The SHORT WAVE Magazine

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Managing Editor: AUSTIN FORSYTH, O.B.E., (G6FO)

Advertisement Manager: P. H. FALKNER

Assistant Editor: L. H. THOMAS, M.B.E. (G6QB)

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AUTHORS' MSS

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FOR THE EXPERIMENTER AND THE RADIO ENGINEER

The SHORT WAVE Magazine

EDITORIAL

CTV *On September 22, to be marked by a banquet to celebrate the occasion, the Independent Television Authority will launch commercial TV in Band III — an undertaking which in the opinion of many is an unnecessary luxury and which some believe will be financially disastrous. However, if the warm winds from Moscow lead in due course to a real disarmament programme, then the radio industry will certainly need all the new outlets it can get to sustain its tremendous productive capacity.*

It is probably hardly realised what a large proportion of our radio production is directly dependent — not upon competitive commercial business in the accepted sense — but upon Ministry of Supply contracts to satisfy the requirements of the Services. There can be no question that the radio industry owes a good deal of its existing prosperity to the expenditure of public money, reckoned at the rate of scores of millions a year.

It is likewise hardly realised that the Independent Television Authority is being financed, at this stage, by public money — to the tune of £1½ millions as a direct Treasury grant spread over two years. The Government put on the whips and the House of Commons decided that (a) It wanted an independent TV service, and (b) To give the ITA a fair chance in competition with the BBC, the Treasury should find the money to start the new service.

We are now about to see the first fruits of the enormous effort that is going into the launching of CTV. What the ITA has to compete with, on a commercial basis, is the BBC. This is not quite the statement of the obvious that it looks, for the point is that the ITA will not compete merely by entertaining a small public for a few months. The BBC is an extremely well organised undertaking, operated on the strictest commercial principles, and directed by men of the utmost integrity and great experience. It is a public, and public-spirited, body with years of know-how in the technical and artistic sense. It has its own training schemes, communication networks, research services, engineering facilities, production resources and a programme capacity far beyond anything even yet thought of for the ITA

It is supposed that " the advertisers " will pay to make it possible for the ITA to get on an equal footing with the BBC. But even a cursory examination of the finance involved suggests that the BBC holds all the cards that matter, and that " the advertisers," the radio industry (or somebody) will eventually have to underwrite the ITA to the extent of many more millions before a truly competitive service can emerge.

Thus, the real battle for commercial television will be fought out on the floor of the House of Commons about two years from now, when the ITA will have to ask the Government of the day for further large subsidies to keep CTV going —" owing to unexpected difficulties in technical development, rising costs and the reluctance of advertisers to buy time at remunerative rates."

In the meantime, to the plaudits of the patent medicine people, the detergent manufacturers and the petrol companies, let the ITA bring on its dancing girls. Our money is on the BBC.

Austin Forbes G6FO.

Miniature All-Band CW/Phone Transmitter

FOR CAR, CARAVAN, /A OR /P OPERATION

F. T. WILSON (G2XX)

This neat design will be of great interest to all who want a small transmitter which is truly portable, covers a wide frequency range, gives both CW and phone working, matches into any random-length aerial, and needs only a power supply as an additional unit. It shows how much can be done with a small space, since the model illustrated is contained in a box less than 7 inches cube, with room to spare. Even if not exactly followed, our contributor's design is full of ideas for those who have similar equipment in mind.—Editor.

HAVING become the owner of a caravan last year, the writer (and his XYL) decided that if caravanning was to be really enjoyable Amateur Radio was a necessity—well, almost ! The transmitter to be described is the outcome.

The first step was to lay down the essential requirements in order of importance ; this produced the following list.

(1) Small physical size,
(2) Power consumption to be within the capabilities of the car battery,
(3) Self contained ; the only additional items to be a key, microphone, aerial and power supply,
(4) As wide a frequency range as possible,
(5) CW and 'phone operation,
(6) The use of standard components.

From a study of the list it was clear that miniature techniques would have to be employed and the total input limited to about 60 watts. Also, the circuit must be designed for bandswitching without plug-in coils. The last item was added to avoid replacement difficulties which might arise with specially designed components.

RF Circuit

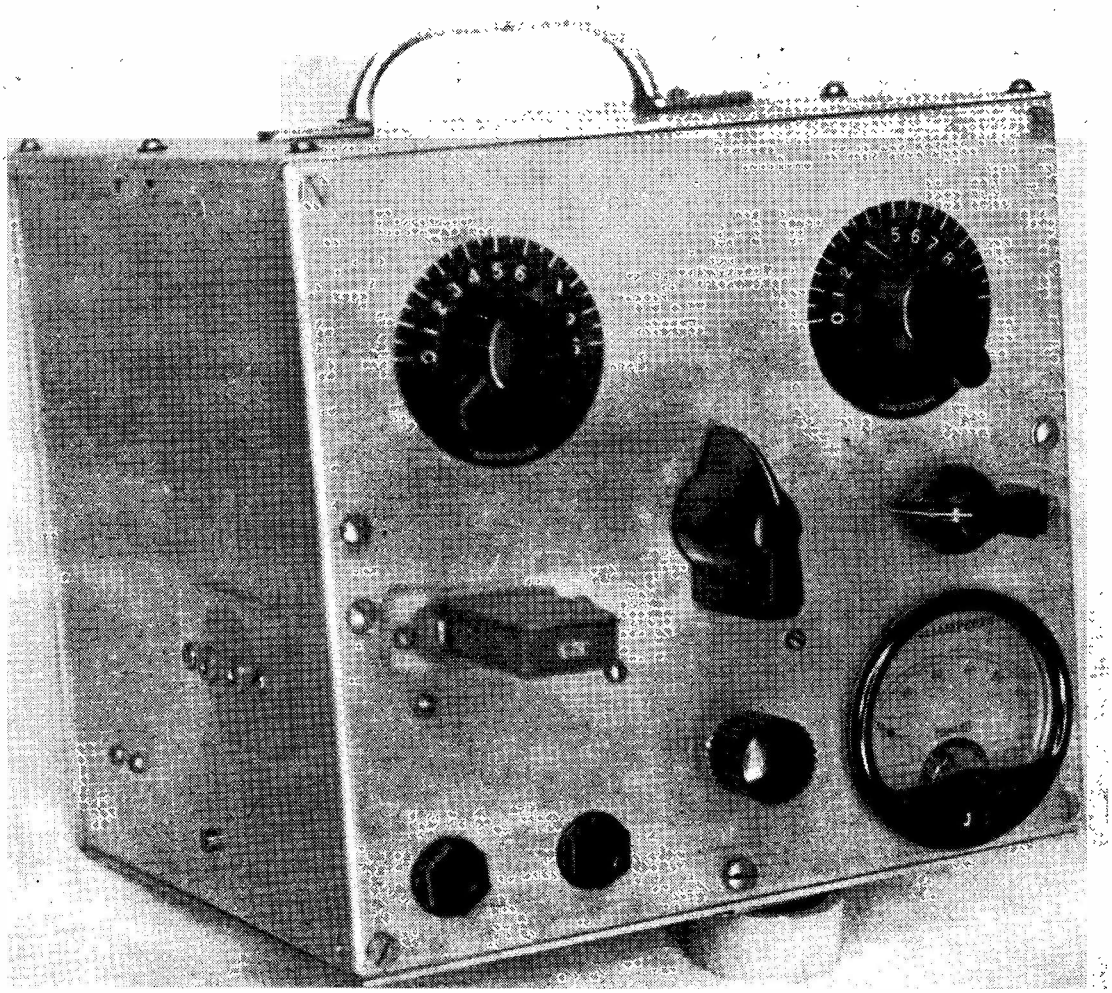
The complete circuit diagram is given in Fig. 1 and it will be seen that the RF section is a simple CO-PA. VFO operation is not really a practicable proposition in a transmitter of this size although it must be admitted that effective crystal control does require rather a large number of crystals.

The oscillator uses the familiar Colpitts circuit with the cathode taken to a capacity divided between grid and earth. The valve chosen for this position is the 6CH6 which is virtually a miniature 6AG7 on a noval base. The heater consumption (0·75) is high but this is the only valve in the miniature range which will deliver sufficient output on 28 mc when quadrupling from a 7 mc crystal. Some compensation is obtained by the low anode current which does not exceed 15 mA on all bands. The oscillator anode is fed through a 2·5 mH RF choke and is untuned.

The PA is a 5763, capacity coupled to the oscillator. This valve is ideally suited to low power transmitters and will handle a maximum input of 50 mA at 350 volts, 17 watts. It has the characteristic high power sensitivity of all beam tetrodes and requires only 3 mA grid current. Unfortunately, it was not designed for RF power amplifier applications and although the anode/grid capacity is only 0·3 $\mu\mu$F, the single-ended construction means that it cannot be used successfully in compact multi-band rigs without neutralisation. (This fact was learned the hard way !).

In the first design the oscillator anode circuit was tuned and the transmitter was reasonably stable on the lower frequencies. However, there was some instability on 28 mc and on 21 mc nothing would persuade the 5763 to stop oscillating. Eventually, after stopper and damping resistances had failed to do the trick, it was realised that neutralisation was the only answer. Since the PA tank is a pi-network conventional neutralisation circuits were obviously impracticable and so the oscillator anode circuit was transferred to the PA grid. It then became possible to use the capacitance bridge neutralising circuit described in the ARRL *Radio Amateur's Handbook*.

For the benefit of those not familiar with this circuit a brief explanation is perhaps in order. C*n* is the neutralising condenser. C*n* and C7 form two arms of the bridge. The other arms are made up of the anode/grid capacity of the valve and the input capacity which includes the output capacity of the oscillator valve, the stator/earth capacity of the tuning condenser (C8) and all strays. The ratio of C*n* to C7 must equal the ratio of C*a-g* to C*in* for balance. Since this is the only criterion it would appear that the actual values of C7 and C*n* are not important provided the *ratio* is correct. However, in practice this does not seem to be the case and it has been found that if C7 is increased in value much above ·0005 μF the



General appearance of the all-band CO-PA "Caravan Transmitter" designed by G2XX. Though approximate dimensions overall of his model are only 7 ins. by 6 ins. by 6 ins., the frequency coverage, band-switched, is 3.5 to 28 mc inclusive, either CW or phone. The Brimar 5763 PA takes up to 15 watts input and the total load on the car battery is about 7 amps. at 12 volts. An external dynamotor power supply is used.

bridge cannot be balanced. With the ·0003 μF used, a setting for C*n* can be found where the bridge is balanced on all bands.

The output tank is a normal pi-network with two tapped coils, both of which are in circuit on 3·5, 7 and 14 mc. On 21 and 28 mc the larger coil is short-circuited and the small coil with its single tap remains in circuit. The taps are determined experimentally to suit the capacities and operating conditions and the network is designed to work into a 75-ohm load. On 3·5 and 7 mc the capacity of C13 is too low for adequate loading of the 5763 and sockets have had to be provided for additional padding condensers, shown as Cp in the circuit diagram.

Keying

The key breaks the screen supply to both valves, a system which the writer has always favoured. Keying is clean, free from clicks, thumps and chirp, and the time constant chosen (10 milliseconds) seems a good average. The design of screen keying circuits is very ably covered in an article by G5JU in *Short Wave Magazine* for February 1951.

Modulator

In any low power transmitter where economy in watts is a major consideration, there is no real alternative to Class-B modulation, so this system has been adopted. A 12AU7 provides

two stages of speech amplification and is followed by a 12AT7 in zero-bias Class-B. Under these conditions, with 300 volts on the anodes, the 12AT7 is capable of delivering over *seven watts* of audio which is quite an achievement for such a small valve. On peaks it runs into grid current to the tune of 14 or 15 mA but life tests have apparently shown that the valve is well able to stand up to this treatment.

It will be noted that there is no DC return for the grid of the first half of the 12AU7. The reason for this is that the crystal microphone used has an internal resistor. Unfortunately, the amplification has turned out to be rather inadequate except for a carbon microphone and another stage is desirable. A single 6C4 would give the additional gain necessary and there is just about enough room for one more valve. Modulation depth is varied by raising or lowering the voice. This is crude but effective and does away with the necessity for another control on the already crowded front panel.

Metering

To avoid having to carry a separate meter around, room was found on the panel for a 2 in. meter and a 2-pole switch so that the various currents can be measured. The meter used is a 0-100 mA Ferranti which, with the shunt removed, has a full-scale deflection of 7·5 mA. Almost any similar meter is suitable provided the range is not much less than 0-10 mA. The shunts give ranges of 0-50 mA for oscillator anode current, 0-7·5 mA for PA grid current and 0-100 mA for both PA and modulator anode currents.

Since the meter switch has to be a miniature component alternate contacts are used as shown in the circuit diagram. Few, if any, of these small switches have break - before - make contacts, a fact which was not appreciated when the transmitter was wired up. Originally, adjacent contacts were used with the result that the first time the switch was operated HT was shorted to earth when the contacts moved from the oscillator anode to the PA grid. In addition, the meter pointer neatly wrapped itself around the stop.

Construction

The photographs clearly show the construction of the transmitter. It is housed in a box measuring $6\frac{3}{4}$ ins. x $6\frac{1}{4}$ ins. x 6 ins. made up from small sheets of aluminium. (This box formerly contained a valve voltmeter which explains the handle and also the fact that the layout is not altogether ideal since various existing holes had to be used). A flat sheet of aluminium slightly narrower than the box is bolted to the front and back to form a chassis. The RF stages are almost in the centre of this chassis with the audio section arranged at the rear. Some modification to the driver transformer was necessary to reduce the space which it occupied. The only problem in building the transmitter lay in finding a suitable modulation transformer. Eventually, the junk box produced a piece of ex-Service gear (Modulator Type 78) from which the modulation transformer was rescued. This proved to have the correct ratio and was small enough to fit into a corner of the chassis.

The PA anode coils are mounted directly on the bandswitch which makes for short leads and gives a reasonably rigid assembly. A

COIL DATA

PA GRID COIL, L1. (*across SW1/a in circuit opposite*).

Wound with 28 SWG enam. wire on 1-in. diameter polystyrene former in four sections.

1st section : 24 turns close-wound
2nd section : 12 turns close-wound
3rd section : 5 turns close-wound
4th section : 4 turns spaced wire diameter approximately

Taps taken off between sections. Spacing between sections approximately $\frac{1}{8}$-in. ; 4th section turn spacing is adjusted to cover 30 mc with C8 near minimum capacity

PA ANODE COILS, L3 and L4.

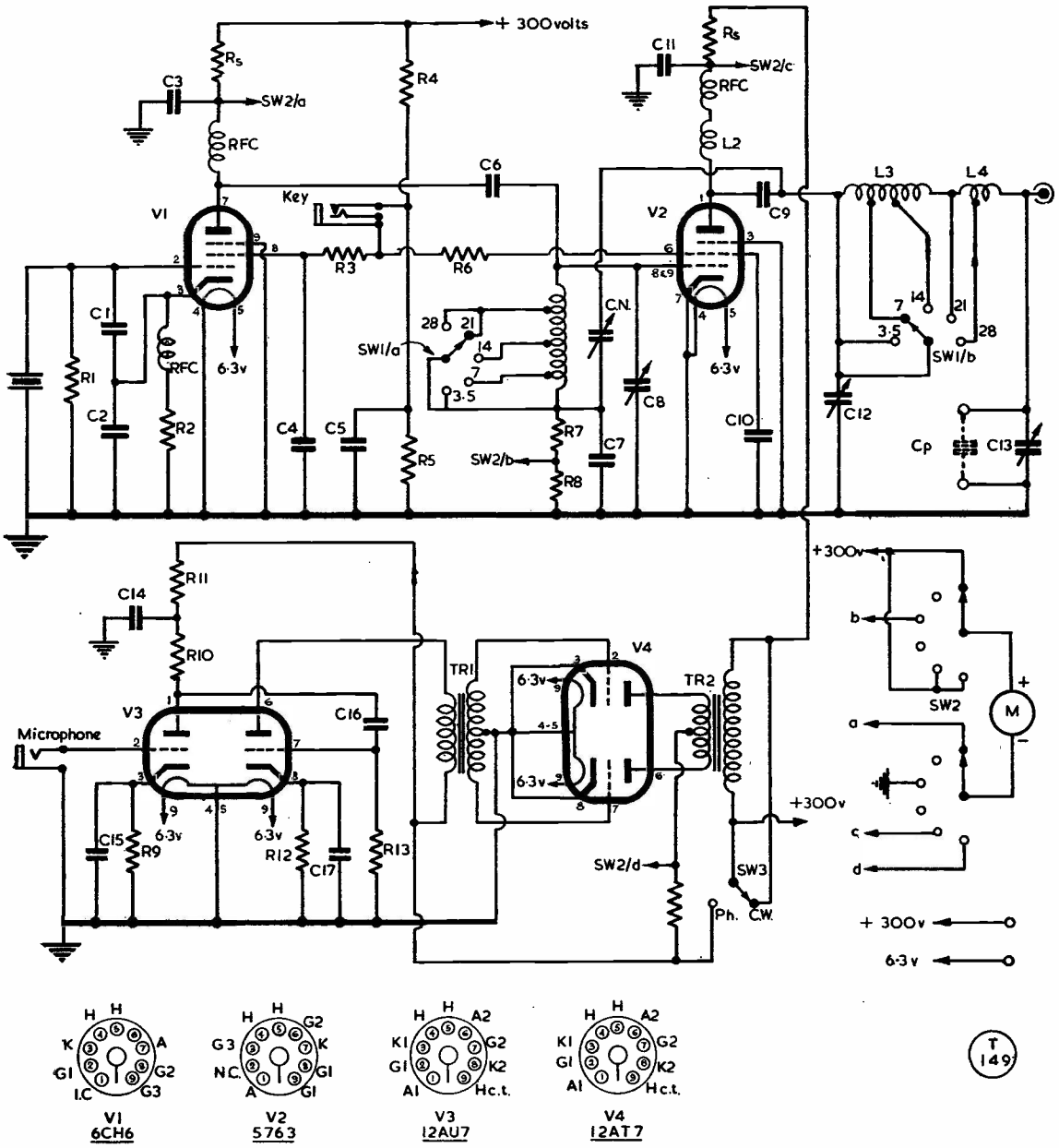
L3 = 40 turns 22 SWG enam. wire on 1-inch diameter polystyrene former, tapped at 22nd and 32nd turns from plate end.

L4 — 6 turns 16 SWG enam. wire, 1-inch diameter. Spaced to occupy $\frac{3}{4}$-inch and tapped at 2nd turn from plate end.

Table of Values

Circuit of Miniature Transmitter

C1	= 10 $\mu\mu$F, ceramic	R8	= 1,000 ohms, $\frac{1}{4}$-watt
C2	= 50 $\mu\mu$F, ceramic	R9, R12	= 1,800 ohms, $\frac{1}{2}$-watt
C3, C4, C10,		R10	= 100,000 ohms, $\frac{1}{2}$-watt
C11	= .001 μF (TCC "Hi-K")	R11	= 20,000 ohms, $\frac{1}{4}$-watt
C5	= 1 μF, 275v. peak (TCC "Picopack")	R13	= 500,000 ohms, $\frac{1}{4}$-watt
C6	= 50 $\mu\mu$F, ceramic	Rs	= Shunts to suit meter and give desired ranges
C7	= .0003 μF, mica	RFC	= 2.5mH
C8	= 50 $\mu\mu$F, miniature variable	L1, L3, L4	= *See coil table*
C9	= .0005 μF, disc mica	L2	= Anti-parasitic choke. 12 turns of 32 SWG enam. on $\frac{1}{4}$-in. diameter former, close-wound
C12, C13	= 140 $\mu\mu$F, miniature variable	TR1	= Class-B driver transformer, single plate to push-pull grids (Elstone C.B.D.)
C14	= 8 μF, 350v. wkng. electrolytic	TR2	= Modulation transformer, 15,000 ohms to 6,000 ohms
C15, C17	= 20 μF, 35v. miniature electrolytic	SW1	= 2-pole 5-way ceramic wafer
C16	= .01 μF, mica	SW2	= 2-pole 6-way miniature switch
Cn	= 2-8 $\mu\mu$F trimmer (Philips)	SW3	= SPDT toggle switch
Cp	= Additional loading condenser for 3.5 and 7 mc. Values between .0005 and .001 μF.	M	= 0-10mA meter or similar
R1	= 50,000 ohms, $\frac{1}{2}$-watt	V1	= 6CH6
R2	= 150 ohms, $\frac{1}{2}$-watt	V2	= 5763
R3, R6	= 4,700 ohms, $\frac{1}{2}$-watt	V3	= 12AU7
R4	= 10,000 ohms, 6-watt	V4	= 12AT7
R5	= 47,000 ohms, 6-watt		
R7	= 22,000 ohms, $\frac{1}{2}$-watt		



Circuit complete of the transportable band-switched CW/Phone transmitter designed and described by G2XX. V1, V2, is the RF section, using a 6CH6 at V1 and a 5763 as PA ; a pi-section tank circuit is used for matching any length of wire on any band. Modulation is by plate-and-screen control, the speech amplifier-modulator section being V3, V4, using miniature twin-triodes. A switched meter, with suitable shunts Rs, is used for the various current measurements. All values are given in the table.

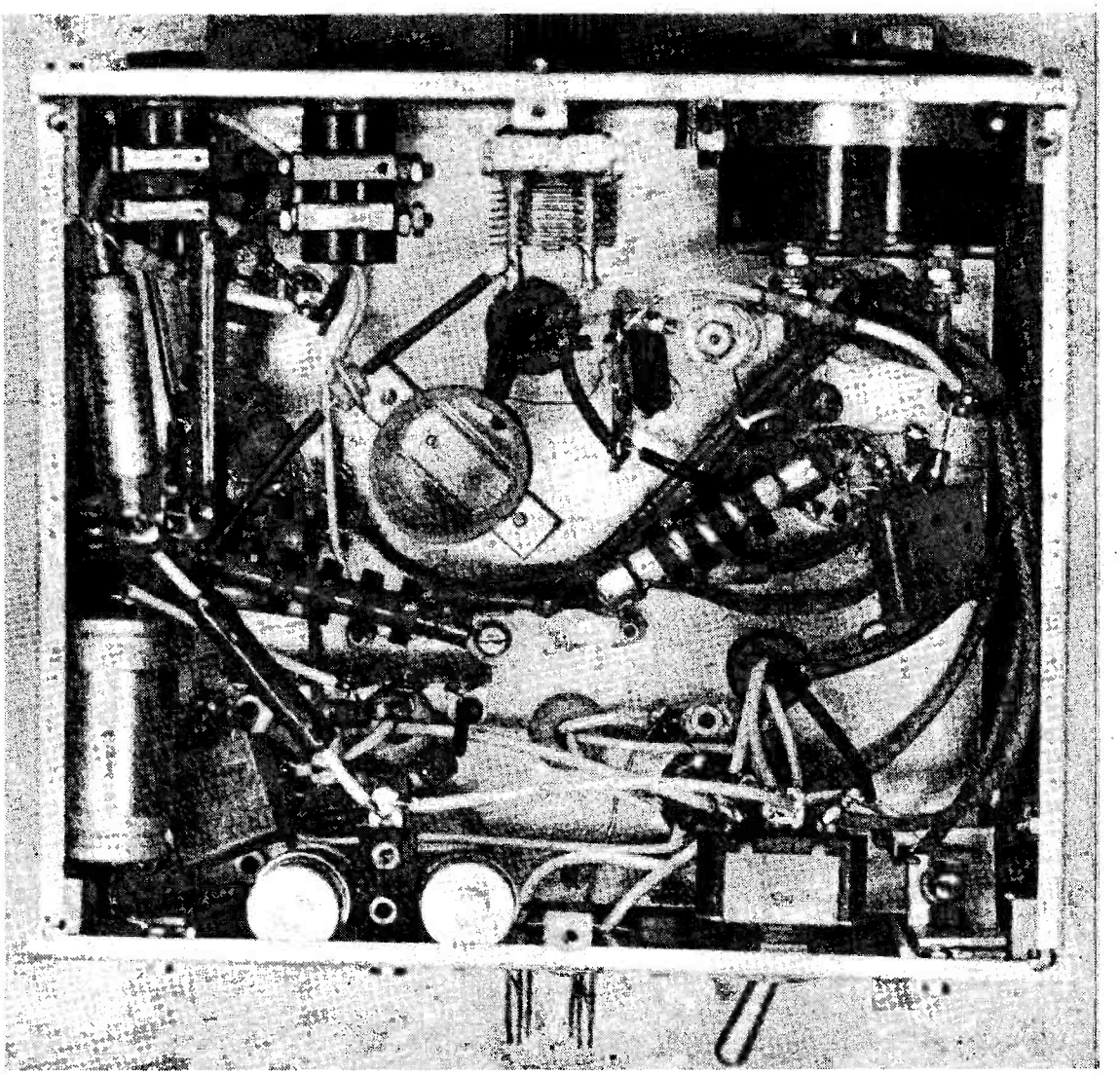
suitable miniature feed-through bushing for the PA anode lead was made from a Kovar-glass seal such as is used on potted transformers. The neutralising condenser is soldered to the lead through this bush. Holders for the crystal and output padding condenser are made from strips of polystyrene. The crystal holder has two valve base sockets with FT243 spacing while the padding condenser Cp plugs into Clix sockets.

