

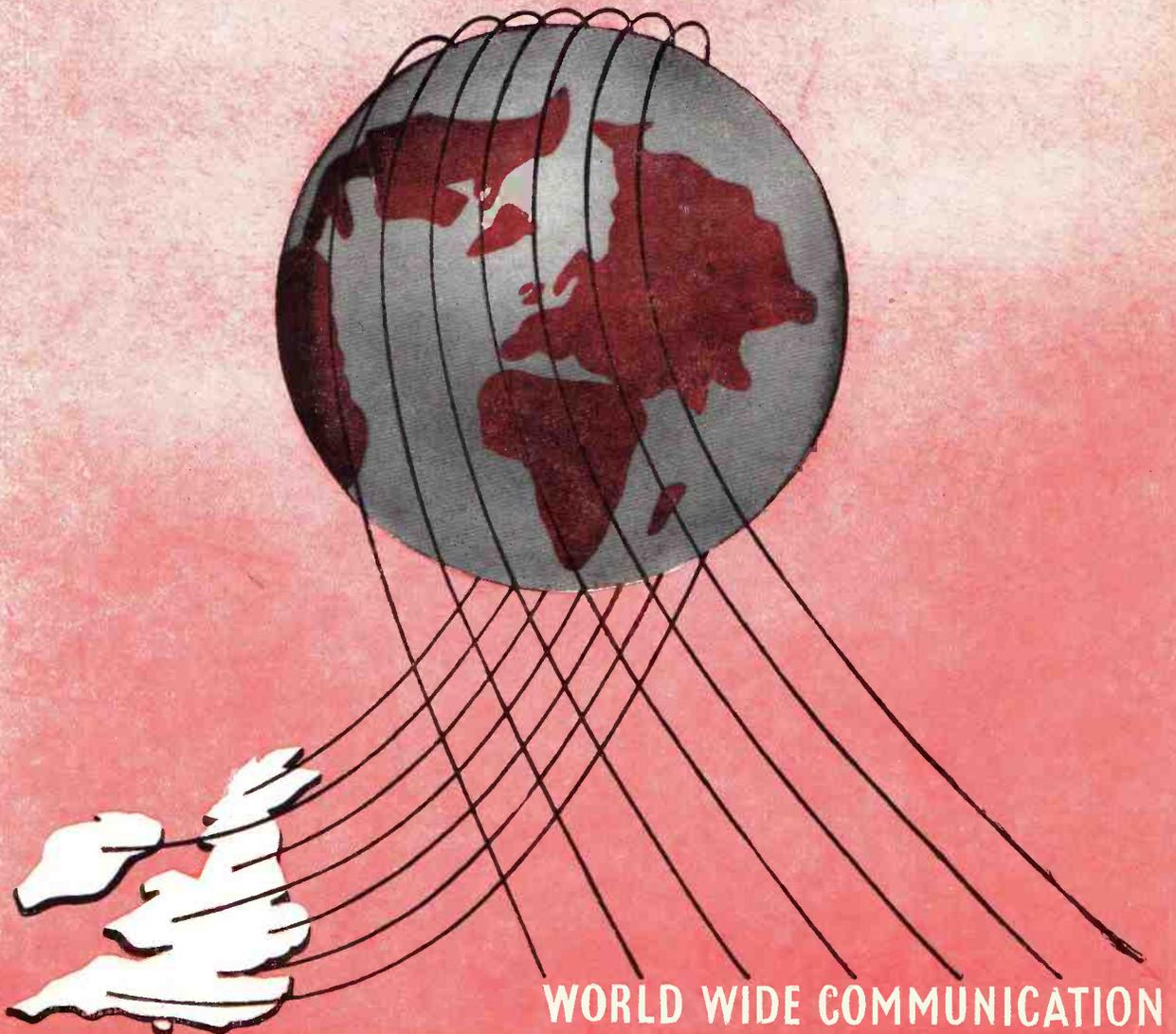
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The
SHORT WAVE
Magazine

VOL. XIV

SEPTEMBER, 1956

NUMBER 7



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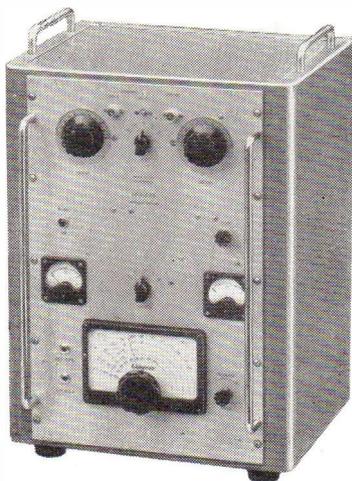
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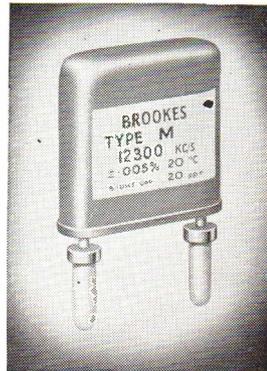
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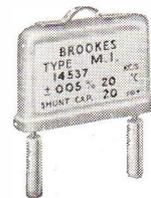


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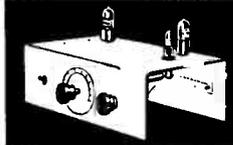
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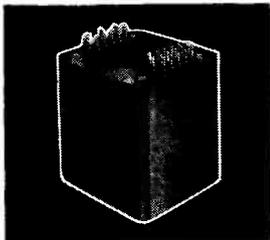
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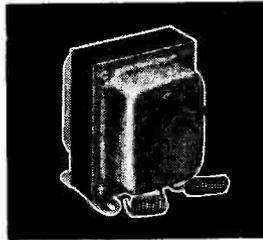
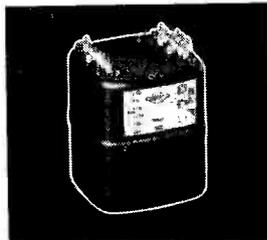
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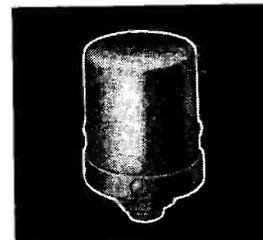
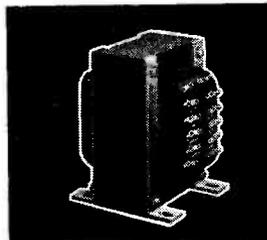
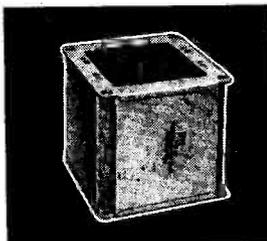
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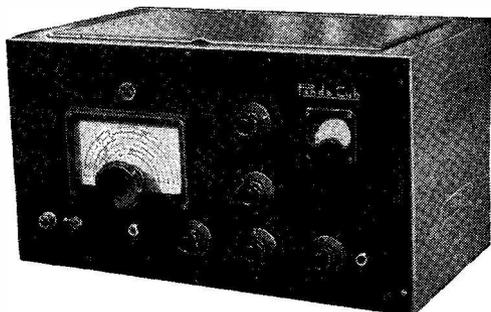
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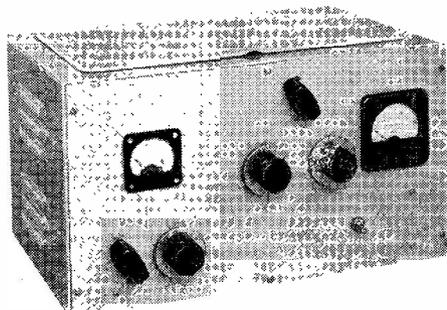
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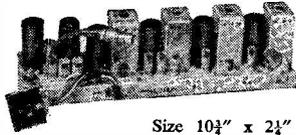
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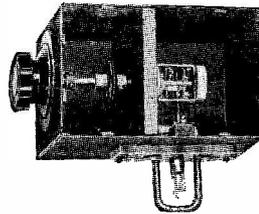


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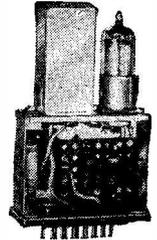
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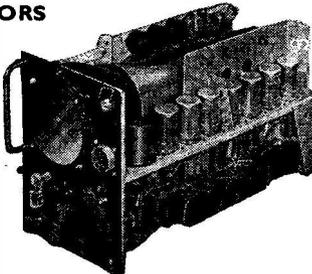
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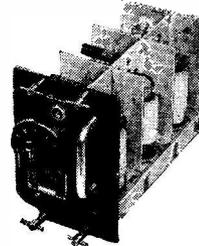
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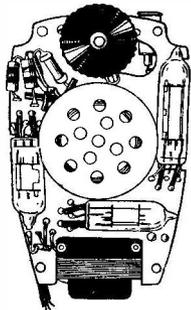
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The SHORT-WAVE Magazine

E D I T O R I A L

Imprudent Several daily newspapers dated August 15 reported — in quite different ways according to the character and approach of the paper concerned — an arrangement concluded between the British Red Cross Society and an unofficial organisation known as the “Radio Amateur Emergency Network.” The remarks of the chairman of that body were given a good deal of prominence. Broadly, the idea is that the R.A.E.N. should provide radio communications for the Red Cross in times of national disaster or emergency.

On the face of it, this seems to be an admirable project, worthy of the widest support, particularly as the PMG is reported to have given permission for free RAEN/Red Cross message handling, waiving the “third party clause” in the Licence for this special purpose.

Closer examination of the RAEN/Red Cross scheme, however, shows it to be an undesirable arrangement from practically every point of view. In the first place, as the “Times” was the only newspaper to make clear, the PMG does not allow the network to go into action until all other means of communication have failed — this means the GPO itself, the Police, Civil Defence, and local Service communications, to say nothing of such organisations as the Automobile Association, which now operates a private radio system on a nation-wide basis. Hence, amateurs engaging themselves to the RAEN/Red Cross scheme will be drilling for a possibility so remote and a chance of real action so nebulous as hardly to justify the commotion that this proposal has engendered.

Secondly, the intention is, of course, that RAEN/Red Cross networks should be operated on the amateur bands. Nobody would object to this under real emergency conditions — when you take the action first, and sort out the rights and wrongs afterwards. But in preparing for the very remote possibility of being allowed to operate, RAEN/Red Cross networks must forthwith be established, and message-handling exercises carried out, on amateur frequencies. Furthermore, if any degree of efficiency and reliability is to be attained, these practices must be frequent, and channels kept reasonably clear for them.

Without taking the question of responsibilities further, our contention is that all this is quite wrong. The amateur bands are congested enough as it is, and will become more so. There is no room for private networks operated in the interests of outside organisations. It is more-

over, bad in principle even to suggest that amateur channels are open and available for such a purpose — or that amateurs can provide, from their own resources, all the facilities that would be required. Furthermore, if R.A.E.N. frequencies have to be kept clear for exerciess — which many people believe have no real value or significance — there is likely to be a good deal of friction over the air. Indeed, that is already in evidence.

There is, no doubt, a good case for the Red Cross Society to have a communications system of its own — if the A.A. can operate a private radio network on a national basis, there is every reason why the Red Cross also should have something on the same lines. But we further contend that such a network, like the existing A.A. organisation, should be on frequencies outside the amateur bands. There are plenty of channels in the 5-megacycle region — used by School CCF networks, the Home Guard, A.T.C. detachments and similar semi-official units — which would be entirely suitable for local RAEN/Red Cross activities on a shared basis. This is really the nub of the whole thing — the question is whether this project should be operated on the amateur bands. As to the usefulness of the scheme itself, that is for individuals to decide in the light of the fact that disaster will apparently have to be utter and complete before the R.A.E.N is even called in !

Amateur station operators should be very careful before allowing themselves to be drawn into schemes of this sort. It would be far better if those who are in a position to serve were to join Civil Defence or one of the Service reserves, always crying out for recruits with just the qualifications possessed by radio amateurs. It was those who joined the Service volunteer formations in the pre-1939 period who did so well when the time came, and whose record has justified the post-war Service support for the Amateur Radio movement. It is mainly on that support that Amateur Radio still depends for keeping its status, and its frequencies. These are not “given us by the G.P.O.” The Post Office, excellent institution that it is and always as co-operative as it can be, is (in this context) only the agent for the higher authority which decides to what extent amateurs are to be given frequency space at all. It is not with the G.P.O. that we must justify ourselves, but with the Services, who rightly look upon radio amateurs as their most valuable potential reserve. From the point of view of industry, too, the educative value of Amateur Radio is such as to make the movement an important recruiting ground for technicians.

While not wishing to condemn the RAEN/Red Cross scheme out of hand, what we suggest is that it should be looked at again in the light of the arguments — based on many years' experience of these problems — put forward here. This must also mean a re-appraisal of whether the R.A.E.N. itself should continue to be operated on amateur channels.

Austin Forster
G6FO.

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THIS is a companion unit, of identical size and shape, to the "DX-Pilot" exciter unit described in the May issue of SHORT WAVE MAGAZINE. As the title implies, the "DX-Hunter" is intended for the enthusiast whose main interest is the pursuit of DX, be it rare or otherwise. Features to note are that the PA unit is band-switched to cover the 28, 14 and 21 mc bands; full licensed power is available on CW (some reduction is advisable on telephony); HT voltage is not unduly high—700 volts or less; heater and bias supplies are self-contained; and harmonic output is low.

General Design

The design of the "DX-Hunter" is centred around two Brimar 5B/245M ("miniature 807") valves, connected in parallel. The input circuit is fully tuned and uses separate switched coils for each band. The output circuit is of the pi-type, using variable tuning and loading condensers. One coil is provided for 28 mc and a second tapped coil covers 21 and 14 mc. Meters are fitted to read anode and grid currents.

The transmitter is intended to run from two separate HT supplies, both of low impedance, and delivering some 300 volts for the screens and around 700 volts for the plates. The *low impedance* screen supply is an important point and it is one the writer has found, from practical experience, to lead to an improved

performance. It is well known that the screen current of a beam pentode/tetrode type of valve can vary considerably, dependent on such factors as grid drive, anode voltage and screen voltage. If a high-impedance source of screen voltage is used—as, for example, when it is obtained through a high resistance in series with the plate voltage—it can easily happen that the screen grid is starved and the efficiency impaired. This is particularly the case when using telephony and leads to inability to modulate fully. The writer cannot recall having seen the point mentioned before—but it is certainly one to add to the usual faults, such as lack of grid drive, incorrect matching and so on, which are considered when a telephony transmitter is not functioning as it should.

To enable the "DX-Hunter" to be operated conveniently on phone, an audio frequency choke is inserted in series with the screen supply but is shorted out for CW work. Modulation has to be applied to the valve anodes only.

Then there is the question of how to protect the PA valves when drive is off. The use of a clamper has become popular in recent years but it pre-supposes a high impedance screen supply. Also, cases have come to light where the clamp valve has adversely affected telephony operation. The writer considers there is no method to equal that of applying a definite amount of negative voltage to the grid

so that the valve is cut off (or nearly so) during quiescent periods. The process of tuning-up is also then more positive.

Since in any case it is desirable to provide a heater supply, the addition of a bias supply is a relatively simple matter. A small receiver-type transformer is employed instead of a single winding heater transformer and the additional parts are few in number. The resistor values are selected to give a voltage rather less than the actual working bias, the balance being derived from the flow of grid current through part of the resistor network. An increased bias voltage is provided for telephony operation.

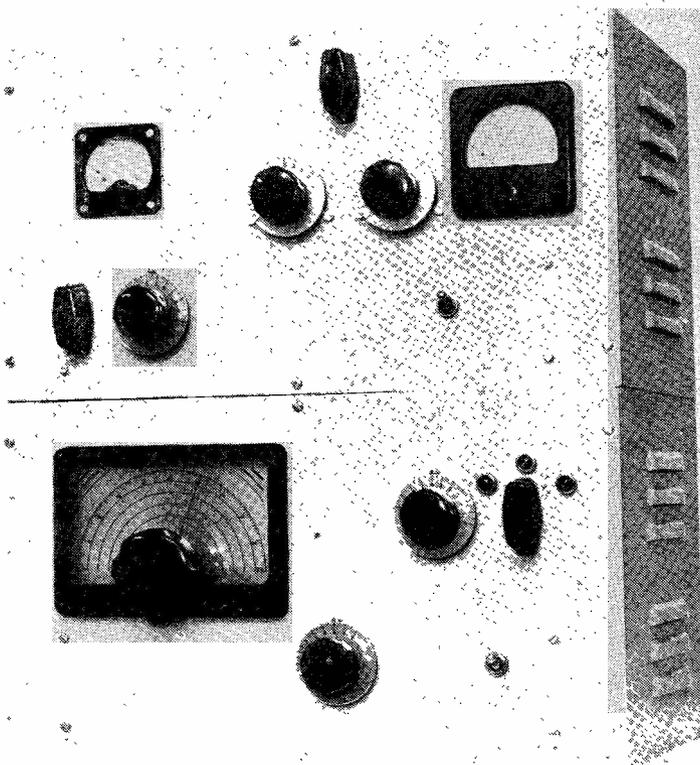
Precautions have been taken to limit the radiation of any high order harmonics generated by the PA but, as usual, it will be necessary to take additional steps to ensure that harmonic radiation does not occur through the normal aerial coupling system.

It is recommended that either a well matched aerial, using low impedance coaxial feeder, be employed, or else a separate aerial tuning unit, fed from the transmitter with low-impedance line. Whilst a good match can be obtained with a pi-output circuit into a long wire or other aerial system of medium to high impedance, it becomes difficult to prevent any harmonics that may unavoidably be generated from reaching the aerial. Also there is a kind of shock excitation effect which is liable to cause interference to both broadcast and television receivers, unless the power input is low.

Construction

The cabinet and chassis are identical with those used for the VFO-Exciter unit, of which details are given in the May issue of SHORT WAVE MAGAZINE. As before, the manufacturers are prepared to supply the metal work with the major holes cut out, thereby saving much of the "hard labour."

The drawings give exact information on the



The "DX-Pilot" VFO-Exciter and the "DX-Hunter" photographed together. The Exciter unit (lower) was discussed in detail in the May 1956 issue of "Short Wave Magazine" and the PA section as described here has been designed to work with it, as a companion unit. Modern valve types are used throughout, with Brimar 5B/254M's ("miniature 807's") in the RF amplifier. The transmitter, which is band-switched for 14, 21 and 28 mc, can be run at 100 watts input on telephony.

layout of components on both the chassis and panel. The bushes of three components (S1, S3 and C7) pass through both the panel and the wall of the chassis, hence care is needed to ensure these holes register with each other.

LIST OF PARTS

- | | |
|--|------------------------------|
| 1 Chassis, Panel and Cabinet, as detailed | <i>Philpott's Metalworks</i> |
| 1 Mains Transformer, 6.3v. 2 amps plus HT winding for bias supply | <i>(see text)</i> |
| 1 AF Choke, 12 Henry, 20 to 60 mA. PCF11 (<i>Woden</i>) or similar | <i>Cat. No. 836</i> |
| 1 Transmitting Variable Condenser 100 μ F. (C11) | <i>Eddystone</i> |
| 1 Transmitting Variable Condenser 390 μ F (C12) | <i>Cat. No. 839</i> |
| 1 Variable Condenser 54 μ F (C7) | <i>Eddystone</i> |
| 2 Knobs, bar type | <i>Eddystone</i> |
| 3 Dials, direct drive | <i>Cat. No. 844</i> |
| 2 Coil Formers (for L1, L2, L3) | <i>Eddystone</i> |
| 1 RF Choke RFC3 | <i>Cat. No. 1022</i> |
| 1 Lead-through Insulator | <i>Eddystone</i> |
| 1 Stand-off Insulator | <i>Cat. No. 695</i> |
| 2 Yaxley Ceramic Switches, 2 pole, 3-way (<i>see text</i>) | <i>Eddystone</i> |
| 2 Valveholders, B8G with 1½in. fixing centres | <i>Sorad</i> |
| 2 Valves 5B/254M | <i>Sorad</i> |
| 1 Metal Rectifier type DRM1B | <i>Brimar</i> |
| 1 Plate Current Meter 0-300 mA., 3in. square flush | <i>Brimar</i> |
| 1 Grid Current Meter 0-25 mA., 2½in. square flush | <i>Pullin</i> |
| 1 Toggle Switch, double pole on/off | <i>Pullin</i> |
| 2 Coaxial Sockets (and plugs to match) | <i>Bulgin</i> |
| 2 HT Insulated Sockets (and plugs to match) | <i>Belling-Lee</i> |
| | <i>Belling-Lee</i> |

Not shown, because their positions do not call for exact detail, are the holes at the rear required for the two HT sockets, the two coaxial sockets (input and output), the mains lead, and for the earth terminal which is bolted to the wall of the chassis but allowed to project through the cabinet.

The two large variable condensers, C11 and C12, are fitted so that the ceramic end plates rest on the chassis—hence the mention in the

drawings of the spindle hole positions being approximate. The condensers are secured to the panel with the bolts and pillars provided.

A slight modification should be made to these condensers before they are finally mounted. It consists simply of fitting soldering tags beneath the screws securing the lower side rods and, on the front plate, connecting the rotor tag to the smaller tags with short lengths of copper strip. The tags at the rear then become available as earth points from which to run copper strips (separate and insulated from the chassis) to the common cathode earthing point at the valveholders. Holes in the chassis (about 1/4 in. diameter) are required to permit these leads to pass through. It is emphasised that this method of earthing the condenser rotors is *essential*, as considerable RF currents flow and these currents should not be allowed to find odd return paths through the chassis.

The valveholders must be of the type having fixing holes 1 1/2 in. apart (some are 1 1/4 in. or less) to permit the making of 1 1/4 in. holes in the

Table of Values

Fig. 1. Circuit of the "DX Hunter" Power Amplifier for 10, 15 and 20 metres.

C1, C2, C14 = .005 μ F moulded mica, 1,000 volt	C12 = 390 μ F transmitting variable
C3, C4 = 32 μ F electrolytic, 250v. wkg.	C13, C15 = .0005 μ F moulded mica, 2,000 volt
C5, C6 = .0005 μ F moulded mica	R1 = 5,000 ohms, 3 watt
C7 = 50 μ F variable	R2 = 5,000 ohms, 1 watt
C8, C9 = 2,200 μ F "Hi-K" or "Cascap"	R3 = 4,000 ohms, 1 watt
C10 = .001 μ F moulded mica, 2,000 volt	R4 = 1,800 ohms, 1 watt
C11 = 100 μ F transmitting variable	R5 = 1,000 ohms, 1/2 watt
	R6, R7 = 22 ohms, 1/2 watt
	R8, R9 = 47 ohms, 1/2 watt
	R10, R11 = 100 ohms, 1/2 watt
	V1, V2 = Brimar 5B/254M

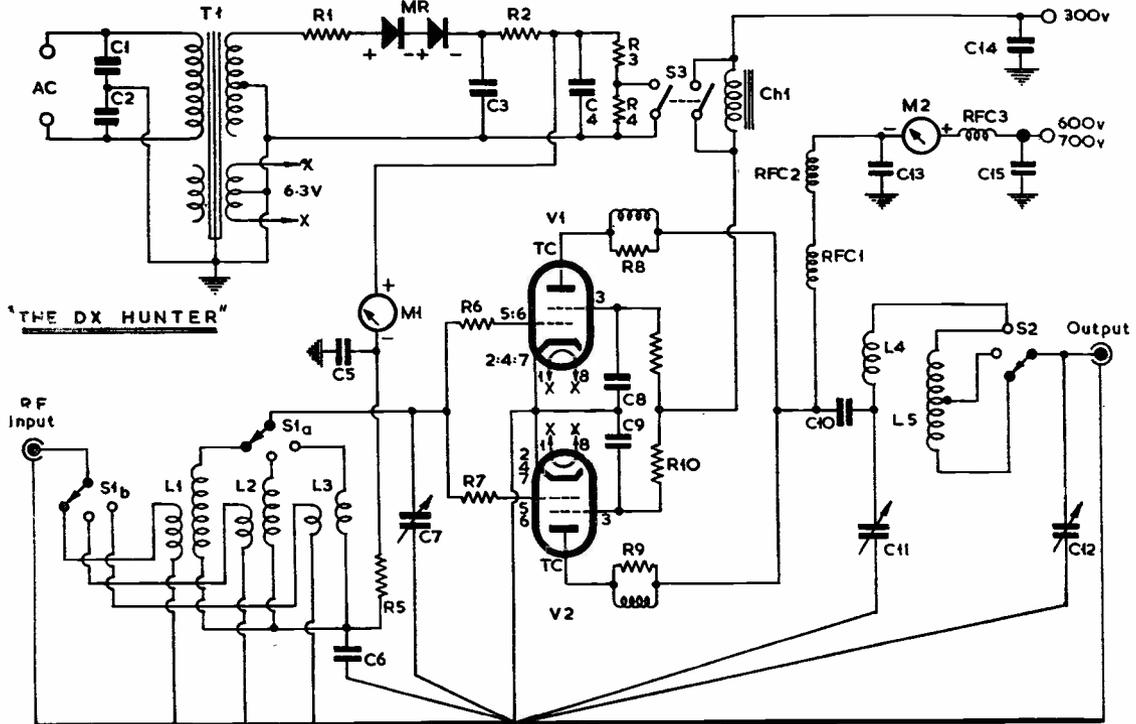
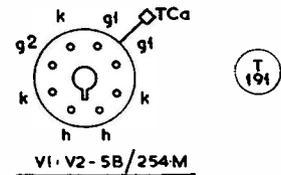
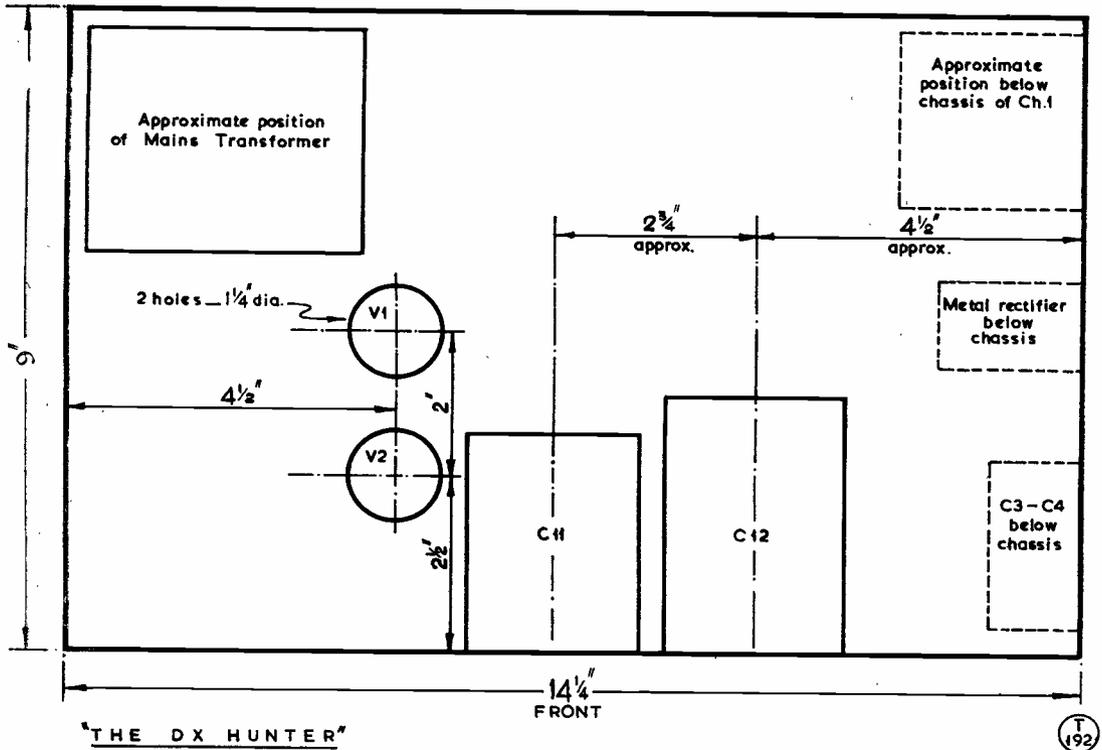


