W3AS, W8UPN, W8ACE and The West Gulf Bulletin.

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NOVICE TRANSMITTER KITS complete with tubes, crystal, meter, power supply, all parts. 20 watts (6L6) $19.95, 75 watts (6L6-6L6) $34.95—75-150 watts (6AG7-807-807) $49.95. Write for information. Dixon Electronics Co. 13444 W. McNichols, Detroit, Michigan.

QSL! FB Samples, 10c. Tooker, Lakehurst, New Jersey.

QSL Cards? Unbeatable samples 25c. Sackers, W8DED, Holland, Michigan.

WANTED—top prices paid—Navy selsyns 1DG, 1F, 1G, 1CT, 5D, 5DG, 5F, 5G, 5CT and BC-348, BC-221. AN/ART-13, AN/ARC-1, AN/ARC-3, RTA-IB, etc. Lectronic Research, 719 Arch St., Philadelphia.

GONSET 2 METER converter. Like new. Best offer over $35.00. WN4VGU, Tepwood Farms, Bethel, Ohio.

MAKING LIST of Baptist preachers who are hams. Free copy to each one listed. Write Rev. Wes Miller, W5QNK, First Baptist Church, Canton, Oklahoma.

COLLINS 32V1 with spare 4D32 $375. Excellent conditon. J. Larson, W6IMQ, Whitney 2620.

WANTED: NC240D or HRO, rack mounting only. W2CDW, 7329 255th St. Glen Oaks, Queens, New York.

WANTED: APR-4, other APR-, APS-, APT-; ARC-1, ARC-3, ART-13, BC-348, BC-221, etc.; TS-12, 13, 35, 120, 146, 155, 173, 174, 175, 323, other TS-; particularly MICROWAVE equipment, Spectrum Analyzers; G-R, Ferris, etc.; 723A/B, 3C22, all tubes; manuals, meters, parts, cable. Littell, Farhills, Box 26, Dayton 9, Ohio.

SALE: W4DWF Half KW-Phone-CW xmtr. Described June and July '51 CQ. Completely deTVI'd. Perfect working condition. Spare tubes, coils for 10-11, 15, 20, 40, 80. Will deliver within 150 miles or see it my shack 30 miles from Phila. 11 miles from Penna Turnpike. First $350.00. W3CUO, Walt Clevenstine, 711 Arch St., Spring City, Penna. Crating slight additional charge.

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FOR SALE: COLLINS 32V2 same as new, 9 hours actual log time. Workshop beam, D-104 mike with push-to-talk stand, coax relay, all for $500.00 cash and carry. Clyde Cook, W6GBV, 190 Magnolia Ave., Milbrae, Calif.

NOVICES: Am selling complete Novice station. NC-57 receiver, BC-457 75-150 watts converted, less power supplies. Key, headphones, xtals, callbook and meters included. Best offer over $110. Send for particulars. W9QQG, 5545 Woodlawn, Chicago, Ill.

75A-1 and HQ129X Wanted. May have modifications if faithfully described. Also interested in HRO5OR or HRO5OR1. Will pay cash. All letters answered. Harold Beddor, W7JPD, 428 North Montana St., Diflon, Montana.

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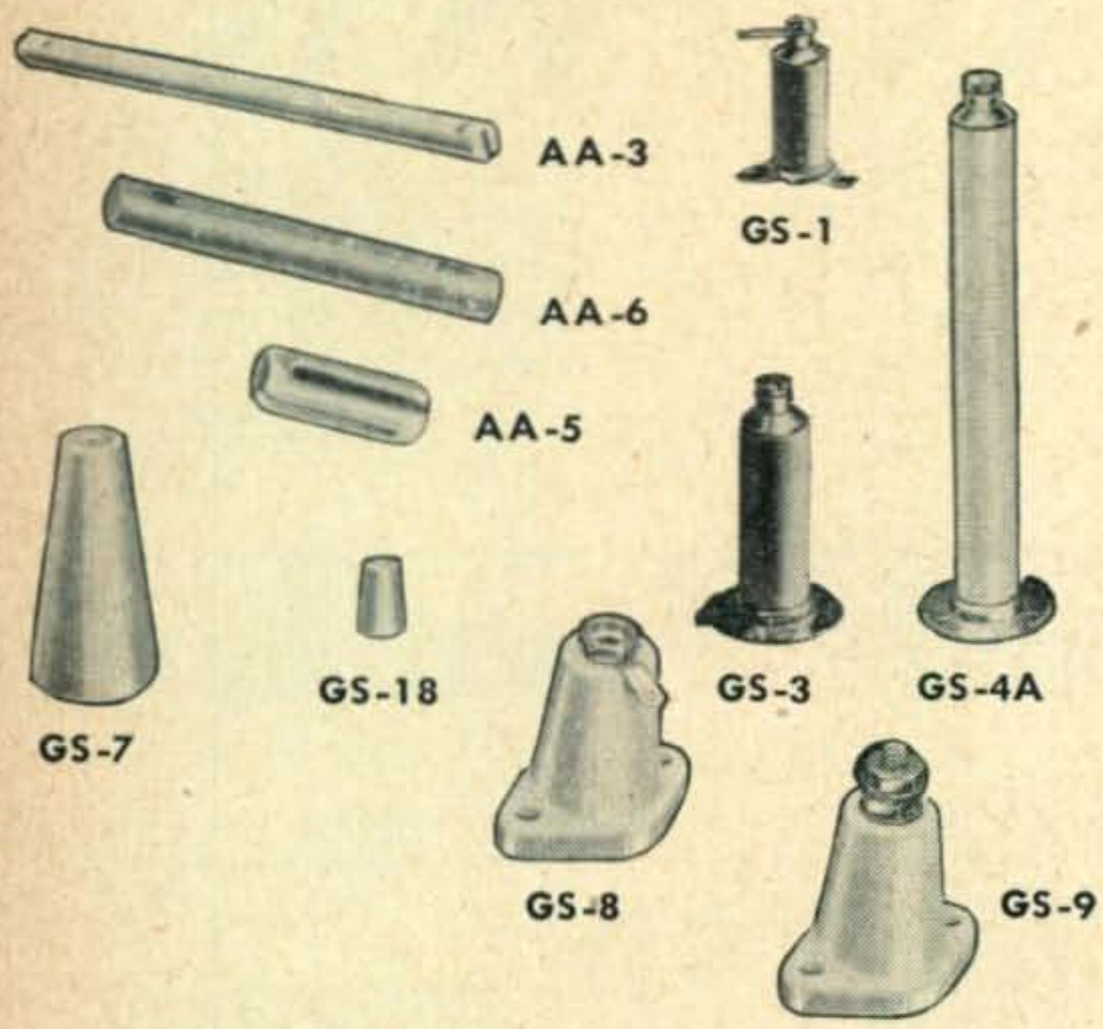

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