Adjustment

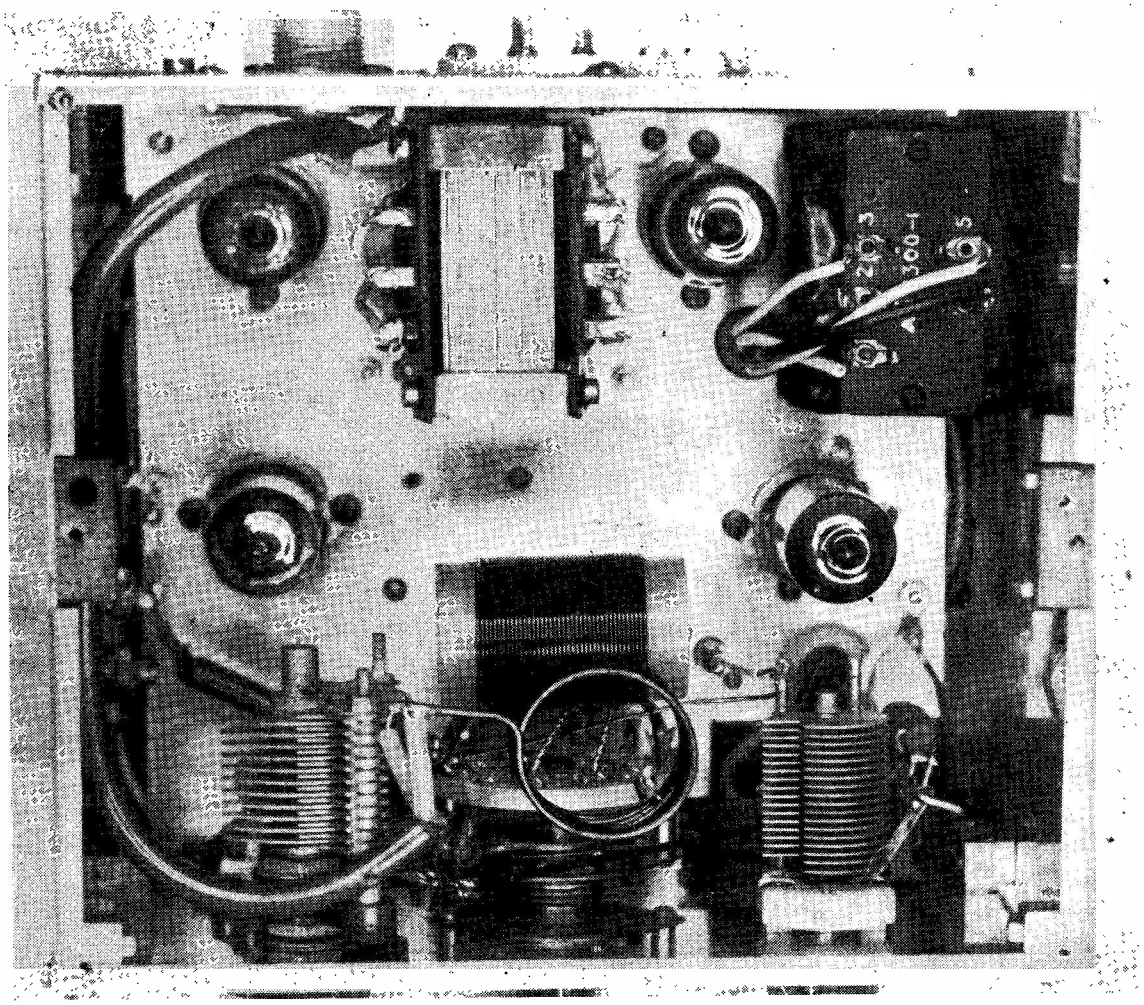
Adjustment of the transmitter follows normal practice. With a 3·5 or 7 mc crystal plugged

in and the meter switched to the PA grid, current readings should be obtained at all settings of the bandswitch. The oscillator anode current should be about 15 mA but is not a reliable guide to the operation of V1 since it does not vary by more than 1 mA from the oscillating to the non-oscillating condition due to the cathode bias resistor. The PA grid condenser C8 should be regarded as an excitation control rather than a tuning adjustment. On 3·5, 7 and 14 mc it will be found that the grid current of the 5763 is as high as 8 to 9 mA whereas the valve only requires 3 mA. Even on 28 mc when the 6CH6 is quadrupling from a 7 mc crystal, the maximum grid current obtainable is not less than 3 mA.

After the RF stages have been checked for satisfactory operation, the PA should be neutralised. Connect a dummy load or aerial to the output and disconnect the PA screen supply. Plug in a 7 mc crystal and set C8 for optimum grid current at 28 mc. Tune C12 through resonance and adjust C*n* until there is no change in grid current when C12 is varied. Repeat for 21, 14 and 7 mc. The setting of C*n* is not particularly critical and a position should quickly be found where, *on all bands,* the grid current remains steady regardless of the setting



Layout and wiring under-chassis in the G2XX transmitter, as described in his article. The 5763 PA section is top right; the wiring associated with the valve-holder at the same level on the left is that around V1, the 6CH6 oscillator multiplier.



Internal layout of the G2XX all-band transportable transmitter, looking down into the upper section, above chassis. The PA coils are arranged centrally, as near as possible to the band-switch, the PA valve is right front, and the 12AU7-12AT7 modulator section is at the back. All in a 6-inch box, and TVI-proof, too!

of C12; 3·5 mc is not included in the neutralising adjustments because on this band the 5763 should be perfectly stable with or without the neutralising circuit. When neutralising is completed the PA screen is reconnected and the valve can then be loaded to its full rating of 50 mA.

It will probably be observed that, contrary to current practice, no precautions have been taken against TVI. The simple fact is that no TVI has been found even though deliberate attempts have been made to produce interference on a TV receiver located in an adjacent room. Whether this is due to the short RF leads, the screening, or just the low power is not at all clear but it is a very satisfactory feature although, naturally, the writer would not care to guarantee that all transmitters built to this design would turn out TVI-proof.

Any power supply capable of delivering 6v. at 2a. and 300v. or 350v. at 120 mA will meet the requirements of the transmitter. All testing and fixed station work has been done with an AC power pack but for portable use the LT is obtained from the car battery and the HT from a dynamotor. The total load on the battery is between 6 and 7 amperes which is considered reasonable.

Although designed primarily for use in a caravan it is obvious that in physical dimensions, weight and power rating this transmitter would fulfil almost any need for a small, compact and portable rig.

Modern Top Bander

CW/PHONE TRANSMITTER FOR 160 METRES USING MINIATURE VALVES

R. G. B. VAUGHAN (G3FRV)

It is generally agreed that, for the 160-metre band—with its power limitation and the relatively large values of inductance and capacity required—it is better to have a separate transmitter, operated exclusively on that band. There are, of course, many ways in which the matter can be approached, varying from a "breadboard lash-up" to a fully engineered design. That discussed here is a CW/Phone transmitter in unit form—RF section, modulator and power supply—which from the information given can be built up in any convenient way, or as separate items. In the author's case, the RF section and modulator form one unit, with the power supply as an addition.—Editor.

THE past few years have brought an increasing number of stations on to 160 metres. Unfortunately, quite a few of these seem to have worked on the principle that "anything does for Top Band." How wrong they are !

The transmitter to be described is possibly a little elaborate — but it is believed that the extra expense and trouble involved have been well worth while. No originality is claimed and the author's only object is to put forward a basic design, with a few suggestions which may prove useful. If this article plays any part in keeping up activity and improving signal quality he will be well pleased.

No attempt will be made to give full details of mechanical construction, as this obviously depends on the components available—in any case most amateurs have their own ideas about the look of their rigs !

The accompanying photograph gives a general idea of the appearance of the original as built up at G3FRV. The transmitter is constructed in two units, the first consisting of the RF stages and Modulator and the second the power supply. Miniature type valves have been used wherever possible, with the result that the physical size of both units is quite small, being in fact 10 ins. x 8 ins. x 8 ins.

Some readers may wonder why the power supply was not included in the main transmitter unit. There are reasons for this, the first being that old enemy of radio equipment, temperature. With the power supply built in, the working temperature would be high, and could cause VFO drift, component breakdown and other troubles. The second point, so far as the author was concerned, was the necessity to provide for portable/mobile operation, and, being fundamentally lazy, G3FRV objects to carrying unnecessary mains power packs up hill and down dale ! The unit is not at all critical as to power supply, and where portable operation is contemplated a suitable alternative may be substituted for the AC mains unit. RF output is from an 80 ohm coaxial socket at the rear of the transmitter unit. No aerial tuning device is incorporated in the transmitter proper as the author believes that aerial matching is best carried out by means of an external tuner, enabling the most efficient type of aerial coupling to be used in individual circumstances. Contrary to popular opinion, a Collins coupler is *not* always the best !

The RF Stages

Fig. 2 shows the circuit diagram for the RF stages of the transmitter, whilst Fig. 2 gives an idea of the actual chassis layout. The VFO (V1), using an EF91, is an exceptionally stable circuit of the Tesla variety. There does not seem to have been a great deal of data published about the Tesla, although the circuit itself is by no means new. The degree of stability is exceptional ; a prototype built by G3FRV and checked over a period of 9 hours gave a maximum deviation from nominal of 280 cps at 2 mc. Considering no special components were used, this result was thought to be extremely encouraging. A good deal of work was carried out in connection with relative component values, and those given were found to be the best compromise between output and stability. Readers who saw G3FLP's excellent article in the November, 1954, issue of *Short Wave Magazine* will no doubt remember the novel keying system which he described. This circuit has been tested by the present writer with a number of different valve combinations and has always been satisfactory. It should be noted, however, that different valve types from those quoted in the original article may require differing component values.

The VFO unit itself is mounted in an Eddystone die-cast box for screening purposes, the only external connections being to power supplies, V2 grid, and keying circuit. The lead to V2 grid should be coaxial and earthed at the VFO end only, this being a precaution to avoid trouble the author experienced due to induction from the PA stage. Originally the

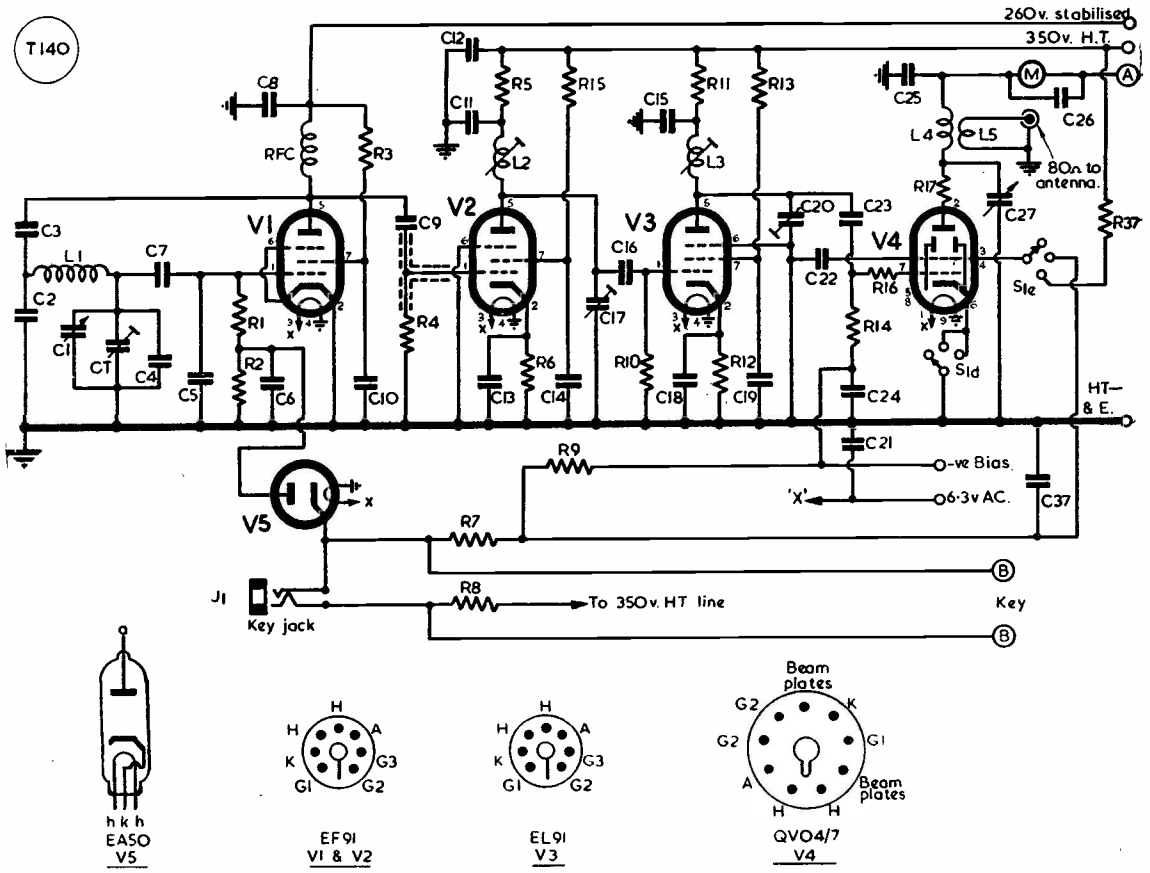


Fig. 1. RF section of the 160-metre transmitter described by G3FRV. It is a straightforward VFO-BA-BA-PA arrangement, designed for full break-in working and relay control on telephony. The VFO features the extremely stable Tesla oscillator circuit, and miniature valves are used throughout this section. The design for the modulator will be given next month.

coax was earthed at both ends ; this, of course, formed an RF pick-up loop. V1 protrudes from the side of the box and is fitted with a screening can. Some specimens of EF91 have been noticed to suffer from loose electrode assembly, causing microphony. These should be reserved for the buffer stages and *not* used in the VFO, or for that matter the modulator.

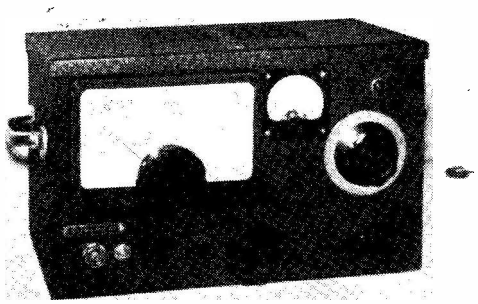
The coil L1 is wound on a $\frac{1}{4}$ in. paxolin former with 40 SWG double cotton covered wire. After the winding has been completed two or three coats of polystyrene varnish should be applied. The two connections are anchored to 8 BA bolts fitted with soldering tags mounted on the coil former. All connections to the coil and tuned circuit, also external connections to the valve base, should be made in 16 SWG tinned copper wire to ensure rigidity. The tuning condenser C1 is a miniature type which started life in an RF27 surplus unit ; all three sections are paralleled. This is mechanically coupled through the die-cast box

Table of Values

Fig. 1. Circuit of the RF Section

CT = 75 $\mu\mu$F ceramic trimmer
C1 = 225 $\mu\mu$F ceramic variable (ex RF27 tuning unit)
C2 = 380 $\mu\mu$F silver mica
C3 = 310 $\mu\mu$F silver mica
C4 = 330 $\mu\mu$F ('NPOL' negative temperature coefficient — 750)
C5, C7 = 100 $\mu\mu$F
C6 = 500 $\mu\mu$F silver mica
C8, C10, C11, C12, C13, C15, C18, C19, C21, C24, C25, C26 = .01 μF, 500v., working, mica
C9 = 50 $\mu\mu$F silver mica
C14 = .02 μF, 500v., working
C16 = 50 $\mu\mu$F, mica
C17, C20 = 3-30 $\mu\mu$F Philips Trimmers
C22 = .002 μF, mica
C23 = 177 $\mu\mu$F, mica
C27 = 200 $\mu\mu$F, variable
C37 = 0.1 μF, 500v., working
R1 = 10,000 ohms, $\frac{1}{2}$w.
R2, R3, R9 = 30,000 ohms, $\frac{1}{2}$w.
R4 = 68,000 ohms, $\frac{1}{2}$w.
R5, R7, R8 = 10,000 ohms, $\frac{1}{2}$w.
R6 = 150 ohms, $\frac{1}{2}$w.
R10 = 47,000 ohms, $\frac{1}{2}$w.
R11 = 6,800 ohms, $\frac{1}{2}$w.
R12 = 68 ohms, $\frac{1}{2}$w.,
R13 = 25,000 ohms, 1w.
R14 = 15,000 ohms, $\frac{1}{2}$w.
R15 = 10,000 ohms, $\frac{1}{2}$w.
R16, R17 = 68 ohms. $\frac{1}{2}$w.
R37 = 10,000 ohms, 1w.
M = 0-50 mA (FSD) (PA Anode current)
V1 = EF91, 6AM6, Z77
V2 = EF91, 6AM6, Z77
V3 = EL91
V4 = QV04/7, 6AQ5
V5 = EA50
VFO = Dial, Eddystone Cat. 598
RFC = 2.5 mH (Eddystone)

to the standard Eddystone slow motion dial. With the tuned circuit values given, coverage should be obtained over the frequency range 1800 kc-2000 kc with a slight overlap at both ends. This coverage can be band-set by means of Ct. It is essential to use good quality fixed condensers in any VFO to obtain *real* stability. Anode and screen volts are stabilised in accordance with usual practice, although at G3FRV it has been found that the transmitter operates perfectly with the stabilisers pulled out. Stabilisation does tend to remove the last traces of power supply ripple, and also helps keying, and is worth while on these counts. Output is coupled to V2 grid by C9 which is kept small to minimise loading.



Front view of the RF-Modulator section of the 160-metre table-top transmitter described in the article

Buffer Amplifier

V2 is a normal fixed tuned buffer stage at 160 metres. Bandpass wide-band couplers have been found to be an unnecessary complication at this frequency, and at G3FRV high L/C ratio fixed-tuned circuits are used. Staggered tuning is employed to ensure flat drive over the band. V3 acts as a further buffer amplifier stage. No further comment is called for as design is conventional.

RF Amplifier

The PA stage consists of a QVO4/7 which has been found to be about the only easily available valve that is really suitable for Top Band operation. The 807, whilst being excellent, is felt to be rather a waste for 10 watts; in any case maximum efficiency cannot really be expected under these conditions. The heavy heater drain is a point to be taken into consideration where portable operation is contemplated. The 5763 has been tested by the author and it was found that no more than 50% efficiency could be obtained when operating it as a straight amplifier on 1·8 mc. Valves such as 6BW6 and similar types are not even worthy of consideration due to high inter-electrode capacities. The 6AQ5 appears to be suitable, but has not actually been tested. The QVO4/7 is not only readily available and small in size, but also operates efficiently with quite low grid drive ; 1·5 mA was found to be suffi-

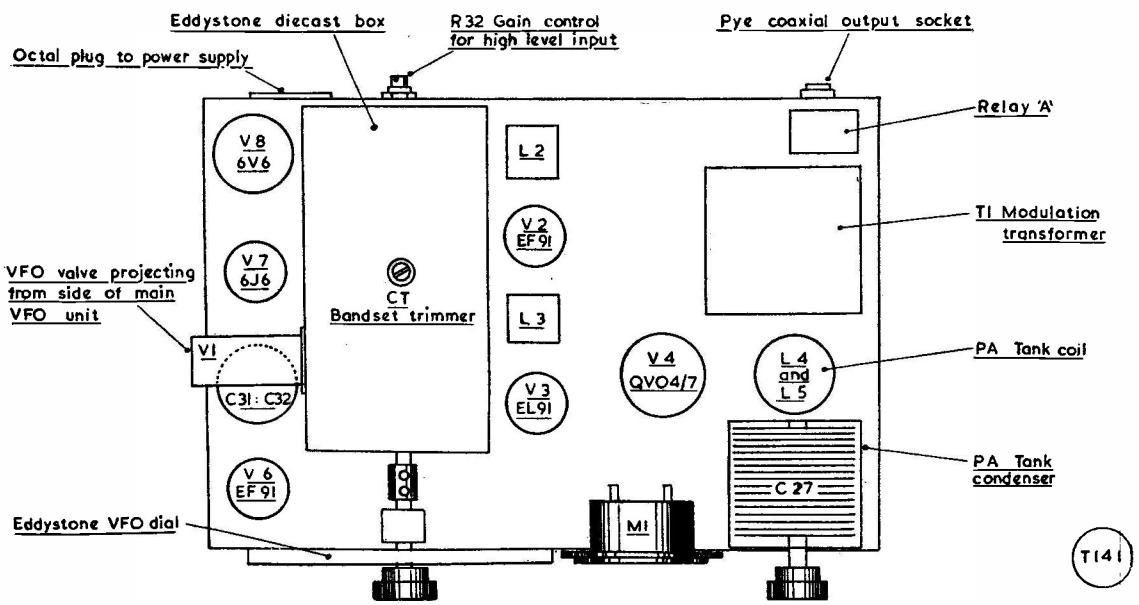


Fig. 2. The general layout above chassis for the Top Bander designed by G3FRV. His object has been to get the RF side and modulator into one cabinet, the power pack being a separate unit. This transmitter could, of course, be built as three separate units.

cient for both CW and telephony.

Circuit values and design of the PA stage are conventional. Series/parallel tuning has been adopted to avoid insulation of the tank condenser C27 or the use of RF chokes. The last are thought by the writer to be an abomination, as they always cause more trouble than they are worth. Those who require further evidence of the evils attendant on the use of the said RF chokes need only refer to G3IEF's article in the January, 1955, issue of *Short Wave Magazine*. Dimensions and winding details for the tank coil are given in the Table, and the condenser may be any wide spaced 200 $\mu\mu$F type. The stage is plate-and-screen modulated and the values shown for the screen circuit are carefully chosen to ensure increment modulation. It will be noted that the screen grid is switched to the keying line on CW (position 2 of Sle). This was necessary, due to the entirely different screen grid conditions required on CW with this keying system. The cathode circuit of the valve is returned to earth *via* one wafer of the control switch (S1d) which open-circuits the cathode of the PA valve when tuning up on any particular frequency. Link coupling to an 80 ohm Pye coaxial socket is employed from a PVC link around the tank coil. The most important point where the link coupling is concerned is that the " earthy " side of the link winding be taken to earth at the output socket in order to reduce undue circulation of RF currents through the chassis. The grid of the PA is operated with approximately 50 volts fixed negative bias obtained from the power supply. Fixed bias is always desirable from an efficiency point of view, and eliminates receiver noise, nearly always caused by standing current. At G3FRV the PA valve is mounted so that the bottom inch or so of the envelope is below chassis. This helps to reduce any tendency to instability in the stage. Provided that grid and anode stoppers are mounted right on the valve base, no trouble should occur. Procedure for checking instability will be described later.

Throughout the RF stages, only mica condensers should be used. As fairly small components are the order of the day, most of the wiring may be point-to-point with a small tag strip for anchoring purposes. All wiring done in this manner should be rigid ; wiring that is sloppy on the chassis is to be avoided. One earthing point should be chosen for each stage to avoid loop effects ; 3 or 4 soldering tags mounted with a 6BA nut and bolt through the chassis near to the valve base will serve very well. The VFO assembly is preferably tested before being wired into the transmitter.

(To be concluded)

Coil Winding Data

VFO COIL L1

70 turns No. 40 SWG double cotton covered, close wound on a $\frac{1}{4}$-in. outside diameter former, doped with coil varnish. Winding terminated on 6BA solder tags.

BA TUNING

L2 70 turns 32 SWG pilewound on $\frac{1}{4}$-in. Aladdin former (with slug). *See below for details.*
L3 as for L2.

TANK COIL

L4 50 turns 26 SWG enamelled, close wound on $1\frac{1}{4}$-in. outside diameter former. Winding length $1\frac{1}{2}$ins.
L5 3 turns 22 SWG PVC-covered, overwound at cold end of L4. Whole coil to be doped with coil varnish, windings terminated on 4BA soldering tags.

Parts List For L2/L3

2 off	Former Aladdin Cat. ...	PP 5937/4
,,	Eyeletted Top Aladdin ...	PP 5973/4
,,	Dust cores Aladdin ...	PP 5839
,,	Insulating piece Aladdin	PP 16040
,,	Cans J. Dale & Co. ...	DT/V1

GOUGH ISLAND — ZD9AD

Since the note on p.247 of the July issue of SHORT WAVE MAGAZINE, a lot is being heard about the Gough Island expedition. This is a privately-organised survey and exploration trip which will sail for that remote spot at the end of this month, for a stay until about March next year. The radio side will be in charge of G3HPM, who will sign ZD9AD and use British commercial amateur-band equipment throughout. Activity will be on all bands, including possibly 160 metres, but mainly on 21 mc CW and phone ; it is hoped to open ZD9AD about mid-October. Gough Island is at 40° 1′ S, 10° 0′ W, about 220 miles south of Tristan da Cunha, is uninhabited, and was first visited (by Captain Gough) in 1731 ; the highest point of the Island is about 3,000 ft. and large numbers of sea birds breed on its steep cliffs.

MORE RUSSIAN BONHOMIE

It is reported (*Manchester Guardian*, August 12) that for the first time Russian weather charts—transmitted on the facsimile system and to the meteorological code used by the rest of the world—are being received at the Meteorological Telecommunications Centre at Dunstable. No prior arrangements had been made with the Russians, nor had any offer of co-operation been received from them—they have, of course, always had the benefit of the met. data transmitted by radio from Dunstable. The Russian charts simply started to come in on the network, a sort of mute request to be allowed into the meteorological circle. The Russian Wx transmission is a new noise on the HF side of our 14 mc band. It should not be long now before Box 88 is open for business again!

Variable Power Control and Protection

CIRCUITS FOR ANY SCREEN-GRID TYPE PA VALVE

N. P. SPOONER (G2NS)

FOR the guidance of operators on board ship and at coast stations, the PMG has laid down that "a general obligation which is imposed on all stations alike, and which is regarded as of the highest importance, is that they shall interfere as little as possible with the working of other stations." In certain specified cases "sending apparatus must be provided with devices readily permitting of material reduction in power" while, in others, transmission is even subject to the condition that "there is no interference with other traffic and that in particular the minimum power necessary for establishing communication is used." Without such safeguards these stations might tend to perpetrate the equivalent of "cluttering up the air and spoiling programmes"—so to speak!

Nearer home, Condition 4 of the Amateur (Sound) Licence fully stresses the necessity for CW and Telephony non-interference. The advent of TV has shown that trouble can often be greatly mitigated and at times completely avoided, merely by reducing power. This enforced throttling-down of the transmitter entails no great hardship because it is the type and efficiency of the *aerial system* in use that is responsible for 75% of a station's performance. Reckoning 5 or 6 dB as being equal to one S-point, it is encouraging to remember that a modest 10 or 15 watts should under normal conditions put down at the receiving end a signal that is only a couple of S-points weaker than that which would appear when the input is increased to as much as 100 watts. The difference in the cost of gear, when plate modulation at these two differing powers is envisaged, is quite an item. Granted, then, that at all times a means of reducing input at will is definitely advantageous, besides being a necessity for local working, it only remains to decide what form this can best take.

Control and Protection

There will be a slight addition to the circuitry to make the proposed power variation available, so why should the opportunity not be taken to add PA protective measures at the same time? The universal popularity of the 807, singly or paralleled for harmonic suppression, has led to modern PA screen voltage clamper valve technique which in turn provides facilities for a simple power control system devoid of AC mains or HT supply juggling.

In the writer's case, a 50,000-ohm potentiometer effectively varies the input to a Panda PR-120-V from 150 to 10 watts, in 6-watt steps. Owners of this transmitter will find that a pot'meter mounted on a small bracket will conveniently bolt to the PA screening box, in a position to the rear of V10, the clamper valve, where its leads can be dropped straight down through the rubber grommet already holding the power supply leads. It is then a simple matter to lift the cabinet lid for making input variations. In the present case the leads happen to have been made in shielded cable, but this may not always be found necessary.

Fig. 1 shows the simplicity of a clamper valve and power control circuit applied to any single 807 PA and Fig. 2 indicates how a power control may be added to the "Panda" or to

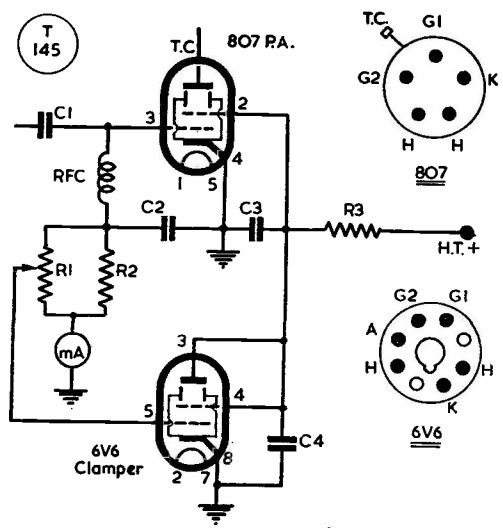


Fig. 1. A single 807 PA (top) with a 6V6 clamper valve which not only protects the PA (see text) but also, by means of R1, can be used to give smooth control of DC power input to the RF amplifier.