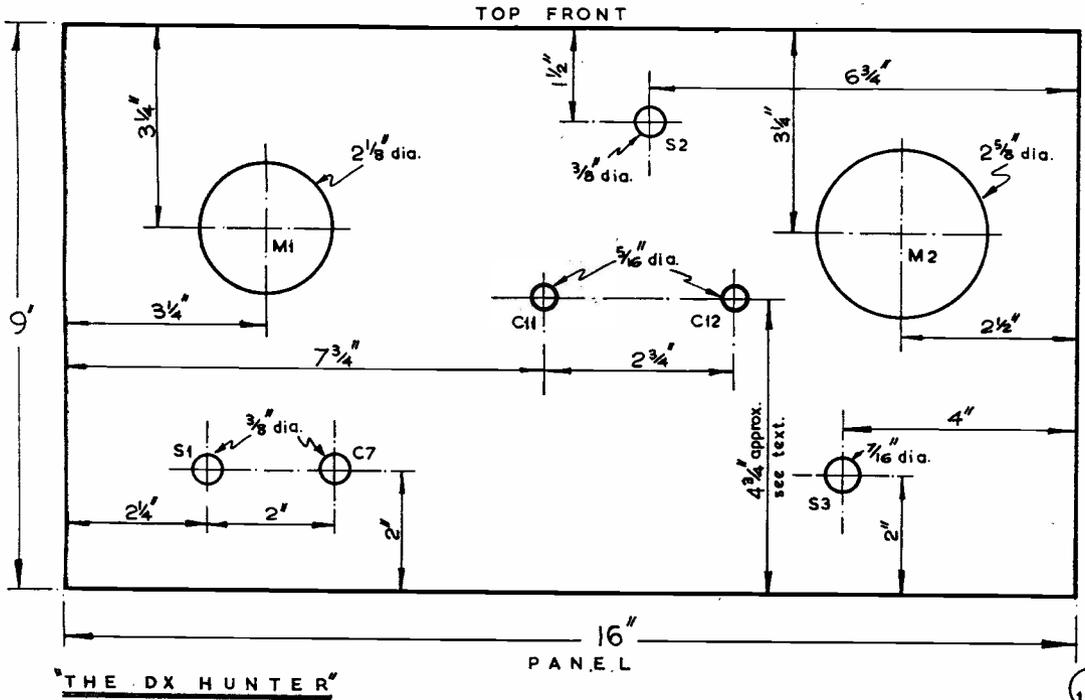
Fig. 1. Circuit of the "DX-Hunter," which is the PA unit for operation with our "DX-Pilot," as described in detail in the May issue of "Short Wave Magazine." This PA uses modern valve types (the Brimar 5B/254M, which is a miniature 807), and is band-switched to correspond with the three HF DX bands covered by the "DX-Pilot." Full constructional details are given in the article. (Note: The resistor above R10 should be marked R11 in the circuit)



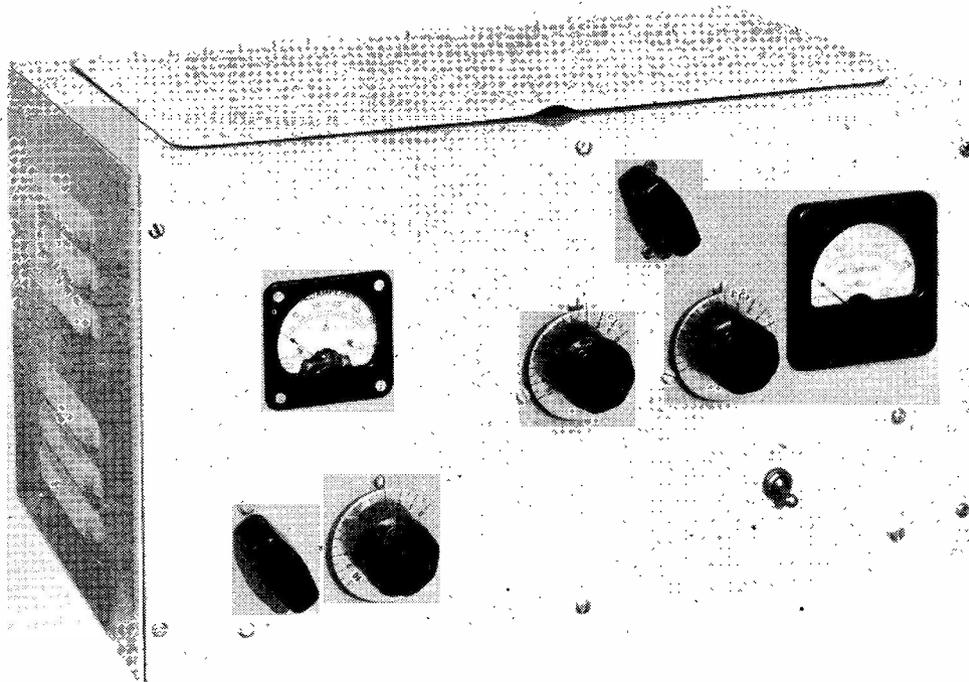


T 192

Fig. 2. Chassis layout of the "DX-Hunter." The metal-work can be supplied to this design by Philpotts, Loughborough, to match the "DX-Pilot" Exciter.



T 193



General appearance of the "DX-Hunter," showing the neat panel layout. All necessary controls are provided, with grid and plate (right) feed meters. The grid and tank band-switch knobs are in the 28 mc position in this photograph.

chassis. It will be found that the valve envelopes pass comfortably through this size of hole, leaving a small clearance gap through which air can rise and aid in cooling the valves. The valveholders are sunk 1 in. below top chassis level, which results in the screening plates inside the valves coming below the chassis.

The mains transformer does not have to supply many watts and the constructor may find it possible to use one smaller than that shown in the photograph. The secondary volts for the bias supply need not exceed 150v. In the present case, with 250 volts AC at the terminals, R1 has to be inserted to drop some volts and this resistor should be rated at 2 or 3 watts as it carries both AC and DC—a small resistor will run hot. Minor variations in the values of R2 and R3 will quite likely be necessary, in

individual cases, to bring the bias volts to the correct values, which are 65 volts with R4 in circuit and 50 volts with this resistor shorted out. The actual working bias with drive applied increases because of flow of grid current through R3 and R4.

Many of the bias components are mounted on the side wall of the chassis, the metal cased smoothing condensers being first insulated with "Sellotape" (the positive terminals are earthed) and then secured in place with metal clips. Room is also available on this wall for the AF choke. (See under-chassis photograph.)

Switches

S3 is a double pole, on/off switch, R4 being soldered to one pair of contacts and leads from the AF choke to the other. When the toggle is in the down position, both R4 and Ch1 are shorted out, as required for CW operation.

Both band-change switches are of the ceramic type. In the photograph, it may be noticed that

Fig. 3. Panel layout of the "DX-Hunter"; this drawing should be compared with the front-view photograph for the identification of the various panel items.

S1 has a second (paxolin) wafer; the original idea was to fit coloured indicating lights to the same coding as in the "DX-Pilot." However, there is hardly sufficient room to accommodate MES lampholders near the switch and the second wafer is not at present in use. It may be possible later to fit the new really miniature lamps and holders but at present these are not readily available.

The anode switch S2 is mounted above the variable condensers in a position which allows the coils to be soldered directly to the switch contacts. This entails spacing the wafer some 2in. or 2½in. behind the panel and a switch with side rods of this length should be ordered.

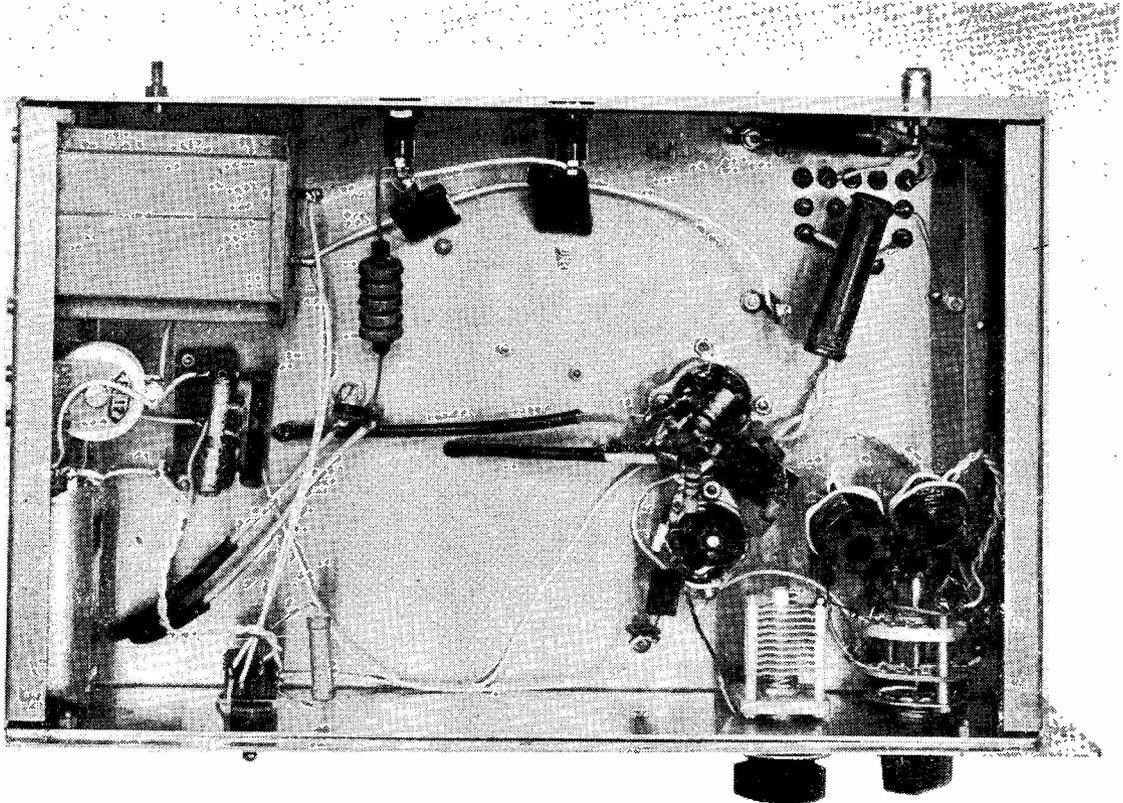
Coils

The grid coils are similar to the coils in the output stage of the "DX-Pilot," except that a section of former is also used for the 28 mc coil L3—See photograph below.

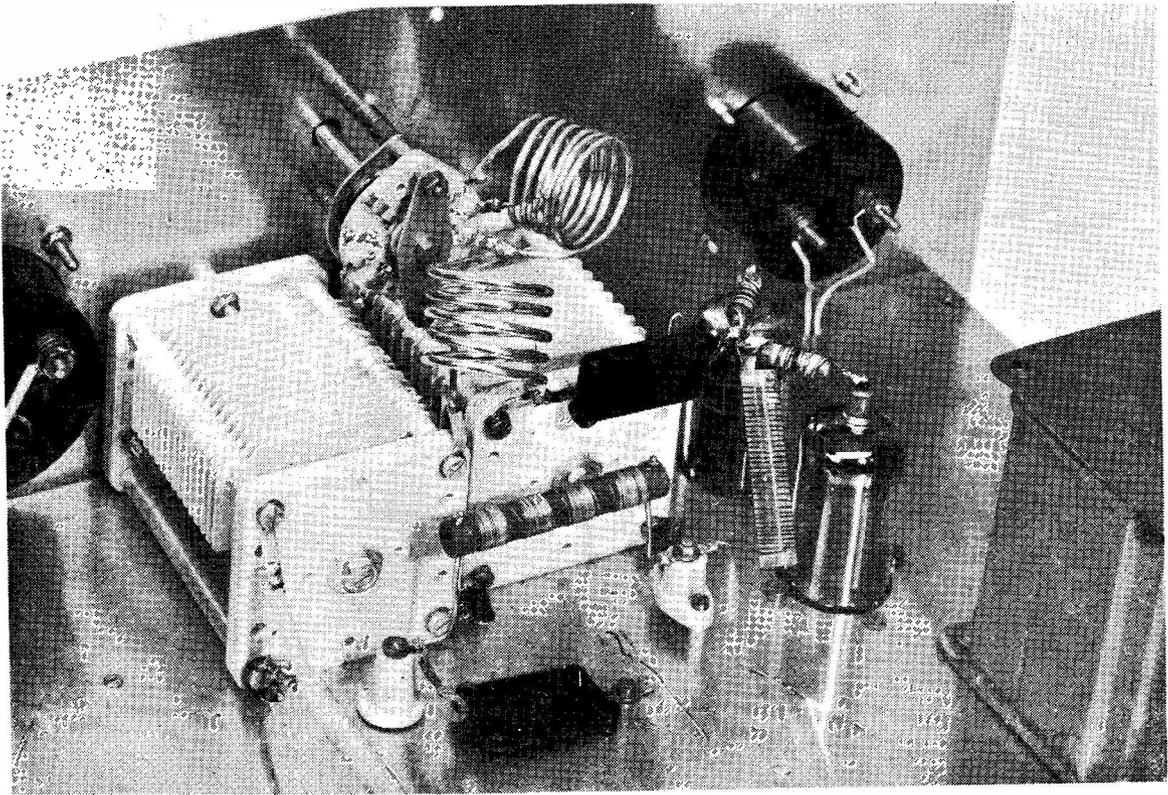
L1, for 14 mc, has eight turns; L2, for 21 mc, six turns; and L3 four turns, 18 gauge enamelled wire being used in each case. L1 and L2 are close wound and the turns on L3 spaced one wire diameter. The coupling windings for L1 and L2 are each two turns of thin PVC insulated flex, wound over the low potential end. One turn suffices for L3. These coils are wound on Eddystone type 646 formers.

The ends of the tuned windings are anchored through holes in the ribs of the formers and then taken direct to the switch contacts, with L3 going to the contact which gives the shortest path. The low potential leads from the coils all go to an insulated tag, conveniently situated, from which C6 goes to the common cathode connection at the valveholders, so again avoiding the possibility of undesirable circulating currents in the chassis.

The anode coil for 28 mc has five turns of silver-plated ⅛in. diam. copper tube (obtainable



Nothing terrifying in the under-chassis construction of the "DX-Hunter." The three-band switched grid assembly is lower right and the small screen AF choke Ch.1 upper left; beneath the latter, up against the left-hand chassis drop, is mounted the Brimar DRM1B metal rectifier for bias supply. The phone/CW switch S3 is at left on the front chassis drop.



The construction of the tank side of the "DX-Hunter" is simple enough. The 5B/254M's are sunk slightly in the chassis, for screening purposes, and the small coils attached directly to their plate caps are "R8" and "R9" in the circuit; RFC1 and C10 are connected at their junction, and RFC2 is mounted between the stand-off insulators. The large variable on the left is C12, and the nearest coil is L4, with L5, tapped as shown in the circuit, on the panel side of the tank band-switch S2. On the right-hand chassis corner is the bias and LT supply transformer T1.

from a surplus TR9 unit), with an outside diameter of $1\frac{3}{8}$ in. and spaced to occupy a length of 1 in. If wire has to be used, it should not be smaller than 12 gauge. One end is taken to the junction of C10 and C11, the other direct to the first switch contact.

The other coil, L5, has seven turns of 14 gauge wire, self supporting, outside diameter $1\frac{3}{8}$ in., length approximately 1 in. A tapping is made three turns away from that end which joins the 28 mc coil and a very short copper strip lead taken to the middle switch contact. The positions occupied by the coils can be seen from the photograph of the top deck.

RF Chokes

In a parallel fed circuit, such as is used in the "DX-Hunter," the anode chokes have to stand up to a high RF voltage and ordinary standard chokes are not satisfactory. To achieve high efficiency on all three bands, it was found advisable to use two solenoid-type chokes in series, as shown in the circuit.

RFC1 is wound with 35 turns of 26 gauge wire on a 2 in. length of polystyrene rod $\frac{1}{4}$ in. diameter, each turn being carefully spaced from the adjacent one, the whole receiving an application of polystyrene varnish. This choke is sufficiently light to be held by its wire ends between one end of C10 and a small insulator bolted to, and also spaced away from, the chassis.

Between this insulator and a second one of the lead-through type (which carries HT through the chassis) is held the second choke, RFC2 in the circuit. For this is used a $2\frac{1}{2}$ in. length of polystyrene or "keramot" rod, $\frac{1}{8}$ in. diameter,

DIAL SETTINGS

BAND MC	GRID DIAL, C7	TANK DIAL, C11
28	30°	40°
21	30°	60°
14	65°	70°

at the extreme ends of which holes are made into which can be forced short lengths of 16 gauge wire, used for securing the choke. The former is wound with a total of 80 turns of 34 gauge silk covered wire, put on in four sections of twenty turns each, with gaps between the sections.

These chokes have both low self-capacity and low capacity to earth, and the efficiency of the combination is indicated by the low minimum dip obtained on each band, and by the fact that the chokes run quite cold.

The by-pass condenser C13 is mounted above the chassis. A third choke, RFC3, is used in conjunction with C15 as much to prevent stray RF entering *via* the HT lead as to stop any leaking out.

The anode suppressor components can be described under the heading of chokes. They are made simply by winding five turns of 18 gauge wire using 47 ohm half-watt carbon resistors as formers, so that, in effect, the choke and the resistor are in parallel.

Final Constructional Points

Note should be taken of the way the valveholders are mounted, to bring the grid tags fairly close together and facing C7. A copper strip goes across from one valveholder to the other, held by tags at the fixing bolts, and this strip is used as the common earth return for the various leads previously mentioned and shown in the diagram.

Small "Hi-K" or "Cascap" types are essential for the screen by-pass condensers C8 and C9, and may well be used elsewhere instead of moulded mica condensers. Condensers C10, C13 and C15 have to stand up to the full modulated voltage and, for high reliability, the working voltage of these should be 2000v. or more. The capacities used are such as not to affect materially the speech quality on telephony.

The metal rectifier is in two separate units mounted on a common centre rod and they are wired in series, observing the correct polarity. The Brimar DRM1B is supplied ready for mounting.

The output coaxial socket can be fitted at any convenient point, to the front or to the rear, the run from C12 being made with heavy coaxial cable with the outer braid earthed to the rotor of C12. Light coaxial cable suffices on the grid side.

The switches S1 and S2 should of course move in the same direction when changing bands and, incidentally, in the same direction

as the band switch in the exciter unit. In actual fact, the 28 mc band is selected when the switches are over to the left.

It has been assumed that fuses and control switches for the mains supply are provided externally but they can of course be fitted to the unit itself if desired.

If the heater winding on the mains transformer does not have a centre-tap, as shown in the circuit diagram, it will be in order to earth one side of the winding. Since the cathodes are directly earthed, it has not been deemed necessary to fit heater by-pass condensers.

Interconnections

A length of coaxial cable, suitably terminated with plugs, will be required for transferring the driving power from exciter to PA.

The screen current requirements of the PA are comparatively low and can if desired be taken from the exciter unit, the positive side of C27 (p.122, May issue, SHORT WAVE MAGAZINE) being the appropriate point for the connection. A well insulated lead must be run to the HT power unit supplying the plate voltage and it is assumed this supply can be relay controlled through the same switching as the Exciter. For telephony operation, a modulator capable of an output of 60 to 70 watts audio is necessary, the output winding of the modulator transformer being placed in series with the HT to the transmitter. Assuming an input of 700 volts, 150 mA (which is about right for telephony), the modulation transformer should be arranged to work into an impedance of approximately 4700 ohms.

Operation

Both the exciter unit and the transmitter proper should be well bonded together and to earth. If necessary a separate negative HT lead should be provided.

Until a set of dial readings have been obtained, it will be well to operate the PA at reduced power—say with 450 or 500 volts HT—to reduce the possibility of accidentally over-running the valves.

Another precaution to observe is to keep the grid current very low (only one milliamp or so) until the transmitter has been loaded up. Even with this low drive, the anode current will rise to a high value with the tank circuit out of resonance.

The transmitter is tuned up in the way normal to a pi-output circuit, starting with the loading condenser C12 at full mesh and gradually reducing the capacity as necessary, maintaining resonance by adjustment of C11.

There is not the slightest difficulty in loading up to 200 mA plate current on each of the three bands and it is recommended this value be not exceeded and, in fact, only reached when using CW. On telephony, the additional bias will reduce the current, as is in any case necessary.

Optimum grid current appears to be about 6 mA and no benefit is obtained by exceeding

this value. To minimise harmonic production, C7 in the PA unit and C24 in the exciter unit should be kept at exact resonance and the amount of drive controlled by adjustment of C19 in the exciter unit. (See p.122, May.)

Approximate dial readings obtained on the prototype transmitter, as described and illustrated here, are as shown in the Table.

Vertical Aerial for Top Band

QUARTER-WAVE LOADED
SYSTEM REQUIRING GUY
SPACE ONLY

A. G. WOOD (G5RZ)

Many operators are deterred from using 160 metres, or put up with inferior results on that band, because they have not the space for a half-wave horizontal system. This article shows that a very effective Top Band aerial, not particularly frequency conscious, can be devised by applying the principles of the resonant whip (as used for mobile working) to a vertical wire of no more than normal house-top height. Even if a vertical support is needed for the aerial, space in the horizontal has to be no more than is necessary to accommodate the guys. Alternatively, a telescopic metal mast, insulated at the base, could be used. The general idea is, in fact, susceptible of infinite variation. The particular merit of the vertical arrangement described here is that, for medium-distance daylight working, it gives results rather better than can be obtained with a normal long-wire arrangement.—Editor.

ONE frequently hears, in connection with Top Band activity, remarks to the effect that a particular operator is unfortunately placed and is unable to put up a really satisfactory aerial system for this band. Consequently it is felt that the results of some experiments recently concluded by the writer might be of general interest—and of particular interest to those suffering from lack of horizontal space.

For the past ten years practically all transmission from this station, apart from VHF, has been on a 270ft. end-fed aerial, some 70ft. above ground level, and of course, there is no disputing the fact that for DX and county-

chasing, an aerial of this size is very useful indeed on Top Band. There are, however, many amateurs who use this frequency just as much, if not more so, for local and semi-local working with a maximum radius of something in the region of 40 miles. The writer is no exception and he happens to be interested in a daylight net where ranges of between 15 and 35 miles are generally involved.

For a long time the more extreme range contacts—taking about 40 miles as “extreme” in this context—have been marred to a greater or lesser extent by fading and phase distortion, and these effects have also been observed over quite local distances. It has been realised that the reason for this is no doubt due to interaction between the horizontal radiation from the flat top and the vertical radiation—or ground wave—from the feeder line. However, matters came to a head during some recent tests with G3HMO's /M equipment when a station some 30 miles equidistant from G3HMO/M and G5RZ reported twice the field strength from the former's little whip aerial at ground level to that being received from the writer's magnificent sky-wire, notwithstanding the fact that double the power was going in at G5RZ!

Vertical Experiments

As a result of this illuminating report experiments were instituted at G5RZ using a fifty foot vertical wire strung up to the top of the house mast, loaded to resonance on the Top Band frequency and fed at earth lead level.

Several interesting things happened immediately. All stations on the fringe reported a big improvement, the 30-mile distant control station giving 100% increase and, what was even more important, both fading and phase distortion disappeared. Moreover, the more local stations whilst reporting only a moderate increase in strength considered there to be a definite improvement in speech quality, the inference being that with the long-wire there had always been some degree of phase distortion present, which although not marked was enough to put an edge on the quality of the

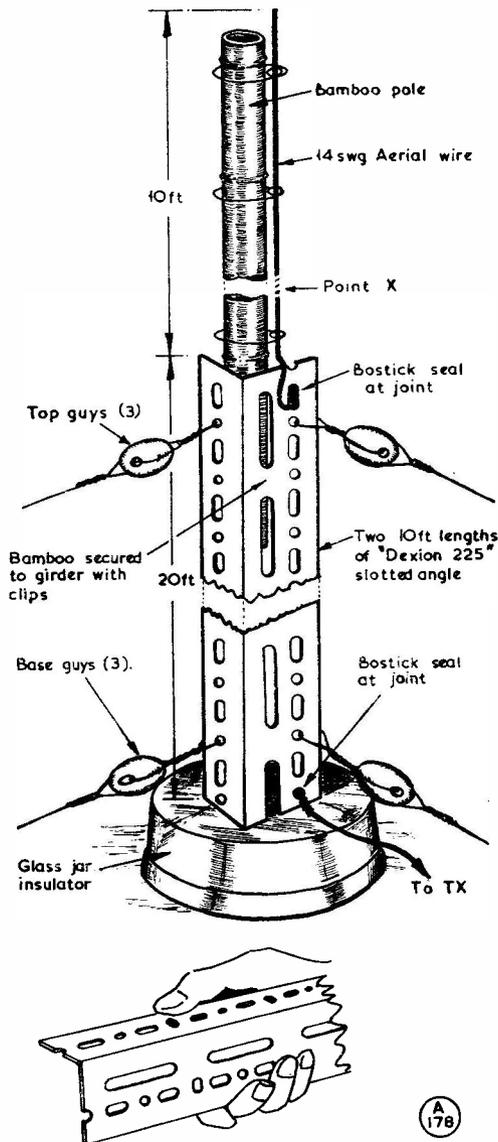


Fig. 1. General arrangement of the vertical Top Band aerial as evolved by the writer. It is not actually necessary to use "Dexion 225," nor a bamboo end-section to support the last ten feet. Any 25-40 ft. vertical tube, copperised metal mast, or just a wire hung from the highest available support, will do. In any event, the same principles apply.

speech, to make it sound "not so good."

Reception too, improved substantially, the degree of interference from the coastal and fish-phone stations being considerably reduced.

At this stage and before detailed tests could be carried out, the halyard carrying the aerial broke and ran through the block at the top of the mast. Attempts to rectify matters resulted

in the breaking of two guy wires and disclosed the fact that after all these years it was time the mast was dismantled anyway, before it fell down unaided!

A fresh experiment was therefore started to determine whether a more modest arrangement could be made to give comparable results. This took the form of a 30ft. vertical assembly which could be erected and dismantled single-handed and in a matter of only a few minutes.