Table of Values

Fig. 1. Single 807 PA with Clamper Valve and Variable Power Control

C1 = 100 $\mu\mu$F
C2, C3, = .01 μF
C4
R1 = Variable power control; 50,000-ohm pot'meter
R2 = 27,000 ohm grid leak
R3 = 7,000 ohms, 5-w.

Table of Values

Fig. 2. Paralleled 807's with Clamper Valve and Variable Power Control

C1 = 100 $\mu\mu$F
C2 = .002 μF
C3, C4 = .001 μF
R1 = 50,000 ohms, variable power control
R2 = 10,000 ohms, grid leak
RFC = Standard RF choke

any similarly paralleled 807's. It may be explained, for readers who have not used a clamper valve, that the system not only limits anode current safely but it also allows the keying of an early stage with consequently fewer key-clicks. It obviates the necessity for a separate bias pack and permits the use of an ordinary grid-leak. As will be seen from Fig. 1, the clamper anode and the PA screen voltages are obtained through a common dropping resistor R3. The protective action of the system then works as follows: When drive is applied, voltage is developed across the grid-leak and the clamper and PA are both biassed. In this condition the biassed clamper makes only a light anode current demand on the common HT and the PA screen is accordingly allowed to enjoy its normal voltage with accompanying normal PA anode current. When drive is removed there is no voltage across the grid-leak and both valves become unbiassed. The clamper at once makes a heavy anode current demand on the common HT which immediately robs voltage from the PA screen and thereby safely limits the PA anode current.

The variable power control action, obtained by R1, is as follows: Alterations in the value

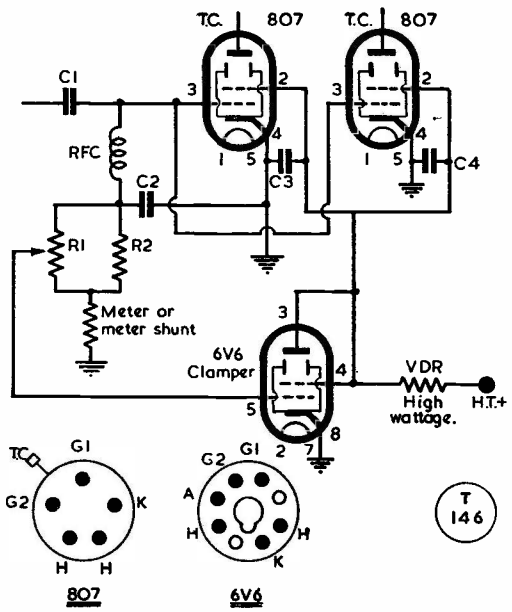


Fig. 2. A PA consisting of a pair of 807's in parallel, a very popular arrangement, in which protection is obtained by the same circuit as Fig. 1. Here again, R1 can be regarded as a variable power control on the screens of the PA. A circuit embodying these principles should be used with all tetrode RF amplifiers.

of the parallel resistance across the grid-leak R2 vary the bias on the clamper grid which in turn varies the PA screen voltage and the anode output. The combination is safe, efficient and reliable and has been in constant use in the writer's station since 1953.

NEW VF AUDIO OSCILLATOR

Salford Electrical Instruments Ltd. have recently introduced a new variable frequency audio oscillator, which covers a range of 50 c/s to 50 kc in three switched "bands," and is of particular interest to the radio and telecommunications industries. The VF audio oscillator gives a sinusoidal output of a relatively high amplitude and frequency stability. The frequency calibration can be accurately set by monitoring against an internal crystal calibration.

The unit consists of a two-stage Wein bridge oscillator operating in three frequency ranges, the amplitude being stabilised by means of a "thermistor" degenerative loop. The output is isolated through a cathode follower stage which feeds, *via* a potentiometer, a conventional amplifier with degeneration to reduce the output impedance to 600 ohms. The output itself is monitored by means of a meter incorporating a germanium bridge rectifier and multiplier, terminals or a jack point being used to provide a balanced output. The cathode follower also feeds a signal to a pentode which functions as a non-linear mixer of this signal with the output of a 5 kc crystal oscillator, the amplitude of which is controlled by a diode rectifier. The beat frequency output from the mixer is fed through a high-pass filter to a magic eye tuning indicator. A calibration trimmer enables the frequency to be set to a very much higher order of accuracy over a restricted part of the range.

CARDS IN THE BOX

The callsigns listed below are those of operators for whom cards are held at our QSL Bureau, but for whom we have no forwarding address. Please send a large stamped addressed envelope, with name and callsign, to: BCM/QSL, London, W.C.1, and the cards will be posted on the next G clearance. If appearance of the call-sign/address in "New QTH's" and in the *Radio Amateur Call Book* is required, that should be mentioned at the same time, as we are European agents for the *Call Book*, the only directory to the amateur stations of the whole world.

G2LO, 3AUD, 3BGJ, 3CXL, 3DFQ, 3ENY, 3FTE, 3GQ, 3JOK, 3JQJ, 3JWT, 3KAU, 3KCU, 3KFI, 3KFQ, 3KHA, 3RL, GM3IA, 3JGS, 3KAI, 3KHJ, GW3JLP.

Single Valve Transceiver

INGENIOUS MINIATURE STATION

T. HOLBERT (VS6CQ)

In the quest for simplicity and miniaturisation VS6CQ has struck an original note with his single-channel transmitter/receiver using one valve only, switched to provide either function. It has many obvious applications, not the least of which is that for local net working with minimum power.—Editor.

THE rig described here is possibly the ultimate, at present, in portable gear. The receiver has better sensitivity, and the transmitter higher RF output, than comparable transistor rigs. In addition, there is very little to choose between them in size if a miniature valve is used.

The single RF pentode is switched to function either as transmitter or receiver, and the crystal is used as frequency control for both. Any high slope RF pentode will work in the circuit. In particular, the EF50 and 6AC7 are both recommended. In the battery powered version, the 3A4 is suitable, and a 1T4 will also work, if the reduction in RF power output is accepted.

Circuit Details

The transmitter side uses a regenerative crystal oscillator in the AC version. In the battery circuit, a modified crystal oscillator will be seen. A pi-coupler is used for aerial matching. Since the RF power is low, and as operation will usually be on a single channel net, compression type semi-fixed condensers are suggested for the pi-coupler, C1 and C2. The screen supply is taken from the junction of the potentiometer network, R2-R3, and the output transformer primary is shorted. Cathode keying is satisfactory for the AC version, but screen grid keying has to be used on the battery powered model.

On receive, a leaky grid detector comes into operation. The crystal acts as the tuned circuit, with the aerial loosely coupled to it through the

Table of Values

Fig. 1. AC Version of the One-Valve Transceiver

C1, C2	= 500 $\mu\mu$F, double compression BC type	R2	= 20,000 ohms, ½-w.
		R3	= 100,000 ohms, ½-w. pot'meter
C3	= 5-30 $\mu\mu$F compression type trimmer	RFC1, RFC2	= 2.5 mH RF choke
C4	= 30 $\mu\mu$F	S1	= 4-pole, 2-way Yaxley type
C5	= 100 $\mu\mu$F	T1	= Transformer, 30 : 1
C6, C7, C8	= .01 μF, 350v. DC	V	= EF50, or 6AC7
R1	= 100,000 ohms, ½-w.		

Coil L1. on 1-in. diam. former, for 7 mc, 15 turns ; for 3.5 mc, 30 turns ; for 1.8 mc, 60 turns.

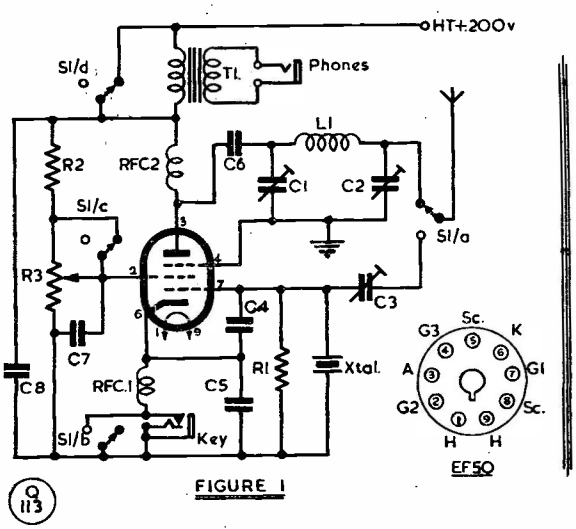


FIGURE 1

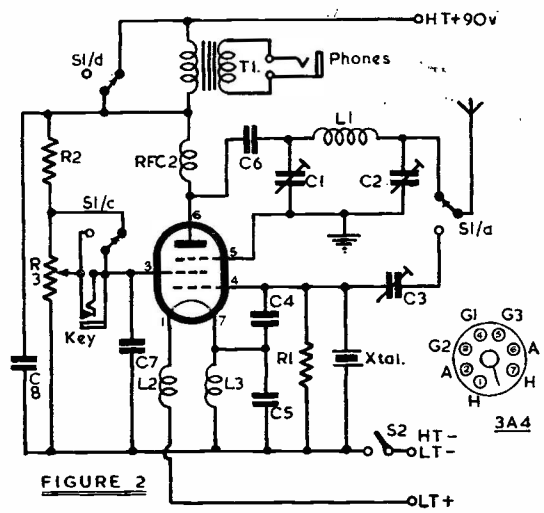


FIGURE 2

The single-valve transmitter/receiver circuit discussed by VS6CQ. Fig. 1 is the version using an AC valve (EF50 or similar) and in Fig. 2 is shown the circuit modified for a battery-type valve (3A4 or 1T4). Switching is in the "send" position ; when S1 is moved, the circuit becomes a one-valve receiver with reaction, controlled by R3. In either case, the crystal acts as the grid tuned circuit, the transceiver being intended for single-channel local working — say, on a Top Band net — or as a standby. For battery operation, as in Fig. 2, all values are as given in the table, with the addition of : L2, L3, Filament RF chokes, 100 turns 32 SWG enam., close-wound on a 1-watt resistor (any high value) as former ; S2, on-off toggle. With AC valves 200v. HT can be used, and in the battery version, 90-100 volts.

small semi-fixed condenser C3. The output transformer comes back into circuit, and the key is shorted. The screen grid voltage can now be varied by means of the potentiometer, R3. The correct setting of this control is most important for maximum sensitivity, since it is used to control reaction.

Adjustment

After checking the wiring, connect aerial, phones, key and power supply. Connect a suitable milliammeter across the key. Set C1 and C2 to maximum capacity by screwing down fully. Set S1 to "send" and switch on power supply. Unscrew C1 until the characteristic resonant dip is observed on the milliammeter. Now start unscrewing C2 and load up in the normal way for pi-couplers.

Switch to "receive" and set R3 for minimum screen voltage. Now carefully increase the screen voltage until the threshold of oscillation is apparent; this is the setting for maximum sensitivity for phone reception. By increasing the voltage a shade further, the receiver will slide smoothly into oscillation. This setting gives maximum CW sensitivity. If the reaction is ploppy, reduce the capacity of C3 until smooth control is obtained.

Modulation

By plugging in a carbon microphone in place of the key, sufficient modulation can be obtained for local working. It can also be obtained by using a carbon microphone, with energising battery, across the output transformer secondary. The appropriate switch section will have to be disconnected, to bring the transformer into circuit on "send." Any other modulation system requires a stage of preamplification which is not considered worthwhile, since the essential feature of this transceiver is its simplicity and "one-valveness."

Conclusion

The rig has been tested on 7 mc over a distance of 2½ miles to a 25 watt fixed station. Reports were RST 599 both ways, when using a 6AC7 and a 50 foot end fed horizontal aerial. On a 12 foot vertical rod, RST 559 was exchanged. Due to lack of activity at the right sort of distances in the Far East, it has not been possible to carry out medium-distance tests, but sensitivity and RF power output checks with signal generator and dummy load show that the performance is satisfactory. Considerable ranges should be possible under suitable band conditions. Similar results to those quoted should be obtained on 80 metres and Top Band. where the transceiver will hold its own on Sunday morning cross-town nets.

SIGN OF THE TIMES

Commercial CW telegraph stations are now beginning to appear in our 21 mc band—this is, of course, designated as a "shared band," so there are no immediate grounds for complaint. (If the band had been kept well populated, it is more than likely that the commercials would not have been so ready to open on it.) Point-to-point transmitters signing FYB2, OXE21, OXR25 and OXR54 have been identified working traffic schedules, and are strong signals.

QUALITY VHF RECEPTION

The radio industry has backed up the BBC's FM/VHF development by the production of a number of new receivers incorporating a tuning range for Band II (87.5-100 mc), in addition to the usual "short," "medium" and "long." A modern AM/FM radiogram *ensemble*, all of which give 3-speed auto-change record player facilities, is a very fine musical instrument and the quality of the BBC's FM transmissions is converting a great many people back to regular sound programme listening.

SERVICES FOR READERS

Direct subscribers to SHORT WAVE MAGAZINE—that is, those who pay a subscription to us in advance — are entitled to free both-way use of our QSL Bureau. For the benefit of all readers, whether subscribers or not, we have made arrangements with the publishers of the *Radio Amateur Callbook* (the only directory to the radio amateurs of the whole world) for the revision of the G callsign/address lists, available to us from all sources; all such notified to us by licence holders are published in our regular "New QTH" feature, and in the earliest possible issue of the *Call Book;* as this appears quarterly, it is right up to date.

Readers of SHORT WAVE MAGAZINE are also offered a wide range of Achievement Certificates, covering operation from the Top Band to the VHF's; established several years ago, these Certificates are now recognised as standard awards throughout the world. On production of the necessary proofs they are, moreover, issued entirely free of charge. To date, we have accepted claims for a total of more than 440 awards under the headings of FBA (Four-Band Award), WABC (Worked All British Counties), WFE (Worked Far East), WNACA (Worked North American Call Areas) and VHFCC (VHF Century Club). Any qualified reader, irrespective of whether he is a direct subscriber, may apply for these Certificates.

Other services offered are the free publication of exchange-of-crystal notices, and one-way QSL Bureau facilities for all U.K. amateurs who care to lodge stamped addressed envelopes with BCM/QSL, London, W.C.1. (This is the full, sufficient and only address from any part of the world for the Bureau operated by us.) *Both*-way use of BCM/QSL is, however, strictly reserved for direct subscribers only. We also accept six-month subscription orders at the half-rate of 12s.

DX COMMENTARY

L. H. THOMAS, M.B.E. (G6QB)

LA2CQ

FROM all quarters the story is the same: "This spell of lovely weather has kept me out of the shack" . . . "Due to the wonderful weather radio has taken a back seat" . . . "Who would chase DX on a fine sunny afternoon in August?" . . . "Been away on holiday" . . . and so on from practically all our correspondents. One of the penalties for living in a country where we only have a good summer about once every seven years is that we all acquire some kind of midsummer madness when it *does* happen. Notwithstanding all this, a surprising number of tenacious types have emerged with news of DX on all bands. The weather story has certainly come to the fore, but it shouldn't blind us to the fact that conditions have also become very much better. We only hope they will stay that way later in the year, when shocking weather forces us indoors and the shack becomes the focal point once again.

Contests and Ladders

The Contest season will shortly be in full swing, most week-ends finding the bands busy with serial number exchanges and the usual frantic chases after the rare ones. We find it quite impossible to publish the rules of all these events in full, but on another page you will find a list of dates and times. Basically the rules are much the same, except that in the International DX Contest (formerly the "CQ" Contest) the number consists of RST (or RS) followed by the contestant's Zone number instead of a progressive serial number. Scoring takes Zones, as well as Countries, into consideration.

Regarding Ladders, we intend to keep our three tables going during the autumn and winter, after which we will, as they say, "review the situation." WABC remains as popular as ever; the 21-mc ladder should see some radical changes as the band opens; and we should like a lot more support for the Five-Band DX Table, which is proof of versatility and helps to keep the activity distributed among the bands, which is always a good thing. Note that DL7AA, on top of that ladder, is only one point short of showing 100 countries or more on all bands. His score of 99 on Eighty is surely unique.

CALLS HEARD, WORKED and QSL'd

Top-Band DX Tests

It has been well established, over the last few years, that the most likely time of year for G/ZL and G/Far East working on the Top Band is around the autumn equinox — late September and early October. VS6CQ (Hong Kong) writes to say that he is prepared to operate on a 14-day sked this autumn to see what hopes there are for VS6, and ZL3RB (Canterbury) makes a similar proposition on behalf of ZL.

For the benefit of the sceptics, of whom there are many, ZL3RB states that he has QSL's from G6CJ and G6GM (the latter for two years in successsion), and that ZL1AH has worked G6GM quite a number of times. ZL3RB ran skeds with EI9J last February, and heard him at RST 449, although he was not heard himself. They are accordingly starting up again this autumn.

ZL3RB will be on 1882-1886 kc and will search between 1800 and 1830 kc. He will start at 0600 GMT and will transmit for alternate periods of five minutes, listening in between—every morning in October and November. Transmitting equipment comprises a

pair of 6146's running at 100 watts, and Vee-beams with 560 feet on each leg. There is no AC in the station, and therefore a low noise level.

VS6CQ proposes to run a sked for 14 days (October 1-14) and he thinks the most favourable time will be at dawn there (around 2200 GMT here). This, of course, will not be a good time for QRM at this end, but we might be able to persuade *amateurs* to keep his frequency clear, even if we can do nothing about commercial stations. His frequencies will be 1862, 1870 or 1901 kc, and he will listen nowhere near those frequencies, but, as with ZL3RB, between 1800 and 1830 kc — also between 1890 and 1930 kc if QRM is too bad at the other end.

Both of these tests are well worth supporting if you have (a) A reasonably quiet receiving location, and (b) An aerial system which gives you a good signal beyond the usual ranges of GDX. Otherwise, we fear, they will only result in disappointment.

Chasing Counties

Those who are not competition-minded may regard the chasing of British counties on the Top Band as an affair of no importance, but the fact remains that the search for the necessary contacts for a WABC Certificate has stirred up a most welcome amount of CW activity on the band.

It was not until November 1952 that we signed the first WABC and posted it to GI3HFT in Belfast. We have just had the pleasure of filling in No. 105! Think of the number of QSO's involved by 105 operators each trying to contact 60 counties (many of them have now topped the 90 mark) and you will have to admit that there has been some real activity where things were tending to stagnate.

Most pleasing, too, is the fact that the competitive spirit has by no means spoilt the "friendliness" of our Top Band; in fact many of the 'chasers write from time to time to say that what keeps them on this band is simply the absence of cut-throat tactics and the general matiness of the ten-watters. Long may it continue this way.

G3JHH (Hounslow) has gone to 77/81, thanks to GM5PP/P (Bute) and GW3EFZ/A (Denbigh). G3KEP (Bingley) collected GM5PP/P in three Scottish locations, but his own projected portable work was held up by a spot of trouble with the receiver.

G3BRL (London, W.5) added Argyll with GM3JZK (Isle of Mull), and G2NJ (Peterborough) pulled himself up to the present maximum (97/97) with GM5PP/P (Bute).

GW3KCQ (Lampeter, Cards.) forsook his rock-bound spots on 80 and 40 and sampled the joys of Top Band, which he describes as a "gratifying change." He has a 540-ft. wire, North-South, and tells us that another active station in Cardigan is GW3KHY.

G3JAM (Woodford Green) puts himself back on the ladder with 54/67, and has collected quite a few new ones. On a fortnight's holiday he visited several amateurs in the region of Morecambe, Windermere and the I.o.M. His trouble with local high-tension grid wires subsides in the summer, and he has discovered that the 11 kV lines on wooden poles are worse offenders than the big 132 kV jobs; the range of their QRM in wet weather is some times as much as a mile.

G3JKO (Nottingham) collected lots of portables, some from his /A location and some from the permanent one. He queries whether both are allowed to count in the one score. As far as we are concerned, they are, provided that both QTH's are "permanent." Naturally we could not allow scores from a *portable* to be mixed up with the home station's efforts. Also when a station moves from one QTH to an entirely new one he has to start again, unless the distance is less than 60 miles.

GC2CNC's recent comments on a G5 station working EA1CB in French are now explained. It was the old cross-band phenomenon again! G5JP (Hawkinge) raised the EA on 80 and then asked him to listen on 1850 kc, but had difficulty in getting the scheme over until he found that the Spanish station understood French better than English! Earlier on he did the same thing with TF5TP, who was on 80, and lots of stations on that band heard TF5TP calling G5JP, and getting no reply on the frequency, so they all charged in and caused the "rabble" referred to by a previous correspondent.

Incidentally, G5JP poses a problem—if you call and do *not* get a reply, are you one of the rabble? Or do all the others become the rabble automatically? And what of the chap who *does* get the QSO? Is he the cad? Finally, he worked 4X4AM cross-band during August, as well as a YU, an OY7, and an SM8 marine station, worked right down across the Bay until he reached Lisbon.

CONTEST DATES

September 3, 0001 GMT to September 4, 2359 GMT :
Labre Contest, CW.

September 10, 0001 GMT to September 11, 2359 GMT :
Labre Contest, Phone.

September 17, 0001 GMT to September 18, 2359 GMT :
European (WAE) Contest, CW.

September 24, 0001 GMT to September 25, 2359 GMT :
European (WAE) Contest, Phone.

October 1, 1000 GMT to October 2, 1000 GMT :
VK/ZL Contest, Phone.

October 8, 1000 GMT to October 9, 1000 GMT :
VK/ZL Contest, CW.

October 22, 0200 GMT to October 24, 0200 GMT :
International DX Contest, Phone.

October 29, 0200 GMT to October 31, 0200 GMT :
International DX Contest, CW.

Sark Again

Another Sark expedition was on the air at the end of July, without any previous publicity or organisation, when GC4RD/A appeared on 1911 kc. He worked quite a bunch of G's, including G5JM (Buckhurst Hill) who passes the news along. 'JM also tells us that GC3HFE will be visiting Alderney regularly in future, and hopes to be on the air from there in early September. No details yet available except that he will be rock-bound and probably QRP.

Not Good

From ON4IB (Bruges), who is an official of the Belgian amateur organisation and so should know, comes a note that the "ON4IC," "ON4IF" and "ON4KC" contacts on 160 metres, mentioned in the June and July Commentaries, could not have been with genuine ON4's. He states definitely that there are no Belgian stations licensed for, or operating on, Top Band and that any signing ON4 calls are pirates of one sort or another.

Trans-Atlantics

Elsewhere you will see the proposals for this year's Trans-Atlantic Tests, in a panel. Note that no specific dates are fixed, but it is *essential* that the frequency-schedule be observed.

Activity in July was encouraging, and we have the following data from W1BB. On July 3 he and G3JVI heard each other; on July 5 K2BWR worked G3GGN, repeating it on July 12. On July 13 both K2BWR and W3RGQ worked G3GGN. Then on July 31 W1BB worked G3JVI (0325-0345 GMT) and heard G3GGN very weakly. W3RGQ was also heard by G3JVI. The tests continue, and W1BB says it is obvious that the Pond can be crossed at almost any time. It is only the lower static level that makes winter contacts easier.

Twenty Metres

All sorts of DX has been cropping up on *Twenty* at almost any time during the twenty-four hours, and the number of places you can work seems to depend more upon activity than anything else.

GM3JDR (Wick) tells us that KC6CG needs contacts on CW with GC, GD and GW, and will be on for about another three months. 'JDR has recently worked him, as well as FY7, ET, ZS8, JA, FP8, W6 and 7. VS6, XW8AB (first GM) and other nice ones; he missed on HI8HG, VS4CT and CR4AL. G2YS (Filey) winkled out MP4QAL for a new one; G3BRL deserted the Top Band and raised a lot of W's, as well as HP1EH and CE3RE, around midnight, and also VK5KO (0625).

G5BZ (Croydon) collected KC6CG, a new one for him, and "the usual sort of DX" on the band. G3EPG (Cheadle) had a contact with G3HCU, operating from VE3RCS, on August 16, and says that 'HCU has been issued with the call VE3DXI; he may be heard as VE3ATU, '3DXI or '3RCS for a few weeks. G3EPG himself raised VP8BF on CW, and KH6OR, VE8YC, KL7AGU and KL7AON on phone.

GI3IVJ (Belfast) did well with VE6, 7 and 8, W6 and 7, KL7, CE, YS, TI, PJ, several KH6's, ZM6AS, KA, CR6, and, in Europe, HE, PX and LB8YB. A nice bag by any standards! DL2RO (Hamburg) comments on the stir caused by PX1EX (Andorra), who, on August 11 at 1830, had the following answer one CQ: KC6CG, KR6USA, XW8AB and KH6IJ. Nice to have a prefix like that . . .

Forty Metres

An old 40-metre stalwart, G6TC (Wolverhampton) writes to tell us that the band is neglected but good for DX. In the first half of August he worked several W's, LU8HAM, VK2AMB, 3APM and 3ZM, ZL1AM, 2FI, 3GU, 3JX and 3SX—all between 0630 and 0830 BST, with 75 watts to a dipole. GI3IVJ (Belfast) raised CT2, KP4, LU's PY's, YV1AD and several W's.

G3JJZ (London, S.E.6) put up a new aerial and wanted to see whether it worked on Forty. It did, and he has been there ever since. On his first "CQ DX" his 15 watts brought back a 569

TRANS-ATLANTIC

TOP-BAND TESTS, 1955/56

Dates: Every Sunday, December-March inclusive.

Times: No set limits, but peak activity 0500-0800 GMT.

Frequencies: American stations will be listening for Europe between 1830 and 1870 kc. *DO NOT* call W/VE stations on or near their own frequencies, as they will not be listening there.
Full details of W/VE frequencies later, also of other stations participating.

FIVE BAND DX TABLE
(POST-WAR)

Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries
DL7AA	691	99	159	219	109	105	222
G6QB	602	52	108	222	85	135	236
G5BZ	584	63	113	230	112	66	232
G3FXB	523	67	121	184	101	50	193
G2VD	511	48	94	180	90	109	189
G4ZU	504	12	45	212	115	120	216
G2WW	488	23	70	190	98	107	198
G2BJY	466	48	78	141	83	116	181
G3DO	462	24	46	201	84	107	223
G2YS	409	59	78	146	80	46	161
GM2DBX (Phone)	376	33	31	158	73	81	169
G2BW	368	24	57	144	100	43	165
G8KU	335	22	50	160	28	75	168
W6AM	335	13	32	254	32	4	254
ZB1KQ	284	6	34	118	64	62	139
G8VG	280	36	76	124	18	26	141
G3IAD	272	41	88	129	9	5	149
GM3JDR	211	39	36	101	34	1	108
GM3EFS	189	22	39	96	12	20	105
G2DHV	172	19	25	110	6	12	113
GM3DOD	58	6	14	30	7	1	35
G3HEV	43	8	19	14	1	1	26

from W2FA, and other W's followed. Europe was pretty well rounded up, plus ZB1 and FA9, and then CR6AI was raised around midnight — 559 with 20 watts.

Another interesting appreciation of Forty comes from C. Harrington, an SWL who has just returned to the game after sixteen years' absence. He started on the band last April, and has logged 700 stations in 37 countries since then — on the family broadcast receiver! Now he says he has "tasted blood" and is out for better things.

All the above shows that Forty is well worth taking some trouble over—but don't all get on there at once, please.

TOP BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
G2NJ	97	97
G5JM	97	97
GM3EFS	94	94
G3HIS	94	94
GM3OM	93	95
GI6YW	93	93
G3JEL	92	94
G3HIW	92	93
G3JEQ	92	92
G5LH	92	92
G6VC	92	92
G3EUK	89	93
G3CO	89	92
G2AOL	87	91
G5JU	87	87
G2AYG	83	84
G3BRL	79	80
G3JHH	77	81
G3GYR	74	76
G3JKO	73	85
G3DO	72	72
G3GGS	67	73
GM3DOD	66	70
G3KEP	65	73
G3FAS	64	79
G3JJZ	63	74
G3GGN	61	79
G3JJG	61	68
G2HKU	61	62
G3JBK	60	71
G5FA	60	66
G3DGN	60	64
G3JAM	54	67
G8CO	50	65
G2CZU	50	53
G3FNV	44	68
EI8J	38	48
GM3JZK	38	41
G3HQT	20	29

If you heard or worked ZS5DHE during July 8-16, it was the station of the Durban Radio and TV Society, at the Durban Crafts Fair. Transmitters were in operation on 3.5 and 7 mc, and here we see ZS5BF with the 80-metre equipment. In spite of the very high local noise level, usual on these occasions, a large number of contacts were made by the nine ZS5's who manned the station.

The Overseas Mail

Our old friend G5LI (that was) is now active again as VE2LI, with 200 watts, and anxious to meet G's on the 80, 40 or 20 metre bands. (Thanks also to G3IDC for confirming the above.)

G3IAD (Wakefield) is on his way to become a VQ4, having signed on as a radio officer with East African Civil Airways for three years. As soon as his VQ4 call materialises he will be running skeds with G3CVG (Morecambe), who is his father, and also looking out for old friends.

Horse's - mouth story from Brunei: VS4CT on Sarawak now replaces the former VS5CT (Brunei), but will probably be in British North Borneo by the time you read this note. He has applied for ZC5CT and hopes to be using that call during September and October; by November he will be back with the more prosaic call of G3DCT. Pete runs 90 watts to a pair of 807's and has an HRO and two dipoles. He has a few words to say about bad manners, his particular pest being those types who sit on the station he is working and call him continuously. Many QSO's have been wrecked in this way, and he doesn't know whether to work them so as to keep them quiet, or to ignore them and suffer mutilated QSO's. (We suggest the thing to do is to work them but to state that no QSL will be forthcoming, giving the reason!)

G3HCV (Lympne) tells us the story of MP4QAK, the station which he ran very successfully during March and April from Umm Said, Qatar. With the aid of MP4QAD he was able to get the necessary permission to operate, and did a fine job out there. QSL's have been dispatched, but anyone still short should contact G3HCV with particulars.

MP4QAD (who is ex-G8JX, VS1CF and MP4BAM) should be on 21-mc phone very shortly. MP4QAL is also very busy, "dishing out QSO's at a fantastic rate."

W6AM (Long Beach) now scores 254 countries *on Twenty only*, his latest being ZD3A. All are confirmed! He also makes 206 on phone, EA9AR being the last one to show up.

The 21-mc Band

You never know with this one! Just as it seems to have taken a turn for the better, it falls right back again. Comparison with

previous years, though, does suggest that it should be better this autumn than ever before.

DL2RO found a good opening to the West on August 13, when North America was coming in well between 2000 and 2100 GMT. All W districts except the sixth were worked, and W7FB's signal "had to be heard to be believed." New ones during the month were FQ8AG, HE9LAA and LZ2KST, others of interest being ZP6CR, CX1CA, AP2Y, CE4AD and . . . UA9DH.

G3DO (Sutton Coldfield) covered the band with his new two-element beam, on phone, and raised PJ2AA, VP2GG, ZP9AY, EA8AI and OK3KBT, the latter two being new ones. G5BZ, also on phone, collected HB1OP/HE, OQ5GA and VP6JK.

GW3AHN (Cardiff) now occupies the top rung of the ladder with 128 worked, the latest two being VP2GG on phone and ET3AH on CW. Others during the month were ZD2, MP4, HE, IS, FF, HC (all phone) and KP4, LU, CE, MP4, ZD4, FF and JA8AQ (on CW); he found conditions improving at the end of the month, with VK, VS6, VS1 and 2, and JA coming through regularly in the mornings.

GM2DBX (Methilhill) worked VQ2ST and LU8DB, also "just about all the active hams in Malta" — all on phone. Also HB1OP/HE, for a new one.

21 mc MARATHON

(Starting July 1, 1952)

STATION	COUNTRIES
GW3AHN	128
VQ4RF	126
VQ4RF (Phone)	125
G4ZU	115
G5BZ	112
DL2RO	110
G4ZU (Phone)	110
DL7AA	109
G3HCU (Phone)	107
GW3AHN (Phone)	103
G3TR (Phone)	98
G2WW	98
G3DO	89
G6QB	85
G2BJY	83
G2VD	80
ZS2AT	80
G2YS	80
GM2DBX	78
G3FXB	77
GM2DBX (Phone)	73
G3CMH	71
ZB1KQ	64
5A2CA (Phone)	60

Ten Metres

Short skip and occasional DX seems to be the rule on *Ten*, which does stir and show signs of life occasionally. G3IDG (London, S.W.12) heard 4X4DK on phone, and stations working WØZRX/MM and ZB1's. G5BZ raised some short-skip—the first for about three years. GI3IVJ had contacts with DL, EA, F, ON, OZ, PA and SM.

DL2RO worked what he calls "semi-DX"—PY, LU, VQ4 and CR6, and comments on the excellent phone signal from ZD3BFC, most evenings between 1800 and 1900 GMT.

Miscellany

The rare ones *do* QSL, even if you have to wait . . . G2DHV reports receiving cards from CEØAA, TI9MHB and AC3SG. G6BS (Cambridge) has put in claims for the WAVK Certificate, both phone and CW. Incidentally, readers who were mystified by the reference to "VK8" in our paragraph about this WAVKCA (Worked All VK Call Areas) award on p.249 of the July issue are asked to note that this should have read "VK5 (North Australia)" — the district which *was* VK8 in pre-war days. A regrettable error in transcription, which we hope has not bothered anyone.

One or two mentions of *Eighty*: G5JP says it is time more G's came on that band, which is in danger of being swamped by a variety of stations. Nothing can be done about the true high-powered commercials, but a lot of the others are only using a few hundred watts and *can* be made to shift. A little more "occupancy," just to stake our claim, might clean up the band somewhat.

GM2DBX has been working mobiles on Eighty, including GM3AMM/M at John o'Groats. GI3IVJ raised VEIZZ one night. G3JHH comments on the UB5 activity there, and mentions a type who, because he couldn't raise one, called "CQ Free Europe" on the frequency—not only pointless but quite unrewarding.

G6YQ (Liverpool) should by now have reached his 1,000th QSO with VK4YP (all post-war). For some time they have been peeling them off at the rate of two per day on Twenty CW. 'YQ had an enjoyable visit from CE3AG/CEØAA and his XYL, during which they had two S9 skeds with CE3AG's home station, operated by his brother CE3DG. All went off in copy-book style, as one always hopes it will — but so seldom does!

DX Gossip

The recent PX1EX in Andorra was quite genuine, operated by F8EX, an F9 and an F3. He worked at least four bands and gave out many European contacts on 40 and 80.

The former G7DW/MM is now on the air as VP2VB/P, and has been heard around 14050 kc CW. He may be visiting many rare

Short Wave Magazine DX CERTIFICATES

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

FBA
No. 51 GI3IVJ (Belfast)

WNACA
No. 80 SM6AMR (Gothenburg)
81 OH3RA (Hameenlinna)
82 ZL4CK (Dunedin)
83 OZ3FL (Sundby)

WABC
No. 96 G3JJZ (London, S.E.6.)
97 G3AZY (Wellington)
98 G3GGS (Preston)
99 G3KEP (Bingley)
100 G3HHV (Plymouth)
101 G3GRS (Gravesend)
102 G3GGN (Littlehampton)
103 G3JJG (London, S.W.16)
104 G3FAS (High Wycombe)
105 G3DGN (New Barnet)

Details of MAGAZINE DX AWARDS and CERTIFICATES, and the claims required for them, appeared in full on p. 323 of the August, 1954 issue.

spots in the next year or so. Watch for British Phoenix Is., Nauru. VR4, CR10, VU5, VQ9, among others!

W's are allowed to work Laos —so XW8AB will be more difficult to winkle out from now on . . . An "ACØAA" who recently showed up on 14 and 21 mc is regarded with slight suspicion . . . KAØIJ is returning to the States. leaving Iwo-Jima without any amateur activity.

VR6AC is spasmodically active from Pitcairn, running 25 watts on Ten and Twenty from 12-volt batteries topped up by a wind-charger. At present he is having difficulty in loading his aerial correctly, and he finds very few replies to his calls.

VK1ZM is a new one on Macquarie—phone on 14100 kc . . . VS2DQ, after a holiday in the U.K., hopes to go to Christmas Island, ZC3, where the QRM comes from man-eating land crabs! A station signing ZC3AC showed up on CW during July, but seemed to have worked only a few W6's.

VK4YP reports ZY9AA, giving name as "Spiv," QTH Phoney Island, and QSL *via* Santa Claus. (At least one W6 was he rd to promise a QSL immediately—by air mail!)

AC5PN in Bhutan is genuine, but AC5SQ has now left . . . AC3PT in Sikkim works mostly phone, 14100 kc . . . FW8AB is being fixed up with a power transformer by well-wishers and QSO-wishers in the States.

VQ4NZK ("Globe - Trotter" W6NZK) is said to be planning activity in VQ7 and VQ9. Nothing definite yet . . . AC4LN is yet another mystic from Tibet—nothing known . . . KE6AA ("Edwards Island") is probably another one with too vivid an imagination.

Apparently MP4QAH, when operating from Halul Island. stated that contacts would count as with Qatar. It has now been established that Halul is within the territory of Trucial Oman. This, presumably. means subtractions for some and additions for others! MP4QAL is now on Halul, too.

(Acknowledgments, as always, to KV4AA and the West Gulf, North California and South California DX Clubs for some of the above items)

Late Flashes

ZS1PD, instead of signing ZS1PD/ZS8, has been assigned the call ZS8L . . . VK9WP has come up on Forty (7002) . . . VQ8CB now appears to be on 14046 and 14073 instead of his former spot around 14100 kc.

Not of much interest to us. unfortunately, but KC6AA is said to be very active on 7116 kc phone. Just try and hear him!

Station of DM2ACB, Schwerin, active on 3.7 and 7 mc phone, running about 20 watts.

ACØAA, previously mentioned, says he is in Sinkiang—which is not in Tibet at all, but in the territory which would formerly have signed C8. It *is* in Zone 23—but is *he*?

Another "funny" is FU8AZ, apparently working W's in shoals. He can't be heard in VK, although the other FU and YJ stations are S9.

VP2VB/P (see previous note) on the sloop *Yasma* survived hurricanes Connie and Diane and arrived safely in KZ5-land. There he will spend four or five weeks preparing for his Pacific hop.

YJ1DL has been active on CW, 14010 kc at 0600 GMT, having lent his modulation transformer to the local BC station!

No more for now, but doubtless activity will be looking up by next month. All news. please, by the dead-line. **first post on Friday, September 16.** The following one will be *Friday, October 14*: overseas readers please note. Address everything to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Until we hear from you again. 73.

This photograph was taken at the Royal Signals reunion at Catterick Camp, and shows, left to right: G3EMO (Liverpool), G3IIS (Chelmsford) and G3IDG (London).

SOME ENCHANTED EVENING

FRED'S TIME DX

By G3COI

UP to the time QSO occurred, it had been a disappointing evening for Fred. Since teatime he had been on all bands—at least on all bands that he could get his rig to light a pea lamp on, and as the only measuring instrument Fred could call such was his battered old "surplus" receiver, that could mean many an unauthorized band as well.

He had tried break-in on Eighty . . . well, it was *semi* break-in — he had only to throw three switches and press a bit of aerial wire on to the receiver to go from Transmit to Receive and he was so skilled at doing this that he had fooled many an FOC man. Or at least he *thought* so. Well, to resume, he had tried it and could not even raise a *dit* from an Army station whiling away the long duty hours fiddling with the enormous gap on his key. Fred sent slow CQ's with plenty of callsigns, and then fast CQ's with no callsigns. He tried chipping in to Old Timer's Nets both local and distant without success and with the coming of TV time when the G's hurriedly left, he thumbed his carbon mike into the aerial and tempted a DL with an *Algerminer Angrufft.*

With mounting despair, he screwdrivered the coils out of his rig and began the slow and exasperating job of coaxing enough drive to fire his 807 and at the same time prevent that battered bottle from flying off on its own to some point just outside the band limits—this time 40 metres. Again the dreary calling process was repeated with the monotony broken only by 500 kilowatts of Arabian music and the grinding noise from one of Fred's "whiskers" as his PA oscillated furiously, key up.

As 2200 hours approached, he once again groped into the old tea chest in which he kept his coils and carefully plugged in his twenty-metre set. Funnily enough, Fred never had trouble with drive on this band—in fact, he would often demonstrate to visitors how the PA could run about 200 mills with the VFO valve removed entirely. To save self excitement Fred keyed the PA HT. The note was distinctive.

After several dummy runs on the key, that is to say strings of dots and such well-remembered Aids to Proficiency as "Best Bent Wire," he switched to receive—not to listen out, mark you, but in order to prepare himself a cup of cocoa that he might better withstand the onslaught of a band in which no quarter is asked or given.

He was coming back from the kitchen to the shack, which was in the roof, when he heard a very familiar note calling an AC4. Intrigued, he forgot his torpor and pressed on up the shack ladder at an increased rate of climb.

Panting heavily, he reached the top and picking his way carelessly through a nest of 1154 parts and reclaimed wire, flopped into his well loved wicker QSO chair and listened, fascinated, to the sounds that were issuing from his cunningly mounted speaker. (Slung from the rafters by rubber bands.) *It was his own station he heard calling the AC4* and lo, the DX station replied to the call with the usual (for Fred) report . . RST 336 73 VA.

Fred's first reaction was hardly visible, except that his face glistened paler than ever in the glow from his rig. Then he was racked with an acute sense of disgust at the thought of a pirate using *his* call and actually working an AC4 . . . a call which Fred thought must be extremely rare but vaguely familiar nevertheless. He spent a futile hour calling "himself," using a phoney callsign in an attempt to bring the bounder to book; but it was no use, both AC4 and pirate had departed.

Fred pulled the big switch and several little switches and went to bed. But he slept badly, with his key hand twitching an unreadable CQ.

The next morning, Fred gazed unseeingly at the morning paper while munching his cornflakes; then gradually his face became intense as he absorbed the meaning in a small article on the Science Fiction page:

"SCIENTIST OFFERS NEW THEORY

Yesterday, Professor F. Ede Bach stated that, following experiments with the new radio telescope, there were indications that a giant star was about to be discovered and that the size of this star was so immense that it would reflect radio waves precisely two years, nine months, three days, four hours, twenty minutes after they had been transmitted . . ." *(it said).*

There was a clatter of crockery as Fred flew up to the shack. In a trice he had turned back the pages of his log to two years nine months, etc., etc., ago, and there, sure enough, was the record of the infuriating QSO he had witnessed last night. Tearing the page from his log and with a "Fame at last!" look, he began to write "To DX Commentary, *Short Wave Magazine.* Dear OM, a funny thing happened last night . . ."

SIX MONTHS, HALF-RATE

Readers are reminded that the annual subscription of 24s. for SHORT WAVE MAGAZINE can be paid in two instalments of 12s. each. The first payment guarantees delivery of the *Magazine,* post free in the U.K., on publication day every month for six months. Orders, with remittance, to: Circulation Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CORRECTION — "PORTABLE TRANSCEIVER FOR TOP BAND"

With reference to this article in our August issue, we are informed by G8PG that he ought to have made it clear that V2 is actually a 1LN5 used as a tetrode with screen-suppressor grids strapped and taken direct to HT+. A 1C5 could be used in this position in the circuit as shown, but the 1LN5 is more economical. He also points out that the value of R5 should have been given as 47 ohms, and not as stated. G8PG asks us to offer his apologies to any reader who may have been inconvenienced by these errors.

REFLECTION FROM THE METEORIC-E LAYER

SOME NOTES ON 30-50 MC PROPAGATION PHENOMENA

R. NAISMITH, M.I.E.E.

THERE may be times when amateur communication appears to be impossible on the 21 or 28 mc bands over a particular path, although some high-power commercial station can be heard working on an even higher frequency over the same path. Transmissions of this type have been observed for many years, but it is only comparatively recently that the significance of them has been fully appreciated. Thus, VHF transmissions receivable over intermediate distances up to 1,500 or 1,600 miles are now described in the American journals as a "new type of VHF communication." Both the strength and the quality of the signals are generally low even when quite high powers (50 kW) are used. The transmissions can be observed most readily in the 30-50 mc frequency band. It is quite clear that the signals are scattered back* from a cloud-like structure in the lower part of the ionosphere and that most of the energy in the outgoing signal never reaches the receiver. Although it appears to be an extremely inefficient method of transmission it has some advantages and these are discussed below. From the description above there should be very little chance of confusion with the more normal types of DX communication on the HF bands.

Ionospheric Structure

The irregularities or clouds in the lower part of the ionosphere which are responsible for this VHF type of transmission have been attributed to a variety of causes. It is well known that there is a good deal of movement going on more or less continuously in the region at roughly 60 miles over the Earth's surface. This can be observed visually at times of auroral display. It is clear, however, that communication of this nature is not that which is frequently referred to as due to "auroral reflections" since it may take place when there are no signs of auroræ. One favoured suggestion is that it is due to turbulence, another that it may be due to some forms of atmospheric electricity (not necessarily accompanied by lightning flashes), still another suggestion attributes it mainly to the incidence of sporadic meteors. It is difficult to provide a convincing argument in favour of any one of these suggestions and it may well be that there is some contribution from all of them. Since the writer considers sporadic meteors to be the predominant if not the exclusive cause of this phenomenon, some facts relating to the effect of meteors on the reflection of radio waves are discussed below as a guide to those who may wish to study the new type of radio communication.

Some Effects of Meteors

It has been recognised at least since the early 1930's that meteors could contribute to the reflecting properties of the upper atmosphere; but it was not until some of the high-power radar types of equipment became available after the war that the impact of meteors on these upper regions was fully appreciated. It is estimated that about a ton of meteor dust is added to the earth each 24 hours and this dust in entering the atmosphere at speeds up to about 45 miles/second, produces ionised gas trails which are not only visible to the eye but may also be detected by radio provided a suitable wavelength is chosen. (During periods of meteor showers they are also audible in the form of whistles, generally of descending pitch.) Both the visible and the radio evidence favour the suggestion that there is a thin region at a height of about 60 miles and one description refers to this as a "Meteoric-E layer." Other features of this layer are its very low reflecting properties, its marked diurnal variation corresponding to the well known diurnal variation in sporadic meteors, and its direct association with meteor showers and its almost continuous presence even during ionospheric and magnetic storms.

Advantages of the Meteoric-E Layer

The more or less continuous existence of the meteoric-E layer even during storm conditions is of considerable value in maintaining communication when the more usual types of radio propagation are interrupted. The use of VHF enables much of the congestion existing in the HF bands to be avoided with a consequent reduction in interference, and more efficient and directional types of aerial can be employed.

The area of transmission is limited to about 1,600 miles, thereby enabling the same frequency to be used in adjacent areas of approximately this dimension.

There is still much to be done to find out how to use the layer to the best advantage, but the quality of the transmission path at present does not appear to justify its employment as a means of increasing the service area of a television station!

A methodical study of this new type of VHF phenomenon, either individually or in groups, could add valuable data to the comparatively sparse amount of reliable information at present available.

(**See* "The Scatterbacks," by F. J. North, G2DCI, SHORT WAVE MAGAZINE, July 1947, discussing a long-distance reflection effect observed at that time on the 28 mc amateur band. This would appear to be the first published reference to the phenomenon described by our present contributor.—*Editor*).

MOBILE MARINE

After long negotiations with the Post Office, the first /MM ("mobile marine") licence has been issued to G8AO, master of an East Coast collier plying between Tynemouth and the London power stations. His enthusiasm and persistence have been rewarded by permission to work /MM on the 28 mc band only. G8AO will be remembered as a keen two-metre man at one time, when he had the equipment fitted in his ship and was permitted /MM operation under somewhat severe restrictions.

Rotary Beam Controller

ADAPTING AUTOSYN UNITS FOR DRIVE AND BEARING INDICATION

W. H. MORRIS (G3JCQ)

ONE problem which confronts the prospective rotary beam user is that of providing a suitable means of remote control. The unit described and illustrated in this article makes use of a couple of items which are available on the surplus market and can be adapted to provide a most useful and efficient rotary beam controller.

Some time ago the writer acquired a pair of Bendix Radio Compass Indicators and after experimenting with them found out that though originally designed to operate on high-cycle AC supply, they would function perfectly well on 50 cycle AC. These Radio Compass Indicators are to be found in two sizes, *viz.*, a large model with a dial diameter of approximately 5ins., and a smaller model with a dial diameter of approximately 3ins. Both models contain identical Autosyn Motors. The larger one was chosen for use as a desk mounting indicator whilst the smaller one was dismantled and the Autosyn motor removed to provide a means of transmitting the beam position to the direction indicator. The other item which is used for beam rotation is a 24-volt DC geared reversible motor which originally saw wartime service in automatic flight control as an elevator control motor. This motor (Aircraft Type 3) which has a final shaft speed of three r.p.m. and a torque of 150 in./lbs. is rugged enough to support and rotate a light weight beam for 10 metres.

Indicator Control Unit

The large Radio Compass Indicator, together with the components shown in Fig. 1a are mounted in an aluminium box measuring 8¼ins. x 8¼ins. x 4ins. The box contained a detachable cover plate which was used as the front plate carrying the Radio Compass

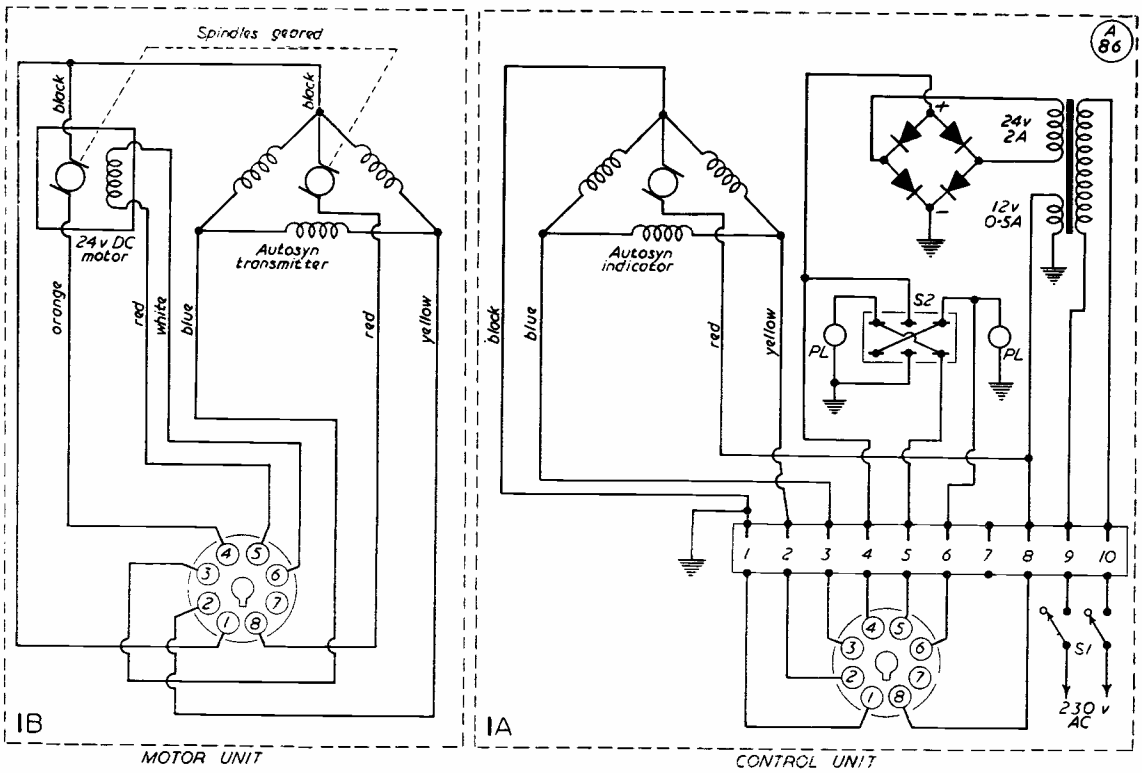
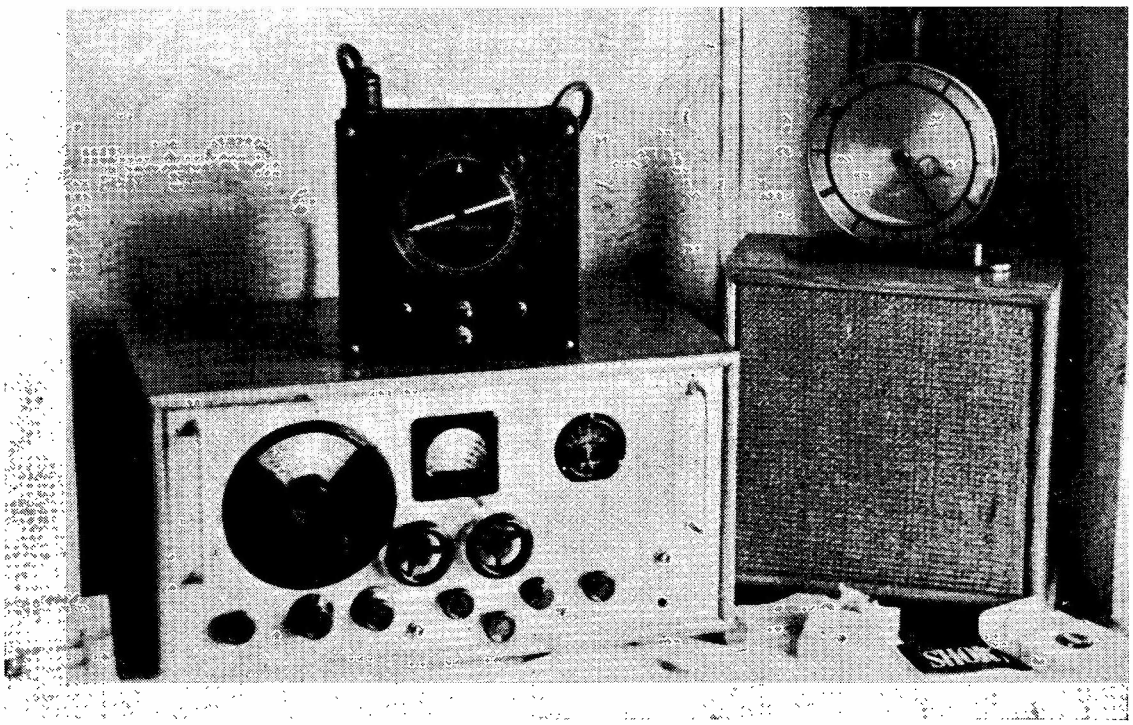


Fig. 1. Wiring layout of the Controller, showing inter-connection of the Autosyn transmitter (geared to the drive motor) and the indicating Autosyn unit.