Two ten-foot lengths of "Dexion" steel slotted angle were bolted and electrically bonded together, to the top of which, attached by two clips, is a further ten-foot length of light bamboo pole. A copper aerial wire runs from the top of the pole down to the top of the Dexion girder to which it is electrically bonded, secured to the pole at convenient intervals by a turn or two of wire.

Three egg insulators are attached to the top and bottom of the girder at the base and light guy wires are run from these to convenient tie points around the mast. The whole affair stands on an inverted glass jar (of the potted shrimp or tongue type) which serves as a very adequate insulator. The base of the mast is connected by copper wire to the feed-through insulator in the roof of the shack about fifteen feet above ground level. It is not a practical proposition to sweat these connections so adequate protection against the weather must be provided at the electrical bonding points by covering the bolts with a layer of Bostik, or similar dressing, and this should be done immediately after contact has been made since the bare steel exposed after scraping off the protective layer of paint will rust quite quickly.

The all-up weight of this array is in the region of 20lbs. and it offers very little resistance to the winds that blow, besides looking neat and unobtrusive. The general arrangement is shown in Fig. 1.

An alternative, if somewhat more expensive, way of guying would be to substitute nylon cord for the galvanized iron guys, but even then egg insulators should be employed to prevent chafing and fraying at the tie points. There are also, of course, many alternative methods of general construction. A light timber support for the vertical wire could be substituted for the Dexion but might require an additional set of guys, thereby introducing more unnecessary metal into the field. At many locations it would probably be possible simply to hang the wire, with tensioning at the bottom end. The Dexion sections were used at G5RZ because they were handy for the test.

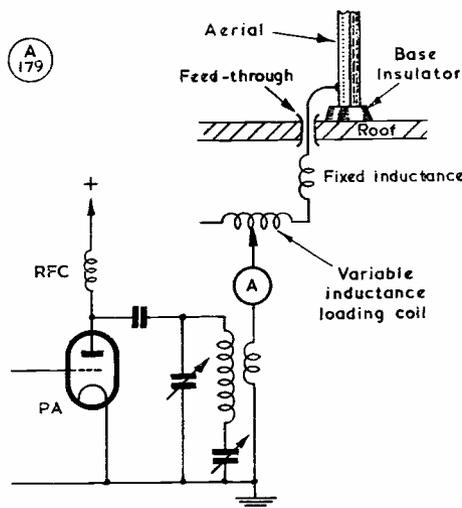


Fig. 2. Electrical layout of the 160-metre radiating system described by G5RZ. The effectiveness of the whole arrangement depends upon the correct adjustment of the loading coil, the object being to obtain maximum indication in the RF ammeter. Any similar electrical arrangement will work just as well, and the two inductances can be combined as one.

Feeding and Loading

The feed impedance at the base of a quarter-wave vertical aerial is very low—of the order of 35-50 ohms, so that power may be fed in either directly or, if more convenient, by means of co-axial cable of similar characteristics.

The natural resonant frequency of an aerial of the dimensions given above is, of course, quite high, and is in fact in the region of 7 mc, so that for Top Band operation some degree of loading becomes necessary.

At the point of entry into the shack at ceiling level the aerial is connected to a 35-turn space-wound coil on a ceramic former, taken from a TUSB unit and having a calculated inductance of about $30\mu\text{H}$. This by itself is inadequate but its siting helps to prevent the radiation of stray RF in the region of the transmitter.

The second loading coil is of the “infinitely variable” type, as found on slider-tuned screw adjusted tuners in equipment such as the Wilcox-Gay VFO unit, but a tapped coil would serve almost as well. The maximum calculated inductance of this coil is $27\mu\text{H}$.

Coupling

A pi-section PA plate circuit or Collins coupler is the most satisfactory manner in which to match the PA output to the very low impedance of the aerial. In some cases it may be found that the pi-section constants are such

that it is not possible to get down low enough to obtain a correct match. In such cases a three or four turn loop wound over the earthy end of the PA coil and connected in series with aerial and earth will prove entirely satisfactory.

Obtaining Resonance

It is most important that this aerial system be resonated correctly into the mid-portion of the range of frequencies over which it desired to operate. If, for example, normal Top Band operation is at frequencies between 1800 and 1900 kc, then the system should be brought into resonance at about 1850 kc. This may be achieved in a number of different ways.

If the aerial system is disconnected from the tuning unit and coupled by a few turns of wire to the pick-up probe of a GDO, it may be possible with careful tuning to see the slight flick as the GDO goes through the resonant point. Conversely, the GDO can be used as a very low powered transmitter and a field strength indicating device located some little distance away from the aerial can be used to show the resonant point. Failing this the transmitter itself can be put on lowest power—just sufficient to give an aerial current reading—and the aerial loading coil and PA tuning condenser varied together in step, whilst

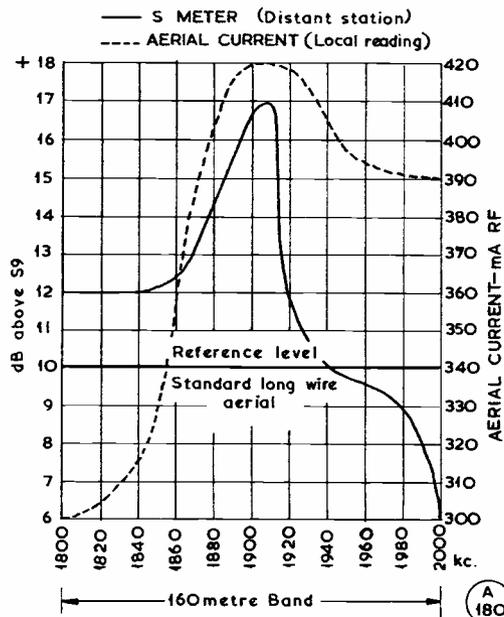


Fig. 3. Curves plotted under practical test conditions, in co-operation with a distant station at 15 miles. This curve was taken without any top loading capacity (“capacity hat”). The bandwidth for VFO operation would be good enough for all practical purposes over the range 1880-1920 kc, with the system resonated at 1900 kc. (In this presentation, the vertical scale above the reference level has been exaggerated for clarity.)

keeping an eye on the thermo-couple for maximum reading in terms of RF current into the system. The loading coil setting is quite critical—a turn or two either way making a measurable difference in the aerial current reading. When correctly tuned the PA loading condenser is quite flat; similar aerial current readings can be obtained with very little loading condenser in circuit, but under these conditions the setting is very sharp. This condition is to be avoided as the results at a distance will be much inferior.

Figs. 1 and 2 show the actual aerial arrangement as now in use at G5RZ for all Top Band working.

Results

Of course, the results are what matter. To check performance, a test programme was gone through with a station some 15 miles away, with the aerial resonated at exactly mid-band, *i.e.*, 1900 kc. Test transmissions were made at about 20 kc intervals; at each point the degree of grid drive and the power input were adjusted to levels obtained on 1900 kc. Comparative readings were then taken on the aerial ammeter and on the S-meter at the distant station.

The results of this test are shown in graph form in Fig. 3. The reference level of S9 + 10 dB is the normal signal received by the collaborating station when a 200ft. long-wire aerial some 70ft. high at the open end tapering down to 15ft. at the input end is in use at G5RZ. It will be seen that for a bandwidth of 140 kc—from 1800 to 1940 kc—the results obtained with the vertical are better than those from the long wire; that for a narrow band about 20 kc either side of resonance they are much better; and that there is a marked peak at actual resonance. The aerial current curve follows substantially the same shape.

It is interesting to compare these results with those obtained—in connection with their resonant whip investigation for mobile work on Top Band—by G3HMO/G6FO, which were described in detail on pp. 194-198 of the June 1956 issue of SHORT WAVE MAGAZINE. It is only proper to record that it was the result of this very interesting series of experiments which led the writer into an investigation of the behaviour of a larger home-station vertical array tuned against ground. As is to be expected, a comparison of the two sets of curves shows that the whip array for mobile operation, tuned against a capacity earth, is far more frequency-critical and has a far higher gain at resonance. Nevertheless, the G5RZ home-

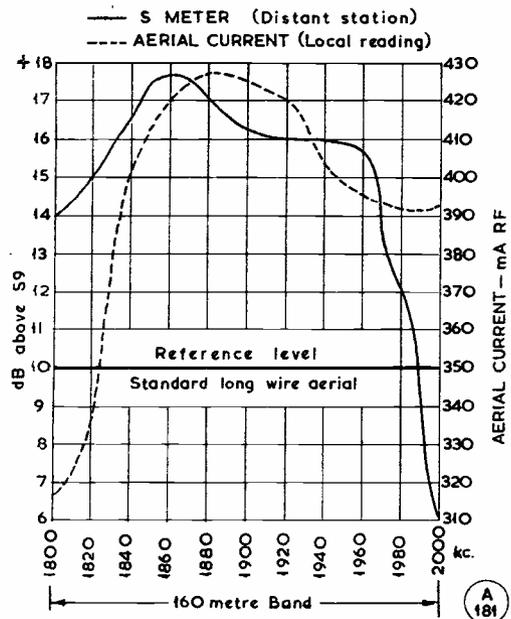


Fig. 4. Curves taken under the same conditions — and during the same test period — as Fig. 3, but with top loading capacity (a “capacity hat” — see text). The significance of this curve is that the bandwidth of the system is much greater, making VFO operation practicable over a frequency range of at least 120 kc in the 160-metre band. The upward kink at 1860 kc is probably due to some local re-radiation effect. The important result is that the 30 ft. vertical system gives a better signal, at the 15-mile test point, than a 200 ft. long wire! Reception is improved in the same way, signals being loud and steady, whereas before they were subject to fading. (In this presentation, the vertical scale above the reference level has been exaggerated for clarity.)

station system tuned against ground shows a worthwhile gain over quite a wide tuning range in comparison with the standard long-wire, quite apart from other advantages already enumerated. The chief of these is that the system calls only for height vertically, with enough space on the flat simply to peg out the guys.

Top Capacity Test

The next phase was to examine the effect of a capacity hat. This consisted of a copper wire hoop two feet in diameter, stiffened with six radial spokes, which was attached to the aerial at the foot of the bamboo section at the point marked X in Fig. 1. This had the effect of lowering the resonant frequency by about 25 kc. A further series of measurements was then taken over the whole band and the results are shown in graph form in Fig. 4. It will be seen that the effect of the hat has been to flatten the resonant peak quite considerably and to improve slightly the general signal level as received at the distant station, over almost the whole of the band. Again, the aerial current

curve follows the distant S-meter plot very closely and is at a slightly higher level. The 6 dB gain above reference signal level which covers 20 kc without the hat has now been extended to 120 kc with the hat—a very worthwhile gain where VFO operation is intended. The peak signal level also appears to be slightly better when a hat is connected.

Conclusions

In cases where Top Band ranges of the order of 40 miles radius are envisaged, it would seem that compared with a long wire much steadier and appreciably stronger signals can be expected by the use of this simple, easily erected, vertical array. The addition of a small capacity hat will give slightly better peak signals and some-

what more consistent results over almost the whole of the Top Band, without the necessity of having to re-resonate when making any normal change of frequency. Extensive tests have not been carried out at night over longer distances but a number of random contacts have been made at distances in the region of 200 miles when reports have generally been about one to two S-points down as compared with the long wire. Thus, for those having to cope in cramped locations such an aerial is still a workable proposition for general communication purposes on the 160-metre band. It should be added that all test observations were made with the long wire aerial disconnected and lowered to the ground. It has now been disconnected altogether!

COURSES FOR THE R.A.E.

As is now usual at this time of year, courses of instruction for the Radio Amateurs' Examination (May 1957) are announced by a number of local authorities. In every case, these courses cost only a few shillings for the whole session, because they come under the Education Authority for the county, borough or municipality. The instruction generally is of a high standard (often given by qualified teachers who are themselves licensed amateurs) and in most instances "no previous knowledge of radio assumed" is the point from which the course starts.

Below is a list of all centres where it is known that instruction for the next R.A.E. can be given. If your local technical college or evening institute does not figure in the list, do not assume that it has no interest in the R.A.E. Ask to see the principal or the enrolment secretary and find out if a course can be arranged; it will frequently be found that it is not offered in the local syllabus because no request has ever been made for it. Numbers are not important—instruction can often be provided for a class of two or three, though naturally the more there are who can join it, the better. (When making these approaches, quote Subject No. 55 in the syllabus of the City and Guilds of London Institute.)

In this list, unless otherwise indicated, the reference in each case is to the local technical college, evening institute or college of further education, the address of which can be obtained from the telephone directory for the district.

ENGLAND: Barrow, Birmingham (Education Dept.), Bolton, Bognor Regis, Bradford, Brentford, Cambridgeshire (Technical College), Cannock (*apply* G3ABG, 24 Walhouse Street), Coventry, Derby, Dudley, Exeter, Farnborough, Gravesend, Grimsby, Guildford, Hastings, Hull, Ilford (*apply* G8TL, 28 Morgan Crescent, Theydon Bois), Ilkeston, Islington (*apply* G2CJN, 145 Uxendon Hill, Wembley Park), Leicester, Loughborough, London (E.M.I. Institutes), London (Northern Polytechnic), London (Technical College, S.E.4), Middlesbrough (Constantine Techni-

cal College), Newcastle-on-Tyne (Rutherford College), Northwood (*apply* G2QY, Potter Street School, enrolment September 10-12, 6.30-8.30 p.m.), Oldham, Plymouth, Preston, Rotherham, Salisbury, Southampton (University), Swindon, Walsall, Wellingborough, Wembley (*apply* G8PD, Copland School, High Road, enrolment Sept. 10-13, 7.0-9.0 p.m.).

SCOTLAND: Dumfries, Dunfermline (Lauder Technical College), Glasgow (Allan Glen's School, enrolment Sept. 10-12, evenings), Glasgow (Burnbank School of Engineering).

WALES: Flintshire (Technical College); Swansea.

NORTHERN IRELAND: Coleraine; Londonderry.

CHANNEL ISLANDS: Jersey Evening Institute.

We shall be glad to hear of any addition to this list, or courses starting in centres not mentioned here.

VERY SAD STORY

We have just had a letter from a not-so-young reader who, wanting to become a radio amateur to pass the time during his later life, has taken the R.A.E. each year for *ten years*, and the G.P.O. examination once—making eleven attempts in all. He has read two home-study courses and bought all the necessary technical books. Every time he has failed. On appealing to the authorities (though that is against the regulations) he has been told that he is "only a few marks below the pass standard." There are very few reading this who would not agree that it really is a bit hard. A failure once, twice or three times and one would accept that a candidate must be quite unsuitable. But to *try* for ten years and get so near a pass is a different matter. Unfortunately, this reader has never been able to obtain any local tuition. As he lives in Mansfield, Notts., we would be glad to hear from any amateur in those parts who would like to be put in touch with him, with a view to seeing if it is possible to help him get through *next* time—though our correspondent says, not unnaturally, that he has now almost given up hope.

KL7 and a UO5 for new ones. G3BHW (Margate) stuck to CW and rolled in HZ1HZ, XE, OQ5, ZD6, VS6, CR6, CX, JA and lots of the more usual stuff. A brief phone sortie brought in ST2DB and FF8BL.

G3FPQ says his best were BV1US, CR5SP, CR9AL, HZ1AB, ST2DB, XE2BM, YA1AA, VS1, 2, 4 and 6, all on phone; DU7SV was a new one on CW. G3GGS collected PJ2MC for his only new DX.

G3GZJ (London, S.E.23) worked FQ8, ZE, VQ2 and VS6, with DU7SV as a gotaway. G6VC (Northfleet) raised UA3, UC2 and CN8. G2YV (Cannock) went on phone and was rewarded with VS4BO, MP4KAC, ZD8SC and a nice sprinkling of VQ, ZS, ZP, FB8, VE8, CR5, DU and the like; he also worked Kurt Carlson on *Flying Enterprise II* (W2ZXM/MM).

G3JZK (Cambridge) says a new aerial has improved things a lot, bringing in VS6, FB8, ZD1, VQ2 and ZE on CW. He has now built himself a panoramic adaptor and finds it very amusing to watch signals converging from all parts of the band on to some new DX.

G3HEV (Downham) worked VP6, OQ5, VQ2, VU, VS1, CE, VS6 and FS7RT for new ones, and finds plenty of activity around the band.

G3INR (Hereford) had two interesting QSO's, the first with VP6WR/VP6RV, with G5RV at the other end, and the second with CE3ZO with, of course, G6ZO operating. New ones on the band were VQ5, VP6, CE, UB5, VQ2, YU and KZ5.

G2ACC (Salisbury) was called by PJ2AA/G5RV on 21200 kc phone. Louis told him that he was based on Caracas but makes frequent trips to various countries in the Caribbean area and also down to Ecuador and Colombia. He also hopes to have a VP4 call and will be operating from Aruba (PJ2AA) again in two or three months' time. All QSL's to G5RV, Box 3443, Caracas, Venezuela.

G2YS (Filey) has been chasing UA1KAE (Antarctica) nearly every morning. The UA puts in a colossal signal until 1100, but 'YS hadn't heard him work a G up to the time of writing. New ones

were ZL2AFA and FB8BX, with OY7ML, KH6MG and several of the U districts as gotaways.

G3HCU boosted his score with HZ1AB, UA3EG, YA1AA, ZD2JHP, ZD6RM and ZK1BS—and he wonders how many were lucky with the latter. 'HCU has his new four-element beam in use now, and finds results improved, though not quite right regarding back-to-front ratio yet. Lots of other DX was worked, such as BV1US, ZD8SC, HC2BH, VK's, ZL's, TI, ZP and a batch of Africans.

Twenty-Metre DX

G2DC thinks the most prominent feature of this band is the amazing number of signals that have emerged from behind the Iron Curtain. But he adds that from the quality of their signals they don't seem to have got the cobwebs out of their old rigs yet, and at times the racket equals the bad old days of 7 mc. Mal Geddes (ZE3JO) kept his promise and showed up as VQ1JO on August 14; the frequency immediately "started to boil" with W6's in a mad rush to get him before going off to work. Another one that caused the pot to boil over was FL8AB (Djibouti) who appeared at 2130 GMT on August 13. He had a very leisurely

and long-winded QSO with EL2S and then went QRT, leaving at least half of the Western amateur world in a state of exasperation. Others of interest were UA9's and O's. YVØAA, UH8AA, KG1FA (Grahamland Ice Cap), FM7WD, PX1EX, PZ1AM and UG6GAL.

G3JLB missed DU7SB, FG7XC and HP1BR and rates them as gotaways—heard under thick layers of European QRM. G3BHW, on CW, collected HP1EH, UA9's, FM7WP, VP4KL, UD6, UR2, CP3CA and HI8FR. On one occasion, at 2330 GMT, he found all six continents coming in at once.

Best for G3FPQ were BV1US, CPIAN, FO8AB, OA6H, SM8KV/Spitzbergen, TI2PZ, VQ5FS and XE2KW, all on phone; also PX1EX, SM8KV and UG6AN on CW. G3GGS was pleased to winkle out ON4CK/LX, and other new ones were UD6AL, HK3TH and EL2S. UQ2AK and UAØSB were also worked, but FG7XC, FQ8AF and HI8FR were gotaways.

G3GZJ thought 20 metres in fine shape, though aerial troubles frustrated him somewhat. But he did raise EA9, CE, LU, KZ5, VP6, TI, UO5, UP2, UQ2 and UR2. New for G6VC were UQ2 and CX.

G3JZJ is now at RAF Locking, but from Compton Bassett he

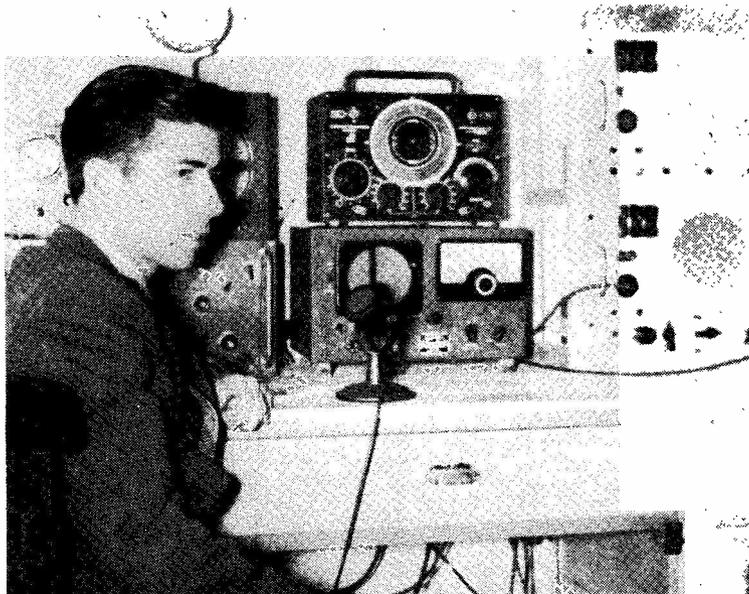


At left, FB8BE, Tamatave, Madagascar and on the right G3IAG, radio officer of the m.v. "Pinemore." G3IAG was able to make this personal QSO when his ship visited Madagascar recently. He tells us that FB8BE runs 50w. on 7 and 14 mc phone, looks for G contacts, and speaks very good English. On another trip, to Calcutta and Mombasa, G3IAG ran across G3KRG, also a ship's radio officer.

is not bothered by TVI. Best inter-G contact was with GC3KAV, nearly 800 miles away. Bill wants to acknowledge the "immense help" rendered him by G8PG and G3EJF in getting on the air. Final note: GM3KLA rarely gets a QSO before 2300, has no daylight DX at all, and has never heard a station on the band before 1600, even in mid-December.

G3HAJ (London, E.12) tells us that G3HCS, formerly of Romford, has been living in Holyhead, Anglesey, for over eighteen months. He asks us to try to stir G3HCS up (he is *still* his best friend!), as he has been provided with various pieces of gear and has a fine QTH with a 50-foot flagpole. AC mains and an HRO. G3HAJ hopes that these few words in print may be the final stage in getting GW3HCS going for Anglesey!

G3KOG (Ulceby) reports a substantial jump up the 160-metre ladder, thanks to GM5PP/P, G15RI/P and others on their holidays. He says the band is holding up well and that there is surprisingly little static at times. G3KOG is another one who is considering the possibility of a WABC on phone, and asks what we think of it. The answer is that we think it quite possible, and will be pleased to issue a suitably-endorsed WABC Certificate to anyone who manages it.



EA7HJ is at La Linea, Andaluzia, just across the causeway from Gibraltar, where the operator is employed by an English firm. All bands are worked from EA7HJ, main interest being 20-metre CW and phone, in English and Spanish. The receiver is home-constructed, in an 8-stage 10-valve layout, and the transmitter runs an 807 final, modulated by a pair of 6L6's. The VFO is 6SK7-6F6-6F6, giving drive on 10, 15 and 20 metres, and the speech amplifier is 6J7-6J5-6SN7 phase splitter. Aerials are a folded dipole and a long-wire.

G2HDR (Bristol) is busily chasing his 60th Top Band county and has been listening every evening for the promised signal from GW3IDG/A in Anglesey. He has been hearing the GM's again—the first time for months.

G3AKX (Sale) suggests that G5PP and the other expedition boys must be qualifying for a "WFABC" award—"F" for "from." He was pleased to meet some of the expeditionaries at the recent Topfest, a comment also made by G2CZU and G3KOG. And he adds that GW3JBH (Monmouth), recently worked on 80, is promising some Top Band activity.

G3JHH (Hounslow) has not been very active, but put his score up by one when he worked G5PP in Kirkcudbright. G3HEK (Oswestry) collected Dumfries (GM3AKU/A), Ayr (GM3BHR/A) and Suffolk (G3DDK) for new ones, and is now looking northwards for four remaining GM counties and then southwards for Alderney and Sark. Anyone short of Shropshire should keep a look out for G3HEK.

G2NJ (from his boat in Hunts.)

heard "ON4KCA de ON4IF" and also "CQ Test de ON4IF" and called him, but he didn't come back to 'NJ or anyone else.

Miscellany

Having more or less rounded up the bands, we come to all the odd bits of gossip that don't fit any of them. G2DC had a long QSO with VS1GV, who says he has now taken over the VS QSL Bureau (Box 2394, Singapore), and also told him that G's are getting out there in fine style on *Forty*.

G2YS (Filey) sends us some notes he has translated from the Italian *Radio Rivista*, most of which appear under "DX Flashes." He, with many others, was glad to see the up-to-date Prefix List in the August issue, but quarrels with many of the decisions as to what is, or is not, a country. Good gracious, so do we! But it's no good setting up one's own standards if they are not recognised by other organisations, particularly the ARRL, and at least we now have uniformity. However illogical it may seem, the fact remains that if the ARRL chooses to give some island "country status," then so

21-28mc MARATHON, 1956

Station	Total	21 mc	28 mc
G2CDI (Phone)	146	139	76
G3HCU (Phone)	125	120	45
VQ4RF	113	74	80
G2DC	101	96	35
MP4BBW (Phone)	95	77	57
G3KHE (Phone)	87	82	20
G5BZ	87	74	38
GM2DBX (Phone)	63	59	19
ZB1HKO	42	39	19
G3GZI	36	36	6
G3JWZ	28	27	5
G3JVJ	23	23	4

TOP BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
G2NJ	97	97
G5JM	97	97
GM3EFS	96	96
G6VC	94	94
G3HEK	89	92
G2AYG	88	89
G3GGS	86	91
G3JHH	85	86
G3BRL	83	83
G3KEP	80	81
G3FNV	78	85
G3AKX	78	80
G3DO	74	74
G1JEX	72	77
G3KOG	72	77
G2CZU	66	67
G3DVQ	62	63
G3KOC	61	67
G3EJF	60	64
GM3KLA	60	62
G2HDR	58	59
G8CO	56	69
G3ICH	38	55
G3JZP	30	42
G3JSN	26	30
G3KMQ	24	54
G3JME	16	25

must we—otherwise, we should soon have two different lists.

G3JZK comments on the business of reports being the same for a kilowatt-plus-rotary at one end, and 150 watts-plus-dipole at the other. He gives two reasons. First, stretching of the S-point; secondly, the reciprocal theorem which states that if a given voltage V_1 in your aerial induces a voltage of V_2 in the other fellow's, then a voltage of V_1 in his will induce V_2 in yours. This cancels out the effect of the beam (assuming that the other man is using his for reception) and leaves only the difference in power, which is easily accommodated by an elastic 6 dB S-point.

G3INR has a few unkind words to say about DX stations who listen for the friend of the station

they have just worked, and then his friend, and so on. As no one else takes the slightest notice, the DX station, so as not to appear unmannerly, sometimes continues calling said "friend" indefinitely—until he goes QRT.

Piracy Again

This time it is G3JDT (Liverpool) who is suffering from the activities of a pirate. The said pirate was calling himself "G3JDT" before the real one was on the air, but now that the genuine 'JDT is active on all bands, he wants to make it known that this call, prior to July 31 this year, was used by a phoney.

SWL Reports

Month by month we receive more SWL reports on the DX bands. Unfortunately there simply isn't room in this feature to publish their lists of calls heard, but we don't want them to think that we do not appreciate the trouble they have gone to in compiling them. We are very pleased to receive information on rare DX stations from SWL's, but we must reluctantly ask them to note that lists of "routine DX" heard cannot be published, or even mentioned.

Acknowledgments and thanks, this month, to E. Elsley (Mold), G-6501 (Penshurst), B. Farmer (Guildford) and an unknown gentleman who sent a long list of 20-metre calls heard with no name or address as a clue. Also (last moment) to P. R. Nash (Leamington Spa) and SAC Melvin (BAOR).

The Overseas Mail

MP4BBW (Bahrein) sent a note immediately before departing on leave, and he will not be back there until about October 4. He confirms YA1AA passed through Bahrein, but none of the boys could get down to the airport to meet him; he was worked on Fifteen (21143 kc phone).

5A4TZ (Tripoli) is G3KJW, and he is active on Twenty with 50 watts and a 16-ft. whip aerial. Several other amateurs have emerged from his regiment, and they hope to get a station together shortly, but lack a decent receiver.

MP4BCA (Bahrein) worked UA6UI and HZ1SD for new ones on Twenty, but found Fifteen

much more interesting. On that band he raised YA1AA, HB9ET, YU and SP (all new for him) and his first W, W8CEG.

The DX section of the *Malayan Radio Amateur* makes it pretty clear that Fifteen is the favourite band out there. From VS1 they can always work Europe with QRP and a dipole if conditions are anything like up to scratch. We gather that at least seven XZ's are active in Burma and that the Burma Amateur Radio Society has a membership of eighteen licensed amateurs. Where do they all hide?

VS4BO still burns the midnight oil on Fifteen, but gave everyone a pleasant surprise by showing up

Short Wave Magazine

DX CERTIFICATES

The following have been awarded since the publication of our last list, in the June 1956 issue:

MDXA
No. 4 W8KIA (Reliance, Ohio)

WFE
No. 23 W9ABA (Wilmette, Ill.)
24 G3YF (London, E.4)

FBA
No. 61 W6YY (La Canada, Calif.)
62 G8TS (Farnham)
63 K2BZT (Summit, N.J.)
64 CN8AF (Casablanca)
65 OY7ML (Thorshavn)

WNACA
No. 99 SM7MS (Malmö)
100 OH2LX (Puistola)
101 EA1BC (Oviedo)
102 ON4KR (Brussels)
103 IICZE (Livorno)
104 IT1TAI (Palermo)

WABC
No. 130 G3DVQ (Purley)
131 G3KOC
(Barrow-on-Humber)
132 GM3KLA (Shetland)
133 G3BEC (Yeovil)
134 G3EJF (Tottington)
135 G3JFT (Derby)

WBC
No. 27 OH3NY (Lyly)
28 ZL4CK (Dunedin)
29 W3UXX (Norwood, Pa.)
30 LU6AJ (Buenos Aires)
31 SM3AT (Sundsvall)
32 SM7MS (Malmö)
33 OZ3RO (Kolding)
34 W3SOH (Philadelphia, Pa.)
35 OZ5UF (Fredericia)
36 DL2TH (B.A.O.R.)
37 SM4ALK (Skattkarr)
38 SM6AJN (Skara)
39 W6ZZ (Menlo Park, Calif.)
40 W6ZZ (as W1WV,
Brookline, Mass.)
41 VU2MD (New Delhi)

Details of MAGAZINE DX AWARDS and CERTIFICATES, and the claims required for them, appeared in full on p. 246 of the July 1956 issue. A complete List of U.K. Counties was given on p. 20 of the March 1956 issue.

on the forty-metre net one Sunday morning.

VQ4FI forwards the Radio Society of East Africa's *Circular Letter*. East African amateurs co-operated in the recent Coronation Safari, but we gather that it showed up just how few portable and mobile stations were available out there. For the 1957 event they hope to have many more low-power stations out in the field. The Society's Annual Dinner saw a gathering of sixty, who got together with VQ4BP as master of ceremonies.

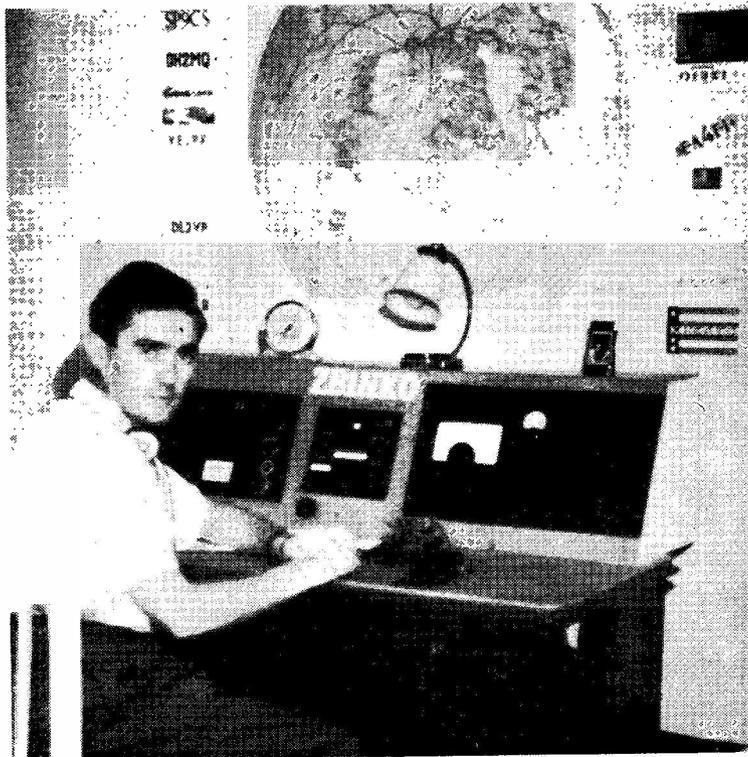
Apparently, even in VQ4-land the terrific Iron-Curtain activity has made itself felt considerably, and most of the Russian countries are willing to work phone. One of them even signed off his transmission with "God Save the Queen"!

DX Flashes

VK1RW is operating from Direction Island (Cocos-Keeling Group), T7, chirpy . . . **VR3B**, Fanning Island, is on Twenty CW . . . **VR6AC**, phone only, 14145 kc . . . Chile has now been divided into *nine* districts instead of seven, the new ones being in the South . . . **UA1KAE** is at the Russian Antarctic Base, operated by **UA3DQ** . . . **YA1AM** is still active on 14050 kc, around 1400 GMT . . . **VQ8CB** is now QRT—no activity on Chagos for the time being . . . **XW8AC** is on 14130 kc phone . . . **VK9TW** (Danny Weil) has been very busy from Nauru but had probably left by the time you read this; now bound for **VR4** . . . **FL8AB** can be found on 14040 kc CW.

ZC5JM should be on 14 and 21 mc by now . . . **W6VUP** should be on from **KS6-land** shortly . . . **KG6IG** is on Iwo-Jima, despite the obsolete prefix . . . **SM8KV/LA/P** has been on from Spitzbergen on 7, 14 and 21 mc CW, also on 21 and 28 mc phone; he was prepared to **QSY** to 3.5 mc on request. By this time he will probably be QRT.

It seems that the conditions for obtaining a licence in the Vatican City include (a) Citizenship; (b) three weeks' residence; and (c) passing of an examination in Amateur Radio. **ON4QX**, a United Nations official, qualifies on the



Station of **ZB1HKO**, Belzan Valley, Malta, is operated by **G3HKO**, who has been on 160 metres from **ZB1** (ten U.K. counties worked); he plans to be on Top Band again this winter season, with a 264-ft. aerial. His HF activity is mainly on 14 mc, for which the aerial is a ground-plane. QSL policy at **ZB1HKO** is as recommended on p. 193 of the June issue of "Short Wave Magazine."

first two and hopes to pass the test. So we may have a genuine HV on the air at last.

Look out for **VQ5GC** from **VQ9-land**, late in September or early in October . . . genuine radiations from Albania emanate from **ZA1KAD**, **1UB**, **1UV** and **2CF** . . . **CR10AA** is a genuine station, though not run by the same operator as the original station with the same call. He only has 10-15 watts, and the receiver is a home-built six-valve superhet . . . **MP4QAL** is now off the air, having been posted . . . **KJ6BN** has been similarly treated and is QRT.

ZC3AC hopes to be on 21 mc phone soon . . . **SV0WN** works from Crete on 14 mc CW . . . **W7FNK** is planning a trip to **ZM7** . . . **EA9DF** hopes to go to **lfni** around October 1 . . . **PX1EX** was active and genuine during August, but **PX1OP** was a phoney; **HB9OP** holds the call and was not there.

ZK1BS is going to "some island near by" and hopes to have a **ZK3**

call! **FW8AB** has left Wallis Island — now unpopulated . . . **FD4BD** hopes to be on soon with 100 watts . . . **VS1HC** made a trip to **VU5** but they wouldn't let him operate.

AC3SQ, **AC4NC** and **AC5PN** make a very tempting trio—all active and genuine, but *how* does one raise them? Down in the Antarctic, in addition to **UA1KAE**, we have **KG1FA**, **FB8YY** (Adelie Land), and **KC4USA**, **4USV**, **4USN** and **4USB**.

W6AM now scores 266 on CW, thanks to **VK9TW**. He is trying to persuade **W6NMC** (remember **NE1NMC**?) to go to **XE4**, Socorro Is. . . **W6ITH** still holds the call **FS7RT** and may return there yet again; the recent **PJ2MC** activity, from the other side of the island, was also due to him.

FR7ZC is the only active station on Reunion, and he is in trouble with gear and awaiting bits and pieces from the States . . . The amateur population of Northern

Australia (at present just about *nil*) will be increased by VK5AB and 5MB, both of whom hope to obtain their new VK8 calls by the end of the year . . . DL9CI/LX, DL1CR/LX and DL3AO/LX have all been worked on 14 mc by W's . . . HC8GI (Galapagos) has also been in evidence again.

CQ WORLD-WIDE DX CONTEST

The rules for the 1956 CQ DX Contest are now out, and the following is a summary of the information available :

Phone Section : 0200 GMT, October 20 to 0200 GMT, October 22.

CW Section : 0200 GMT, October 27 to 0200 GMT, October 29.

All bands 1.8-28 mc will be used. In the Phone Section there are single-operator and multi-operator categories; in the CW Section single-operator, multi-operator and novice.

CW stations will exchange five-figure groups, the RST report followed by their Zone number; Phone stations four-figure groups (RS and Zone). (*14 for all G's.*)

Contacts between stations on different continents, three points; on the same continent, one point; in the same country, no points, but will be permitted for the purpose of increasing the multiplier.

Two multipliers—one for each Zone worked on each band, and

one for each country worked on each band.

Logging instructions: Fill in Zone number and country only the first time worked in each band; use separate sheet for each band; keep all times in GMT; compute your own final score in full; make sure name and address is not omitted; and sign the usual pledge!

All logs to be forwarded by December 1 to *CQ Magazine*, 67 West 44th Street, New York 26, N.Y., and marked "Attn. Contest Committee."

FOC Contests

The FOC will be running their annual marathon (primarily for G and European members) on October 21, 0900-2300 GMT, and their DX marathon on October 13-14, 0001-2359 GMT. Full details and rules have been circulated to members, but this may serve as a reminder of the dates.

Late Flash

Reg Tibbetts of W6ITH writes direct to tell us that while he was waiting for the licence situation to develop with regard to FS7RT and PJ2MC, he started things going with a view to opening up from other rare spots. As all good things come in batches, he now finds he has three more "rare spot" licences actually in hand,

plus permission to go to them, plus accommodations all lined up!

One is brand-new and has never been operated; the other two have seen no activity for many years, have no present stations, and have never been on phone. In all three cases, licences have actually been issued to him and call letters assigned.

Now all he needs is to be twins or triplets! The grape-vine or jungle telegraph of the amateur world being what it is these days, Reg very wisely keeps quiet about the actual locations.

He also tells us that YV5BZ says they have many better spots than YVØ to work from, including La Blanquilla Island, 80 miles off the YV coast. This one would not be so tough from the transportation point of view as Aves Island, where they had a bad time. (Incidentally, all QSL's for YVØAA are now going out—to those who have sent theirs in that direction.)

So that's that for another month, and we expect an even busier one to come. Note that the next deadline is on the early side—**first post on Friday, September 14**. Please get everything in on time, to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Until next time we wish you Good Hunting, 73 and BCNU.

"BURTON FOR BEER"

We are informed that the Burton-on-Trent Radio Society is to put G3KZA/A on the 160, 80 and 40 metre bands for a local exhibition to last a week from September 24; the station will be operating between 1200 and 2100 clock time daily, and all contacts will be confirmed by a special QSL card, drawing attention to the export for which the town is so justly famous!

CALL BOOK PRICE INCREASE

We are informed by the Chicago publishers of the *Radio Amateur Call Book* that effective with the Fall (Autumn) issue, there will have to be an increase in cover price, consequent upon their rising costs of production. This increase will make the Full Edition 37s. 6d. over here, and the Abridged Edition (which omits only the American listings) 17s. 9d., both post free.

The current (Summer) edition of both versions can still be supplied at the old price of 31s. and 15s. post free respectively. The Abridged Edition is, and always has been, very good value, as it not only contains all known amateur callsigns/addresses outside the U.S.A., listed alphabetically by prefix, but

all the regular *Call Book* DX data pages as well. The current American listings take up about 360 of the total of 560 pages; thus, the Abridged Edition is a 200-page publication, of which the U.K. section takes some 23 pages.

MOBILE RALLY

Sunday, September 16, from 12.00 noon

at

STONE CROSS AERODROME
NEAR SOUTHAMPTON

This is 7½ miles west of Southampton, on the A.31. Talk-in stations will be operating from 10.30 a.m., with G3KYU on Top Band, G3GYK on Eighty, and G2HIF on Two Metres. There are cafés within reach, for those not wishing to bring a picnic lunch and/or tea. No set programme is planned, as the event is intended to be a get-together of mobile enthusiasts.

Organised by the Bournemouth Amateur Radio Society
Hon. Sec.: J. Ashford, 119 Petersfield Road, Boscombe East, Bournemouth. (*Southbourne 44569.*)

Simple Ten-Metre Converter

TUNED OSCILLATOR TYPE

F. JENKINS (G3WS)

As has so often been said, nearly all the older types of communications receiver are poor performers on the ten-metre band. Many in the "surplus" category, still in common use, do not cover 28 mc at all. These difficulties can easily be overcome by the use of the ten-metre converter described here, which should give results a good deal better than those obtainable with most receivers already performing quite well on the 28 mc band.—Editor.

THE existing station receiver at G3WS was "not so hot" on 28 mc, so it was decided to construct a converter using modern valves and consisting of an RF stage, mixer and tunable oscillator. The cost of building the model was quite modest—in fact, by making use of "surplus" valves and items that are probably already in hand at most stations, it need amount to no more than a few shillings.

Circuit Description

Circuitry consists of an RF stage using an EF95 pentode, the grid being tuned by C1 and dust-cored coil L2. The aerial input coil L1 is wound on the earthy end of L2. The anode of the EF95 is tuned by C4 and L3, in conjunction with fixed capacity C5. Capacity coupling is used between the EF95 and the mixer section of V2, which is an ECC81. Output from the mixer is taken at about 3 mc via L4 and C8, tuned to 3 mc approximately.

The other half of V2 is used as a Hartley type oscillator, with the HT line stabilised; this is essential for really good results. Power supply requirements are 200v. DC at 60 mA and 6.3v. AC at one amp.

Assembly

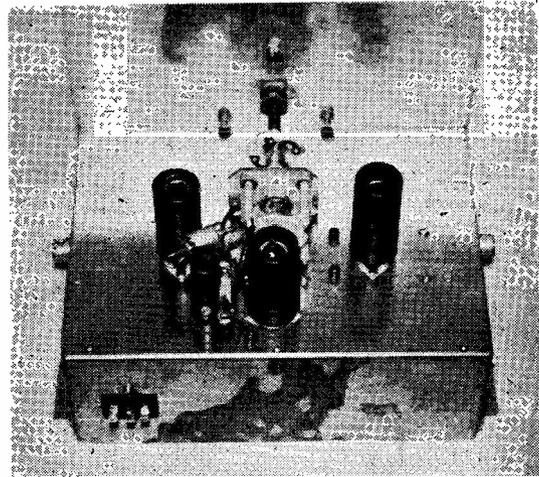
Construction is straightforward. The chassis used at G3WS is 7½ in. by 5½ in. wide and 2½ in. deep. The front panel can be made to a size to suit the type of tuning dial used.

Layout can be seen from the top view photograph, which shows the RF valve in position to the right-hand side, with the variable oscillator tuning condenser C11 in the centre and its associated band-set trimmer C10 and

coil L5 slightly to the left. V2 is at front centre, with V3 on the left. At the rear of the chassis is the input supply socket.

Looking at the underside view photograph, from the left comes the aerial input coax socket to the RF coil L1/L2, then the valveholder for V1 and immediately to the right is the anode coil L3, with C4, C5. V2 valveholder is at the lower centre position, with C6 leading to it. Between V2 and the supply socket is the IF coil L4 and the coax output socket, for connection to the main receiver, at the right-hand side.

It is important that C11 variable be fitted with an insulated spindle; alternatively, the spindle should be isolated from chassis. C11 as used in the model is an Eddystone type 476, which is 15 + 15 $\mu\mu\text{F}$, but only one section is actually connected. A single-section condenser



Top chassis view of the 10-metre converter, as constructed by G3WS. It is capable of giving very good results with any receiver tuning around 3 mc, which is the IF used. One of the valves shown is a stabiliser, V3 in the circuit.

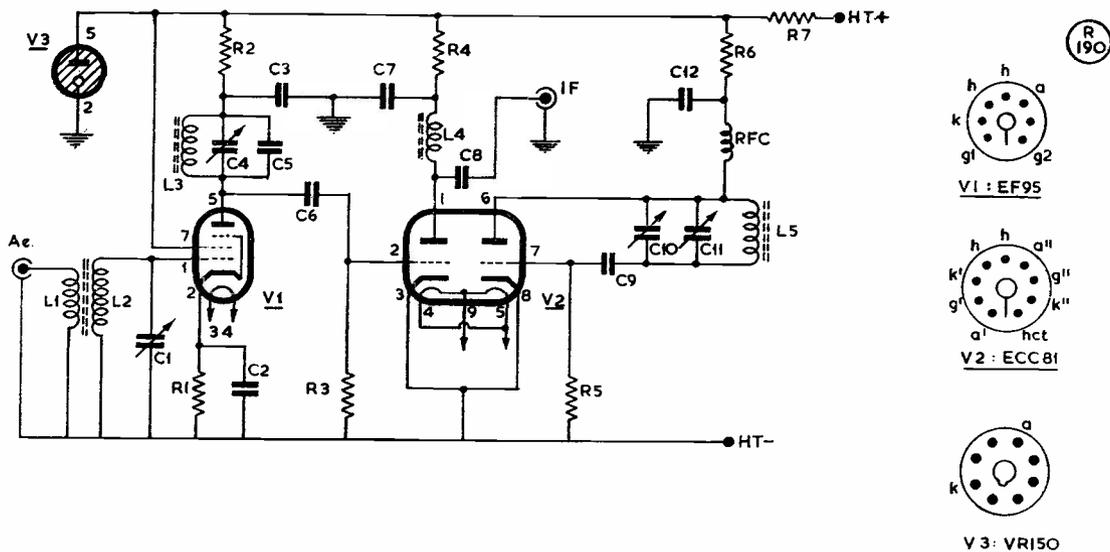
of about the same capacity would obviously do here. An Eddystone flexible coupler is fitted between C11 and the dial drive. Trimmer condenser C1 and C4 are the well-known Philips spiral type.

Coil Data

Coils L1/L2 and L3, with L5, are of 3/8-in. dia., on Alladin formers, with the windings centred. L4 is also of 3/8-in. dia., but on a sectionalised former of distrene, five slots being used at 10 turns per slot; the required 50 turns could just as well be wound on a plain former if a slotted one is not available.

All wiring is in 22 SWG, PVC covered, and earths are taken to a common point at each valveholder.

lover



Circuit of the 10-metre converter described by G3WS. It is a tuned oscillator arrangement (C11), with L4 adjusted to a quiet spot near 3 mc. A unit of this sort will bring the 28 mc band on to any receiver which either does not tune Ten, or has an inferior performance on that band.

Setting Up

After checking through, connect an HT supply of about 200v. and LT at 6.3v. First, adjust R7 to find the value which just keeps the stabiliser V3 glowing. Now connect a length of 72-ohm coax from the IF output socket to a receiver tuned to 3.0 mc, and adjust the dust-core of L4 for maximum "sharsh" in the receiver.

Next, with C11 at maximum, adjust dust-core L5 to tune the coil to 25 mc; this frequency can be checked by wavemeter, or GDO, or by listening on another receiver. It is obviously important that it should be set up fairly accurately.

With C11 at minimum capacity, adjust C10 so that the oscillator circuit tunes to 28 mc. This will effect the previous setting of L5 core, so it is now a matter of correcting one against the other until C11 tunes 25-28 mc.

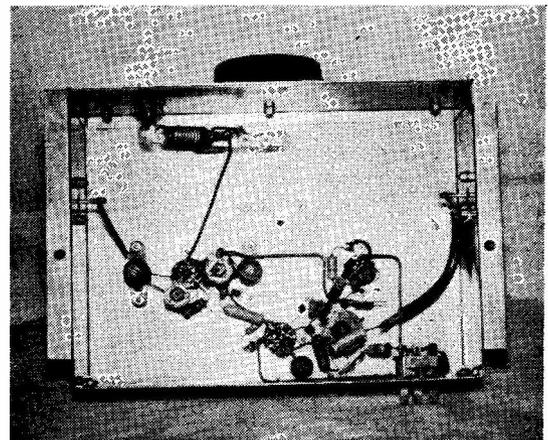
Connect the aerial, set C11 to the LF end of the band, and adjust cores L2 and L3 for maximum noise in the main receiver. Now with C11 at the HF end, trim C1 and C4 for maximum noise. Repeat on the low and high end adjustments until the noise level in the main receiver is constant, indicating a "flat" response. (If you happen to have a signal generator, and an AC meter suitable for connecting across the output of the main receiver, this process is easy.)

By this time, if the 10-metre band is at all

open, the converter should be very lively indeed; instead of getting on with the job of setting up, you will be wasting time listening to signals you may never have heard before! Any slight re-adjustment for frequency coverage can be made by careful trimming with C10 against L5 core.

Performance

After a half-hour warm-up, the frequency stability on the model was 0.01%, with a clean T9 beat on CW signals. Valve feeds are:



Under-chassis layout of the 10-metre converter. Wiring is quite straightforward.

Table of Values

SEO Converter for the 10-metre Band	
C1, C4, C10 = 3-30 μF trim- mers	R6 = 47,000 ohms, $\frac{1}{2}$ watt
C2, C3, C7, C12 = .001 μF silvered mica	R7 Depending on voltage source (see text)
C5 = 6.8 μF ceramic	L1 = 4 turns No. 34 enam. (wound over earthy end of L2)
C6, C9 = 68 μF ceramic	L2, L5 = 7 turns, No. 30 enam. (close wound)
C8 = 100 μF ceramic	L3 = 6 turns, No. 30 enam. (close wound)
C11 = 15 μF variable	L4 = 50 turns, No. 30 enam. (pile wound)
V1 = 6AK5 or EF95	
V2 = 12AT7 or ECC81	
V3 = VR150/15 or QS150/15	
R1 = 220 ohms, $\frac{1}{2}$ watt	Note: All coil formers $\frac{1}{8}$ " dia. slug tuned
R2, R4 = 1,000 ohms, $\frac{1}{2}$ watt	
R3 = 1m.ohm, $\frac{1}{2}$ watt	
R5 = 15,000 ohms, $\frac{1}{2}$ watt	

Improving the HRO

LOW-NOISE RF AND MIXER STAGE MODIFICATION

T. W. BLOXAM, B.Sc., Ph.D. (G3LSS)

DURING some experiments with a low-noise two-metre converter using 6AJ4's in a push-pull cascade arrangement feeding into an HRO (of pre-war vintage), it became clear that improvements in converter noise figure were of little value in the face of excessive noise in the HRO over the range 24-26 mc. A radical improvement in the noise factor of the HRO appeared to be the first step towards better weak-signal reception on two metres.

An article of considerable interest by Longrich and Smith appeared in *QST* for March, 1955, in which low-noise valves and circuits were incorporated in an HRO-5. This arrangement, with some additions and modifications, is shown in the diagram. No new principles or radical changes in design are claimed by the writer.

The modifications involve: (i) substitution of an EC91 cathode follower and triode-connected 6AC7 for the first 6D6 RF stage; (ii) substitution of a pentode-connected 6AC7 and triode-connected 6AC7 for the 6D6 second RF and 6C6 mixer stages respectively; (iii) substitution of a 12AT7 for the 6C6 oscillator, coupled to the mixer *via* a 6C4 cathode follower; (iv) addition of an OB2 voltage regulator for the 12AT7 and 6C4 HT; (v) employing the other half of the 12AT7 in a new S-meter bridge circuit.

V1, EF95, 10 mA anode and screen together; V2, ECC81, 15 mA in mixer section, 2.4 mA in oscillator. Total consumption is 51 mA at 200v. HT. If current loading is a factor to be considered, then the stabiliser V3 *could* be omitted; this would bring the total load current down to about 28 mA, but it would be at the expense of oscillator stability.