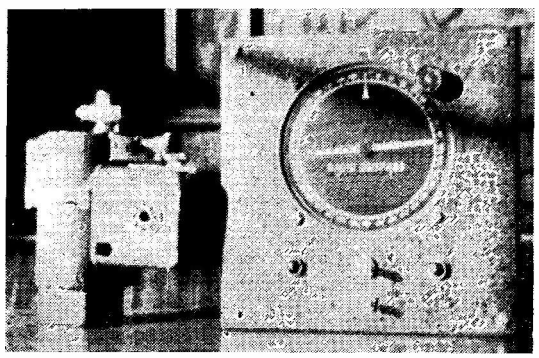
General view of the Control Unit at the operating position.

Indicator, control switches and pilot lights. The remainder of the components are positioned in the box in such a manner as to allow clearance for the rear portion of the Radio Compass Indicator when the cover plate is replaced. It was found necessary to remove the Cannon-type socket from the rear of the Compass unit so that the wires could be extended and connected to the 10-way junction block. Connection between the control unit and the motor unit is by means of octal plugs and sockets and 7-core cable. Efficient operation of the unit has been obtained with a connecting cable length of 60 feet. Control of the motor unit is by means of a DPDT switch (S2 in Fig. 1a).

Motor Unit

Attached to the side of the 24v. DC motor is a box containing relays, rectifiers, resistors and associated wiring. When all this is removed from the box it serves to provide an ideal housing for the Autosyn motor. The four wires from the motor will require lengthening to enable them to be connected up to the octal socket which is fitted into the box accommodating the Autosyn motor. Fig. 1b shows the wiring for this unit.

At this stage it was necessary to decide upon a means of coupling the rotation of the 24v. DC motor shaft to the Autosyn spindle. A search through the junk box provided the solution and the necessary parts. Drive between the two motors could be accomplished with nothing more elaborate than a set of four bevel gears, an old condenser spindle assembly and a broken down potentiometer shaft and wiper. Mounting the Autosyn motor inside the box called for a bit of juggling. Fig. 2 shows the general arrangement. First, the back plate of the box, which is attached to the motor



In this view, the Autosyn motor unit is to the left of the Controller

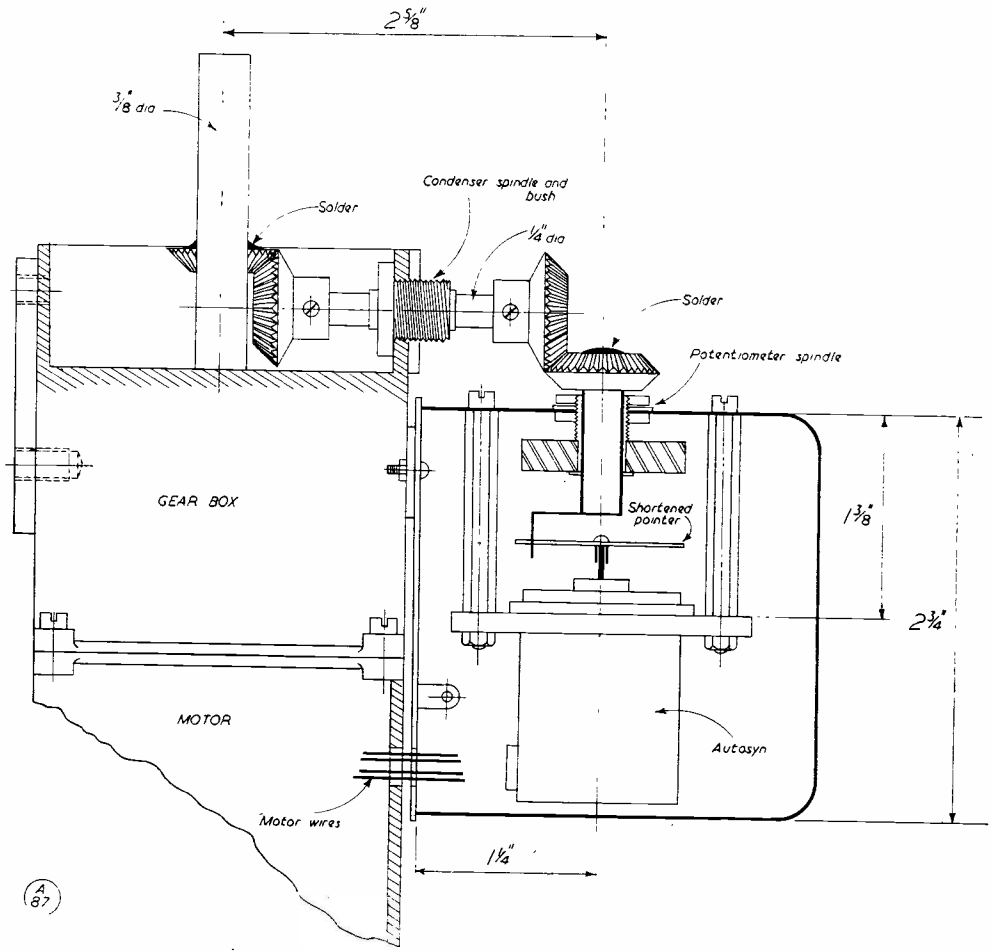


Fig. 2. Showing mechanical arrangement of the Autosyn drive, mounted on the main motor housing at the base of the mast.

by means of two set screws, was lowered by $\frac{7}{8}$in. to provide sufficient room to accommodate the drive shaft from the motor without protruding above the level of the gear box top. The upper side of the box was marked off and drilled to take three $1\frac{1}{4}$in. x 6 BA bolts to suspend the Autosyn motor inside the box. Drilled centrally between these three holes is a 7/16in. diam. hole to take the potentiometer spindle, bush and wiper. The wiper arm when slotted and bent downwards to engage the shortened pointer on the Autosyn spindle provides an efficient drive which is completely free from back lash. A shortened bevel wheel is fitted to this spindle. Drive from the motor shaft to the bevel gear above the Autosyn is transmitted through the condenser spindle. This spindle and its bush are mounted in a 7/16in. diam. hole drilled through the upper wall of the gear box housing. The spindle was temporarily removed from the threaded bush and the bush fitted in the hole. The spindle was then pushed through the bush and the inside bevel gear slipped on the spindle. (It can later be secured by a grub screw.) The bevel gear which drives the Autosyn gear is then fitted. The box containing the Autosyn is replaced and secured by the two fixing screws. The bevel gears above the Autosyn can then be adjusted for correct mesh. The bevel gear which is fitted on the motor shaft is drilled $\frac{3}{8}$in. and shortened. It is then inverted to provide correct direction of rotation of the Autosyn motor. This bevel gear and the Autosyn bevel gear are held on their shafts by solder.

An alternative method of driving the Autosyn motor would be to use two gear wheels of the type found in clockwork motors. They will have to be of the same type and size, and spaced by an idler gear to provide the correct

directional rotation of the Autosyn motor. These gears could be fitted to their respective shafts by means of brass bosses sweated on to the gears and drilled to suit.

The motor unit is mounted on a 3ft. length of 1in. diameter steel pipe by means of two cast dural conduit saddles which are bolted to the side of the motor. This support tube is then attached to a more substantial mast.

Beam Drive

Mounting a beam on the motor unit was achieved by using a piece of flat steel bar measuring 12ins. x 1½ins. x ¼in. This bar was drilled with a ⅜in. hole so that it could be slipped on to the motor shaft and secured by a ¼in. grub screw which is located in the side of the bar. Two ¼in. bolts hold the 1¼in. diameter dural boom to the carrier.

Finally, the motor unit will require some protection from the weather. An old paint tin provided this. It is approximately 7½ins. diameter and was marked off and drilled so that it could be inverted and slipped over the motor shaft and secured by the four set screws intended for fixing the gear box cover. The lid of the tin was previously drilled to fit around the motor support tube. When finally pressed into position this tin and lid give complete protection to the motor unit.

A beam using coaxial feeder can be rotated through better than 360° providing a certain amount of slack is left between the beam and the first fixing point of the coaxial feeder.

SOME MOBILE RESULTS

Using the equipment described on pp.242-243 of the July issue SHORT WAVE MAGAZINE, G3ATL/M reports a series of very successful 80-metre contacts at the end of July, when on holiday in Cornwall. Nearly twelve different stations were worked, all when G3ATL/M was strictly mobile, some of which were real GDX for /M, *e.g.*, G3DVI (Liverpool), G3FSU (Biggin Hill) and G3IOK (Worthing). An interesting personal QSO was with G3IKF of Blisland, a remote spot on Bodmin Moor; G3ATL was the first amateur who had ever visited G3IKF in the ten years he has lived on the Moor!

Another interesting report on mobile results is from G5CP, who is /M on 1910 kc in the 160-metre band. Whilst on holiday at Mablethorpe, G5CP/M worked a number of local and E. Yorks. fixed and mobile stations, the latter including G2FT/M, G3IUF/M, G3JXF/M, G5BD/M and G5GX/M. An outstanding GDX contact was with G3DQ (Flamborough) when G5CP/M was in Kings Lynn and actually mobile—a distance of 95 miles.

". . . And they say I'm the oldest Old Timer working mobile . . .'

NEW "OSRAM 912-PLUS" HIGH QUALITY AMPLIFIER

To extend the range of the popular Osram 912 home constructor's high quality amplifier, The General Electric Co. Ltd. has introduced a modified version suitable for use with radio, tape and microphone inputs. This incorporates the same Osram valves as its predecessor, in the same basic circuit, but two alternative input compensating units have been developed for this and they provide complete compensation for all types of records, both British and American, not only with the crystal pick-up originally specified but also with high quality moving coil, moving iron (variable reluctance) and ribbon pick-ups of low output. Details of the construction and operation of this new version, known as the Osram 912-Plus, are available in *Osram 912-Plus*, a book published by The General Electric Co. Ltd. at 4s. 0d. The original Osram 912 amplifier can readily be converted into the more versatile Osram 912-Plus and instructions on how to do this are included in the new book. The new amplifier is particularly suitable for use with FM/VHF inputs and offers the user the full benefits to be derived from the FM transmissions of the BBC.

VHF BANDS

A. J. DEVON

Fall-Off in Conditions—
Discussing Recent Results—
Activity and Interest Maintained—
Station Reports and News—

THE correspondence this month shows that since the *Stop Press* on p.317 of our last, reporting conditions up to July 24-25, the theme generally has been "good GDX at times but no fireworks."

In fact, the weather became so stable that if there were any marked temperature inversions, they must have been forming well after midnight or in the small hours. On August 21 and 22, when local fog was widespread in the early mornings, with a high degree of condensation, propagation conditions over the affected paths were probably pretty good — but this would have been between 0500 and about 0730 BST. *Not* a period of peak activity!

Incidentally, now is a good time to re-read the masterly series of articles, entitled "VHF Weather Report," contributed to SHORT WAVE MAGAZINE by G3EGB over a period of two years up to last December. (That issue summarises the findings.) Your A.J.D., in thumbing through his own file copies, came upon the chart on p.750 of the February 1954 issue. Take a look at this. It analyses the EDX manifestations over the previous five years — and shows July as being the most likely month for the development of EDX conditions! The caption to that chart even suggests that VHF operators should take their holidays in April, May or August if they don't want to miss the opportunities!

Coming down to our immediate business, most correspondents this month, having sorted out their standing in the Tables, are able to make substantial claims as a result of the recent openings; 51 such movements are recorded. Indeed, the statistics tell most of the story and are very interesting. No less than eleven operators advance in, or enter for the first time, the Countries Worked table. Let them be named, in the order of their appearance: G3GHO, G5YV, G2HDZ, G3DMU, G5DS, G3BNC, G3GSE, G5MR, G2CZS, G2DDD and GC3EBK. With G3GHO, G4MW, G5YV and G6NB each credited 15 countries, it only needs one of them to raise LX1AS (already worked by G5MR and G5TZ) or SP1AC (heard by several, but not yet worked by anyone) to get out in front with 16 or 17 countries. It would seem that G6NB has the best chance, as Bill has already had a "heard" report from LX1AS. *Apropos* the Stop Press note last month, G5MR remarks that LX1AS is hardly a newcomer on the 144 mc band, as he has been looking for G's for two years! (Our meaning was, of course, that he was new EDX from the G point of view.)

Notes on the Tables

The Countries Worked table now includes the callsigns of no less than 55 operators who have accounted for 8 or more countries on two metres since we started on the band seven years ago. If we were asked to pick an outstanding performer in the sphere of EDX working, we would say EI2W who, from the most difficult location geographically, stands at 10C worked; G5YV also has a geographical disadvantage, but nevertheless keeps in front and always turns in a fine performance.

In the Counties Tables there are numerous movements in the All-Time and that Table remains, as always, a record of progress. From it, we see that G5DS now shows the highest number of different stations worked on Two, with a total of 639; it could well be that there are other active operators with even larger totals, but it is G5DS who has checked his log regularly.

Annual Counties does not appear this time because that Table did not close for the year (2359 GMT, August 31) until after this issue went to press. Many claims have been received and the final list, to appear in October, will carry not less than 40 callsigns. All those with claims for Annual Counties (September 1, 1954, to August 31, 1955) are asked to let us have them as soon as possible, so that—as in previous years—the final placings can appear in October. (Claims made for this month have been filed, and need not be put in again unless there was an advance during the period between the dead-line and the last day of August.) And, of course, Annual Counties will have re-opened (for its 7th year) by the time you read this, and there may even be claims for the new one next month.

Notes on the EDX

The most exciting callsign in the Activity Report this time is SP1AC, heard by G2FJR (Sutton Bridge, Lincs.) during the evening of July 22, and by G5TZ (I.o.W.) on the 24th. He is probably the Warsaw station known to be active on the 145 mc band, with high power, a good receiver and an effective beam system; he is often reported by the easterly DL's, and his frequency is given as 145.045 mc — which is near enough for most people!

In the Duchy of Luxembourg, LX1AS has worked many DL, HB, ON and PA stations — we have no details of his gear, but G5MR has his card. Vernon well deserves his success and the distinction of scoring a rare "First," for he is severely handicapped in the GDX stakes, even if the F's are his locals.

The tally of countries available during the July openings is shown by the Activity Report herewith;

on this occasion, it has been possible to confine it virtually to EDX/GDX (for the first time ever) and all correspondents who sent lists have A.J.D.'s thanks for their careful attention to last month's request.

At the time of writing, no workable HB's have shown up, though they have been heard by G5TZ and G6NB. It sometimes happens that EDX stations, unaware that the band is open, are so busy exchanging S9 reports among themselves that they fail to listen for DX, and so miss chances. On the other hand, there are now plenty of European operators who are well able to assess the possibilities, and can be relied upon to be looking for us when conditions seem favourable.

"European Two-Metre Contest, 1955"

Once again, a regrettable example of administrative ineptitude. This contest, supposed to be *the* IARU event in Region 1 (Europe), was scheduled for September 3-4, and for all we know it did take place, to the accompaniment of a certain amount of head-scratching. For once again the rules reached us too late for advance coverage. In "VHF Bands" for October and November last, your A.J.D. delivered himself of some observations on this matter. As a result, an explanation was received from USKA (the Swiss body responsible for the organisation) and subsequently we were assured by OVSV (the Austrian society) that as *they* were laying on the contest this year, there would be no hitch. Accordingly, we forbore taking the action proposed on p.506 of the November 1954 issue.

There was a Region 1 IARU meeting at Lausanne in May 1953, at which the question of organising the European VHF Contest was one of the few items on which any positive decision was reached. It seems that another such IARU conference is due to be held next year (in Italy this time) for which a preliminary meeting, believe it or not, is to take place in Amsterdam in October. As by far the largest contributor to the expenses of these conferences and excursions in Europe is (believe-it-or-not) the British amateur, it is to be hoped that his representation this time will be strong enough to secure proper guarantees as to the conduct, control, organisation and publicity - handling of these European contests. So far, the record is not good.

And in case it may be thought that there is an odour of "sour grapes" about the foregoing, let it be made clear that we are entirely neutral as to who organises the European VHF Contest—all we ask is that it should be properly laid on. And this is for the third year of asking.

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)
14	G2HDZ, G5BD, G8OU, ON4BZ
13	G3BLP, G3CCH, G3DMU, G5DS, G6XX
12	G2FJR, G2HIF, G2XV, G3WW, G6LI, G6RH
11	G2AJ, G3ABA, G3IOO, G4RO, G4SA, G5UD
10	EI2W, G2FQP, G3BK, G3BNC, G3EHY, G3FAN, G3GHI, G3GSE, G3HAZ, G5MA, G8IC, GW5MQ
9	G2AHP, G3FIJ, G3WS, G5MR, G6XM, PAØFB
8	G2CZS, G2DDD, G2XC, G3GBO, G3HCU, G3VM, G5BM, G5BY, G5ML, G8SB, GC3EBK, GM3EGW

Station Reports—East and North-East

G3WW (Wimblington, Cambs.) now has what he calls a "mains driven auto sweep searcher" on his converter; in addition to a good bag on two metres, he was heard by GW3DA/P on 435.3 mc, and on the receiving side, got both G2WJ and G5YV when they were in QSO on the 70 cm band. G3WW also makes some reference to the "Cambridge Breaker Twins" which, not being in touch with the local political situation, we do not understand!

Moving further north, G3IRM of Knaresborough, Yorks., asks if there is anyone within reasonable travelling distance who would be willing to co-operate with him in getting going on 430 mc — he asserts modestly that he is a "newcomer, but a willing learner" and would appreciate assistance from anyone, "or another beginner prepared to jog along" with him. As nice a request as we have ever had, and we hope G3IRM finds a sparring partner.

Stations active in Scunthorpe are G3CCH and G3DMU; this time, it is the latter who writes in, with claims for the Tables. G3DMU says he has been off the two-metre band for some time but finding activity at reasonable hours and the band far better populated than it was two years ago, he is glad to be back again.

G2FJR (Sutton Bridge, Lincs.) also gives SP1AC's frequency as 145.04 mc and though a badly-fading signal, he peaked to S6 when calling CQ on CW at 2018 GMT on July 22. During August 2-8 G2FJR gives DX conditions as "quiet;" he heard EI2W on the 8th, tried hard to raise him, and then in QSO with G3IOO was told EI2W had said that G2FJR was a strong signal in Dublin! G2FJR is one of those who did very well with the Europeans when the band was open—*see* Activity

Report opposite.

G5AM (Witnesham, Suffolk) writes to say that the note here last time about his fruitless CQ's "worked wonders;" he now has a schedule going with G8VN (Rugby) and in turn offers schedules for anyone wanting Suffolk; G3IEX, lately Bexhill, is coming into the district and, with G3OJ, they hope soon to have three stations active locally on two metres.

G2CZS (Chelmsford) says that "having nearly completed painting the house" he will be able to spend more time on the air and hopes to work GW3GWA, never yet heard, even when other southerly stations are working him and the Shropshire people are coming through.

G3CVO (Great Baddow, Essex) makes a point when he suggests that the Activity Report should consist of stations heard, and called but not worked. Proposals on these lines have been put forward before, and your A.J.D.'s answer is the same: The calls-worked lists, if looked at objectively, give quite as much information as the heard, for they disclose areas of local activity, let us all know who is about and workable, and show how others, particularly the leading stations, are doing. We would suggest that this month's Activity Report, for instance, would lose a great deal of its interest if it consisted only of "calls heard." In fact, it seems to us that lists consisting solely of stations heard, and called but not worked, would amount almost to a catalogue of frustrated effort. Our experience is that the Activity Report as it stands is pretty closely scrutinised by the keen practitioners and it is for them to say how they want this section presented. If G3CVO's suggestion finds good support, then it is for your A.J.D. to meet their wishes; it would be no trouble at all to run the Activity Report in whatever way the majority would prefer it.

Station Reports — North Westwards

We are interested to have this time a report from GI2FHN (Bangor, Co. Down) who, with GI3BIL, was out /P on August 7.

TWO-METRE ACTIVITY REPORT

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

G3GHO, Roade, Northants.

WORKED: F8OB, 9EA, G2BAT, 4LX/P, 6AG/P, GD3UB, GI3GXP, GM3BDA/A, 5KW/P (Kincardine), 5KW/P (Roxburgh), 6AG/P (Wigtown), ON4ZK, 4UD, SM6ANR, 7BE.

HEARD: DL1FF, F3JN 3LQ, 8MX, 9CQ, GM3EGW, 3IBV, ON4BZ, 4CN, 4PA, PAØDSW, ØUU, ØVLM, ØYZ. (*July* 19 *to August* 19).

G3JHM, Worthing, Sussex.

WORKED: F3JN, 3LP, 3ND, 8GH, 8MW, 8MX, 9CQ, 9EA/P, G5YV, GC2FZC, 3EBK.

HEARD: F8ME, 8OB, 9DQ, 9RL, G2BMZ, 3AUS, 3FGT, 3WW, 6XM.

G6NB, Brill, Bucks.

WORKED: DL1FF, 1LB, 3VJ, EI2W, 6A, F3JN, 3SK, 9JY, 9QJ, 9RK, 9RL, G3DO/P, 3JZN, 3NT, GC3EBK, GD3UB, GI3CWY, 3GQB, 3GXP, GM2FHH, 3BDA, 3EGW, 5KW/P, 6AG/P, 6KH/A, GW5KW/P, ON4HN, 4UD, OZ1PL, PAØBL, ØDSW, ØES, ØFB, ØFP, ØGER, PE1PI, SM6ANR, 7BE, 7BZX. (13 *Countries: July* 19 *to August* 20).

G2FJR, Sutton Bridge, Lincs.

WORKED: DL1LB, 1XX, 3QH, 9MK, 9QV, F3LQ, 9CQ/A, G3BNC, 3BSU, 3EPW, 3FMO, 6AG/P (Cumberland), 6AG/P (Westmorland), GM2FHH, 3BDA, 3EGW, 5KW/P (Roxburgh), 5KW/P (Kincardine), 6AG/P (Wigtown), GW3DA/P (Montgomery), 3GWA, 3INV, 8UH, LA1KB, 8RB, ON4CP, 4OZ, 4UD, 4ZK, OZ2IZ, 6LD, PAØBL, ØBN, ØDSW, ØEL, ØFC, ØGER, ØGG, ØHA, ØHRX, ØLBS, ØSK, ØUHF, ØUU.

HEARD: DL1FF, EI2W, F9LQ, GW3BOC/P, OZ3EP, PAØFP, ØROB, SM7DYZ, SP1AC. (9 *Countries Worked*, 12 *Heard: July* 16 *to August* 8).

G3WW, Wimblington, Cambs.

WORKED: DJ1VW, 1FF, 9QV, F3LP, G3AGS, 4GR, 6AG/P (Cheshire, Cumberland, Westmorland), G8SB/P (Norfolk, Rutland), GM3BDA, GW3DA/P, (Montgomery) 3GWA, 5KW/P (Kincardine), ON4UD, 4ZK, PAØHA, SM7BE, 7BYZ, 7BZX. (*July* 19 *to August* 14).

G6RH, Bexley, Kent.

WORKED: DL1LB, 1MI, 1SEA, 9MK, F3JN, 3LP, G2HIF/P, 3ABA/P, 3FD/P, 3FKO/P, 3GHO, 3GWB/P, 3XC/P, 4SS/P, 5KW, 5YK (Hunts.), 5YV, 6AG, 6AG/M, 6AG/P (Cumberland, Westmorland), 6XM, 8KW, 8KW/P, 8SB/P (Rutland), GC3EBK, GM3BDA, 5KW/P (Kincardine), 6AG/P (Wigtown), GW5KW/P (Montgomery, Denbigh), ON4CP, 4DN 4HN, 4LN, 4PA, OZ1PL, PAØBL, ØBN, ØBX, ØEL, ØGER, ØHA, ØLBS, ØROB, ØUHF, ØVLM, ØWO, ØYZ, PE1PL, SM6ANR. (10 *Countries: July* 12 *to August* 12).

EI2W, Dublin, Eire.

WORKED: G2ADZ, 2AIW, 2ATK, 2CBR, 2HCJ/M, 2HCJ/P, 2HGR, 2HOP, 2NY 2OI, 3ABA/P, 3AGS/P, 3AJQ, 3BOC/P, 3BPJ, 3BVM, 3CCH, 3DA, 3DA/P, 3DLU, 3DMU, 3DO/M, 3ENY, 3EPW, 3FGT, 3FIH, 3GHO, 3GHU, 3GPT, 3GQR, 3GWB/P, 3HAZ, 3HTY, 3JPJ, 3IER, 3IOO, 3IUD, 3IWJ, 3JZN/P, 3WW, 5TZ, 5YV, 6KK, 6LC, 6MI, 6NB, 6TA, 6WF, 6XM, 6XX, 8AL, 8BP, 8IL, 8ML, 8QY/P, 8SB, 8VN, GI2FHN/P, 3AXD, 3CWY, 3GQB, 3GXP, GM2HCJ/P, 3BCY/A, 3BDA/A, 3EGW, 3IBV, 6KH, 6WL, GW2XV/P, 3BOC/P, 3FYR, 3GOP/P, 3GWA/P, 5KW/P, 8SU, ON4BZ.

HEARD: DL3VP, G5JU, 6XV, ON4UD. (*July* 11 *to August* 11).

G3GPT, Nr. Preston, Lancs.

WORKED: DL1FF, 3QF, EI2W, 4E, 5Y, 6A, F3JN, 8MX, 9JY, G2BAT, 3FAN, GC2FZC, 3EBK, GM2FHH, OZ2IZ, ON4BZ, PAØDSW, PE1PL, SM6ANR. (10 *Countries: June to August*).

G3CVO, Gt. Baddow, Essex.

WORKED: G2ATK, 2BCB, 2BVW, 2CZS, 2DUS, 2JF, 2RD, 3ANB, 3BSU, 3CZY, 3DO, 3EMU, 3FD, 3FD/P, 3FKJ, 3FNL, 3GDR, 3GHO, 3HBW, 3IEX, 3IFN, 3IIT, 3IJB, 3JXN, 3VI, 3WW, 5AM, 5KW/P, 5SK, 6AG/P, 6YP, 8KW, 8KW/P, 8SB/P, 8VN, ON4CP, 4LN, 4OZ, PAØVLM.

CALLED: DL9ARA, G2CIW, 2CLW, 2FJR, 2LW, 3FGT, 3GPT, 3GSE, 3HAZ, 3ION, 3KHA, 4JJ/P, 5DS, 5DT, 5JU, 5MA, 6FO, 6OX, 6TA, 6WU/P, 8IL, 8SC, 8SN/P, GC3EBK, GI3CWY, ON4BZ, 4DW, 4HN, 4TW, PAØFP, ØHA, ØLBS, ØNO, ØROB.

SWL Cox, London, S.W.18.