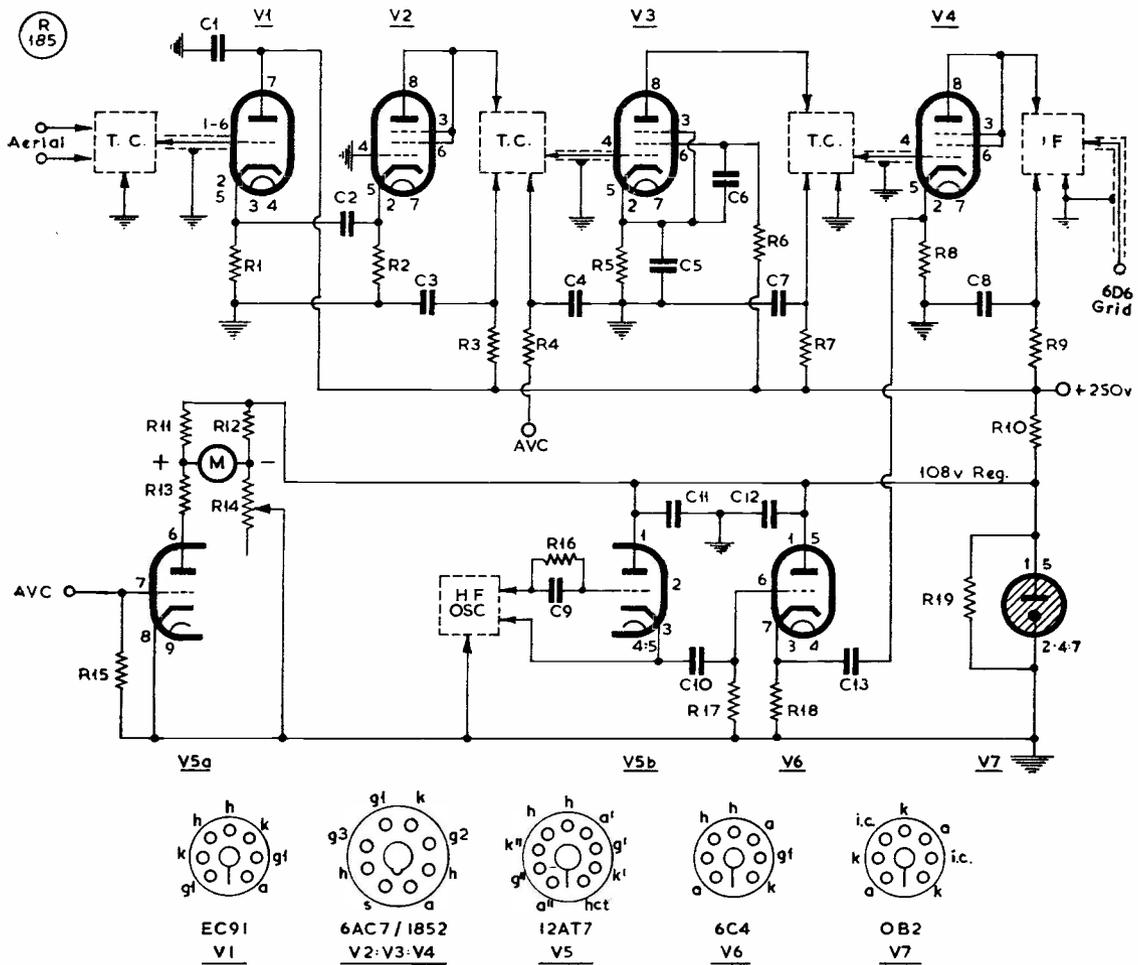
It can be said that this converter—simple and inexpensive, yet giving high gain on ten metres—will give those who at present have no receiver for the 28 mc band an opportunity of tasting the thrills of DX working with very modest equipment.

The functions of the modified RF amplifier and associated stages are as follows: The EC91 as a cathode-coupled RF amplifier provides in itself a gain of less than unity but, since it presents a high impedance across the tuned circuit, there is an overall improvement in sensitivity and selectivity. The low output impedance of this stage is favourable to the operation of the following 6AC7 grounded-grid triode. The circuit of Longrich and Smith employed the same combination of cathode follower and grounded-grid triode for the succeeding second RF and mixer stages. However, the arrangement shown here provides more sensitivity at the expense of a slightly higher noise figure. Oscillator stability is greatly improved by regulated HT derived from an OB2 (now available in this country), and complete absence of "pulling" by the 6C4 buffer stage.

In the writer's case, the additional valves were got in beneath the chassis, but there is room to mount them in the conventional manner by drilling suitable holes in the chassis. Do not attempt to use one half of the 12AT7 for the cathode follower as both cathodes are "hot" and considerable trouble will probably be encountered with self-oscillation of the cathode follower due to coupling *via* the heater.

S-Meter Modification

Since the original S-meter of the HRO is in a bridge circuit, one arm of which is balanced by screen current to the RF and IF amplifiers, it will generally be necessary to re-design the bridge circuit. The arrangement shown works better than the original, since the regulated HT to the 12AT7 maintains the meter accurately at zero when once set by R14. Also, the meter does not slam against the stop



Through the years, more modification suggestions have been made in respect of the HRO than almost any other receiver. This is the circuit discussed by G3LSS which, he shows, will result in greatly improved performance. These modifications, which are fairly extensive, were found to be desirable when an attempt was being made to get the best out of an old HRO with a good two-metre converter.

when the RF gain control is turned down.

The circuit is perfectly stable if reasonable care is taken to return the ground connections of each stage to a common point. Optimum performance of the mixer in terms of anode voltage *versus* injection voltage was obtained with an anode voltage of 50. Re-tuning of the RF and mixer stages will be required, but the oscillator calibration should not be appreciably affected with the coils set on general coverage. Re-calibration of band-spread coils may, however, be necessary.

Once the receiver is in operation it will be noted that the selectivity (particularly that of the first stage) is greatly improved. The improvement in noise figure is little short of

Table of Values

Circuit for the HRO RF and Mixer Modification.

C1, C11,	0.005 μ F	R16, R17	= 47,000 ohms, $\frac{1}{2}$ watt
C2, C13	= 0.001 μ F	R9	= 300,000 ohms, $\frac{1}{2}$ watt
C3, C4,		R10	= 8,000 ohms, 10 watts
C5, C6	= 0.01 μ F	R11, R12	= 33,000 ohms, $\frac{1}{2}$ watt
C7, C8	= 0.01 μ F	R14	= 100,000 ohms pot. (carbon)
C9	100 μ F	R15, R19	= 1 megohm, $\frac{1}{2}$ watt
C10	= 15 μ F	V1	= EC91
R1, R2,		V2, V3,	
R8, R18	= 1,500 ohms, $\frac{1}{2}$ watt	V4	= 6AC7/1852
R3, R7	= 1,000 ohms, $\frac{1}{2}$ watt	V5	= 12A17
R4	= 500,000 ohms, $\frac{1}{2}$ watt	V6	= 6C4
R5	= 150 ohms, $\frac{1}{2}$ watt	V7	= OB2
R6, R13,			

amazing ! Employing a CV172 noise diode, a noise figure of between 7 to 8 dB was obtained

at 30 mc for an input impedance of 500 ohms. An AR88D under the same conditions gave a noise figure of 11 dB (input impedance of 200 ohms). Due to the "quietness" of the receiver it may be difficult accurately to align the RF circuits at higher frequencies using receiver noise alone. In this case a local signal, or a steady signal on the band, must be employed. When functioning properly, shorting

the aerial input terminals should produce a marked decrease in noise level and, like the better VHF converters, an impression of inactivity in the receiver will soon be dispelled when a signal appears.

The improved noise figure is also evident down to 2 mc, and it is likely that very few of the more expensive commercial receivers could give a better performance.

Reactivation Treatment for 813's

RESTORING LOST
EMISSION—
NOTES ON SOME TEST
RESULTS

THE larger valves used by amateurs, like the 813, have thoriated tungsten filaments and although they are usually very much "under-run" they can still lose their emission. Buying a second-hand valve of any size is also a risk as it can have low emission and it can also be "soft," *i.e.*, poor vacuum.

It is not generally realised that air leaks into a valve very slowly, over a period of years; some of the ex-Service valves are often 12 to 15 years old; in this time, a measurable quantity of air can get inside the envelope—enough to make the valve so soft as to destroy itself on application of a high HT voltage.

To take up or absorb any air molecules inside the envelope it is a good thing to run the filament or heater at normal voltage for 24 hours before applying any HT at all. After this period apply a low HT voltage and adjust the loading and drive until a small plate current only is drawn. Leave it running for at least an hour before applying full HT. If the valve is particularly "soft" even this treatment will not save it. The 832 and 829 valves are very bad in this respect as they have a large number of seals where air can leak in. This business of first putting on low HT voltage and slowly increasing it is known as "seasoning" a valve, and is recommended practice with all large transmitting types.

Assuming we have overcome the gas difficulty the valve may still have low emission. Is there anything that can be done to resurrect them? It all depends. Some can be reactivated but others will not respond at all. Various authorities state that the emission can some-

times be restored by running the filament at excess voltage for a short time. For example, *Reference Data for Radio Engineers* gives suggested schedules which can be tried in an effort to restore the valve. The most extreme case is to run the filament at 75% over voltage for three minutes and then 30% above normal for 20 to 30 minutes. An article on "Some Factors Affecting Valve Life" in the *Australian Proceedings of the I.R.E.* lays it down that the filament temperature of valves with thoriated tungsten emitters should be held to within close limits. (This means that the filament voltage should be closely controlled.) Philips state that it should be within + or - 5%. If a thoriated tungsten filament is operated at too high a temperature, decarbonisation takes place at a greatly accelerated rate and permanent, early loss of emission results. If the temperature is too low, the thorium layer will not be maintained and emission will be deficient. In this case, however, reactivation may be possible, provided there is no secondary damage.

This brings us to the real reason for this article. Some time ago the writer had no less than six old 813 valves given him. Only one of the six was any good; it worked well in the transmitter for about an hour when suddenly the HT fuse went. By the time the ohmmeter was got out to look for the short, everything tested normal and in fact it was normal. Replacing the cartridge fuse put the set on the air for another hour or so. This went on for a long time and apart from costing a small fortune in fuses it was most annoying to know that after about 50 minutes' operating one would go off the air with a bang! Condensers were replaced, in fact most of the transmitter was rebuilt, but it still would only run for about an hour. One day the mystery was solved. The 813 was at fault. The clearance between the strap from the anode assembly to the top cap connector had very little spacing between it and the filament "springs." There was sufficient heat to distort this strap until it touched the filament, and bang went the HT fuse. The valve was knocked downwards on its pins in an

attempt to move the "innards" slightly to give more clearance between the anode strap and filament "spring." This operation was not successful. The heavy carbon anode broke away from its supports and it now makes a nice rattle. This left five of the gift 813's. One had low anode current, two more had very little and a third had no anode current at all but lots of grid current. The last was filament open-circuit so it was put in the dust bin.

Process of Reactivation

Before spending money on a new valve it was decided to see if an attempt at reactivation would do any good. Years ago a large transformer was bought in Lisle Street for 2/6. The shop-keeper was rather curt when asked what it was. He said, "If I knew I would not be selling it for half a crown"!

On test, it turned out to have some kind of a 230v. primary with a lot of fancy LT secondaries; it was never used because it was so large. Now it came in useful to provide the excess filament voltage to try reactivating the 813 valves. It was a matter of "kill or cure" as the only reasonable voltage available was 21—a bit excessive! The 813 was connected and power applied. The filament went very white, which was to be expected with 200 watts being shot into it. The measured voltage was 20.5v. When switching on it was decided to give it one minute of the 100% excess voltage treatment. But after the slow 60 seconds had elapsed it was given another minute.

Putting it in the transmitter produced no anode current whatsoever. That appeared to be that. By accident the grid drive knob was turned up too high and it was noticed that the valve was drawing anode current. Reducing the grid drive reduced the anode current in step down to a certain point, after which the anode current dropped to zero. Increasing the input produced no anode current until the drive exceeded 25 mA. (It should be explained that the 813 is provided with sufficient negative bias to cut the anode current to zero when there is no drive at the grid.)

This peculiar phenomenon of no anode current until the grid current exceeded a certain figure does not happen with a normal valve, as we all know. The anode current builds up slowly as the grid drive is increased.

It was then discovered that the longer the valve was over-driven the better it seemed to behave. So it was decided to leave it for a time and see what happened. At the start the anode current was 150 mA and the grid 35mA. It was left for an hour and a half, unwatched.

The anode current was then found to be 270 mA! The valve behaved perfectly normally, giving the same RF output power as a good 813. In fact, it behaved as it should do and did not seem the worse for its overload.

The same filament over-voltage treatment was applied to another 813 and it gave a reasonable anode current and power output without having to resort to excessive grid drive.

Further Investigation

This seemed all too simple so a third valve was given the filament "treatment." It was put in the transmitter and worked well first time, showing about 40 mA grid current and 250 mA in the anode. But after 10 minutes it was disappointing to find that the anode current had dropped down to 80 mA and the grid to 10 mA. There was no RF output. No amount of driving or fiddling did any good. It was given "the treatment" again—21 volts for three minutes. No luck. The anode current remained stubbornly at 80 mA and the grid as before. At about this stage in the proceedings a milliammeter was wired in the screen circuit and it was found that the screen current was 50% above normal. All this was done on 21 mc but repeating the results on 7 mc into a dummy load gave the same result: No joy!

The score was thus two successfully reactivated and one failure.

It is quite possible that the last valve had been entirely ruined by excessive filament voltage causing permanent loss of emission. This presented a problem. How much over-voltage should the last 813 be given? A figure of 14 volts was automatically decided on, for it was the next lowest voltage available on the transformer. Three minutes at 14 volts followed by half an hour at normal produced no result. The anode current was 70 mA and the grid 13 mA. The screen current was excessively high at 50 mA. As a final trial the filament was run at 21 volts for two minutes but this proved of no avail and the valve was still dud.

Looking back over the experiment, what are the results? Two valves made usable out of four, or 50% success. Not bad for a first effort. If a suitable voltage to give 70% overload had been available results may have been better as it is felt that the third valve to undergo treatment was definitely overcooked. If anyone else contemplates trying reactivation, remember a reasonably large filament transformer is required; double voltage means four times the normal filament power, or about 200 watts. If you have any 813's which seem to be down on emission the experiment is worth trying.

THERE are a number of interesting matters on which to comment this month. First of all, though all the data has not yet been worked through and it will be next month before the final results can appear, G5KW (Well Hill, Kent) emerges as the overall winner of our All-European VHF Contest held in July last.

In view of the very disappointing conditions for both sections of this Contest, and Ken's favourable location for such EDX working as was possible, this is the expected result. Had we had the openings that were hoped for, chances would have been much more even and, with the greater activity that good conditions would have brought, the whole affair would have been a great deal more interesting. However, as the tabulated results will demonstrate, several operators put up a very good performance, and G5KW himself showed what could be done in the way of finding multipliers even under such poor conditions.

While the total number of entries is, naturally, on the low side because the EDX was just not coming through for the average VHF operator, it is pleasing to be able to record that entries have been received from five countries outside the U.K.—DJ/DL, HB, ON, OZ, and PA. All further details will be unfolded in our next.

IARU VHF Event

Advance notification, with all necessary information on the rules, was given on p.317 of August "VHF Bands," covering the event to take place over the week-end September 8-9, which means now for most people reading this!

The only points calling for further clarification are the distance radii, which should be reckoned in kilometres as given on p.317 last month, and the closing date with address for logs: *Two copies* are required—this is the IARU ruling, not ours!—which should in the first instance be sent to us, by September 21, for onward transmission to the right quarter. The organisers require that the logs should be set out strictly as indicated on p.317

VHF BANDS

A. J. DEVON

**The European VHF Contests—
More Results on 25 Centimetres—
EI2W Works F8MX for a
"First"—
Station Reports and The Tables—**

of the August issue. We shall send on all logs just as they are received, as we have no responsibility for checking them.

Let us hope that the D.A.R.C. will have much better conditions this week-end than we had in July—some would no doubt say that that would not be difficult! Incidentally, this Contest should produce an upsurge of activity on the 1250 mc band, even if only temporarily and over local distances. It will have been noticed that the rules provide for a band-multiplier: Since the multiplier is the number of bands, 1-3, on which contacts are made, it is going to pay all serious contestants to get a QSO of some sort on 25 cm, even if it is only across the road! We can tell you that this point has already been fully appreciated and that several operators are confidently hoping to get the 3-band multiplier, even if the bulk of their scoring is done on two metres—as, indeed, it must be.

Longer Hop on 25 Cm

This talk about the 1250 mc band leads easily on to a most interesting item of news. It will be remembered that the Luton

group have consistently kept busy on 25 centimetres, using SEO equipment, and that for a long time G3CGQ and G3FUL have been in regular contact over their local distance.

On August 11, the range was considerably extended, when G3FUL/P (with G3CGQ as assistant) went to Brill, near G6NB's QTH, with a 25 cm receiver to G3CGQ's original design (as described in the August 1955 issue of SHORT WAVE MAGAZINE) to listen for G3BVU/P on Galley Hill, near Luton. He had an SEO transmitter using a 703A as oscillator, giving one watt of RF on about 1220 mc. This transmitter was heavily tone-modulated. Aerials at both ends were 12-ele

**TWO METRES
COUNTIES WORKED SINCE
SEPTEMBER 1, 1955
Starting Figure, 14
From Home QTH only**

Worked	Station
48	G5MA
43	G3GPT
41	G3GHO
38	G3FIH
37	G2DVD
36	G5DW
35	G3JWQ
34	G2HDZ
32	G3IOO, G3JZG
31	G3WW, G5DS
30	G3KHA
29	G3WS, G5BM
28	G3IRA
24	G3DLU
23	G3IER, G4JJ/A, G5MR, G8VN
21	G3CKQ, G3DO, G3JXN
20	G3BJQ, G3HWJ
18	G3IEX, G3KPT
17	G3ITF
16	G3BW, GM3DIQ

This Annual Counties Worked Table opened on September 1st, 1955 and closed on August 31st, 1956. All operators who have worked 14 or more Counties on Two Metres in the year are eligible for entry in the Table. The final placings will appear in the October issue. Annual Counties opened again w.e.f. September 1, 1956, and will run till August 31, 1957.

stacks with metal sheet reflectors.

Since it was a cross-band test—there not being enough equipment for a complete 25-centimetre station at both ends—the talk back was arranged on 160 metres, G3BVU having the receiver and G3FUL the Top Band transmitter. At the appointed hour, G3FUL/P started getting a very strong S9+25-centimetre MCW signal from G3BVU/P, the path distance being just over 28 miles.

Apart from the fact that signals were found to be much stronger, steadier, and QRM-free on 1220 mc than *via* the talk-back on 160 metres (using big aerials for the Top Band transmitter and receiver!) a number of most interesting observations were made. The 25 cm signals were easily held for more than an hour, during which it was found that the receiving aerial could be swung, in azimuth, through as much as 30° each side of the maximum before signals fell off quite sharply and were lost. It was also found that there was a critical angle vertically; at 15° of tilt the signal disappeared; the best result was obtained when the beam was held forward slightly, as if to catch a bounce off the ground some distance forward. At all times the signal was very loud and steady, being easily read off headphones several yards away; G6NB was a witness to the proceedings, as he happened to come along just before the Brill party were due to pack up; it is

TWO-METRE ACTIVITY REPORT

(Lists of stations heard and worked are requested for this section, set out in the form shown below, with call signs in strict alphabetical and numerical order).

G2DVD, Slinfold, Sussex.

WORKED : F3ND, 9EA/P, G2ANS, 2ATK, 2HCG, 2HOP, 3AGA, 3AUS, 3DJQ, 3DO, 3GHO, 3HHY, 3IRS, 3JGY, 3JWQ, 3JZG, 3KFT/P, 3KHA, 3KPT, 4GR, 4JJ/A, 5BM, 5YV, 6SN, 8DA, GC3EBK, 3FZC, GW2ACW, PAONO. (July 12 to August 19; over 100 miles only).

G2BRR, Wootton Bassett, Wilts.

WORKED : G2AIH/P, 2CVD/P, 3AYL, 3BA/P, 3FIH, 3GVF/P, 3GYQ, 3KPT, 3WW, 5BM, 5YV, 6FO, 6OX, 8UQ/P. HEARD : G2ADZ, 2CZS, 2HIF/P, 2OI, 2RD, 3AUS, 3DLU, 3FJS, 3FKA/P, 3FP, 3GGT/P, 3GPT/P, 3HXS, 3IRA, 3IRS, 3IUP/P, 3JZC, 3KEF, 3KEQ/P, 3KHA, 3XC, 4JJ/P, 4MC, 5AU, 5CP, 5DS, 5HN, 5MA, 5ML, 5YH, 6AG, 8AL, 8PX, GC3EBK.

G3KPT, Kingswood, Bristol.

WORKED : F9EA/P, G2ANS, 2BRR, 2CVD/P, 2CIW, 2CZS, 2DDD, 2DSP, 2DVD, 2HDZ, 3BA/P, 3FAN, 3FIH, 3FZL, 3GHO, 3GYQ, 3HHY, 3HSD, 3HXS, 3IRA, 3IRS, 3JQN, 3KEO, 3KHA, 3KSR/P, 3XC/P, 3YH, 4GR, 5BM, 5DS, 5HN, 5KW, 5MA, 5US, 5YV, 6FO, 6OX, 8AL, 8IL, 8UQ/P, GC3EBK.

HEARD : G2AIH, 2FJR, 2FNW, 2FT, 2HR, 2HIF/P, 2MV, 2OI, 2RD, 2XV, 3CCH, 3DLU, 3DMU, 3GPT, 3HTY, 3IER, 3ITF, 3JT, 3JUD/A, 3JWQ, 3JZG, 5AU, 5DW, 5ML, 8RW, 8VZ, GW2ACW, 8SU, 8UH. (During period).

G2CZS, Chelmsford, Essex.

WORKED : G2BMZ, 2BVW, 2HIF/P, 3BA, 3BEX/P, 3FAN, 3FFV, 3FIH, 3GPT, 3GSO, 3ION, 3IUD/P, 3JWQ, 3KFT/P, 3KHA, 3KPT,

4BP/P, 4GR, 5BD, 5BM, 5LL, 5YV, 6XX, 8PX, GW3KEQ/P (Radnor).

HEARD : DL1SE, F8GH, 9EA/P, G3AUS, 3HHY, 3HTY, 3KFD, 4JJ/A, GC3EBK.

G3KHA, Knowle, Bristol.

WORKED : F8MX/A, 9EA/P, G2ADZ, 2AHL, 2AHY, 2AUD, 2CIW, 2CZS, 2DSP, 2DVD, 2UJ, 3CGO, 3FAN, 3FZL, 3GHO, 3GOZ, 3HRH, 3ION/P (Dorset), 3INU, 3JMS, 3JQN/A, 3JR, 3KEQ, 3KEQ/P (Surrey), 3KSR/P, 3MA/P (Glos.), 3WS, 5BM, 5DS, 5KW, 6AG, 6FO, 6NB/P (Radnor), 6OX, 8AL, 8IL, 8UQ/P (Nr. Basingstoke), 8VZ, GC3EBK, GW2ACW, 3FXR, 8SU, 8UH, 8UH/P (Brecknock).

HEARD : G2CVD/P, G6NB/P, GW3GWA/P. (July 20 to August 19).

understood that Bill was duly impressed—at any rate, he is getting busy with gear for the 1250 mc band.

In the opinion of G3CGQ and G3FUL, much of the success of the test was due to the heavy tone-modulation on the 703A transmitter at G3BVU/P; the natural instability at the transmitting end was easily accommodated within the pass-band of the receiver—which is a crystal-mixer superhet with a harmonic oscillator and wide-band IF/AF amplifier, as originally designed by G3CGQ—so that the nett effect was a nice, steady MCW signal, as easy to tune as an LF band transmission.

G3BVU, G3CGQ and G3FUL are to be congratulated on this very interesting and impressive result which, to many readers, will be so reminiscent of the early days of 5 metres, when we used to go out on high ground with tone-modulated SEO transmitters and super-regenerative receivers. But it was from those beginnings, in the early 30's, that the technique was learnt and the VHF structure of the present day built up. With all the plans that are in hand for the 1250 mc band, we should be seeing some rapid progress from now on.

Another "First" for EI2W

On the evening of August 9,

EI2W switched up the receiver on an almost empty band and was astonished to hear F8MX at S9, obviously unaware that he was getting into Dublin. Actually, it was F9CQ operating his brother's station at St. Valery-en-Caux, and saying he was about to QSY to 70 cm. EI2W, realising the possibilities and the urgency of getting F8MX back on to two metres, called G6NB (who was finishing a QSO with G3ENY) and Bill immediately said he would change over to 70 cm, raise F8MX, and ask him to listen for EI2W on two metres.

All fell out as planned—though F8MX had a little trouble in finding EI2W. G6NB stood by the whole time and, by acting as linking station, was able to get F8MX and EI2W into touch with one another, to the great delight of both.

Thus Henry of EI2W made another notable "First," for which he will have the congratulations of the VHF fraternity. It is worth recounting the story in some detail, because of the circumstances in which this interesting QSO was made—a good example of the co-operation obtaining on the VHF bands. It is also worth drawing attention to the fact that, with the exception of the original EI/G and EI/GW contacts made on two metres (by EI8G, who has

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

- 15 G3GHO, G4MW, G5YV, G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, ON, OZ, PA, SM)
- 15 ON4BZ (DL, EI, F, G, GC, GI, GM, GW, HB, LA, LX, ON, OZ, PA, SM)
- 14 G2HDZ, G5BD, G8OU
- 13 G2FJR, G2XV, G3BLP, G3CCH, G3DMU, G3GPT, G3IOO, G5DS, G6XM, G6XX
- 12 G2HIF, G3WW, G6LI, G6RH
- 11 EI2W, G2AJ, G3ABA, G3HAZ, G4RO, G4SA, G5UD
- 10 G2FQP, G2HOP, G3BK, G3BNC, G3EHY, G3FAN, G3GHI, G3GSE, G3WS, G5MA, G8IC, GM3EGW, GW5MQ
- 9 G2AHP, G2DVD, G3DVK, G3FIJ, G3IUD, G5MR, PAOFB
- 8 G2CZS, G2DDD, G2XC, G3AEP, G3GBO, G3HCU, G3HWJ, G3VM, G5BM, G5BY, G5ML, G8SB, GC3EBK.

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14
From Fixed QTH Only

Worked	Station
75	G5YV
70	G6NB, G6XM
68	G3BW
66	G3IUD (302)
65	G3CCH
64	G5BD (435)
63	EI2W (258), G3GHO
62	G3BLP (630)
60	G2OI (402), G3DMU
59	G2FJR (427), G3EHY, G4SA
58	G8OU
57	G8SB
56	G3WW (770), G5DS (654)
55	G2HDZ (495), G2HIF, G3IOO, G3BM, GW5MQ
53	G2AJ (519), G3FAN, G4CI
52	G2NH, G5MA, G6RH, G6XX, GW2ADZ
50	G3ABA, G3GSE (518)
49	G3HAZ (358)
48	G6TA (487)
47	G3FIH, G5ML, G5WP
46	G4HT (476), G5BY, G6YU (205)
45	G2DVD, G2XC, G5JU
44	G3BJQ, G3BK, G8DA
43	G2AHP (500), G3BA, G3COJ, G3HWJ, G4RO, G5DF
42	G2CIW* (146), G2HOP, G3BNC, G3DLU*, G6CI (220), GM3EGW (146)
41	G2FQP, G3DO, G3HBW, G3WS (255)
40	G2DDD, G3CGQ, G8KL
39	G2IQ, G3GBO (434), G3VM, G8IL (325)
38	G2FCL (234), G3APY, G3HTY, G3IER, G8VN (190)
37	G2FNW, G2FZU (180), G3DLU, G3DVK (175)
36	G2DCI (155), G3CXD, G3IIT, G5MR (321), G6CB (312), G8IP
35	G3FZL, G3FYY (235), G3HCU (224), G3JWQ
34	G2CZS (243), G3AEP, G3BKQ, G8HC
33	G3HIY (125), GC3EBK
32	G3HII, G3KHA (159), G8QY, G8VR
31	G3HXO, G5RP

never been heard on the band since) EI2W holds all the other "First" for his country, to a total of no less than eight—with DL, F, GC, GD, GI, GM, ON and PA. This is a magnificent record and the proof of Henry's hard work and steady activity on the band; since his "First" with ON4BZ in September 1951, it has taken him five years to make this EI/F contact. None of these QSO's have come easily. By reason of his geographical location nearly all EI2W's contacts must be DX for the band; yet he stands high in All-Time Counties and has a very good place in Countries Worked. At this moment, EI2W is applying him-

Worked	Station
30	G3CKQ (122), G3FRY, G3GOP (208), G3GVF (129), G3IRA, G5NF, GM3DIQ, GW8UH
29	G3AGS, G3AKU, G3FIJ (194)
28	G3ITF, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160), G6GR, G13GQB, GW3GWA
26	G2BRR, G3CFR (125), G3SM (211), G4LX, G4MR (189)
25	G3JMA, G3JXN (220), G5SK, G6PJ
24	G3DLU*, G3FD, G3FXG, G3FXR
23	G3CWW (260), G3HSD, G3JHM (131), G3YH, G4JJ/A, G5PY
22	G2DRA, G3AGR (135), G3ASG (150), G3BPM, G3HIL, G5AM, G8NM
21	G2AOL (110), G3DVQ, G3IWI, G6XY
20	G3EYV, G3IOE, GC2FZC
19	G3FEX (118), G3GCX, G5LQ (176)
18	G2AHY, G3DBP, G3JGY, GC2CNC
17	G3EGG
16	G3FRE, GM3DIQ*
15	G3IWA
14	G2DHV, G3CYY

Note: Figures in brackets after call are number of different stations worked on Two Metres. Starting figure for this classification, 100 stations worked. QSL cards are not required to verify for entry into this Table. On working 14C or more, a list showing stations and countries should be sent, and thereafter added to as more counties are worked.

* New QTH

self to a schedule with Scandinavia—and also has plans for other DX attempts. He will have the good wishes of all who read these lines.

Long-Haul DX Schedule

Down in the West Country, G2ADZ has made arrangements with certain W's for Trans-Atlantic tests on two metres—a most enterprising undertaking, especially as they are prepared to stick at it for a period of years. When conditions are promising on the Atlantic path, both ends keep watch from midnight GMT onwards, calling and listening for 10 minutes at 3-hour intervals. The W's taking part in these tests are on 144.3 mc and below, and have sharpened their beams on their operating frequencies. The whole success of this venture will turn on whether conditions can be accurately forecast at both ends—for it can be accepted that there have, in the past, been fleeting opportunities for a Trans-Atlantic contact on two metres. Of all VHF stations in the U.K., G2ADZ is probably best placed for an attempt of this kind—Bill is right on the edge of the ocean, with a clear getaway to the west. Good luck to him!

Other schedules maintained by G2ADZ are with EI4E (Killarney, 145.1 mc) at 2100 on Wednesdays and Sundays, and with G3FZL (London, 184m.) at 1100 on Sundays; EI4R is joining the EI schedule, and will be on 145.8 mc. It should also be mentioned that EI4E has a high-gain beam and works CW, so it is well worth listening on this schedule, as he should be workable from other parts of the West Country.

Things Generally

The incredible weather has had its effect. Conditions have been very patchy, with one or two bright spells, and this has reacted in the usual way on apparent activity. However, some very good QSO's have been made, on both VHF bands.

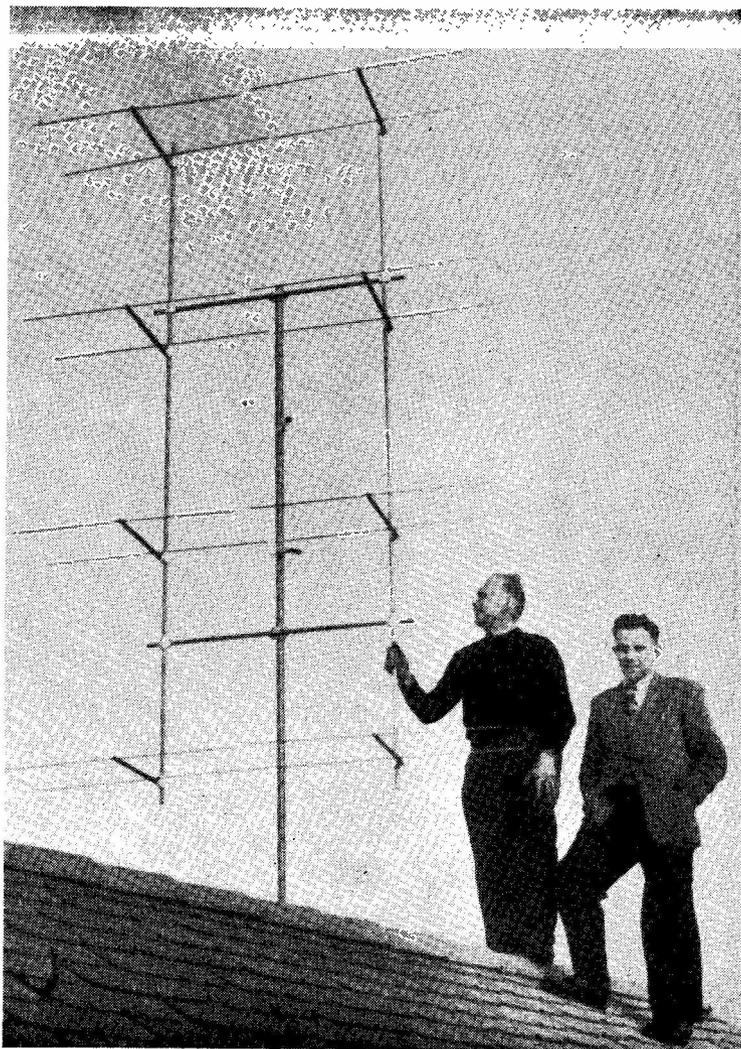
For instance, G6NB (Brill, Bucks.) worked F8MX three evenings running on 70 centimetres—August 7-9. On the 9th, G3CGQ (Luton), who is not well placed

for DX in the ordinary way, worked F8MX on two metres. From Great Bookham, G5MA had good contacts with G13CWY and G13GXP (worked three times), and also with G3AGA (Penryn, Corn.) and G3BW in Whitehaven, Cumb. Other interesting QSO's in Bob's two-metre log for the period were with GW6NB/P (when Bill went portable for a few days while on a fishing trip in Radnor and Cardigan), GW3BOC/P near Colwyn Bay, and GW3FXR in Port Talbot. G2XV (Cambridge) moved himself up another notch in Countries by rasing G13GXP for an all-time new one.

G2CZS (Chelmsford) writes in to show that he is still about on "Two" and at different times during the last couple of months managed QSO's with G2ADZ, G2BMZ, G3GPT, G3IUD/P, G4GR and GC3EBK for the DX stakes. His new aerial is a 3/3/3, T-matched, with which G2CZS is well pleased. G3KHA (Bristol, 4) says "not much to report this month," but moves nicely in both Counties tables.

G3KPT, also of Bristol (Kingswood), and a very active two-metre operator, asks that many more Midlands and northerly stations should tune QHL — for not only are G3KHA and himself around 145.5 mc but there are at least 14 other two-metre stations, within 30 miles or so of Bristol, who are working at the high end of the band. Failure to tune up the band has lost them many possible contacts — notably with F8MX, who was S9+ in the Bristol area on August 9. While he's about it, G3KPT also draws attention to the unsatisfactory QSL position; of 68 stations QSL'd direct, only 25 have come through with cards. One hopes that there will be a little dedigitation in regard to this matter, too.

G2DVD (Slinfold, Sussex) sends in a calls-worked list and explains that it represents only 15% of his total (203) of stations actually worked during the period, as he lists the over-100-mile QSO's only. To add to the Awful Occurrence of last month (the lightning strike) they've since had a Shock-



The 16-element two-metre beam used by HB1RD on Mt. Chasseral — unfortunately, conditions were all against G contacts during the period of our European VHF Contest. In the photograph, HB9RD is on the right, with HE9REP, a Swiss SWL who helps with the HB9RD activities.

ing Happening—the worst gale in living memory for those parts, which swept away all the G2DVD sky-wires except the two-metre beam. A 70-ft. mast guyed at three levels lost its top and the house part of its roof. . . .

During September, G3DLU will be heard /A/P from Bedfordshire, with a portable rig in the car. From the home QTH in Sheffield, he has got up to 24C in both tables following his recent move from the West Country. G6CI (Kenilworth) reports his

latest position in the Tables, and G2BRR (Wootton Bassett) says it's a great pity that there is not more activity during TV hours—he also is going portable shortly.

Though he has been on VHF and reading this piece for about the last five years, G3HTY (Nr. Kidderminster) writes in to us for the first time, with a number of interesting observations. He is in quite a good location, right on the Salop-Worcs. border, and runs 85 watts, with three stacked slots. He finds West Midlands activity "not

TWO-METRE FIRSTS

G/DL	G3DIV/A-DL4XS/3KE	5/6/50
G/EI	G8SB-EI8G	23/4/51
G/F	G6DH-F8OL	10/11/48
G/GC	G8IL-GC2CNC	24/5/51
G/GD	G3GMX-GD3DA/P	29/7/51
G/GI	G3DA-GI2HML	29/6/49
G/GM	G3BW-GM3OL	13/2/49
G/GW	G5MQ-GW5UO	22/10/48
G/HB	G6OU-HB11V	12/9/53
G/LA	G6NB-LA8RB	29/6/53
G/LX	G5MR-LX1AS	23/7/55
G/ON	G6DH-ON4FG	25/9/48
G/OZ	G3WW-OZ2FR	1/6/51
G/PA	G6DH-PA0PN	14/9/48
G/SM	G5YV-SM7BE	1/6/51
GC/DL	GC3EBK-DL3VJ/P	22/3/53
GC/EI	GC2CNC-EI2W	8/10/51
GC/F	GC2CNC-F9OK	17/11/53
GC/GW	GC2FZC-GW8SU	16/6/54
GC/ON	GC3EBK-ON4BZ	4/3/53
GC/OZ	GC3EBK-OZ2FR	2/3/53
GC/PA	GC3EBK-PA0HA	16/7/55
GD/EI	GD3DA/P-EI2W	30/7/51
GD/GM	GD3DA/P-GM3DAP	29/7/51
GD/GW	GD3DA/P-GW5MQ	28/7/51
GI/DL	GI3GXP-DL1SE	5/1/56
GI/EI	GI3GQB-EI2W	13/6/51
GI/GD	GI2FHN-GD3DA/P	29/7/51
GI/GM	GI2FHN-GM3OL	1/7/49
GI/GW	GI2FHN-GW3ELM	8/7/49
GI/ON	GI3GXP-ON4BZ	5/1/56
GM/DL	GM2FHH-DJ1XX	29/5/55
GM/EI	GM3BDA-EI2W	12/6/51
GM/ON	GM3EGW-ON4BZ	21/11/53
GM/PA	GM3EGW-PEIPL	22/4/53
GW/DL	GW5MQ-DL4XS	22/9/51
GW/EI	GW2ADZ-EI8G	19/4/51
GW/F	GW2ADZ-F3LQ	14/5/50
GW/HB	GW2ADZ-HB11V	14/9/53
GW/ON	GW2ADZ-ON4YV	13/5/50
GW/PA	GW2ADZ-PA0HA	13/5/50
GW/SM	GW2ADZ-SM6QP	1/7/53
DL/OZ	DL6SW-OZ2FR	4/3/51
DL/SM	DL2DV-SM7BE	10/3/51
EI/DL	EI2W-DL3VJ/P	29/8/52
EI/F	EI2W-F8MX	9/8/56
EI/ON	EI2W-ON4BZ	21/9/51
EI/PA	EI2W-PA0FC	10/10/53
ON/LA	ON4BZ-LA1KB	4/7/53
ON/LX	ON4TR-LX1MS	? ?
ON/OZ	ON4BZ-OZ2FR	3/6/51
ON/SM	ON4BZ-SM7BE	2/3/53

very brisk," though in G2ATK, G2CVD, G2JZ, G2NV, G3DJQ, G3DO, G3ENY, G3JGY and G3KFD they have regulars who keep the two-metre band warm. It seems to G3HTY that not enough stations in the Bristol and S. Wales areas head their beams west of Birmingham—if they did, they would find G3HTY and a number of others happy to work them. (In view of what has already been quoted from the Bristol area, on this same topic, one hopes that the contacts for which both areas are apparently waiting will forthwith be made!).

From Pinner, Middx., G2HDZ writes that it is about a year since last we heard from him—so he hastens to repair the omission with claims for the Tables. G2HDZ has been steadily active on both VHF bands, and has had some good contacts even though conditions generally have been so poor. He is hoping to be on 23 cm in due course.

Another EDX Possibility

F9TV (Paris) reports some interesting experiences while he was on holiday near Arcachon, on the French Atlantic coast; from there, using his other call F8OS, contact was made on two metres with EA1CO in Gijon, for the F/EA "First." EA1CO is one of the very few Spanish stations on two metres, and has played a lone hand on the band for a long time. By perseverance and steadily improving his gear, EA1CO has been rewarded by a contact which he and F8OS have been trying for since last year.

F8OS/F9TV considers that EA1CO—who has the equivalent of a QQVO6-40 in his PA, a cascade CC converter, and a 12-element "bird-cage" of the type described in SHORT WAVE MAGAZINE for November 1952 — is now well

placed for working into the U.K. A glance at the map shows that Gijon, on the Biscay coast of northern Spain, looks straight across to Land's End, and that the path to GC is crossed only by the Brest Peninsula . . . (QTHR, for those who may want to fix scedules!).

At F8OS, the /A location is unusual—the VHF gear is set up on the top of a steel pylon, 140ft. high, used for fire-watching; as it stands on high ground, F8OS is actually some 300ft. above the surrounding country. From this eyrie, he has not only worked EA1CO several times, but on 70 centimetres got a 194-mile QSO with F8TD at St. Nazaire. As F9TV's report shows, all stations concerned in these contacts are using first-rate equipment and know how to take advantage of the opportunities. If only we could have a wide, steady European opening for about a week, what a wonderful uncovering it would be!

The Tabular Matter

This is complete and, we hope, right up-to-date. Many more calls heard/worked lists would be welcomed, as these are *always* of interest. And don't forget that Annual Counties for 1955-56 wound up for the year on August 31. Anything new worked up to midnight on that date should be reported, so that final placings for the year can appear in the October issue.

Dead-Line

And that, *mes amis*, wraps it up again for another month. Please make a note of **September 19** as the closing date for October, and send all your VHF gen to: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. With you again on October 5, all being well.

ANOTHER RAFT EXPEDITION—FO8AD/MM

Just as this issue was going to press, we were informed that on or about October 15, a sea-going Polynesian bamboo sailing raft, named *Tahiti-Nui*, will leave Tahiti in an attempt to reach Santiago de Chile, about 4,500 miles across the South Pacific. The expedition will be led by the eminent oceanographer Eric de Bisschop, with four other Frenchmen as crew; the *Tahiti-Nui* will also attempt the return voyage.

The expedition callsign will be FO8AD/MM, operating on the 7 to 28 mc bands, using CW only, and European contacts will be looked for around 0800 and 1730 GMT on 14 and 21 mc. It is understood that communication will be entirely by Amateur Radio. Further details of this interesting venture will be given in the October issue of SHORT WAVE MAGAZINE.

Cubical Quad for the DX Bands

ONE BEAM FOR FIFTEEN
AND TWENTY

A. J. SLATER (G3FXB)

This is a type of directional aerial system, having a worth-while gain, of which much has been heard over the last few years. It is most often used as a uni-directional array, with one section working as a parasitic reflector. Our contributor discusses his own variation on this theme, claiming good results on two bands with the system operated as a fully-driven bi-directional array.—Editor.

IN the ten-metre days of 1947/50 the Cubical Quad aerial enjoyed considerable popularity. Now, thanks to an excellent article in January 1955 *QST*, the "Quad" is coming into its own on lower frequencies, people realising that dimensions are not as formidable as they might seem.

Briefly, the Cubical Quad consists of two square loops of wire, one quarter wave long each side, one used as a radiator and the other as a reflector. With a spacing between the elements of 0.15 or 0.20 wavelengths, the feed

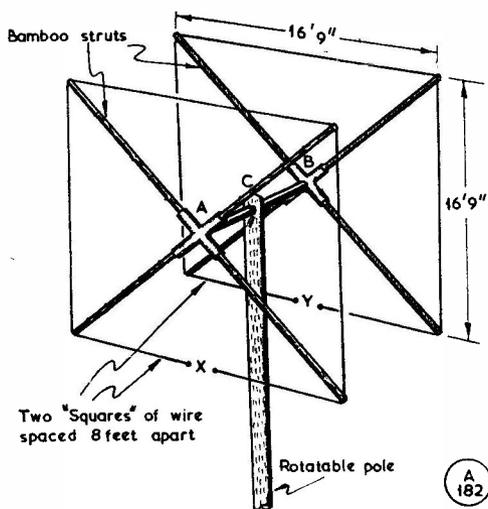


Fig. 1. Layout of the two-band Cubical Quad used by G3FXB. A boom A-B is secured to a pole at balance-point C, the pole being rotatable, through 180°, for directivity. The feed points for the two sections, which are both driven, are at X and Y. The arrangement of the feed line and matching stub is shown in Fig. 2.

point impedance of the radiator is in the vicinity of 100 ohms and therefore offers a reasonable match to 80 ohm co-ax. The reflector is tuned to resonance by an adjustable shorted stub approximately two feet long. Using a "Quad" on these lines, with a pole height of 3/4 wavelength, the aerial gain is claimed to be as good as, or better than, that of a three-element beam.

Mechanical Advantages

Apart from the performance it gives, the "Quad" offers several mechanical advantages.

- (1) The wing span is half that of a 3-element or, for that matter, a 2-element beam. On 14 mc the Quad is 16ft. 9ins. wide as opposed to 33 feet with a beam. Therefore, it is possible to rotate the aerial in the average "suburban garden" without overhanging the neighbours.
- (2) Wind resistance is less.
- (3) The Quad is cheaper, easier to construct and very light.

Variations on the "Quad"

The aerial appears to offer much scope for experiment. One system tried at ZS1BK was to fit a 28 mc Quad inside a 21 mc version, with compromise spacing, and thus get two aerials for the price of one structure. The variation tried by the writer is to use a Quad as a *driven* array and fed with a tuned open-wire line, thus getting two- or even three-band performance with one aerial.

The Quad's predecessor at G3FXB was a single section W8JK used with a tuned line for 14, 21 and 28 mc operation. It was reasoned that if the 8JK elements were each replaced with a 14 mc Quad, possibly increased gain might result, apart from other advantages. The writer had always felt guilty when operating the 8JK so that it hung over neighbouring gardens!

The result is the present set-up, shown in Fig. 1. The disadvantage of feeding both elements (in the same way as the 8JK) in comparison with a parasitic array is, of course, that the system becomes bi-directional—the beam effect is lost. However, our HF bands have not yet come to the stage where front-to-back ratio is essential; furthermore, a bi-directional beam only requires 180° rotation and in any event it is often an advantage to transmit and receive in both directions simultaneously.

Its real advantage lies in the fact that driving both elements is about the only practicable way of securing multi-band operation.

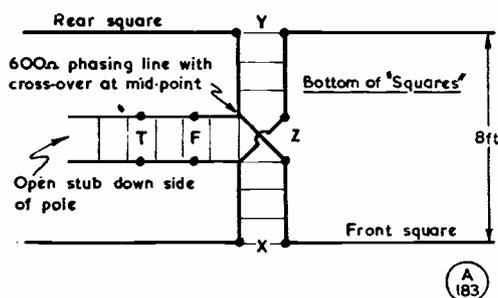


Fig. 2. The inter-connection arrangement between the two loops of the Cubical Quad; a feed line of 14 SWG spaced 2 inches is used. This sketch should be studied with Fig. 3.

Construction

Initially, it was decided to construct an experimental version of the Quad to see what happened in practice. A 24-foot pole was available and it was argued that if reasonable results could be obtained at that height, things would indeed be rosy with a pole height of 40 or 45 feet. The wire forming the Quad is held in place by four 11ft. 6in. bamboos in the form of an "X"—see A, B in Fig. 1. Some difficulty may be experienced in obtaining 12-foot bamboos but they *are* available. Eight-foot pieces lashed together would probably do equally well, but would not be so tidy. The bamboos were secured to a wooden "X" mounted at the ends of a 2in. x 2in. boom and suitably braced to it. A better arrangement would be a couple of more substantial brackets bolted to the boom. Some eight feet down the pole is mounted a secondary and very light boom for carrying the phasing line, the polystyrene feeder spacers being pushed through holes in the boom and secured by cellulose cement. A 500-ohm line consisting of 14 SWG wire with 2-inch spacing is used for the phasing line and also for the feed-line to the transmitter, but anything between 400 and 600 ohms should be quite satisfactory.

Stub Matching

The lash-up complete, the contraption was reared into the air and looked something like an overgrown BC frame aerial! The transmitter was switched on and DX contacts quickly made on both 14 and 21 mc. However, the SWR was far from low and heating of the aerial coil quite considerable! Checks were made and a SWR of at least 10:1 appeared in evidence on both bands. As the feed-line was some 75 feet long this seemed a state of affairs to be corrected and thoughts were turned to matching the aerial, at least on one band.

A start was made on 14 mc with a quarter-wave of open circuited transmission line hanging on the aerial. The feeders were tapped up and down until a tolerable SWR was obtained. Reports immediately improved, the line being substantially flat and aerial coil heating absent.

Attention was then turned to 21 mc and after much "cut-and-try" an interesting fact emerged: On that band the aerial feed point was some 4ft. 6in. down the 14 mc quarter-wave matching section. The remaining 12 feet of the matching section was sufficiently near to constitute a quarter-wave matching section on 21 mc, the only adjustment necessary being to shift the feeder taps from the 14 mc point 3 feet from the aerial to a point some 6ft. 6in. from it—see Fig. 2. For this adjustment it was possible to insert an aerial current meter at a point 4ft. 6in. down the 14 mc stub and tap for maximum current into the aerial. With a power input of some 120 watts the current at this point was about 1.4 amps RF. The 14 mc feed point at the middle of the phasing line was, however, inaccessible from the short ladder available, so the adjustment F on that band was considered satisfactory when the line showed substantially flat characteristics—namely, average line input current and absence of "hot spots" indicated by a neon.

Results

The Quad has been in use for many months now on 14 and 21 mc. On 20 metres the gain seems about 2 or 3 dB better than the old W8JK, despite the fact that the Quad is some 6ft. lower. On 15 metres, the Quad works out

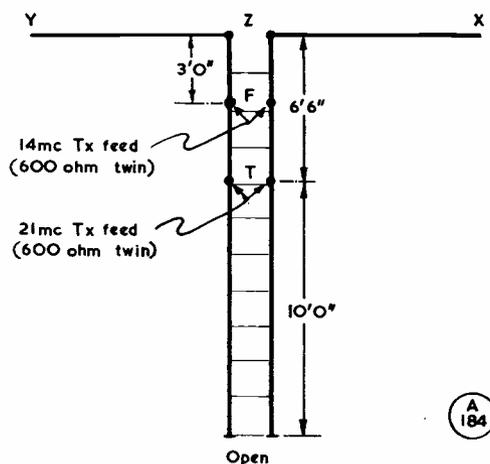


Fig. 3. Dimensions of the matching stub and position of the feed point for the 15- and 20-metre bands; the lettering corresponds to the layout shown in Fig. 2.

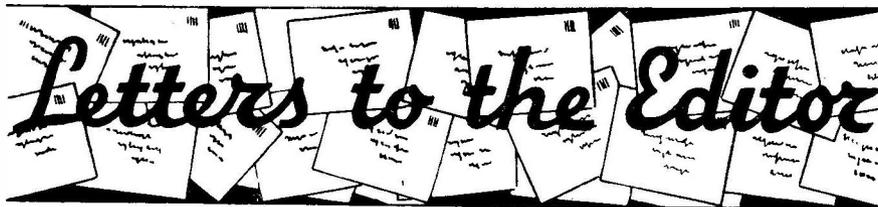
the same or slightly better than the 8JK. On 21 mc, a daily phone schedule with a W4 was maintained for a long period with few misses. In the Phone Section of the last CQ Contest some 22 zones and 40 countries were worked without operation being concentrated on 21 mc alone. The performance overall would appear to be an S-point down on a local equipped with a 3-element beam 45 feet high.

It is, of course, proposed to increase the height at a later date, which will necessitate a change in matching methods (merely to permit access from ground level) but it is felt that corrective stubs for both bands can quite easily be worked out from handbook data. Ten-metre

operation should also be possible.

In fact, DX QSO's have been made on this band simply by feeding with a tuned line. Unfortunately, a vertically polarised "Gee" (navigational aid) station on 31 mc is in operation only three miles away from G3FXB, so that the Quad, by virtue of its semi-vertical polarisation and lack of front-to-back ratio, is rather useless as a receiving aerial.

At more favoured locations, the Quad as described here should perform well and is offered as a multi-band rotary array where normal beams are not practicable. It will bring improved DX results to the "average" amateur station.



Letters published are those which seem to us to be of general interest, but should not be read as necessarily being in accordance with our own views on the subject. We welcome readers' comments.

SWL CARDS

SIR, — This country has 31 licensed amateurs, perhaps 15 of whom are active, and only three or four of us work the HF bands in English. The result is a deluge of SWL cards. I used to answer them all, as I do cards for QSO's, but HR3HH and myself (the two most active operators) now feel that we can only QSL listener reports if a reply coupon is enclosed.

For G's wanting an HR contact, I am on nearly every day at about 1200 GMT, and again between 2300 and 0200 GMT, usually near 21220 kc.

L. O. Williams, HR1LW, Apt. 93, Tegucigalpa, Honduras, South America.

denser is mounted on the front panel and wired across the RF stage grid coil. This aerial trimmer is set at half-capacity when the converter is being lined up.

Its use makes it possible to peak up the weak stations—which are always the most interesting — but tuning does not become a two-handed job. The alteration also improves the IF rejection; this was important at the time I did the modification, as from my window I had a nice view of the Straits of Gibraltar and the megawatt "Voice of America" station in Tangier.

D. W. Auton, G3IHI (ex-ZB2L), 34 Redcliffe Street, Swindon, Wilts.

map, then surely they ought to be able to finance the expedition without having to resort to these methods. If they can't, then they shouldn't go.

May I, at the risk of upsetting the Certificate enthusiasts, offer this simple solution: If these practices continue, let all the organisations that offer DX awards ban operators who charge for QSL's and refuse to accept cards from them as counting towards any certificate or award.

K. Smethurst, DL2UY (G3GPE, MP4BAD, YHIX), R.A.F. Scharfoldendorf, 26, Germany.

SIR,—A great deal has been said regarding the "Yasme Affair," but it appears to me that an important point has been overlooked. Much as we may deplore the ethics of the matter, it would seem that, human nature being what it is, it should not surprise us. Rather, one is pleasantly surprised that such cases are not more numerous.

Although discussion and constructive criticism are perhaps the only contributions amateurs can make where questionable ethics are involved, surely in this instance forceful action is possible in the purely legal sense? Here we have at least two Government

NOTE ON THE RF-24 CONVERTER

SIR,—I use an RF-24 unit as a broad-band converter along the lines suggested by G3KLC in his article "Surplus Converter for Surplus Receiver" (SHORT WAVE MAGAZINE, July), with two other surplus receivers, the B2 and BC-312.