HEARD: DL1AH, 1LB, 9MZ, F3JN, 3LP, 8MX, 8RK, 8YG/P, 9EA/P, 9JY, 9QJ, GC3EBK, GM3BDA/A, 5KW/P, 6AG/P, GW3FYR, ON4CP, 4HN, PAØBN, ØDS, ØDSW, ØGER, ØHAP, ØROB, ØSK, ØUHF. (*July* 12 *to August* 2).

SWL Ball, Shenfield, Essex.

HEARD: F3LP, 9CQ, G3BJQ, 3FGT, 3GPT, 5BD, 5CP, 5TZ, 5UG, 5YV, 6XM, 8IL, ON4UD, PE1PL. (*July* 20 *to August* 20).

SWL Drybrough, Coventry.

HEARD: EI2W, G2AIW, 2CZS, 2FXK, 2HIF, 2NY, 2YB, 3AGS/P, 3ASC, 3ATZ, 3AYT/P, 3BCC/P, 3BGG/A, 3CKZ, 3CUZ, 3CYY, 3DGI, 3DLU, 3DQQ, 3DVK/P, 3ENY, 3EPW, 3ERD/P, 3FAN, 3FJR, 3GFT, 3GHQ, 3GJZ, 3GPT, 3IOO, 3IRA, 3IUD, 3JQY/A, 3JZG, 3JZN, 3KCT, 3WW, 3YZ/P, 4JJ/A, 5TZ, 6AG, 6AG/M, 6AG/P, 6CW, 6FB, 6JK/P, 6MN/P, 6PC, 6RH, 6TA, 6XM, 8IL, 8IL/P, 8PL/P, GW3GWA. (*July* 17 *to August* 21).

GI2FHN/P, Nr. Kilkeel, Co. Down.

WORKED: EI2W, 6A, G3ABA/P, 3AGS/P, 3DA/P, 3DVK/P, 3GWB/P, 3IWJ, 5YV, 6XM, 8QY/P, GI3GXP, GM2HCJ/P, GW3BOC/P.

HEARD: G3JZN, 3KEQ, 3YZ/P, 5JU, 8IL, 8UQ/P, GW3GWA/P. (*August* 7 *only*).

GC3EBK, Guernsey, C.I.

WORKED: DL1MI, F9QE, G2ABD, 2AIW, 2ATK, 2BBN, 2CIW, 2DHV, 2DTO, 2HCJ/P, 2HGR, 2HOP, 2OI, 2UJ, 3AGS, 3DJQ, 3DKF, 3DMU, 3DOV, 3DQQ, 3EOH, 3EPW, 3GGJ, 3GOZ, 3GPT, 3GSE, 3HTY, 3IER, 3IIT, 3INU, 3IUD, 3IUL, 3IWJ, 3JXN, 3MI, 4GR, 6FO, 6TA, 6XM, 8AL, GW2ACW, 3GWA, ON4HN, PAØBN. (*All over* 140*m. July* 23-25 *only*)

G6TA, London, S.W.16.

WORKED: DL3QH, 9QV, EI2W, G2ABD, 2AHP, 2AIW, 2ANS, 2BDP, 2CD, 2DSP, 2DTO, 2DVD, 2HGR, 2YB, 3BEX/P, 3BRX, 3CAS, 3CZY, 3DF, 3DGI, 3DLU, 3DMU, 3FPV, 3FRG/P, 3GAV, 3GHO, 3GOP, 3GOZ, 3GPT, 3GSM, 3IAM, 3IKW, 3ION, 3IOO, 3IUL, 3JDN, 3JFR, 3JFR/P, 3NT, 3XC, 3XC/P, 4GT, 4KD, 4PS, 5BM/P, 5DS, 5KW, 5KW/P, 5MR, 5NV/A, 5US, 6AG/P, 6FO, 6OH, 6OU, 6RH, 6WF, 6XM, 6YP, 8AL, 8IL, 8KW, 8SB/P, 8UQ/P, 8VN, GC3EBK, GM3BDA/A, 5KW/M, 6AG/P, GW3GWA, ON4DW, 4HN, PAØLBS, ØWO, ØYT, SM6ANR. (*July* 16 *to August* 16).

G8VN, Rugby, Warks.

WORKED: F8MX, 9JY, G2FJR, 2FO, 3AOO, 3AYT/P, 3CVO, 3DMU, 3DOV, 3GNR/P, 3GPT, 3GQR, 3HBW, 3IOO, 4JJ/A, 5AM, 6TA, 8IL, 8RW.

HEARD: G2ABD, 2AIW, 2DDD, 2DVD, 2HGR, 2WJ, 2YB, 3DLU, 3EPW, 3FAN, 3HII, 3HXS, 3IWJ, 3VI, 3XC/P, 3YZ/P, 5BD, 5BM/P, 5DS, G5VN/A, 6AG/P, 6AG, 6JK/P, 6XM, 6YP, 8DL, 8FF, 8MW, 8QY/P, GM5KW/P. (*July* 17 *to August* 16).

G2CZS, Chelmsford, Essex.

WORKED: G2HOP, 3ENY, 3GCX, 3IOO, 3KHA, 3YZ/P, GM5KW/P.

HEARD: EI4N, F9CQ,

G3AGS, 3DLU, 3DMU, 3FGT, 3GPT, 3KBL, 4JJ/A, 5OB/P, GM3BDA/A, GW3DOV/P. (*July* 20 *to August* 20).

G3DLU, Weston-Super-Mare, Som.

WORKED: F9RL, GI3GXP, GM6AG/P (Galloway).
HEARD: F8MX, 9JY, GI3CWY, 3GQB, GM3BDA/A, 5KW/P (Aberdeen), ON4BZ. (*July* 23 *to* 24 *only*).

G5AM, Nr. Ipswich, Suffolk.

WORKED: G2COP, 3AUS, 5JU, 8VN.
HEARD: F9CQ, G3DLU, 3FAN, 3GPT, 4JJ/A, 5YV, 8MW, GC3EBK.

G3JXN, London, N.6.

WORKED: F3LQ, 9CQ, 9JY, G2DDD, 2FTS, 2JF, 3ANB, 3ARX, 3FD/A, 3FGT, 3FRG/P, 3INU, 3JFR/P, 3JHM/P, 4IB/P, 5MR, 5TZ, 8IL, GC3EBK, ON4BZ, 4UD, PAØFB, ØOD, ØUHF, PE1PL.

HEARD: DL1FF, 1SEA, 3QH, F3LP, 8MX, 8OB, G2AYK, 2BAT, 2BMZ, 2BVW, 2FJR, 2HGR, 2JF, 3ABA/P, 3AGS, 3CBU, 3DLU, 3DMU, 3DO, 3DOV, 3EPW, 3FAN, 3FMI, 3GJZ, 3GPT, 3GWB/P, 3HII, 3HZJ, 3ION, 3IRS, 3JNI, 3KHA, 4PS, 4JJ/A, 5BD, 5OB/P, 5TP, 5YV, 6FK, 6OU, 6XM, 8MW, GC2FZC, GW8UH, ON4HN, OZ1PL, PAØDSW, ØFC, ØGR, ØLBS, ØRK, SM6ANR. (*All over* 50*m. June* 19 *to July* 20).

G3GSE, Kingsbury, Middx.

WORKED: DL1SEA, 3QH, 9MK, F3JN, 3LP, 8AA, 9CQ/P, 9EA/P, 9JY, GC3EBK, GM5KW/P, ON4UD, OZ1PL, PAØBN, ØWO, ØYZ, PE1PL.

Lists this month represent mainly EDX/GDX heard or worked.

Though conditions were poor and no stations at any considerable distance were worked (*see* Activity Report) GI2FHN says the expedition did prove that the further south one gets in GI, the easier it is to QSO across the water; in support of this, he instances the fact that GI3GQB, only 35 miles further north, did not hear a single two-metre signal all day on August 7, though there was a good deal of portable activity. GI2FHN reports that GI's at present regularly active are GI3AXD, GI3CWY, GI3GQB, GI3GXP and himself, all between 144.0 and 144.20 mc.

This reminds us to draw attention to the fact that, after all these years, we are still without an authentic claim for the G/GI "First"; it is the only missing entry from our very complete list of "Firsts," maintained since the two-metre band opened. So far as we know, GI2FHN and GI3GQB were the earliest GI starters on the band; so would they please look back in their logs (about five years at least) and let us know the call-sign, with the date, of the very first G they worked. *(A.J.D. is a great one for statistics and hates to be without a vital fact!—Ed.)*

Interesting /M QSO

Some of the /M contacts made by G2HCJ (Warrington) have been reported in this space on previous occasions. But the most noteworthy is surely his QSO with F9JY (Cherbourg) on the night of July 24/25, when genuinely mobile near Hatton, about three miles from Warrington. This is probably a distance record (over 250 miles) for /M working and, so far as we know, is also the first G/F contact of its kind. On this occasion, G2HCJ was getting GC3EBK at sufficient strength for a /M QSO but was unable to raise him until he had to stop motoring—G2HCJ then ran up the 3-ele /P Yagi and did it that way.

G3GPT emphasises that he is no longer in the Southport area of Lancs., but at Longton, near Preston; though the Pennines constitute something of an "iron curtain" and make EDX rare for him, he shows a very good log of Europeans for the July session, and particularly wishes to thank G5BD and G5YV for their assistance in getting him across to DL and PA: G3GPT says that he is also grinding himself into the 144.3-144.4 mc area as soon as he can get round to adjusting his overtone crystals.

Henry of EI2W says that the main feature of the period since the July openings has been the consistency of stations like G3GPT, G5TZ, G5YV, G6NB and G6XM, with August 8 a good night for GDX—this was the day they had rain in Dublin! G6NB is easily the strongest and most reliable signal heard by EI2W, and at 255 miles is readable under all conditions. Of Henry's total of 258 different stations now worked on VHF, 94% are outside EI/GI; in other words, DX by any standard. EI2W asks us to mention that EI6A, sometimes given as "Dublin," is actually in Co. Wicklow, 30 miles south of Dublin, and like EI2W scores as a county.

Station Reports—Midlands

G3DO/P/M has been in Herefordshire, Hunts., Radnor, Rutland and Staffs; he worked a large number of stations and mentions EI2W and GM6AG/P, both raised on the mobile 12w. rig using a 3-ele Yagi from a fixed site near Walsall.

Among those who have worked GD3UB (I.o.M.) on his rare appearances is G3GHO (Roade, Northants.); he suggests that we publish a list of EDX frequencies—while this would undoubtedly be useful to many readers, there are difficulties in compiling an absolutely reliable list; as it is, we always give an EDX frequency when it is known with certainty. However, if readers would quote in future reports all the European frequencies they are sure of, your A.J.D. will see if he can devil out an accurate list.

G8NM (Lincoln) reports with claims and says that it has nearly always been his luck to miss the openings; however, he was there for most of July, except the big week-end! G3CKQ (Rugby) has now got to 105S worked in 28C, and his neighbour G3BJQ also moves well in both Counties tables; incidentally, G3BJQ wants Suffolk very badly, so perhaps he and G5AM . . .

EI2W with the 5/5 for 70 cm he used when making the first EI/G contact on that band, with G5YV on July 14, as reported in our last issue. The elements are carried on the horizontal supports and, being end-on to the camera, do not show up in this view.

G8VN (Rugby) *still* on the indoor array, did well with the EDX during the July period, but having tried hard for GM5KW/P on many occasions, thinks the latter must have a filter which rejects "G8VN," because he has never succeeded in working him as G5KW or G5KW/P either. G8VN also tells of a contact with G4JJ/A —this was going well until G4JJ/A was diverted by the arrival of a swarm of bees! SWL Drybrough (Coventry) has now heard 36C and some 200S but is still unsure of the effect of his parasitic array.

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/GM	G3BW-GM3OL	13/2/49
G/GW	G5MQ-GW5UO	22/10/48
G/HB	G6OU-HB1IV	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-PAØPN	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-PAØHA	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/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
GM/DL	GM2FHH-DJ1XX	29/5/55
GM/EI	GM3BDA-EI2W	12/6/51
GM/ON	GM3EGW-ON4BZ	21/11/53
GM/PA	GM3EGW-PE1PL	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-HB1IV	14/9/53
GW/ON	GW2ADZ-ON4YV	13/5/50
GW/PA	GW2ADZ-PAØHA	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/ON	EI2W-ON4BZ	21/9/51
EI/PA	EI2W-PAØFC	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

Station Reports—London District

G3GSE (Kingsbury, Middlesex) writes in again after a silence of about 18 months, during which he has nevertheless been on the air whenever time permitted; as a result of being there for the July openings, he makes good progress in the Tables, with OZ1PL worked for his first Dane. G3GSE says that his new counties are nearly all in his "shadow" area, SW-NNW, in which directions he concentrates when conditions are good for GDX. G2DHV (London, S.E.13) uses an indoor 4-ele but was able to work GC3EBK, G5YV and G6XM during the good spells. G2HDZ (Pinner), reporting before going off on holiday, said he would not be in the fashion, because he was taking neither /A, /P nor /M gear with him! G5DS (Surbiton) scored heavily when the going was good, noteworthy contacts being with LA8RB and SM6ANR, both of whom have helped considerably in advancing the G countries-worked totals. G3JXN (London, N.6) maintains steady progress and now has 145S worked in 21C. SWL Ball (Shenfield) has been hearing the EDX and getting in his QSL's and, on a line of his own, has been out listening portable on a super-regenerative receiver with quite good results; he thought the August 7 field day rather an anti-climax after the superlative conditions during late July.

G6TA (London, S.W.16), now at 487 different stations worked, is building for /P operation and, as usual, shows a very useful activity list. G6RH (Bexley, Kent) accounted for 10 different countries during the July openings, and his EDX log is impressive; it includes no less than 13 PA's. SWL Cox (London, S.W.18) booked in quite a lot of good GDX not shown in his log for the Activity Report, which represents 8C heard.

Station Reports—South and South-West

G3JHM (Worthing), one of the active 70 cm stations, was very pleased to make a first contact on that band with F9CQ on August 3, worked many times since at S9+; this was followed, on the 15th, by another new F on 70 cm, F3LP (Le Havre), who was RS-57 at 98 miles. Both French stations, says G3JHM, use 16-ele stacks and QQVO6-40's in the Tx output stage; they are both to be found on two metres as well and are always ready for 70 cm tests—and with him they are stronger on 430 mc than on 145 mc. And G3JHM is one of several who remark that, having read the article by G3CGQ in the August issue, a start is being made on a receiver for 25 cm.

The G2CVD/P equipment for two metres consists of a 5w. transmitter using a 5763 and a double-superhet receiver, all built into an ASB4 case. Here we see G3BA operating and G2CVD looking on. With G3EJO, who took this photograph, G2CVD will be /P in Devon in late September, investigating various sites for portable work. Your A.J.D. suggests Dunkery Beacon, Hartland Point and the high ground near Torrington as likely spots that worked well in the old 5-metre days!

A slight disappointment for Vernon of G5MR (Hythe, Kent) is that when the band is open and the NW'ly G stations—in counties he badly wants—are busy working EDX over his head, he is quite unable to raise them; as mentioned before, G5MR is very badly situated for working G's, though he has a clear get-away to France; in fact, he often works new French

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH Only

Worked	Station
72	G5YV
70	G6NB
68	G3BW
63	EI2W (258), G3GHO
62	G3BLP (630), G5BD
60	G3CCH, G3DMU
59	G2FJR, G3EHY, G4SA
58	G3IUD (247), G8OU
57	G2O1 (349), G8SB
56	G3WW, G5DS (639)
55	G2HDZ, G2HIF, G5BM, GW5MQ
53	G2AJ (519), G2HDZ (416), G3FAN, G4CI
52	G2NH, G3IOO, G6RH, G6XX, GW2ADZ
50	G3ABA, G3GSE (518)
49	G5MA
48	G6TA (487)
47	G5ML, G5WP
46	G3HAZ (315), G4HT (476), G5BY, G6YU (205)
45	G2XC, G5JU, G6XM (356)
44	G3BK, G8DA
43	G2AHP (500), G3BA, G3BJQ (225), G3COJ, G4RO, G5DF
42	G3BNC, G3DLU*, G3FIH
41	G2DVD, G2FQP, G3DO, G6CI (184)
40	G2DDD, G3CGQ, G3HWJ, G8KL
39	G2IQ, G3GBO (434), G3HBW, G3VM, G8IL (325)
38	G2FCL (234), G3APY, G3WS (183), G8VN (190)
37	G2FNW, G2FZU (180), G3DLU, G3IER
36	G2DCI (155), G2HOP (161), G3CXD, G3IIT, G6CB (312), G8IP
35	G3FZL, G3FYY (235), G3HCU (224), G5MR (300)
34	G2CZS (233), G3BKQ, G8IC
33	G3HHY (125), GC3EBK
32	G2FVD, G8QY, G8VR
31	G3HXO, G5RP
30	G3FRY, G3GOP (208), G3GVF (129), G3IRA, G5NF, GM3DIQ, GM3EGW, GW8UH
29	G3AGS, G3AKU, G3FIJ (194)
28	G3CKQ (105), G3ITF, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160), G6GR, GI3GQB, GW3GWA
26	G3AEP, G3CFR (125), G3SM (211), G4LX, G4MR (189)
25	G3JMA, G5SK, G6PJ
24	G3FD, G3FXG, G3FXR
23	G3CWW (260), G5PY
22	G3AGR (135), G3ASG (150), G3BPM, G3HIL, G3JHM (113), G3YH, G5AM
21	G2AOL (110), G3DVQ, G3IWJ, G3JXN (145), G6XY, G8NM
20	G3EYV, G3HSD, G3IOE, GC2FZC
19	G3FEX (118), G3GCX, G5LQ (176)
18	G3DBP, G3JGY, GC2CNC
17	G3EGG
16	G3FRE
15	G2BRR, G2DRA, G3IWA
14	G2DHV, G3CYY

stations and must have given a first G contact to many an F. New calls listed by him are F3SK, F8YO, F9ND and F9RL; on August 15, when conditions across the Channel were unusually good. F9CQ remarked that G5MR was so strong that, though *not* over-modulating, he was *cross*-modulating all other G signals on the band!

G3ITF (Basingstoke) claims for both Tables, and G3BNC (Southsea) reports in detail on the July openings; with him, the outstanding signals were GM5KW/P and GM6AG/P, with G2HGR and G3EPW also at great strength. G3BNC says his phone QSO with GM5KW/P, for which he waited several hours in a long queue, was rather like working a KH6 on 20m. for the first time. Also heard during this session were EI and GI, but G3BNC had no luck with them; this was when the F's were coming in at S9 on the back of his beam.

G2DDD (Littlehampton), keen on 70 cm and also interested in 1250 mc as a result of recent articles in the *Magazine*, says that, with the 70-cm activity developing along the French coast, it would be a very good thing if there were more G's on that band in our South Coast districts. Like G3JHM, he mentions F3LP and F9CQ on 70 cm, also that more F's will be coming on shortly.

GC3EBK (Guernsey), having tried for three years to work GW, finally succeeded in raising GW2ACW and GW3GWA; he says that this year has been his most successful on two metres, with DL1LB and DL2MI the outstanding contacts. Round to the West Country, where G3IER writes from Cheltenham, and G3DLU from Weston-super-Mare, with entries for the tabular matter. F9JY (Cherbourg) was the first F heard in Cheltenham and, what is GDX to the Cheltenham boys, London and Home County stations were coming in well during July; unfortunately, however, having had a word with EI2W, they would then swing round for the Continentals and (though still audible off the backs of their beams) could not be raised with a G call! G3MA/P, down in Pembrokeshire, was hearing the Europeans, but only had 6 contacts, with G's; East Coast G's could not be attracted, though Pembs. is better DX for most of them than many of the EDX stations they were after.

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 counties should be sent, and thereafter added to as more counties are worked.

* New QTH

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
26	GW2ADZ
23	G3BKQ
18	G2XV
16	G6NF
15	G4RO
14	G3HBW
13	G3IOO, G5YV
12	G2HDZ
7	G2DDD, G2HDY, G3IRW
6	G3FAN, G3JMA
5	G3FUL
4	G3JGY

On working four Counties or more on the 70-Centimetre band, a list showing stations and counties should be sent in for this Table, and thereafter new counties worked notified as they accrue

Manchester VHF Meeting

The panel announcement brings you up-to-date on this; the organiser, G8SB, emphasises that final applications for tickets *must* be received within a day or two of your reading this, because by then the meeting will be "next week-end." A large attendance is expected, as bookings have been coming in very well. G8SB also asks us to say that, for those who may be interested, a visit has been arranged to Ringway Airport (local to M/cr) to see the signals and radar installation.

Bad News!

Just as this issue was going to press, we received a copy of Ministry of Civil Aviation Circular No. 87/1955 (Tels 29/55) dated 24 August. Para. 3 of this says

". . . the band 420-460 mc is now required for Business Radio and other purposes . . . this Ministry has been asked to make arrangements at an early date to vacate in the first instance . . . 450-460 mc."

Our 420-460 mc band is designated as "shared," so there is nothing much to be done about it, except perhaps to concentrate in the 432-438 mc area; this is the agreed band for CC stations on frequencies tripled from the two-metre zone areas—*see* Table p.748 February 1954 issue. Of course, this invasion of the 70 cm band is directly due to the developing pressure on frequencies in Band III (174-265 mc).

Held Over

Until next time are the latest VHFCC elections, some overseas items, and comments on several matters of VHF interest—for we are pressed for time and space this month, and your A.J.D. is being adjured to hurry up and cut it short.

So that, friends, is the whole boiling this time; once again, our thanks to many correspondents for their useful and interesting letters, and we hope to have another budget of news for you next month, for which the dead-line is **Monday, September 19,** at latest, addressed: A. J. Devon, "VHF Bands," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. So, till our next appearance, on October 7 all being well, *vy* 73.

UHF/VHF BAND DESIGNATIONS

In the current literature, services and allocations are frequently quoted as being in "Band II" or "Band V," as the case may be, without it being at all clear where these bands are in terms of frequency. Here, then, is the entry for your notebook: Band I, 41-68 mc (BBC TV); Band II, 87.5-100 mc (BBC FM); Band III, 174-265 mc (shared CTV and Mobile); Band IV, 470-600 mc (BBC experimental); Band V, 600-960 mc (BBC experimental). With the pressure on frequencies now rapidly developing in the UHF/VHF region, the BBC Engineering Dept. has already started fransmission tests and the investigation of propagation characteristics on Bands IV and V, using some very fine experimental equipment produced at the Mullard Research Laboratories, Redhill, Surrey.

FM TUNER DESIGN

Our respected contemporary *Wireless World* offers, as a booklet, a reprint of a series of articles describing the construction of an FM tuner for the reception of the BBC's new VHF sound transmission in Band II, 87.5-100 mc. The price of this well-produced manual, entitled *Wireless World F.M. Tuner,* is 2s. nett and it is obtainable from the Books Dept., Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1.

WHY THE SURPRISE?

The Belling-Lee Band III experimental TV transmitter G9AED on South Norwood Hill, S.E.25, having extended its hours of operation has, not unnaturally, become identified in the public mind with the activities of the Independent Television Authority, due to commence transmission on September 22. G9AED is not an ITA transmitter but a private venture by Belling & Lee, Ltd., Great Cambridge Road, Enfield, Middlesex, for the purpose of field investigations for the installation of domestic CTV aerials. This confusion is, however, not at all surprising in view of the intensive advertising campaign conducted by Belling-Lee in the London local press, devoted to the matter of "Aerials for the new TV programmes."

This campaign suffered something of a set-back when, on August 10, the L.C.C. announced that it would not permit erection of outdoor TV aerials on its housing estates. From the heavy cloud hanging over Enfield, Mr. Lee of Belling & Lee, Ltd., announced that he was prepared to take legal action against the L.C.C. "or any other Council which refused to allow tenants to have outdoor aerials, etc., etc." On what grounds such proceedings could be based, it is difficult to see, because the L.C.C., quite properly, said that until ITA scheduled transmissions started, nobody could say whether an outdoor aerial was necessary or not. Indeed, the L.C.C., if it wishes to prevent the *unnecessary* erection of outdoor TV aerials, is wise to be cautious in the matter, because it has long since been realised that a large proportion of the "wabbly H's," erected all over London for BBC TV on Band I, need never have been put up in the first place. In fact, an inspection of most of the older arrays would show that, what with bent or broken elements, rusty jointing and damaged feeders, they have long since ceased to perform their proper function. In any case, the L.C.C. has intimated that an outdoor aerial would be permitted where a tenant could show his reception really was bad. Experience already obtained with mobile VHF installations in the London area ("taxi radio"), which also operate in Band III, shows that remarkably good coverage, with high signal levels, is obtained with the simplest of aerials under what would appear to be the worst possible conditions for VHF propagation.

"THE AMATEUR TRANSMITTING LICENCE"

In connection with this article, which appeared on pp.325-327 of the August issue of SHORT WAVE MAGAZINE, we are asked by the GPO to make it clear that the address for the preliminary application (*see* para. 2, p.325) is now: Radio & Accommodation Dept., Headquarters Building, General Post Office, St. Martins-le-Grand, London, E.C.1. The GPO also points out that normal first-year restrictions (CW-only for 12 months) apply to all exempted categories of applicants; that if there is sufficient demand the GPO itself holds a Radio Amateurs' Examination in October each year; and that there is a Radio Surveyor (for Morse Test applicants) in Edinburgh, in addition to those given in the list on p.327 of the August issue.

AMATEUR RADIO — For The Beginner

PART VI

SIMPLE CW TRANSMITTER

By **A. A. Mawse**

IT is now time to concern ourselves with the more interesting subject of the actual Transmitter. It would be a simple matter to produce a circuit diagram, a list of parts and a suggested lay-out but to do so would not be in keeping with the intention of this series, which is to provide guidance for the beginner; nor, incidentally, would it be half as much fun!

It is therefore proposed to start right from scratch and to discuss in some detail the reasons why various decisions have been reached so that those who wish, may deviate quite considerably from the final design with a clear understanding of why, and how, things work.

The first consideration, then, is to formulate a definite idea of what the transmitter will be required to do and within the framework of this specification to consider more closely and in greater detail various aspects of the general design.

General Specification

For a beginner the most fruitful band upon which to gain initial experience is the so-called Top Band of 1,800-2,000 kc, followed eventually by an ability to operate in the 3,500-4,000 kc range — the 80-metre band—where long-distance or DX contacts can more easily be achieved.

Finally, it would be an advantage to extend the operating range to include 40 metres, the 7,000 kc band where, interference permitting, some very real DX can be obtained. It would be asking rather too much to expect a single transmitter to cover a wider scope than this without serious loss in efficiency, but even so the piece of apparatus we are considering could be designed so that it may eventually be used as a driver for exciting more powerful gear covering the higher frequency bands.

For the first year or so of operating, it is best to limit power to about 25 watts input; at all times the legal limit is 10 watts on Top Band, or 160 metres. Subsequently it may be desired to run something in excess of 25 watts on the other two bands and it is always desirable to operate equipment on a conservative basis.

These considerations, then, call for a valve capable of handling 25 watts with a good reserve in hand.

Frequency control is of very great importance and to commence with, particularly until experience has been gained and an accurate frequency meter is available, it is as well to think in terms of crystal control with provision for variable frequency (or VFO) control at a later stage. The choice of crystal frequencies is important since Top Band is shared with Coastal stations amongst others and a list of frequencies to avoid is referred to later on in this article.