I found that signal-to-noise ratio and signal strength were improved by removing the loading resistors across each of the RF stage trimmers. A 10 μ F variable con-

MORE "YASME" COMMENT

SIR, — On this dollar-a-QSL question, there is obviously only one answer, and that is "No." This form of QSL blackmail should cease immediately, and it is up to amateurs themselves to see that it is done—otherwise we shall find ourselves having to pay for cards in pesetas, roubles or zlotys!

If these fellows decide they must go and put some hitherto unamateur populated place on the

agencies of the British Commonwealth issuing an Amateur Radio licence to a blatant, undisguised, commercial operator in direct contravention of the accepted principles of amateur licensing.

If the regulations governing

Amateur Radio can be interpreted to permit the operation of an amateur station for the purpose of promoting the sale of QSL cards, who knows where it will all end?

This is a situation fraught with peril to Amateur Radio, and

surely it is time questions were asked by the officials of the agencies which have granted an amateur licence for what turns out to be a card-selling project.

G. V. Lawrence, VE4DB, 22 Avondale Road, Winnipeg 8, Manitoba, Canada.

"THE ZL SPECIAL"

G2RY of Bridport, Dorset, draws attention to the fact that in this article in our August issue, the matching stub E should be of 150-ohm twin-lead; if parallel Q-bars are used, they would need to be of $\frac{1}{2}$ in. tubing, spaced 4/5ths of an inch centre-to-centre, and 8ft. 1in. long for 29 mc. If open-wire line is substituted for the phasing link (F), instead of 300-ohm ribbon, the length of line would have to be increased by the ratio of the velocity factors 0.82 (for ribbon) and 0.95 for air-spaced line—say, an increase in length of 16%, making (F) 4ft. 5in. for ten metres, and 9ft. for 20 metres, when using open-wire line.

G3GZH MEETS "G3GZH"

It is not often that our excellent G.P.O. licence-issuing department falls into error — but it does happen to be true that callsign G3GZH was inadvertently issued to two different operators, one in London S.E.14, and the other in Bognor Regis. Nobody knew about it until they met on 80 metres one evening in July. The G.P.O. has made suitable amends and "G3GZH" of Bognor Regis is now G3KZH. However, having had a couple of months on the air as "G3GZH," he is busy sorting out a rather complicated QSL problem with the real G3GZH in London.

GOOD ATTENDANCE

At the recent annual general meeting of the Rhodesian Amateur Radio Association, at Gwelo, S. Rhodesia, 54 were present out of a total membership of 127, and another 32 sent proxies for the voting. This represents a total effective vote, at the meeting, of 67% of the membership.

"ONE MAN BRAINS TRUST"

Under this arresting heading, the P & O Company in their recent press advertising have been featuring M. J. Murphy, chief radio officer of the P & O s.s. *Strathnaver*. He is shown in the ship's radio room, wearing a headset, and by the intent look on his face C.R.O. Murphy is evidently tuning in some pretty difficult DX!

SYMBOLS FOR CLASSES OF EMISSION

Have you ever wondered what those symbols in col. 2 on p.3 of your Amateur Licence really mean? All of them, not just A3, which everyone knows is phone. Here is the decode:

The letters A, F and P signify amplitude, frequency and pulse modulation respectively; the suffix numerals 0-5, and 9, have definite meanings, thus: 0, continuous wave (or steady, unmodulated, unkeyed

carrier); 1, keyed continuous wave (CW); 2, keyed audio tone modulation on a carrier (ICW or MCW); 3, sound modulated carrier (phone); 4, facsimile fixed picture transmission; 5, television; and 9, "composite transmission." The small-letter suffix meanings are: a, a single-sideband, reduced carrier; b, two independent sidebands, reduced carrier; c, other emissions, reduced carrier; d, amplitude modulated pulse; and f, phase modulated pulse.

So A1 means CW transmission as we know it, A2 is MCW, and A3 is phone; A0 is when you run your carrier for a long time without doing anything to it! F1 is frequency shift keying (FSK). P3d, which we are allowed to do on the 10,000 mc band, works out to be none other than a pulse transmission amplitude modulated by ordinary speech. So far as we know, no single amateur has yet got on to pulse modulation on 3 centimetres.

TV AERIALS by LABGEAR

Known as the Bi-Square, the first "out-of-sight" TV aerial (for BBC Band I only) is designed to stand in any loft or roof space, and should be effective over a range of 40-50 miles. It is delivered pre-assembled, takes no more than a few minutes to put together, and no special mounting is needed. Because the Bi-Square is an indoor type, it meets the rising demand by town-planning authorities for truly unobtrusive TV aerials. The Bi-Square, with others of the Labgear range of TV aerials, as well as interference suppressors, filters and attenuators of various types and designs, were shown on their stand at the recent National Radio Show.

OBITUARY

We very much regret to have to record the deaths of:

Derek Bolton, G3DVB, of Liverpool, on August 4, at the early age of 30 years, as the result of a motor accident in Tanganyika. He was engaged to the sister of G3GST and at the time of his death, G3DVB was representing a Liverpool firm in VQ3.

* * * *

William Rees, GW3CR, of Gilfach Goch, South Wales, on August 17, after a long illness in hospital. He served in the Royal Air Force in both wars, and was a well-known amateur in the Rhondda Valley.

* * * *

We offer our sympathy and sincere condolences to the family and friends of G3DVB and GW3CR in their sad bereavement.

Top Band with the R.1155

NOTES ON A PRACTICABLE MODIFICATION

J. RICHARDSON (G3JKG)

ONE of the principal disadvantages of the R.1155 communication receiver (except for the model 1155N) is the non-coverage of 1,800 to 2,000 kc, now one of our most interesting communication channels. The simple modification described in this article should allow even the most inexperienced owner of this type of receiver to obtain coverage of the Top Band. The 160-metre converter previously employed by the writer for his R.1155 suffered severe damage in the removal from GM to the southern reaches of G country. In preparation for the coming winter, when it is hoped that G3JKG will be on the air again, something had to be done, and with minimum cost. Modifying the coils was the first thought. Then, fortunately, it was discovered that the slug cores gave sufficient variation to raise the band 500 kc to cover 1,500 to 2,000 kc for the loss of a few hundred uninteresting kilocycles at the lower end of the main tuning range.

Apparatus

Some form of signal generator giving an output in the range 1,000 to 2,000 kc, an output meter, a trimming tool and a small quantity of methylated spirits are what is required to effect the modification.

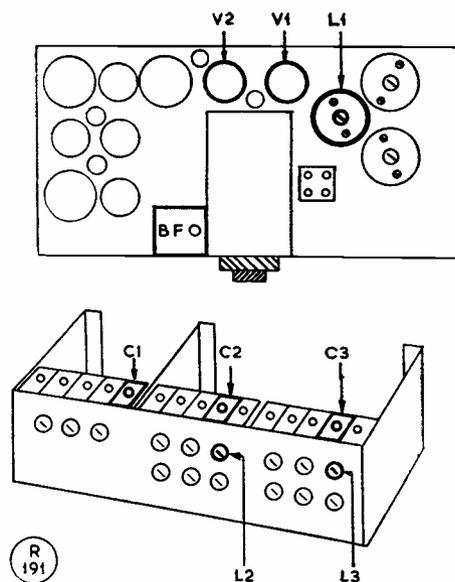
The second harmonic, 2,000 kc, of a 1,000 kc crystal oscillator will do as the "signal generator," and for the "output meter" an AVO on the 12mA AC range was used by the writer.

The upper sketch illustrates the position of L1, the RF amplifier grid circuit tuning coil; V1 is the RF amplifier and V2 the frequency changer.

The lower sketch shows the coil unit on the underside of the chassis looking from the front panel and indicates the location of L2, the hexode grid circuit tuning coil and L3, the local oscillator tuning coil. C1, C2 and C3 are respectively the RF amplifier, hexode and local oscillator trimming condensers.

Setting Frequency Range

With extreme care free the cores of the coils, using the methylated spirit to dissolve the seals. Disconnect the grid (top cap) of V2 and inject



In his article, G3JKG describes how Range 3 of an R.1155 can be modified to cover the 160-metre band. Readers comparing this sketch with the pictorial view of the R.1155 on p. 36 of the "T.1154/R.1155 Manual" will find V1 above shown as V3, and V2 as V4, with L1 marked as D/F (R.3).

a 2,000 kc signal. Set the pointer at the upper end of the scale with the range switch at the position 500/1500. Unscrew the core of L3 until a signal is heard; this will be four or five complete turns of the core. A quick check will show that 1,000 kc now corresponds to the 800 kc mark on the dial.

Replace top cap of V2 and disconnect grid top cap of V1. Inject the 2,000 kc signal at V1 grid and with the output meter connected, or an AC meter across the secondary of the output transformer, unscrew the core of L2 until a maximum deflection on the meter is obtained. Replace V1 grid and inject the signal at the aerial.

Now the top section of the core of L1 must be completely removed. This can be done by taking off the screening can, which is held by the two small screws on the top. The core section to be removed is held by the bakelite top which in turn is fixed by three long brass screws. Get these off and after taking out the top section of the core replace the bakelite and screening can. Adjust C1 for maximum deflection on the meter. The resultant tracking is reasonable over the band 1,800 kc to 2,000 kc but may be improved by adjusting the cores at 1,800 kc and the trimmers at 2,000 kc. Satisfactory tracking over the whole scale can hardly be possible since the coil-condenser combina-

tion was only designed to track over 500 kc to 1,500 kc.

Calibration

It will be found that 800, 1,400 and to the end of the scale correspond to 1,000, 1,800 and 2,000 kc respectively. Complete re-calibration can, of course, be carried out with a variable frequency signal generator.

The BBC stations can be marked in (see *Radio Times* for frequencies)—or by taking a connection from the stator of the BFO variable condenser (found just inside the top of the box

shown in the sketch) through a DC blocking capacity and wound round or positioned near the aerial, harmonics of the fundamental 280 kc will be found ranging from 840 kc to 1,960 kc. It should be noted that the accuracy of this latter method will depend on the setting of the BFO condenser.

Conclusion

Without producing selectivity and gain/frequency curves it is the writer's opinion that the selectivity and tracking of an R.1155 modified in this way are satisfactory over the desired band.

BRIMAR SENTERCEL METAL RECTIFIERS

As a result of the recent sharp increases in the price of selenium, combined with the national wage award in the engineering and allied industries, it has been necessary to increase the retail list prices of Brimar SenTerCel metal rectifiers as follows:—

	£	s.	d.
RM0	...	7	6
RM1	...	8	0
RM1A	...	12	6
RM2	...	8	6
RM3	...	11	10
RM4	...	1	3 9
RM5 (no change)	...	1	10 0
DRM1B	...	14	6
DRM2B	...	15	4
DRM3B	...	1	2 3

For the time being, the prices of the M1 and M3 and the "K" and "Q" range of rectifiers will be unchanged, but prices of the special spindle mounted stacks used in industrial and other applications have also been increased.

LET US KNOW

We are always interested in hearing how readers get on, not only with the constructional designs published in *SHORT WAVE MAGAZINE*, but also the circuits and practical ideas contained in almost every issue. We usually know about it if something *fails* to work out "as described"—but it would also be helpful to have a line from those who get the thing going without any trouble and to their entire satisfaction. In general, they are the ones who practically never write in!

LATEST SHIP-TO-SHORE TELEPHONE

Pye Marine Ltd. has been awarded a contract by the G.P.O. to supply and instal a VHF/FM Coastal R/T Station. This, the first of its kind to be set up in Britain, will be in operation on the Clyde this autumn, and should, in the view of the authorities, be of great assistance to shipping and trade. The Clyde station, using the "first choice International Marine VHF public correspondence channel" (frequencies 157.4 mc receive, 161.9 mc transmit) will also be the first station to operate to the new Inter-

national Maritime FM Standards proposed by the United Kingdom. The installation on the Clyde will be based on the FM version of the Pye Telecommunication "Ranger" series of equipment now going into production and will employ 100-watt transmitters.

It is expected that this will be followed by many such stations throughout the world, by which ships of all nations will be "on the telephone" to subscribers ashore at a very economical rate.

NEW BBC TV CAMERA

The first of the new Emitron cameras at Lime Grove was brought into service on August 3 when the programme "Nom-de-Plume" was transmitted from Studio D.

The pick-up tubes in these cameras are similar in principle to the former C.P.S. type, but an additional mesh on the scanning side of the mosaic greatly reduces the tendency to instability caused by excessive high-light brilliance. The tubes can accept an illumination of ten times the normal peak-white value without instability, and even when instability does set in, it is confined to the area immediately surrounding the point of excess brilliance. The former tendency for the instability to spread over the entire mosaic (causing the effect sometimes known as "peeling off") has been eliminated.

The fundamental sensitivity of the new tubes is approximately the same as the C.P.S. type, but their greater resistance to instability enables them to be worked with twice the previous signal current, giving higher signal-to-noise ratio and an increase in the acceptable contrast ratio.

The normal control of lighting within the camera is by a continuously variable neutral density filter which is remotely controlled. This makes it possible to work with a fixed lens aperture and therefore to maintain a constant depth of field under varying lighting conditions.

ANOTHER TTX STATION

G4XB of Cosham, Portsmouth, reports that he is now on 1820, 1900 and 1915 kc with a transistor transmitter. He can be found on 1820 kc most Sunday mornings from about 10.45 clock time.

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the quarterly issue of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

- G2DSF**, N. Booth, 49 Baggrave Street, Leicester, Leics.
- G3JDT**, B. J. Read, 28 Oxford Drive, Waterloo, Liverpool, 22.
- G3JRA**, J. R. Acworth, 64 College Road, Bromley, Kent.
- G3KQU**, J. Thompson, 27 Chester Road, West Hartlepool, Co. Durham. (Tel.: *Hartlepool 5418*.)
- G3KSG**, F. L. Bones, 45 Merlin Road, Scunthorpe, Lincs.
- G3KVC**, K. J. Thomas, 19 Hillcrest Road, Whyteleafe, Surrey.
- G3KVP**, D. Kitchen, 27 Masefield Crescent, Balderton, Newark, Notts.
- GW3KWB**, R. H. Neville, 15 Brynderwen Road, Newport, Mon.
- GW3KWY**, A. Swain, 32 Hawarden Road, Penyffordd, Chester. (*QTH in Flintshire.*)
- G3KWY/A**, A. Swain (*QSL to GW3KWY.*)
- G3KZH**, A. F. Halcrow, 30 Nor' Bren Avenue, Bognor Regis, Sussex.
- G3KZW**, R. Ratcliffe, 41 Booths Brow Road, North Ashton, nr. Wigan, Lancs.
- G3LBC**, M. McGill, 32 Borrowdale Road, Mirehouse, Whitehaven, Cumberland.
- G3LBG**, J. N. T. Willmott, 84 Havering C. dens, Chadwell Heath, Romford, Essex.
- G3LBH**, D. A. Hunt, 18 Maiden Lane, Langley Green, Crawley, Sussex. (Tel.: *Crawley 2128*.)
- G3LBO**, P. Laughton, 13 Oakwood Drive, Rotherham, Yorkshire. (Tel.: *Rotherham 5159*.)
- G3LBP**, J. T. Wood, 8 Manor Park, Silkstone, Barnsley, Yorkshire.
- G3LBQ**, H. Cadman, 15 Rowan Road, Brentford, Middlesex.
- G3LBR**, F. Richardson, 16 Childeray Street, Stockton-on-Tees, Co. Durham.
- G3LBW**, J. R. Bird, 15 Conway Road, Redcar, Yorkshire.
- G3LCA**, C. F. Hutchings, 40 Cyprus Avenue, Finchley, London, N.3.
- G3LCB**, R. E. Wolpers, 19 Cedar Avenue, Sidcup, Kent.
- G3LCG**, G. P. Bateman (*ex-ZC4PB*), 21 Meadow Road, Woodhouse Eaves, nr. Loughborough, Leics.
- G3LCI**, H. V. Young, 9 Eastcroft Road, Wallasey, Cheshire.
- G3LCM**, L. C. Mansfield, 131 Waddington Avenue, Old Coulsdon, Surrey.
- GW3LCQ**, M. Williams, 12 Penrhos Avenue, Llandudno Junction, Caerns.
- G3LCR**, D. Garlick, 255 Beacon Road, Horton Bank Top, Bradford 6, Yorkshire.
- G3LCT**, A. Kennedy, 70 Queens Road, Blackhill, Consett, Co. Durham.
- G3LCZ**, T. W. Hickinbottom, 13 Almond Grove, Fairfield, Stockton-on-Tees, Co. Durham.
- G3LDB**, C. B. Cox, 92 Garibaldi Street, Grimsby, Lincs.
- G3LDF**, F. Unsworth, 88 Ormskirk Road, Up Holland, nr. Wigan, Lancs.
- G3LDL**, A. D. Moore, 2 Wesley Place, Snaith, Goole, Yorkshire.

CHANGE OF ADDRESS

- G2CMH**, R. T. Henley, 35 Wilmington Way, Brighton 6, Sussex.
- G2DPA**, R. Parnaby, Police House, Holme-on-Spalding-Moor, York, Yorkshire. (Tel.: *Holme/Moor 202*.)
- G3ABA**, L. J. Kennard, 53 High View Road, Guildford, Surrey. (Tel.: *Guildford 2681*.)
- G3AUZ**, M. W. Parry, Hawthorne, The Balk, Blyth Road, Worksop, Notts.
- G3BJR**, D. G. Hopkins, 74 Weighton Road, Harrow Weald, Middlesex.

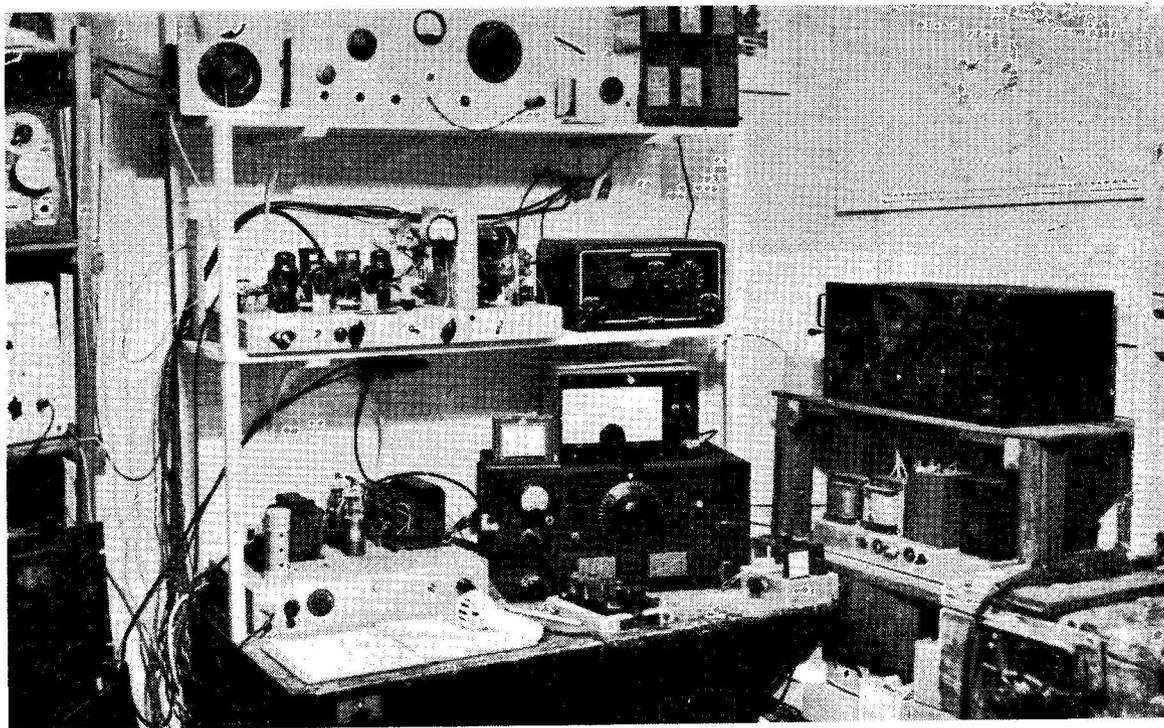
- G3DCJ**, J. E. Wootton, 18 Atlantic Crescent, Sennen, Penzance, Cornwall.
- G3DCT**, P. H. J. Green (*ex-VSACT/VSSCT/ZCSCT*), 21 The Ridgeway, St. Albans, Herts.
- GW3DNF**, Dr. G. J. Bennett (*ex-G3DNF*), 11 Charles Street, Rhos-y-Waen, Chirk, Denbighshire.
- G3DNR**, P. O'Brien, 6 Catherine Way, Stanley Road, Broadstairs, Kent.
- GW3EJR**, J. B. Armstrong (*ex-G3EJR*), 32 Hillfield Place, Parclyn, Aberporth, Cardigan.
- GW3FXR**, L. J. David (*ex-G3FXR*), 142 Western Avenue, Sand Fields, Port Talbot, Glam.
- G3FZR**, M. W. Capewell, 27 Tudor Grove, Thornhill Park, Streetly, Sutton Coldfield, Warks.
- GM3GCA**, A. W. Dunsire, Walnut Cottage, Balcurvie, Windygates, Fife.
- G3HHN**, R. J. Armstrong, Erganagh, Castlederg, Co. Tyrone.
- G3HJL**, F. R. Bailey, 91 Purford Green, Harlow, Essex.
- G3IGG**, J. P. G. Jones, 26 Hooton Way, Hooton, Wirral, Cheshire.
- G3IUE**, M. W. Newell, No. 1 The Bungalows, Green Lane, Radnage, nr. High Wycombe, Bucks.
- G3JXN**, Dr. J. E. Tindle, 15 Byford Road, Leicester, Leics. (Tel.: *Leicester 62502*.)
- G3JXN/A**, Dr. J. E. Tindle, Royal Free Hospital, Hampstead, London, N.W.3 (*QSL to G3JXN*.)
- G3KMZ**, P. W. F. Porter, 31 Cavendish Drive, Edgware, Middlesex. (Tel.: *EDG. 4377*.)
- G3QJ**, J. S. Dunn, Garden Reach, Carr Lane, Riddlesden, Keighley, Yorkshire. (Tel.: *Keighley 4576*.)

CORRECTION

- G3AAV**, G. N. Glover, 166 Otley Road, Leeds 16, Yorkshire.
- G3KFW**, G. Ripley, 8 Old Downs, Hartley, Dartford, Kent.

The Other Man's Station

G2FUU



SINCE this photograph was taken, the station of G2FUU—owned and operated by T. Knight at Hoddesden, Herts.—has been moved to Homefield, Upper Nazeing, Waltham Abbey, Essex. When at Hoddesden, G2FUU found time rather limited and the gear was usually in a “lash-up” condition, particularly as his main interests are experimental work and construction. On the operating side, G2FUU likes talking technicalities over the air; DX is never attempted for its rarity, but only for the interest in working whatever may come along.

The equipment shown here is for phone operation on all bands 1.7 to 2.8 mc, excluding only 40 metres. G2FUU was one of those who originally held an “AA” call (*see* p.201, June issue), obtained in 1938, and his 160-metre transmitter is the original 6L6-RK25 experimental layout of those days; it is now plate-screen modulated, and VFO controlled.

Output from the VFO is on 1.7 and 3.5 mc, the circuit being Franklin 6SN7 into a 6SH7 buffer and 6V6 driver stage with a “self resonant” anode load. The HF band transmitter runs an 829B double tetrode, connected push-pull, as a PA, with 60-70 watts input. This is modulated by a pair of 807's at 700v., with HT supplied by GU50 rectifiers. The speech amplifier is 6J7-6SN7-6SN7 with an Acos Type 30 microphone, and it is interesting to note that the audio output

from the modulator is taken at 15 ohms, thus allowing low-impedance line to be used for coupling into the transmitters, each of which has its own step-up modulation transformer for correct matching into the PA.

Receivers are BC-348, HRO and SX-28, with a Panadaptor unit (seen on the middle shelf), for visual monitoring of any given frequency band, together with some RF27's converted for various purposes, including two metres. Other apparatus includes a signal generator and Type C wavemeter, a crystal calibrator and multivibrator giving 10 and 100 kc points from a 1000 kc bar, and an absorption wave-meter.

At Hoddesden, which was a relatively poor location, the aerial system consisted of a 135ft. end-fed wire (with a similar counterpoise) for 160-metre operation; a 66ft. roof fed at the 70-ohm point 8ft. 9in. from one end, which gave an “average match” for 14, 21 and 28 mc; a ground-plane for 14 mc; and a 21 mc rotatable dipole.

From the new location at Upper Nazeing, G2FUU — whose full licence was issued on the resumption in 1946, after his war-time service on radar in the R.A.F. — hopes to do better with the DX and also looks forward to some activity on VHF.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Dead-line for October Issue : SEPTEMBER 14)

AS is customary in our September issue, we have pleasure in announcing the dates for this year's *Magazine Club Contest*—the Eleventh MCC since this popular annual event was inaugurated in 1946.

This year's dates will be November 17/18 and November 24/25. In response to the wishes of many of last year's contestants, the operating time will be reduced to three hours on each of the four days, the operating period now being 1600 to 1900 GMT on each day.

Several clubs appealed for a later start than the 1500 of last year; and others suggested that the whole contest would be much livened up if clubs only had three hours in which to work each other at each session, instead of four.

So we combine the two suggestions and will see how things go with four sessions of 1600-1900 GMT. If there is a heavy entry, some snappy working of fellow-competitors will be needed if all clubs are to be rounded up at each session.

In all other respects the rules will be unaltered, and will be printed in full next month.

ACTIVITY REPORTS

The **Shefford** weekly meetings are on Fridays at Digswell House, commencing at 7.30 p.m. with a regular Morse class. September 21 will be devoted to a debate on field day results, and on the 28th there will be a transmitter demonstration.

Bailleul will have a station on the air in the Low Power Contest, and will also be taking part in M.C.C. A healthy financial situation has brought the subscription down to half its former rate.

Basildon is a new club formed to cater for the large number of amateurs in Basildon New Town. Membership is fifty already, with a "hard core" of some six licensed amateurs. As soon as suitable premises have been found, they will go ahead with a programme to cater for all members and all interests.

The **British Amateur Television Club** holds its Convention this year on Saturday, October 27, at the Bonnington Hotel, Southampton Row, W.C.2, from 10 a.m. until 7 p.m. Demonstrations of members' equipment will be given, as well as a Film Show. Tickets (members 3s. 6d., non-members 5s.) will be on sale at the door, or in advance from D. S. Reid, 4 Bishop Road, Chelmsford.

The **Midlands** Group of the B.A.T.C. will be meeting on September 13 at the White Swan Inn, Edmund Street, Birmingham (7.45 p.m.), when it will resume active work after the holiday break. A

"live" camera is under construction and the telecine equipment is now in good shape.

New members of the **British Two-Call Club** include G3JJP/DL2XY, GM3KCY/DL2VX, G3KOJ/ZB1PP, G3KXI/ZB1DK, G3JGR/4S7GS, and VK9OQ/VK3AOQ. This year's president is G3DGN, and the vice-president G5KW.

Clifton meet on September 7 and 21 for Constructional Evenings and ragchews, on the 14th for their A.G.M. and on the 28th for a Junk Sale. All meetings are at 225 New Cross Road, London, S.E.14, at 7.30 p.m.