Low driving power is desirable and this point must be considered in the choice of valve to use.

Good transfer efficiency of the power generated by the valve into the plate tank circuit is a necessary factor which must be taken care of in the general design and an efficient impedance match between tank and aerial, so that all available energy may be utilised, is equally important. Since the transmitter is likely to be used with a variety of aerials it is obvious that the transmitter itself must be capable of adjustment over a very wide range of impedances to enable a proper match to be obtained into the aerial, its load.

The transmitter must also have a high discrimination ratio against unwanted harmonics to minimise possible BCI or TVI and also to conform to the terms of the Licence. Finally, the price factor must not be neglected.

To summarise, therefore, the general specification takes the following form:—

(1) Operational Bands 1.8-2.0 3.5-3.8 and, if possible, 7.0-7.15 mc,
(2) Power input: A conservative 25 watts,
(3) Crystal control with provision for VFO,
(4) Low driving power,
(5) Good tank circuit efficiency,
(6) Variable aerial matching device,
(7) High harmonic discrimination,
(8) Reasonable cost.

With these considerations in mind we can now be more specific and start to build round the general framework.

Choice of Valve

An examination of the various types of valves in relation to the manufacturer's data, readily available at reasonable prices on the surplus market, discloses that the 807 (English equivalent KT8c) should be a good choice. Its power handling capabilities are considerably in excess of 25 watts, and being a beam tetrode, it requires very little driving power and it is cheap and easy to replace if damaged.

Tank Efficiency

This is dependent upon what is called the "Q" of the circuit and is governed by the ratio of the capacity to inductance of the tuned circuit in relation to the operating load resistance—the higher the C to L ratio for the same load resistance the higher the Q, and *vice versa*. The choice of Q is governed by a number of factors. A high Q makes for good tank circuit efficiency and high harmonic dis-

crimination, but at the same time by increasing the sharpness of tuning may cause difficulties in operating over a band of frequencies as distinct from a given spot frequency. Moreover, if carried to excess it will lead to high circulating currents in the tank circuit, causing loss of power through the generation of heat. At the opposite extreme a low Q allows broad band tuning, the generation of unwanted harmonics and will produce difficulties in transferring power into the aerial circuit. These effects become most marked at a Q value lower than 5 whilst no increase in tank circuit efficiency will be obtained with a Q factor greater than 24. In practice a good compromise is arrived at if a Q of 12 is achieved. However, other design considerations may sometimes make it necessary to tolerate a figure ranging from 10 to 20 if, as in this case, a fairly wide operating range of frequencies is contemplated. Especially is this so where a wide variety of aerials may be used and any departure from the mid-point of 12 must be considered as a desirable compromise to set against other advantages, such as convenience or simplification of design.

Aerial Matching

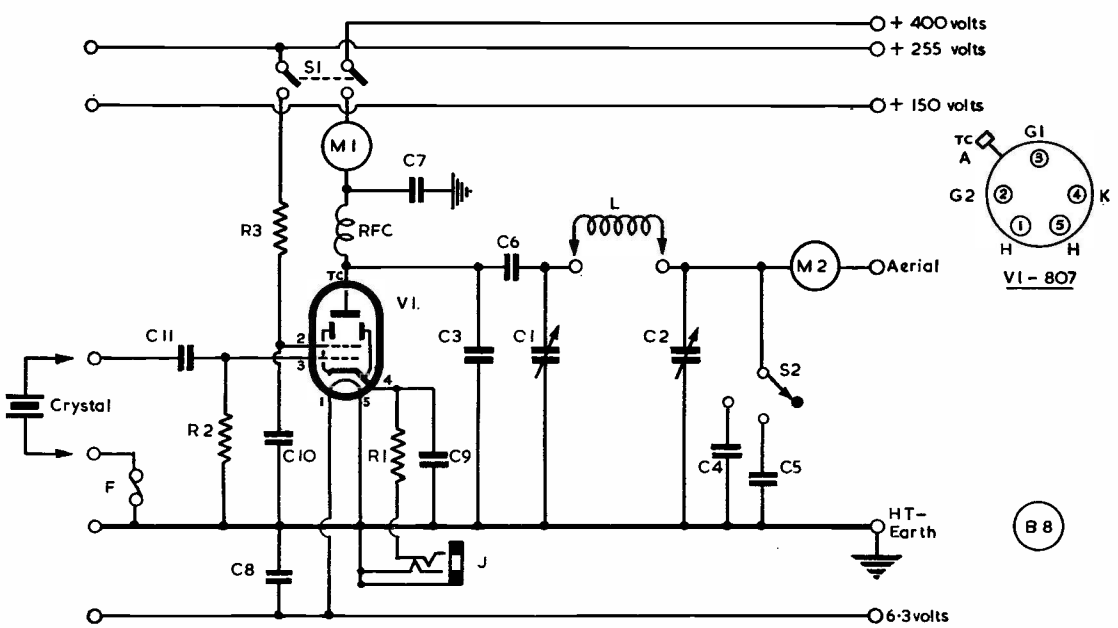
The most successful way of matching the transmitter to practically any aerial load, which at the same time discriminates against harmonic radiation, is to build the tank circuit in the form of a *pi-section network*, which is the logical development of what is known as the Collins coupler. This device can be made to provide an accurate match into anything ranging from a quarter-wave end fed aerial having an impedance figure of about 36 ohms to a half-wave end fed with an impedance around 2,500 ohms, always providing that the circuit Q is not less than 10 and that the impedance ratio does not exceed 100:1.

The circuit constants selected in the transmitter described here have been chosen as a compromise to provide as wide a variation as possible having due regard to other limiting factors and thereby some degree of simplification in the design is possible. A feature of this pi-section form of matching device is that the second or loading condenser in the network needs to be of quite a considerable capacity with low aerial impedance values; so, to avoid the necessity of a bulky and expensive variable condenser in this position arrangements are made to switch in various fixed values of loading condenser,

Table of Values

The Beginner's CW Transmitter

C1	= 125 $\mu\mu$F variable	S2	= Three-pole ceramic switch
C2	= 400 $\mu\mu$F variable	J	= Closed circuit jack socket, for key or meter.
C3	= 30 $\mu\mu$F mica, 1000 volts working	F	= 60 mA flashlamp bulb
C4	= 400 $\mu\mu$F mica	RFC	= 2.5 mH 100 mA radio frequency choke
C5	= 800 $\mu\mu$F mica (or 2 x 400 $\mu\mu$F in parallel)	M1	= 0-100 mA moving coil meter
C6	= .001 μF mica, 1000 volts working	M2	= 0-0.5 amp. thermo-couple RF meter
C7, C8, C9	= .01 μF mica	L	= *See text*
C10	= .002 $\mu\mu$F mica	V1	= 807 valve
C11	= 400 $\mu\mu$F ceramic	Xtal	= Crystal, *see text.* (1898 kc crystal used in model)
R1	= 500 ohms 2 watts		
R2	= 500,000 ohms ½ watt		
R3	= 1,500 ohms ½ watt		
S1	= Two-pole on-off toggle switch		

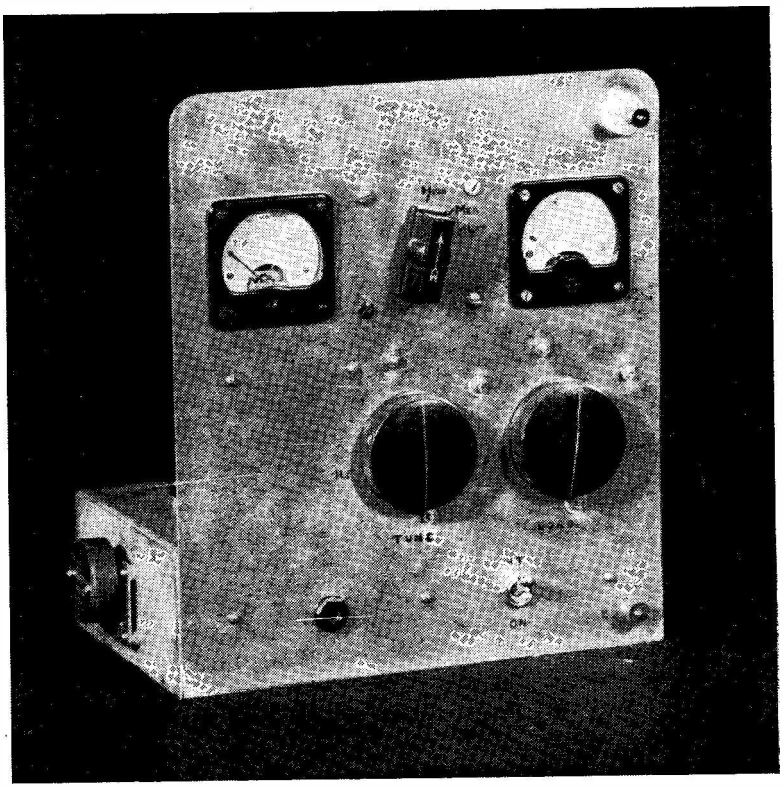


Circuit of the Beginner's 160-metre Transmitter, a single-valve crystal oscillator which, in due time, can be used as a driven RF amplifier (PA) stage with a Variable Frequency Oscillator. To this end, the valve used and the circuit layout chosen are such as to enable the VFO to be plugged straight into the crystal socket, with HT and LT supplies from the Power Pack described in the July issue; the Transmitter as illustrated here is, of course, intended to operate with that particular power supply.

along the lines suggested by ZS6AHI in his article in the March, 1955, issue of SHORT WAVE MAGAZINE. The condensers chosen should be capable of withstanding twice the high tension voltage figure for CW operation, so that ordinary close spaced receiving condensers will not be suitable.

Protective Bias

At a later stage, when this transmitter will be VFO controlled, there may be occasions when the 807 will be required to run in the absence of any drive, especially when some previous stage is keyed. Under these conditions it becomes necessary to provide a safeguard to prevent damage to the valve through excessive dissipation — since, when drive is removed, the plate current will rise to dangerous levels. This can be achieved by introducing a suitable value of resistance between cathode and negative HT return; this will provide what is known as cathode bias. The plate current flowing through this resistance, R1 in the circuit, causes a voltage drop which can be calculated quite readily and which results in the cathode becoming positive with respect to earth. Since the DC grid return is made to earth, this has the effect of applying a negative voltage to the grid which, in turn, will limit the flow of plate current. The value of this resistance is chosen so that under no-drive conditions the plate dissipation is automatically limited to a safe value. At the same time the resistance is by-passed with a condenser, C9, of a value having a low impedance at the operating frequency to allow the RF to pass to earth unchecked.



Front panel layout of the prototype Beginner's Transmitter, as describe d in the article. Other forms of construction are possible so long as there is no radical departure from the basic design. This transmitter can be operated either as a straight crystal oscillator (CO), as it stands, or it can be driven as an RF power amplifier using the VFO-buffer unit to be described in a later issue. In the latter case, the socket on the left-hand chassis drop, seen mounting the crystal, becomes the input point for the RF drive and also feeds power to the VFO unit ; the crystal is simply pulled out for VFO drive. The tank or RF output side of this transmitter is a pi-section network (all the calculations are done for you !) enabling almost any length of aerial to be resonated at the working frequency. Tuning is on the two condenser knobs, aerial current is indicated on the right-hand meter (0-0.5 amp RF) and plate current to the valve in the meter on the left. The function of the central three-point switch is explained in the text, which deals fully with the construction and operation of this transmitter.

Keying

Transmitter keying is always a debatable subject and where a VFO is employed it is always desirable to key one of the earlier and lower powered stages. As at present we are dealing with a single-valve transmitter, obviously this cannot apply. A very suitable position for the key in relatively low powered outfits is in the HT lead to the screen, because the current flowing in that circuit is usually very small and sparking at the key contacts can be avoided. But it has one great disadvantage, in that the key is at a considerable potential above earth and *this can be very dangerous to the operator.* In the absence of a keying relay, therefore, a safer place must be found and although frowned upon by the valve manufacturers many amateurs key by making and breaking the cathode circuit. It is generally necessary to provide some form of key-click filter in this position to minimise key thumps which can cause quite a lot of unwanted interference, but it is necessary to adjust such a filter initially so that the keying characterisitcs of the transmitter are not spoilt. It should be noted that even in this position one side of the key when open is above earth potential, so care should be taken to see that the body of the key is connected to earth and it is desirable that the key itself should be of the protected or enclosed type, for maximum safety. A closed circuit jack is fitted at the key position, so that, if desired, the key can be substituted for a meter to assist in tuning-up procedure ; it should be remembered, however, that a meter at this position reads *cathode* current, which is the total of the cur-

rents flowing in the plate, screen and grid circuits and it is not, therefore, an accurate indication of input power to the *plate* of the valve. When the transmitter is VFO-controlled and keyed elsewhere, the jack automatically closes this circuit.

Crystal Control

It would not be out of place at this stage to deal briefly with the crystal control circuit. The crystals used for producing oscillation must not be confused with those made from silicon or germanium, which are used in the form of rectifying diodes in other applications. Those we are concerned with are made of thin plates of quartz cut and ground accurately to size and clamped between two metal plates forming the holder. Quartz has the property, if mechanically compressed and expanded at a given frequency, of producing electrical impulses at that frequency. If it is placed in a suitable circuit it can be made to oscillate at a frequency dependent upon its physical dimensions and to sustain oscillation at that given frequency over quite a wide variation in the values of the associated components. Hence it can be utilised to produce excitation at the grid of a power valve with a very high degree of stability. Most crystals can be made to "go off" on their third and even fifth overtones by incorporating them in a suitably designed circuit; under these conditions the overtones are not exact harmonics of the fundamental frequency but may differ from them by a few kc. However, in the present application we are concerned only with the fundamental mode and it may be assumed that the frequency of the signal radiated will be, to all intents and purposes, the same as that stated on the crystal holder—or, if the amplifier is tuned to a harmonic of the crystal, at the frequency of that harmonic. Crystal oscillation can become too violent due to too much feed back, resulting in crystal fracture, and to avoid this it is a good idea to wire in a 60 mA flash-lamp bulb in series with the crystal. This will give visual indication of conditions approaching overload and the bulb will most likely "blow" should the crystal current reach dangerously high levels.

The Circuit

Fig. 1 gives the wiring of the circuit decided upon and when taken in conjunction with what has been written before is self-explanatory. C3, which can be about 30 $\mu\mu$F, should be connected directly between anode and earth with short, thick leads or strip. This serves the double purpose of by-passing unwelcome harmonics and assisting to maintain a good Q figure at the high frequency end of the tuning range. It will be noticed that HT and heater supplies are taken directly from the octal socket of the Beginner's Power Pack (described in the July issue of SHORT WAVE MAGAZINE) and that the stabilised HT and heater supplies carry right through the chassis to a convenient 7-pin socket on the other side of the chassis. For crystal control operation a crystal of the desired frequency is plugged into the correct pair of pins. Eventually

THE "BEGINNER" SERIES

First announced in the April issue of SHORT WAVE MAGAZINE, this has now run to six parts. In these have been described — in the way of practical apparatus of immediate use to the reader — a Test Meter, Power Pack, Grid Dip Oscillator, and now a Beginner's CW Transmitter. The first two articles in the series covered the subjects of Learning Morse, and Tools and Materials.

To follow are articles on General Construction, an Amateur Band Frequency Meter, and a VFO for the Transmitter described in this issue.

We, and our contributor, would like to hear from readers following the series, and A. A. Mawse will be glad to deal with Beginners' queries or difficulties through this column (full names and addresses will *not* be given in print). Letters should, of course, be confined to the various subjects dealt with in the series.

Editor

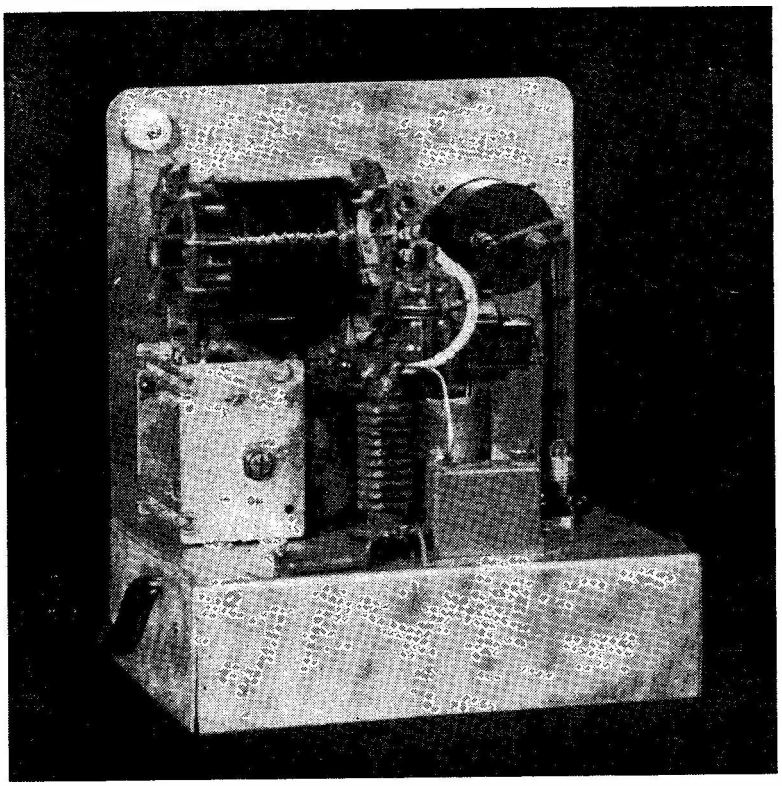
it is intended to describe the construction of a suitable VFO to drive this transmitter and this will be equipped with a mating 7-pin plug, so that all that will be necessary to change over from crystal to VFO will be to remove the crystal and plug in the VFO unit in its place.

The two-pole toggle switch S1 controls HT supply to anode and screen of the 807 but does not interrupt the heater and lower voltage supplies feeding the VFO-to-come.

Lay-Out

It is far more satisfactory for the individual to make his own decisions regarding the mechanical design, as apart from other considerations, this will depend to some extent upon the components which are available. However, it may be of assistance to some readers to know the form of construction and lay-out adopted by the writer. The chassis size is 9 ins. x 6 ins. x 2½ ins. with a front panel measuring 9 ins. x 10 ins. Looking at the front-view photograph, on the top left is a 0-100 mA meter for measuring anode current, balanced on the opposite side by a 0-0.5 amp. thermo-couple RF meter indicating aerial current. (It should be stressed that the readings shown by this meter will differ with different types of aerials and its sole value is to indicate maximum output for correct tuning of the transmitter.) The tuning and loading condensers C1 and C2 are arranged side by side on the chassis with their rotors earthed and the two controls coming out on the front of the panel, the large knobs in the photograph. The key jack and control switch

are located below the chassis with the business ends on the front of the panel. The 807 is mounted vertically on the chassis behind the tuning condensers as also is the RFC, which is of the pedestal type. A strip of insulating material is used as a bridge between the top of the RF choke and the tuning condenser and carries a banana-plug socket, end-up, which serves as one point of contact for the plug-in tank coil. A similar plug is soldered to one of the stator tags on the loading condenser forming the other contact point for the coil and an examination of one of the photographs will show that this arrangement makes for very short connecting leads for all the RF circuitry associated with the tank. Switch S2, which controls the two loading condensers, is of the ceramic type taken from a TU5B unit and is mounted on the panel between the two meters. By the way, the two tuning condensers were taken from a "surplus" T.1154 ex-RAF transmitter; note that this piece of equipment contains a wealth of useful bits and pieces and it still obtainable on the surplus market at a reasonable figure.



Rear view of the Beginner's Transmitter, showing the general arrangement behind the panel. The tuning inductance L is top left, mounted across C2 (left) and C1. The RF choke, with its sectionalised windings, can be seen mounted vertically beside the 807 oscillator valve, on the near edge of the chassis. The condenser to its immediate right is C6, with the crystal current indicator (a 60 mA flash-lamp bulb) mounted to the right rear.

Coils

The coil required for tuning in the 1800-2000 kc range should have an inductance value of approximately 95 μH and this can be obtained by putting 50 turns of 20 SWG enamelled wire, close wound, on a $2\frac{3}{8}$ in. diameter former. The inductance value for the 3,500 kc band should be 25 μH or slightly less, but as this will not be required for the time being we will revert to the matter at a later stage.

Choice of Frequency

The HF end of the Top Band suffers considerable interference from the Loran system and for that reason activity much above 1900 kc is somewhat limited, except for purely local working. In addition certain fixed frequencies are occupied by Coastal stations and others are specifically allocated to ships. A list of these frequencies is given on p.426 of the October, 1954, issue of SHORT WAVE MAGAZINE. Of course, these should be avoided when choosing a suitable crystal or else you will run the risk of having your signals blotted out in the middle of a contact, apart from the possibility of causing interference to the shipping traffic, which will not be received kindly!

Tuning Procedure

Having completed and checked over your wiring —making sure that all RF leads are short, direct and of at least 16 gauge and that supply wires are under the chassis and kept well to the sides as far as possible—plug in the valve, connect up the top anode, plug in the crystal, and the supply leads to the power pack, connect aerial and earth, adjust the loading condensers to provide maximum capacity and switch on.

As the valve heats up anode current will rise to a steady reading of about 40 mA. Adjust the tuning condenser C1 until there is a sudden, sharp drop in anode current, indicating that the crystal has started to oscillate. Tune C1 more carefully for maximum dip on the meter—about 10 mA—then start to load up the aerial by reducing C2 *gradually*, at the same time keeping C1 tuned always for maximum dip.

As this procedure continues it will be seen that although the dip is still in evidence the minimum anode reading is now higher, and in addition a reading will begin to appear on the thermo-couple RF meter, thereby indicating that the aerial is drawing power. Continue this procedure until the product of the anode voltage and anode current indicate an input

of 10 watts, which is the legal maximum. Check that the aerial current is maximum for a given input by making slight adjustments to the two condensers and you are now ready to plug in the key and to go on the air for your first QSO. If all is working well the point of maximum dip will coincide with maximum output. As loading increases the dip becomes less pronounced and will eventually reach a point where it is only just perceptible.

If the system fails to load up as indicated, assuming that the circuit has been correctly wired and adjusted, there is just a possibility that the aerial is very close to or exactly one-quarter wave long electrically, when its impedance may be beyond the capabilities of the matching system. In such an event the addition of a small loading coil or a fixed condenser of, say, .002 μF capacity *in series* with the aerial will alter the resonant frequency sufficiently to enable the system to be resonated as described. With everything adjusted correctly listen to the keying characteristics on the station receiver with the gain turned well down—or on the grid-dip oscillator as described in the August article.

If the keying is inclined to be slightly "chirpy" try altering the tuning condenser slightly off the point of resonance, first to one side and then to the other, as a slight sacrifice to efficiency is much to be preferred to the radiation of a poor note. If this does not effect a cure try the effect of short-circuiting the crystal lamp fuse; no troubles of this kind were in evidence in the transmitter as built by the writer and illustrated here.

One final tip should you be unfortunate enough to become the owner of a somewhat lifeless crystal—they do vary and some are more active than others—and you find difficulty in obtaining oscillation or in getting the crystal to take off cleanly when keying. Drill a small hole in the chassis close to the grid pin and run an insulated wire from the grid up through this hole and loop the other end once round the anode lead. This will provide a slight feed-back effect which should have the desired result. Do not, however, overdo this feed-back or else you will raise crystal current to dangerous levels. Should there be any tendency for parasitic oscillation — rough note signals off the resonant frequency and apparent on the receiver—fit a low value resistor (10 ohms will do) in series with the connection to the anode. This should effect a cure. Lastly, one further word on the subject of safety. Although the tank coil and its condensers are isolated from the HT supply by the blocking condenser C6, it is advisable to avoid touching any part of the tank circuit or aerial when the transmitter is radiating because a radio frequency burn can be very painful and at times dangerous.

COURSES FOR THE R.A.E.

In addition to the courses of study for the May 1956 Radio Amateurs' Examination, notified on p.299 of the August issue of SHORT WAVE MAGAZINE, we have since been informed of the following:

Ilford. — At the Ilford Literary Institute, Cranbrook Road, accessible *via* Gant's Hill tube station on the Central Line. Classes start on September 19, so that applications for enrolment should be made immediately to: C. H. L. Edwards, A.M.I.E.E. (G8TL), 28 Morgan Crescent, Theydon Bois, Epping, Essex. Students from outside the Essex C.C. area can be admitted provided their local Education Authority is informed.

Leeds. — At the Swarthmore Adult Education Centre, 3-4 Woodhouse Square, Leeds, 3, in co-operation with the Leeds Amateur Radio Society. Enrolment is on September 14, the fee for the whole course is 15s., and classes are on Friday evenings, beginning on September 23.

The City and Guilds of London Institute, the examining body for the Radio Amateurs' Examination, also announce that—in addition to the courses notified above and in our August issue—classes of instruction have been organised at the following centres:—**England:** Blackburn Technical College, Bradford Evening Institute, Brighton (Preston) Technical Institute, Cannock Chase Technical College, Clacton Youth Centre, Derby Technical College, Dudley (Staffs.) Technical College, Harrogate Army Apprentices' School, Hastings Technical Institute, Hull Technical College, Ilkeston Further Education, Leicester College of Technology, Loughborough Further Education, Luton Further Education, Lytham St. Anne's Further Education, Middlesbrough Technical College, Newport I.o.W. Technical College, Salford Technical College, South Shields Technical College, Walsall Technical College and Windsor College of Further Education. **Scotland:** Dunfermline Technical College and Hamilton School of Engineering (Burnbank). **Wales:** Swansea Technical College. **Northern Ireland:** Belfast College of Technology, Limavady Technical School and Londonderry Technical College. **Eire:** Crawford Technical Institute, Cork.

In each case, applications for enrolment should be made locally (the full address can be found in the telephone directory) and *not* to the City and Guilds of London Institute.

TTX ACHIEVEMENT

It will be remembered by many who followed our series of articles on Transistory that G3CSZ, Rock Ferry, Birkenhead, was one of the most successful TTX operators, in the sense of getting results with home-made transistors. (Some of those he made to the specifications by G3HMO were shown on our stand at last year's Amateur Radio Exhibition.) G3CSZ now writes to say that he has been granted his telephony permit ("twelve months' qualification") on the strength of the TTX-only CW contacts shown in his log. This is certainly an achievement, and must be a record. G3CSZ has had a total of 53 contacts, all on a CW transistor transmitter, and has never owned a valve rig. He hopes to be on this coming winter with an all-transistor VFO-controlled phone/CW transmitter. We shall shortly be publishing further articles on the practical applications of transistors.

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. callsigns, 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.

DL2XY, Cpl. F. Slim (G3JJP), H.M.S. "Royal Prince," R.N. Rhine Squadron, B.A.O.R. 34.

EI7AB, B. Morrissey, 30 Hyde Avenue, Weston, Limerick City, Co. Limerick.

G2AVF, A. G. Woofenden, 10 Shortridge Lane, Enderby, Nr. Leicester, Leics.

G2SS, A. Skene - Smith *(ex-G3KGE/VK2SS),* 45 Plymouth Road, Buckfastleigh, Devon.