Cray Valley will meet on September 25 at the Station Hotel, Sidcup, for a talk by G8KW on VHF Mobile Communication, with particular reference to the Hamobile equipment. Various types will be demonstrated.

East Kent meets at the Two Brothers, Northgate Street, Canterbury, as, owing to holidays, the permanent headquarters are not available. **Leeds** begin

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE :

BAILLEUL : T. Holbert, G3DXJ, B.R.S., Bailleul Camp, Arborfield, Berks.
BASILDON : R. G. Storey, G3LBT, 1 The Hedgerow, Vange, Basildon, Essex.
B.A.T.C. : D. W. Wheele, G3AKJ, 56 Burlington Gardens, Chadwell Heath, Romford. Midlands : F. J. Rawle, G3FHZ, 16 King's Rd, New Oscott, Sutton Coldfield, Birmingham 23.
BRITISH TWO-CALL CLUB : G. V. Haylock, G2DHV, 63 Lewisham Hill, London, S.E.13.
CLIFTON : C. H. Bullivant, G3DIC, 25 St. Fillans Road, London S.E.6.
CRAY VALLEY : S. W. Coursey, G3JJC, 49 Dulverton Road, London, S.E.9.
CRYSTAL PALACE : G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
EAST KENT : D. Williams, Llandogo, Bridge, near Canterbury.
LEEDS : A. Chapman, 9 Cockshott Close, Leeds 12.
LIVERPOOL : A. D. H. Looney, 81 Alstonfield Road, Knotty Ash, Liverpool 14.
NEWBURY : N.A.D.A.R.S., 83 Newton Road, Newbury, Berks.
NORTH KENT : F. Beadle, G3KLI, 56 Balliol Road, Welling.
NOTTINGHAM : J. Rayner, G3KTQ, 28 Tetterbury Road, Basford, Nottingham.
PURLEY : E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
RADIO AMATEUR INVALID & BEDFAST CLUB : W. Harris, 25 Playford Lane, Rushmere, Ipswich, Suffolk.
RAVENSBORNE : J. H. F. Wilshaw, 4 Station Road, Bromley, Kent.
SHEFFORD : G. R. Cobb, G3IXG, 7 Hitchin Road, Shefford, Beds.
SLADE : C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTHGATE : G. I. Turner, G3DGN, Deegeen, Clifford Road, New Barnet, Herts.
SOUTH MANCHESTER : M. Barnsley, G3HZM, 17 Score Street, Bradford, Manchester 11.
SURREY (CROYDON) : S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
SWINDON : F. G. Whately, 6 Crombey Street, Swindon.
TORBAY : L. D. Webber, G3GDW, 43 Lime Tree Walk, Newton Abbot.
WORTHING : J. F. Wells, 37 Salvington Gardens, Worthing.

their new season on September 26 with the officers elected at their recent A.G.M.—President, G3AHU; chairman, Mr. N. B. Bridges; secretary, Mr. A. Chapman; and treasurer, G4AD.

Liverpool ran a very successful “/A” site on August 6, at a Garden Fete in aid of charities. Three stations were active, covering the 1.7, 3.5, 14, 21 and 144 mc bands. The club team were placed second in a recent D-F Contest organised by the Association of North Western Radio Societies. Evening contests of this type have given the club much amusing activity this season. The new session commences in September with a “super junk sale.”

Newbury open their new season with a meeting at Elliott's Canteen, West Street, Newbury, on September 28. On this occasion they will be addressed by the Astronomer Royal on Astronomy and Cosmology. Tickets are free, but must be applied for, with stamped addressed envelope addressed to NADARS, 83 Newton Road, Newbury, Berks.

North Kent meet on September 13 to hear a tape-recorded lecture by Capt. P. P. Eckersley on Radio Through the Years. On September 27 G4ZU will be talking to them on his Minibeam. For these events the club have hired a hall at the Congregational Church, Bexleyheath, and all are invited to attend.

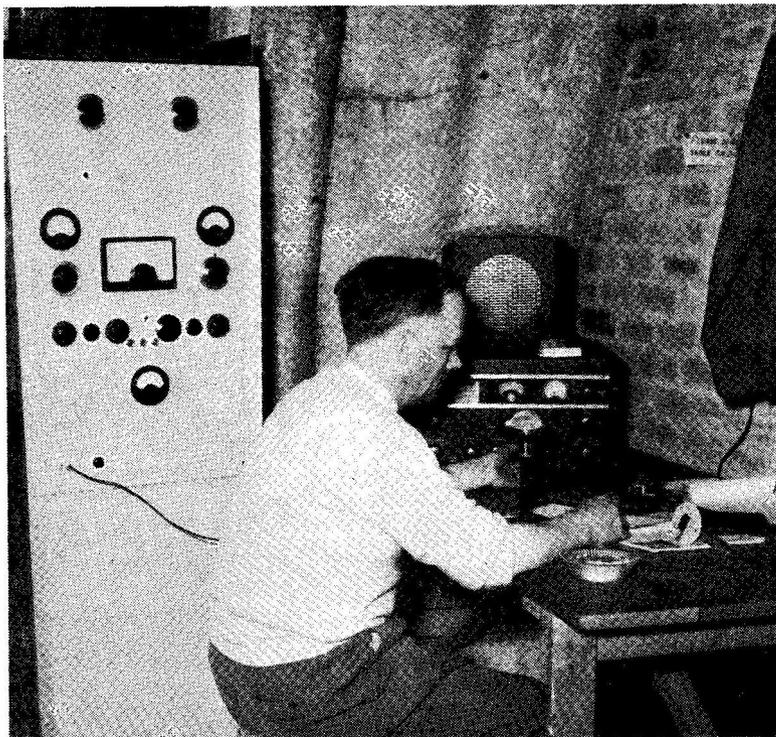
The **Radio Amateur Invalid and Bedfast Club** publish news of their members' activities in a mimeograph called “Radial,” of which full particulars are available from the secretary (*see panel*).

Slade will hear a talk on Automation at their September 14 meeting. On September 28 Messrs H. and D. Wilson will be giving a Film Show. The Club Tx G3JBN is available for the use of members every day, and instructional and constructional classes are held on Tuesday and Wednesday evenings.

Worthing are holding their A.G.M. on September 10, 8 p.m. at their usual meeting-place — the Adult Education Centre, Union Place, Worthing.

Nottingham (Amateur Radio Club) took part in the Garden Party of the Sherwood Community Association, when a very attentive audience watched G3IQM and helpers operating 80-metre phone. At the general meeting in August a sub-committee was appointed to manage the contest side of activities during the coming season. The club call G3EKW should be heard frequently from September onwards.

Purley heard a talk by G3DPW on Radio Control of



When the Midland Amateur Radio Society held their own field week-end over July 7/8 — as reported in August “Month with the Clubs” — this was the LF band station, signing G3JDJ/P.

Model Boats at their August meeting. The September gathering will take the form of a Junk Sale, and there will also be a visit to the BBC at Tatsfield during the month. The recent Summer Fair involved the club in much activity and was a very successful event.

Ravensbourne resume activities in full during September. A recent exhibition was very successful, with G3HEV, G3FT1/A and G2DHV/A active on 1.7 to 21 mc.

South Manchester meet on September 7 for a discussion on TVI; on the 21st G3DQU will talk on the Propagation of Radio Waves, and October 5 is the date of the A.G.M. An R.A.E. course has been arranged, and will run on Monday evenings from October 18.

Southgate, Finchley and District resume meetings on September 13 at the Arnos School. No agenda has yet been fixed. During August the Group were very active at the Friern Barnet Summer Show with a working station operated on several bands with equipment lent by G3DOX and G3BWQ.

Crystal Palace will hear G3BCM on his prize-

Deadline for next month's reports is: **Friday, September 14**. They should be addressed to “Club Secretary,” *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

winning home-built Transmitter-Receiver at their meeting on September 15. On October 20 their speaker will be G4ZU, on the design of his Mini-beam. Both meetings 7.30 p.m. at Windermere House, Westow Street, S.E.19.

Surrey (Croydon) report a very good attendance for the recent lecture on the Radio Organisation of the A.A.—even during the holiday month. The September Junk Sale takes place on the 11th, and the main worry is that there is usually too much gear and too little time.

PHILIPS UNIVERSAL MEASURING INSTRUMENT

An extremely versatile and compact instrument which can be used for measuring AC or DC voltages and currents, resistances and capacities, is now available from Philips Electrical Limited. Measurements—except those of direct voltage and current—are made electronically, achieving, it is claimed, greater accuracy than is possible with conventional moving-coil instruments.

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<i>Direct Voltage :</i>	20 mV to 1kV. (An HT probe can be supplied for 1-30kV.)
<i>Alternating Voltage :</i>	100 mV to 300 V at 20 c/s-100 mc. (For frequencies in excess of 100 mc a separate diode probe can be supplied.)
<i>Direct Current :</i>	10 micro-amps to 1 amp.
<i>Alternating Current :</i>	0.1 micro-amps to 10 mA at 20-1000 c/s. 10 micro-amps to 1 amp at 20 c/s-100 kc.
<i>Resistance :</i>	1 ohm to 1000 M/ohms.
<i>Capacitance :</i>	30 μ F to 3 μ F.

The instrument is provided with a switch to reverse polarity when measuring positive and negative voltages in succession. Calibrating voltages of 1v. and 30v. are built in and the instrument is fully protected against overloading.

BBC's NEW MOBILE STUDIO

A Mobile Studio and Control Room, designed by the BBC's Engineering Division, is on the road, and has already been used for outside broadcasts. The new vehicle weighs nearly 4½ tons and is 22ft. long, 7ft. 6ins. wide and 9ft. high from road level. It contains an acoustically-treated studio some 10ft. long by 7ft. wide, together with a control room which provides facilities for controlling the output of the studio and a number of external sources, such as commentators' microphones, which may be located at scattered points over the site of a large outside broadcast. Provision is also made for recording and reproducing programmes, for the introduction of effects from gramophone discs and for the reception of speech from commentators using a radio microphone.

Telephones are provided for communication with permanent BBC centres and other points, while the control engineer's and producer's positions are

Swindon have a full list of activities for the new season, and the September meeting will be devoted to a Comparative Demonstration between FM/VHF and Medium-Wave broadcast reception, by G3FLB. For October it is hoped to arrange a lecture on Interference Suppression.

Torbay continue to meet on the third Saturday, and at the September gathering Mr. Olway will talk on Meters and Their Uses. Three members, one sightless, have passed R.A.E., and Morse classes are now being run. Meetings are at the YMCA, Torquay.

equipped with talk-back facilities enabling them to speak to the studio, or to the commentators for briefing. A radio receiver is provided from which a programme can be fed for cueing purposes to any desired point connected to the mobile studio and control room. The output from the mobile control room can be sent to the nearest permanent BBC centre, either over Post Office lines or over radio circuits. Duplicate transmitters have been installed in the vehicle for the latter purpose. The whole equipment can be operated from the public electricity supply or from built-in batteries, which can be recharged whenever a mains supply is available.

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MILLION WORDS ON TAPE

A novel talking exhibit was staged by Multicore Solders Limited on their stand at the National Radio Show. This company manufactures the "Bib Recording Tape Splicer," and the demonstration took the form of a message recorded on 20 odd pieces of recording tape jointed with a Bib Tape Splicer. Every word could be heard clearly, despite the 20 joints, through three handsets on the stand connected to a Tape Recorder, which throughout the period of the Show continuously played a 20-ft. loop of tape. During the run of the Exhibition, it is estimated that almost a million words were heard, equal to about three average novels.

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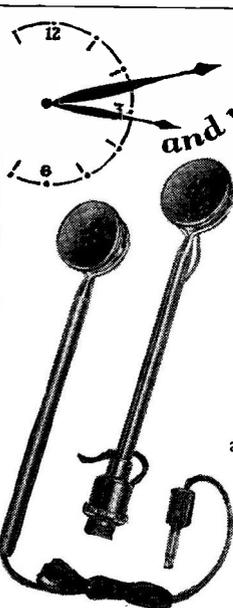
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Catalogue Ref. No.	Alloy Tin/Lead	S.W.G.	Approx. length per carton
C 16014	60/40	14	19 feet
C 16018	60/40	18	51 feet
C 14013	40/60	13	17 feet
C 14016	40/60	16	36 feet

SIZE 1 CARTON 5/- each (subject)



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Strips insulation without nicking the wire and splits twin flex. Adjustable to most wire thicknesses. Nickel plated and in cartons with full instructions. 3/6 each (subject)

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SALE: £16 TAPE RECORDER KITS, VESPA STAPE DECK, TAPE, VALVES, MAINS TRANSFORMER, CIRCUIT DETAILS, ETC. EVERYTHING DOWN TO THE LAST NUT AND BOLT.—TUBB, 70 CORONATION ROAD, SHEERNESS, KENT.

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WIRELESS SET TR 1934, 1935, 1936; RT18/ARC-1; Terminals 1 + 1, 1 + 4; Bays No. 1 and 2, 3-channel duplex—Wanted by R. Gilfillan & Co. Ltd., 7 High Street, Worthing, Sussex.

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WANTED: Tuning Units Type 170, Ref. 10D/17698; Rotary Transformers Type 3, Ref. 10K/1957; Transmitter/Receivers RT18/ARCI and AN/ARC3. — R. Gilfillan & Co. Ltd., 7 High Street, Worthing, Sussex.

QSL CARDS AND LOG BOOKS, G.P.O. APPROVED, CHEAPEST, BEST. PROMPT DELIVERY, SAMPLES. — ATKINSON BROS., PRINTERS, ELLAND, YORKS.

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TU5B 10/-; TU7B, less case, 7/6. 1117 Wave-meter, less meter, 30/-; 3½-inch 500 microamp meter, 25/-. Wanted: 1.7 mc Command Receiver.—Barnes, 104a Tudor Drive, Morden, Surrey.

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SMALL ADVERTISEMENTS, READERS—continued

WANTED: Circuit and Gen. on Hambander Communication Rx, Serial Number 587.—West, 23 Palmer Road, Poole, Dorset.

FOR SALE: Grundig TK9 Tape Recorder, little used, eighteen months old, with Grundig Ribbon mike and Acos crystal mike, six reels tape; cost over £90, sell £55 o.n.o. Also Canadian 48 T/R, as new, with mike, key, headphones, handbook, and spare valves, £5 o.n.o. BC348, new front panel, wooden case, £10 o.n.o. Newnes' *Radio Servicing Data Books*, five volumes, perfect condition; cost over £9, sell £5. Buyer collects large articles, or special arrangements made. — Write A. J. Hibberd, 13 Coverley Place, Rigby, Warks.

250-WATT Audio Modulator with Woden UM4 Transformer, new TZ40's and multi-match Driver Speech Amplifier with low level clipper for above, both in grey steel cabinets, £20 or nearest offer. HT supplies extra. Delivered 50-mile radius, otherwise buyer collects. — Marshall, G2MA, 57 Godstone Road, Rotherham, Yorks.

SX-28 Receiver, £32 10s. Signal Generator. Marconi Type TF762A, 430 to 610 mc, £15. Signal Generator Type 47, 9500 mc, rough externally, £4. C.N.Y. Rx, rebuilt with power pack in steel case, £6 10s. Mains transformer for Sx-24, £1 10s. Pair 35T's, 35/-. Reasonable offers considered. — Apply Webb, 9 Wick Farm Road, Littlehampton.

640 EDDYSTONE, perfect, three-month guarantee, £19. Free delivery 30 miles.—Anderson, 372 Trelawney Avenue, Langley, Slough, Bucks.

AMATEUR selling up. All gear and large quantity of components, including over 200 Rx and Tx valves, £50 the lot.—Apply R. F. Read, 26 Hillside, Little Thurrock, Grays, Essex.

SX-28, power pack and Band 6 require attention, £30. Buyer collects.—Baker, 40 Redhill Lodge Drive, Arnold, Nottingham.

COMPONENTS. A quantity of radio components for sale, valves, condensers, resistors, etc., £5.—Carpenter, 86 Locket Road, Wealdstone, Harrow, Middx.

HALLICRAFTER S-27 with standard S-meter, as new, £30. Q-Max VHF Converter with 4 coils, £5. 2000v. mains transformer at 500 mA, £2. Pair 100TH's, 30/-; 832 valves, 15/- each, 829B £1. Bendix TA-12, unmodified, complete with all valves, £10. A considerable amount of other equipment for disposal. — G3XC, 33 Kendal Drive, Slough, Bucks. (Tel.: Slough 22566.)

R107, 1.2 to 18 mc, 9 valves, good condition, with manual; nearest £12.—G3FHH, 111 Burnside Avenue, Skipton, Yorks.

HRO power pack, 4-coils, 1.9-14 BS, 14-30 GC. G2IQ and Cascode 144 mc converters. G2DD 70 cm. converters. 20ft. alloy mast with 4-element Yagi, rotating head. Two Selsyn motors. RF 105 unit, CV82, 2 CV53 valves; rack 6ft., power pack, 250v. 6.3v. *Wireless World* from 1942, *Short Wave Magazine* and *R.S.G.B. Bulletins*. £38 the lot or separately, buyer collects. — Mancey, 8 Stuart Road, Thornton Heath, Surrey.

SMALL ADVERTISEMENTS, READERS—continued

CR-100 £15; crystal controlled two-meter converter, IF 27-29 mc, £5; American Services Oscilloscope, 110v. AC, £8; 62A unit, 50/-; Gee Mains p/pack, 60/-. Buyer collects London.—Box No. 1708, The Short Wave Magazine, Ltd., 55 Victoria Street, S.W.1.

FOR SALE: Two new HRO's complete with coils. bandspread 80, 40, 20, 10 metres, £27 10s. each. Two complete sets of new bandspread coils, £12 per set. B2 Tx/Rx, as new in original leather suitcase, £20. Army 12 Transmitter with spare PA valve, Ant. tuning unit, remote control unit, £20. Army 12 Xformer, £2, new. QVO4-7 new boxed, 10s. Wanted: Transformer 1000-0-1000 volts at 500 mA, or similar voltage rating, and AR88 cabinet.—R. Field, 103 Claybrook Road, Hammersmith, W.6. (Ful. 0701.)

WANTED: Eddystone or similar Communications Receiver; ex-Govt. not objected to; must be reasonable price.—Perry, 55 Woodview, Grays, Essex.

JERSEY holiday: Stay at "The Lincoln." 3 St. Saviours Road; near sea/town centre. Ham shack; photo dark-room; s.a.e. please for brochure.

BRT-400D Rx £100, Labgear LG-300 Mk. II Tx with 813, £52 10s. 0d., Labgear LP filter, £5; all above items perfect. T.131 Mod. p/pack (1000v. 500 mA. 300v. 200 mA, 130v. 30 mA) £10; Acos "22" mike. new, 3 gns. Xtal calibrator 1,000 kc. 100 kc, 10 kc. including AC mains p/pack, £7 10s. 0d. Complete set transformers for 80w. modulator, all Woden. new unused: 750-0-750v. 250mA, 12H 250mA. 3-13-0-3-15v. 4A. 2-0-2v. 6A, DT3, UM3. £15 the lot. cost over £20 new. Also Minimitter ATU, as new, £10; The Lot, including relays and switchery, delivered 100 miles, £200. — 30 Priory Terrace, Stamford. Lincs.

PETROL generator, brand new 2 h.p. side-valve engine. with oil bath air filter and governor, coupled to 500w. 12 or 24v. generator, volt, amp meters. Portable, perfect working, £12 10s. 0d. or near offer.—B. Cedar, 9 North Drive, Streatham, London. S.W.16. (Phone: STR. 1388, call after 8 p.m.)

SALE: Tx 80/40/20/10m., 813/PA, 807/mod., P/Spacks, in open rack, 60ins. x 21ins. (5 panels). £35 o.n.o. VFO (TU7B) 50/-; Rx BC-348 and external p/pack. perfect condition, £15; Class-D Wavemeter, £4; 30ft. alloy mast (one piece) £3. Partially completed 2m. equipment, various xtals, 807's; RF-26 unit. Morse keys, carbon microphone, numerous small components. quantity magazines, offers? Buyer collects. — Apply evenings: Mrs. Whiteoak, 220 Skipton Road, Colne, Lancs. (Tel.: Colne 723).

AMERICAN Panoramic Viewer containing 13 valves. 5in. CRT, own internal power pack, in black crackle case, £15, plus carriage. 20-watt amplifier, 5 valves, own internal power pack, controls; bass, treble, volume and switched input for crystal, moving coil and carbon, £10 plus carriage, s.a.e. for replies.—J. A. S. Wootton, 152 West Street, Crewe, Cheshire.

EDDYSTONE 640 for sale, this receiver is in perfect condition and unmodified. Manual available. £20. All offers considered.—Storey, 84 Twining Avenue, Twickenham.

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ECC81 ... 9/-	SP61 ... 4/-	6J6 ... 7/6	12J7 ... 7/6
ECL81 ... 9/-	T41 ... 7/6	6J7 ... 7/6	12K7 ... 7/6
ECL80 ... 9/-	VP23 ... 6/-	6K7 ... 6/-	12K8 ... 7/6
EF36 ... 6/6	VR116 ... 6/-	6L6 ... 10/-	12Q7 ... 7/6
EF37A ... 12/6	VU111 ... 4/-	6N7 ... 7/6	76 ... 7/6
EF39 ... 6/-	OZ4A ... 6/6	6Q7 ... 8/6	807 ... 3/6
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EL38 ... 10/-	6BW6 ... 8/6	6U4 ... 7/6	

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Reliable Surplus Valves—Final Price Reductions. 12H6, 1/-; EB34, 9004, 1/9; 2C26, EC31, 2/6; 6SK7GT, KTZ63, 3/9; KTZ41, D77, 4/3; 6J7, 4/9; 6Q7GT, 6/9; 80, 7/6; KT33C, 8/-.

The following are in Maker's Cartons. VU111, 2/3; 6H6, 2/9; 954, 3/-; 6SK7, 3/9; 6SH7, 6K6GT, 4/9. Special offer of 6 valves, 1 each 6SK7, 6SH7, 6K6GT, 80, EB34 and 1246 for 13/9, plus 1/6, p. and p.

VCR97 Cathode Ray Tubes with socket. Full picture, 35/-; slight restriction (outside mask limits), 25/-; cut off, suitable for oscilloscope, 12/6. carriage 2/6 extra. Bargain assortment of 1 to 5 watt resistors, 25 for 5/-.

Midget Ceramic Condensers. 1,2,3,4,7,5,10,15,22,27,33,39,47,56,75,100,150,220,270,330,390,470,680,1000,1500,2000,3000 pf. 8d. each, 7/6 doz. 5000,10,000 pf., 10d. each, 9/6 doz. 1 mm. Green Peribraid sleeving, 216 yds. for 11/6, post free.

Heavy Duty Twin Screened Cable, 9d. yd.

Electrolytic Condensers. 20 µF, 50v., 1/3; 50 µF, 12v., 1/9; 50 µF, 50v., 2/-; 8 µF, 450v., 2/3; 16 and 32 µF, 350v., 4/3; 32 and 32 µF, 350v., 5/3.

Please allow for postage on orders less than £1.

2a, BURNLEY ROAD

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AINSDALE SOUTHPORT

SMALL ADVERTISEMENTS, READERS—*continued*

SALE or exchange 14-21-28 mc Tx, VFO frequency multiplier, push-pull 807 PA, what offers? Box No. 1709, The Short Wave Magazine, Ltd., 55 Victoria Street, S.W.1.

WANTED: Panda PR-120-V Table Topper, must be in good order, no alterations, state price.—Box No. 1800, The Short Wave Magazine, Ltd., 55 Victoria Street, S.W.1.

CLIFTON Tape Deck, 3-motor 2-speed, hardly used, erase bias oscillator unit, £5; exchanges. W.H.Y.?—J. Brown, Waterworks, Penryn, Cornwall.

813 £2, 832 £1, 832A £1 10s. 0d., 829 £3, other valves available. 365 μ F variable condenser for Elizabethan or Z-match A.T.U., 7/6d. HRO receiver, six coils, power pack and speaker. £20. RME 70 receiver, with two valve preselector, £20. Other gear, lists s.a.e.—G3IDW, 136 Beech Avenue, Swindon, Wilts.

GOING abroad, must sell, 50w all-band Tx, as G5RV. Separate VFO self contained. 100w 829B 10m PA. 2m Tx with 829B PA, 80w Modulator. Power supplies, 2 racks, home built Rx with Denco coil turret. Operating desk 5 x 2½ feet. What offers?—J. A. Lowe, G3GVF, Hillside, Hartley Wintney, Hants.

HALLICRAFTERS SX24. Good condition, £20 or near offer, or would consider part exchange for AR88LF. Buyer collects—Merseyside.—Box No. 1803, The Short Wave Magazine, Ltd., 55 Victoria Street, S.W.1.

LABGEAR LG300 Mk. II Transmitter, complete with 813 and power supply for up to 300w input containing pair 866's, 5U4, VR150, VR105, £60.—Box No. 1802, The Short Wave Magazine, Ltd., 55 Victoria Street, S.W.1.

REGRET going QRT VK. Complete station of G3BES for sale, £150.—S.a.e. to: 59 The Avenue, Harrow Weald, Middx. (*Grimsdyke 3195.*)

BC-348Q, internal power pack, nearest £15. Wanted: SX28 handbook. — G3KHT, 31-AMQ, R.A.F. Honington, Bury St. Edmunds, Suffolk.

FOR SALE: Hallicrafters S19R, fitted internal power pack and speaker, 540 kc to 46 mc; components for 250v. P/Pack, with milliammeter and voltmeter.—Dance, 24b Dartford Road, Sevenoaks, Kent.

AR77E, with speaker and phones, for sale, black and chrome, excellent condition, £25.—Dowse, 15 Woolstone Road, London, S.E.23.

5Z4M/3 6V6M/1, £1. 8" cabinet speaker, 25s. 6d. 70w. Auto, 15s. 6d. 2000 R phones, 5s. 6d. — R. Grain, 15 Waverley Gardens, Grays, Essex.

C43 QRO Tx. Original PA, modified exciter, slightly robbed modulator, enclosed rack, circuits, fair condition but will sell or exchange at junk value as space wanted. Prefer you inspect and collect. — G6AU, 197 Ramsgrave Drive, Blackburn, Lancs.

WANTED: Two Philips PE1/100 valves CR100 Manual, buy or borrow, Grid Dip Oscillator.—Offers to: Gates, 67 Broad Street, Dewsbury, Yorks.

WANTED: AR88D with S-meter, must be in good condition, state any modifications and price required.—Hamer, 52 Seagrave Road, Coventry.

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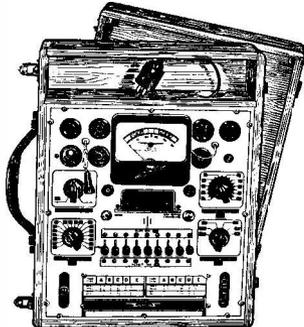
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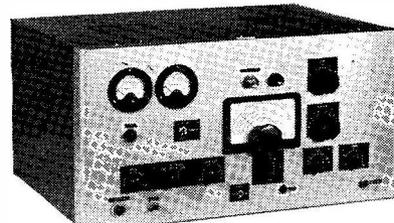
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