GM3FLY, N. W. Jaap, 156 Adamton Road, Prestwick, Ayrshire.

G3JHH, J. H. Hunt, 205 Heath Road, Hounslow, Middlesex.

G3JJP, F. Slim *(DL2XY),* 74 Longford Road, Kingstanding, Birmingham.

G3JNI, J. A. K. Pitcher, 63 The Chase, Holland-on-Sea, Essex.

G3JWD, W. A. R. Mitchell, 335 Deansbrook Road, Edgware, Middlesex.

GM3KBZ, J. Dunlop, 29 Douglas Street, Milngavie, By Glasgow.

G3KDG, C. A. Arno, 15 Morley Crescent, Broadfields, Edgware, Middlesex. *(Tel.: STO 9042).*

G3KER, A. J. White, 39 Brocklehurst Street, New Cross, London, S.E.14.

G3KGB, R. Robson, 15 Cell Farm Avenue, Old Windsor, Berks.

G3KGL, J. Tickner, 996 Wimborne Road, Moordown, Bournemouth, Hants.

GW3KHD, A. Macro, 24 Dessmuir Road, Tremorfa, Cardiff, Glam.

G3KHT, 4136553 Cpl. James N. J., 3 T.T.S., R.A.F. Station, Cosford, Wolverhampton, Staffs.

GW3KHY, J. D. Robinson, Swnydon, Llanon, Cards.

G3KIM, E. Dungworth, 47 Watson Road, Worksop, Notts. *(Tel.: Worksop 2127).*

G3KIR, A. G. Hacker, Easton House, Obridge Road, Taunton, Somerset. *(Tel.: Taunton 5776).*

G3KIV, K. E. Brockway, 193 Rushton Road, Desborough, Nr. Kettering, Northants.

GM3KJB, F. H. A. McClymont, 2 Kerse Terrace, Rankinston, Ayrshire.

G3KJG, F. Davison, 6 Handforth Grove, Manchester, 13.

G3KJQ, D. J. Garner, Glenariff, Start Lane, Whaley Bridge, Nr. Stockport, Cheshire. *(Tel.: Whaley Bridge 309).*

G3KJT, J. R. Edgington, *(ex-MD5FA/VQ4FA),* 27 East Drive, Carshalton Beeches, Surrey.

CHANGE OF ADDRESS

EI5P, P. Fitzsimons, Sandown, Grange Lawn, Waterford, Eire.

G2AHY, H. S. Woodhouse, Fellswood, The Avenue, Crowthorne, Berks.

G2AWF, Maj. W. A. Maddocks, Poldhu, Acre Lane, Heswall, Cheshire. *(Tel.: Heswall 3148).*

G2DMR, J. Korndorffer, 23 Windsor Avenue, Clitheroe, Lancs.

G2YV, D. Whitehouse, 62 Hednesford Street, Cannock, Staffs.

G3CCL, G. H. Ireland, 20 St. Chads Road, Withington, Manchester, 20.

G3CXJ, R. Davies, 114 Shadwell Road, North End, Portsmouth, Hants.

GW3DCY, S. Richards, Mayfield, Upper Garth Trevor, Nr. Wrexham, Denbighs.

GM3DER, J. P. Wilson, *(ex-G3DER),* c/o Decca Navigator Co. Ltd., Kidsdale Camp, Whithorn, Newton - Stewart, Wigtownshire.

G3DKX, A. Perry, 148 Henry Prince Estate, Earlsfield, London, S.W.18.

GC3EML, J. H. E. Watson, Carteret, Portlet Drive, St. Brelade, Jersey.

G3GKG, G. B. Horsfall, 56 Cambridge Road, Macclesfield, Cheshire.

G3HEA, J. U. Burke, Marwell, Ashurst Wood, East Grinstead, Sussex.

G3HJG, D. Whiteling, 17 Torbay Road, Urmston, Manchester.

G3HUM, H. W. Powell, 25 Cheriton High Street, Folkestone, Kent.

GM3JNW, H. L. Fleming, B.Sc., 43 Inglewood Road, Fairyburn, Alloa, Clackmannanshire.

GM3JPW, W. G. Thomson, 88 High Street, Ayr, Ayrshire.

G3KBI, T. S. Waller, Garden Cottage, Easington, Loftus, Saltburn-by-Sea, Yorkshire.

G3LL, K. N. Holland, 16 Crimicar Lane, Fulwood, Sheffield, 10.

GW3ZV, J. Banner, Rhombic Farm, Halt Road, Rhigos, Nr. Aberdare, Glam.

G4GS, H. Eastwood, 2 Manley Road, Oldham, Lancs. *(Tel.: MAI 1956).*

G4QU, F. C. Mason, Flat 4, 61 Earls Avenue, Folkestone, Kent. *(Tel.: FOLK 51920).*

G5BT, C. W. Crook, Applewood, Eastwick Drive, Great Bookham, Surrey.

G5BY, H. L. O'Heffernan, Broad Meadow, Thurlestone, Kingsbridge, Devon.

G5FN, S. A. Howell *(ex-GW5FN),* 55 Barwell Road, Ashton-on-Mersey, Sale, Cheshire.

G5MA, N. H. R. Munday, Fircroft, Groveside, Great Bookham, Surrey.

G8KU, P. B. Briscombe, Roseacre, Irton, Nr. Scarborough, Yorkshire.

CORRECTION

GM2DBX, J. Taylor, The Pharmacy, Main Street, Methilhill, Methil, Fife.

GM3EST, A. E. Sinclair, 76 Jerviston Road, Motherwell, Lanarks.

GW5BI, V. J. Bartlett, 25 Partridge Road, Roath, Cardiff, Glam. *(Tel.: Cardiff 25568).*

MOST of us look upon Amateur Radio as an interesting and exciting hobby, although the moments of real excitement are few and far between. When *do* they come for most of us? In raising a rare DX piece; in suddenly hearing an old friend from the past calling us; in trying out something new that actually works? Yes, surely the latter is the crowning moment . . . when the new rig is put on the air for the first time, the first CQ is called, and the first reply received. Perhaps the excitement comes at the first moment of putting the power on the new piece of gear. Does it give forth a fizz, a flash and an expensive smell, or is there dead silence (faintly ominous, this)? Whatever happens, there is some sense of achievement which gratifies the vanity inside most of us. We made it! This is a common experience shared by all amateurs, whether they are the types who fiddle with new gadgets all the time, or those who spend weeks on the careful construction of a completely new transmitter, receiver or parts thereof.

NEW SKY-WIRES

Only second to the real thrills detailed above are those of connecting up a new aerial system, carefully tuning it, and settling down to see what it will do. Will that elusive ZC7 fall into the net this time? And if he does, have we lost our good spot out in ZD5? How does it go on 21 mc, where the other one wasn't so hot? There are so many queries to be answered when a new piece of wire is first hung up in the air. Incidentally, this is a line of experiment that is truly open to all, occasioning a minimum of expense. Those with a lot of space have more choice of different types; but those with more cramped locations are given better scope for their ingenuity and improvisation. If the garden is only thirty feet long, why not try hanging up one of these Skeleton Slots? Or how about a ground-plane in one of its many forms? At any rate, there is more satisfaction in getting good results from a poor location than the owner of an aerial-farm will ever experience.

LIGHTNING REFLECTIONS?

Many VHF operators (on the 5-metre band) have experienced the freak conditions made possible by displays of Aurora Borealis, when signals can be directed northwards and reflected from the ionised curtains hanging above the Arctic wastes. Some have also heard the phenomenon of meteoric reflection, when signals of very short duration are reflected back at enormously greater power than their normal level. One dot in a call-sign may suddenly swell up to four or five S-points louder than the general signal strength, owing to reflection from a favourably-placed meteor, or the ionised track which some of these bodies leave behind them. We were intrigued, a week or so back, to note that twenty-metre signals were apparently being reflected back from the ionised tracks of lightning flashes, because it was one of those days when static though not very strong, was absolutely non-stop. Time and time again we heard a "scrunch" of QRN, coinciding with an extra loud dot or dash from the CW signal we were listening to at the time.

ATOMICS

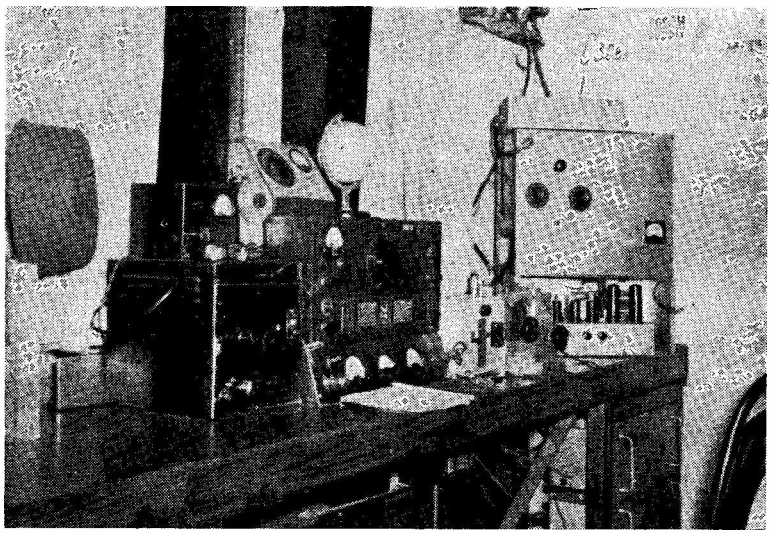
For the jaded amateur in search of new realms of knowledge, we can strongly recommend one or more of the many new books on atomic physics. Scores have been written, from the "armchair science" level up to that of sixth-form text-books, and they open up a vast new world which is being explored by most of the greatest living scientists. The present-day degree of understanding of the way in which matter is held together is amazing. Atoms are pictured almost as if it were possible to obtain microphotographs of them, and the existence and behaviour of protons, neutrons and orbital electrons is as well postulated and proved today as the existence of molecules was twenty years ago. For full measure, we find thrown in the story of alpha- and beta-particles, gamma rays, X-rays, mesons, photons, positrons and neutrinos, all taking their part in the extremely orderly and tidy scheme of the building of matter —*and* its conversion into energy, which affects every member of the human race.

TVI CHALLENGE

Later this month, when the temporary ITA transmitter takes the air for the first time, amateurs all over the Home Counties will have to get busy with their harmonic detectors on a completely new range of frequencies. Already the growing popularity of the BBC's FM transmissions from Wrotham has converted the 88-95 mc band into yet another vulnerable part of the spectrum, although BCI is nothing like TVI when it comes to the final clean-up. The great thing is to realise that the problem *can* be solved, and that large-scale closing-down during TV hours is quite unnecessary. Reflect on the situation of some of the W's in crowded cities, with as many as twelve TV channels operating twenty-four hours a day, and the TV aerials on the roof of the same block as the 20-metre beam of the DX-chaser. Many of us old fogies can remember the days when BCI kept the average amateur off the air—his one-valve transmitter and next-door's one-valve receiver were rather apt to form one large mixer circuit! It seemed insoluble, then.

THE OTHER MAN'S STATION

G3GBH



AT G3GBH, owned and operated by J. H. Jones, 32 Willow Garth, Newby, Scarborough, Yorkshire, the gear is installed in an outside shack (specially built for the purpose), which is 9 ft. long by 6 ft. wide, with a table running the full length of one side. The station "as is" can be compared with the first G3GBH fit-up, described on p.243 of the June, 1951, issue of SHORT WAVE MAGAZINE—then, the gear was housed, and operated in, a built-in *wardrobe!* This is the first occasion in this series that one station is described for the second time, the reason being, of course, that it is an entirely new installation.

As can be seen, G3GBH's gear is neatly built and laid out. From left to right along the bench, we see, on the right of the speaker, a home-constructed frequency-meter consisting of a 6K8 1000 kc CO and mixer, into which is fed the output of a 6AC7 oscillator covering 1-2 mc; the GDO, above the frequency meter, is a 9002 ECO covering 1-70 mc with five plug-in coils; above the HRO main receiver is a field strength meter-*cum*-phone monitor.

The small panel under the HRO is for station control, which is by relay throughout; the meters read PA input, PA drive and mains voltage. To the right of the HRO is the VFO power pack, followed by an exciter unit consisting of broad-banded buffer-doubler stages for 3.5, 7, 14 and 21 mc. The all-band PA consists of a pair of 807's in parallel, with band-switched pi-section tank circuit and clamp valve protection using a 6Y6, which also provides variable power control. The PA is built, with its modulator, as a complete unit into a stripped T.1154 frame (far right, across the bench) and all inter-connecting leads are screened and filtered against TVI. The speech amplifier, visible on the lower deck of the transmitter assembly, consists of 6SK7-6SK7-6J5 phase splitter into p/p 1622's in Class-A driving a pair of 807's in zero bias Class-B; negative feedback is applied to the 1622 driver stage.

In the aluminium box above the PA unit is a four-section low-pass filter, feeding into the aerial tuning unit mounted on the wall; this incorporates a harmonic check meter, permanently wired in. All power supplies are safely under the bench.

The aerial installation at G3GBH includes a dipole for 80 metres, a 100 ft. wire used on 40 metres, and a ground-plane for 20 metres. Activity is mainly on 14 mc CW, with occasional phone sessions on 7 and 3.5 mc for contacts with G's. It was the ground-plane that first put G3GBH in touch with the DX; previously, he was unable to raise it. Now, 75 countries have been worked, and 34 States of the American union. Though the PA can be run up to the full 150w., the input is more usually 80 watts as a maximum. Work in hand includes the provision of aerials for 21 and 28 mc, a separate transmitter for the 10-metre band exclusively, and another for the Top Band.

Thus we see, over four years, the development of an active station, designed and built to modern standards, and almost entirely home-constructed. And it must have been a relief to G3GBH to get out of that wardrobe!

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Dead-line for October Issue : SEPTEMBER 16)

IN 1946, the first year of post-war operation for amateurs, we originated the *Magazine Club Contest,* known from the start as "MCC." Year after year this has been repeated, by popular demand, and we are now glad to announce the tenth of the series.

Club Secretaries please note these dates and times for the **Tenth MCC :** November 19 and 20, 26 and 27, between the hours of 1500 and 1900 GMT. The Top Band will be used, as always, and the rules will be unchanged from last year, with the exception that the operating times have been made half an hour *later,* at the request of several Clubs who participate every year. Total operating time remains sixteen hours—four four-hour sessions on two Saturdays and two Sundays.

The rules in full will appear next month, for the benefit of Clubs that have not previously taken part in this interesting event. The accent will be on inter-Club working, as usual, with three scoring points for a contact with another Club, but only one point for a QSO with an ordin ry private station.

We hope to see a record entry this year, including some real opposition for those Clubs who manage to make the top three places over and over again.

CLUB REGISTER

Another m: tter of immediate interest to honorary secretaries is that we want to publish a full and up-to-date list of all Clubs, with secretary's name and address. The reason for this is two-fold—not only do we wish to maintain an accurate register of active Clubs but, more important, we want to be able to answer the typical query, so often received: "Can you put me in touch with the nearest radio club?" These come in from all over the country and while Clubs generally get at least a proportion of new members by reason of the addresses published in this feature every month, at the opening of the season—so to speak—it is obviously desirable that a full list should be available for reference.

So, **special note,** all secretaries are asked to action the above *by September 30.* Let us have full title, callsign if any, and hon. secretary's name and address. We hope to publish the list in the November issue.

WINTER PROGRAMMES

After the finest summer for several years, in which all kinds of outdoor and portable activities have been flourishing, we find most Clubs organising their winter sessions with the usual mixture of lectures, film shows, junk sales and quizzes. No one seems to be able to produce new ideas for meetings, and this suggests that the normal formula is the backbone of most of the Clubs and the reason for their continued existence—and also, perhaps, the reason why they remain somewhat static as regards membership.

Barnsley hold their AGM on September 9, and a Film Show on the 23rd. **Bradford** celebrate the end of their 1954/55 season with an "Any Questions?" meeting on September 13.

Coventry will hear an Introduction to Amateur Radio, by G3HDP, on September 12, and their AGM is announced for the following meeting, on September 26.

Ravensbourne closed down for August, but reopen on September 7 and meet every Wednesday thereafter, at the Science Room, Durham Hill School, Downham, Kent.

Purley report a very successful session at the Summer Fair, where they operated G3DPW/A under the usual difficulties attendant upon these events. They also had to provide the PA system at short notice.

Slade are to have a demonstration of the Osram 912 Amplifier on September 16. This meeting will be at the Aston Technical College, Ettington Road, Birmingham 6, and admission will be by ticket only. On September 30 Dr. P. D. Whitaker, of Birmingham University, will talk on the The Application of Electronics to Research in Nuclear Physics.

Southend have a new Hon. Sec.—see panel for name and address. **Spen Valley** celebrate the opening of the new season with a supper for members and XYL's on September 21. On the 27th there is a joint meeting of the Bradford, Leeds and Spen Valley clubs at Cambridge House, Bradford, when G2QM will lecture on Aerials. Then on October 5 Spen Valley will hear a lecture on Emergency Communications in Civil Defence, by the C.D.O. of the West Riding County Council.

Sutton and Cheam open up on September 20 with a talk on Modern Contributions to the Electronics Industry, by a Mullard representative. This meeting will begin at 8 p.m. at the Harrow Inn, Cheam Village. Future talks include one on Transistors (October 18) and one on High Quality Sound Reproduction (November 15). Visitors will be welcome to any of these meetings.

Clifton hold their AGM on September 9 and have a Field Day on October 2, with a discussion thereon on October 7. Their recent Field Day was so

successful that this late-season event has been put on "by request." Farnborough, Kent, will be the rallying place, as before.

The **British Two-Call Club** reports a steady increase in membership, recent additions ZC1AR / ZC6AR / AR1LA; G3EFG/VK3YU; G3DFI/VS1BX / ZD6BX; G3JFC / VS1GN; G6UT/ZS1RC and GM3ITN/DL2YI. The hon. sec. will welcome applications from all who have held two calls, one G and one or more overseas.

The **QRP Society** says that members' interests seem equally divided between portables and low-powered home stations. New members are welcomed, the QRP requirements being a power limitation of 5 watts for home members and 20 watts for those overseas. There is no requirement of 100 per cent. QRP operation, but a *genuine interest* in low-power work is essential.

A field-day occasion. Surrey Radio Contact Club's station was operated by G2DN, G8TB and G3DVQ (left to right) and by G3IIE, who took the photograph.

Surrey (Croydon) will be holding a Sale of Members' Gear at their meeting on September 13. At their August meeting G2KU/VS5KU showed his collection of slides, made during his stay in Brunei and Sarawak.

OVERSEAS

The South Coast Radio Club, far from representing Kent, Sussex and Hampshire, as one might suppose, met recently at Margate—in South Africa! They publish a lively monthly magazine called "South Coast QRM," complete with technical articles, gossip columns, fishing stories, and little general-interest essays of all kinds. Local amateurs keep their advertising side going, their commodities ranging from hardware to holiday flats, hot dogs to ice cream, and the "first fully refrigerated bottle store on the South Coast" (ZS5OA/5OB)!

Another interesting club report, also from South Africa as it happens, is on the activities of the **Durban** Radio and Television Society. During last July, they participated very successfully in the Durban Hobbies and Crafts Fair. This drew large crowds and ZS5DHE, active on all amateur bands, was one of the centres of attraction. The profits of the venture, which are stated to have amounted to some *thousands* of pounds, went to the local Rotary Club Fund to help finance their work among the African peoples—in the present situation out there, a most worthy cause. A souvenir QSL card was produced for ZS5DHE and among the Durban ZS5 group's exhibits was the TV equipment operated by ZS5PA on the 145 mc band—the only television of any sort in South Africa. The whole thing was so successful, that a repeat has already been laid on for next year, with all the stand space booked!

Grafton will be re-opening on Friday, September 9, holding the AGM on the 16th and enrolling new members on the 23rd. They will again be running their very successful R.A.E. course (95 per cent. passes last time) every Monday and Wednesday, beginning on September 26, with Friday as "Club Night." Grafton claim, probably correctly, to be the only Club running meetings three nights a week as a regular thing.

Ilkeston begin their winter programme on September 15, when they meet in Room 5, Ilkeston College of Further Education, Field Road. Thereafter, meetings will be held every Thursday at 7 p.m., with lectures beginning at 7.30. First talk of the series will be on Wire Broadcasting, followed by two lectures by A. C. Cossor Ltd. Six evenings in the season will be devoted to receivers and reception, and on October 9 the Club will visit the GPO Station at Rugby.

Scarborough will be moving themselves to new premises in September. They will be located in Chapman's Yard, Waterhouse Lane (off Newborough). The lecture programme is suspended while members fit out and decorate the new HQ. Note, also, the Hon. Sec.'s change of address (see panel).

Deadline for next month's reports is:
Friday, September 16.
They should be addressed to "Club Secretary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

There is no closed-season depression at **Bournemouth,** where summer attendances have been above the average for the year. Membership is still increasing slowly, and new members, or visitors, will always be welcome at the Cricketer's Arms, Windham Road, on the first Friday of the month, 7.45 p.m.

Dorking, a Club now in its ninth year, continues to meet every Tuesday at 5 London Road. Local activity is strong on Two Metres, and the Club's own two-metre station is nearly complete; reports on G3CZU will be welcomed and acknowledged. Members G2TP, 3IAM and 3HZJ are regularly active on the same band.

Leeds opens up again on September 22 with an evening visit to Holme Moss. On September 27 they combine with Bradford for a lecture on aerials at the Bradford HQ, and on the following night they hold their own Junk Sale at Swarthmore Adult Education Centre.

Mitcham also start up again in September, and on the 16th they have a Junk Sale. It is hoped to visit Mullard's CRT and Valve section (at Mitcham) on September 30.

Hawick begins the new season's meetings on September 15, in the Clubrooms at 13 Wilton Crescent. It is hoped that the Club Tx, GM3FHS, will be in action quite early in the autumn.

Romford are to have talks from VE3AML (ex-G3FT) on September 27 and October 4; he is a past chairman of the Club and is on a visit to this country. Meetings are held every Tuesday, 8.15 p.m. at RAFA House, 18 Carlton Road, Romford.

Shefford have a visit to Bedford Radio Society on September 16, review their NFD activities on September 23, and have a lecture and demonstration (subject not announced) on the 30th. **North Kent** have a Junk Sale on September 22, and from October 2-8 are running a Top Band Contest of their own, with activity limited to one hour (any hour) per day.

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE :

BARNSLEY : P. Carbutt, G2AFV, 33 Woodstock Road, BARNSLEY.
BOURNEMOUTH : J. Ashford, 119 Petersfield Road, Boscombe East, Bournemouth.
BRADFORD : F. J. Davies, 39 Pullan Avenue, Bradford 2.
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.
COVENTRY : J. H. Whitby, G3HDB, 24 Thornby Avenue, Kenilworth.
DORKING : J. Greenwell, G3AEZ, 7 Sondes Place Drive, Dorking.
GRAFTON : A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middlesex.
HAWICK : G. Shankie, 17 Ettrick Terrace, Hawick, Roxburghshire.
ILKESTON : J. Eaton, G3EZZ, 74a Station Road, Langley Mill, Nottingham.
LEEDS : J. M. Gale, G3JMG, 104 Bentley Lane, Leeds 6.
MITCHAM : D. Tilcock, G3JYV, 16 Taffy's How, Love Lane, Mitcham, Surrey.
NORTH KENT : A. Wills, G3KCN, 42 Anne of Cleves Road, Dartford.
PURLEY : E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
QRP SOCIETY : J. Whitehead, 92 Ryden's Avenue, Walton-on-Thames.
RAVENSBOURNE : J. H. F. Wilshaw, 4 Station Road, Bromley, Kent.
ROMFORD : N. Miller, 55 Kingston Road, Romford.
SCARBOROUGH : P. Briscombe, G8KU, Roseacre, Irton, Scarborough.
SHEFFORD : G. R. Cobb, G3IXG, 7 Hitchin Road, Shefford, Beds.
SLADE : C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTHEND : P. C. Baldwin, 13 Inverness Avenue, Westcliff-on-Sea.
SPEN VALLEY : N. Pride, 100 Raikes Lane, Birstall, nr. Leeds.
SURREY (CROYDON) : S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
SUTTON AND CHEAM : F. J. Harris, G2BOF, 143 Collingwood Road, Sutton.

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WANTED. R44/ARR5, BC-222, 603, 604, 620, 624, 645, 659, 683, 684, 939, 788, RT1248, SPR2A; any U.S. technical manuals.—Bunge, Montpellier Hotel, New Brighton, Cheshire.

1155 for sale; separate boxed power output; excellent working order; instruction book; £8; delivered 12 miles. — 'Phone *Field End 8542*, 33 Waverley Road, Harrow, Middlesex.

SALE: 45ft., 12-section mast, complete guys, strainers, pickets in two bags, £5 plus carriage 10/- o.n.o. Oil filled Variac, 7½ amps 220 volts out, 200-250 volts in, £4. VR150/30 stabilizers 6/6. 6V6GT, 4/6. WANTED: HRO MX Handbook.—Box 1616, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Radiovision Commander Receiver, little used, appearance as new, £20.—Coleman, 46 Maynard Road, Hemel Hempstead, Herts.

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: *CQ*, January, March, April, June, 1945. *QMF* before June, 1952. *Monitor* since February, 1954. G.E. *Ham News* before 1952. *B.S.W.L. Review* before August, 1941, November, 1941, September, 1948, to Februrary, 1949. *QRP* November, 1949. *Radial* January, 1955.—G3IDG, 95 Ramsden Road, London, S.W.12.

SALE: Avometer 7, perfect, £10 ; 813's 45/- ; HK257B/4E27 42/- ; Eddystone absorption wavemeter (Cat. 696) £4 ; Ceramic 807 bases (twelve) 5/- ; 24 mF/550 volt wkg. (six) 10/- ; 0-3 amp Thermocouples (two) 6/- ; Vitavox m/c hand mike with transformer 20/- ; Edixa II 35 mm camera, f2.8 Isconar, coupled with rangefinder, 8-speed synchronised prontor shutter, Ever Ready case, lens hood and 2X yellow filter and holder, £23 ; or offers any item. Wilcox Gay VFO with manual, unmodified, £4 5s.—Box 1615, Short Wave Magazine Ltd., 55 Victoria Street, London, S.W.1.

BC-312N Receiver, with AC power pack, fully modified, S-meter jack and converter for 21 and 28 mc bands ; just overhauled and aligned ; superb performance, £12. — Parsons, 90 Maesycoed Road, Cardiff.

FOR SALE: Communications Receiver, BC-342N (Crystal). Transformer, speaker, phones, etc. ; recent check-over, perfect, £15.—Kyle, 59 Bathurst Walk, Iver. *'Phone 963*

WANTED, THE FOLLOWING ITEMS: Medium wave Command Receiver in new condition and unmodified, your price. Hallicrafters original speaker and case in blue grey crackle, your price given. Handbook or any circuit details for Phillips Communication Receiver Type PCR (Cat. No. ZA26707) (Serial No. 04554). Sender well compensated. Also Phillips power unit, AC type, for PCR ; good condition please, BC-348 for breakdown and spares, etc.—G. V. Allen, 107 Union Road, Brincliffe, Sheffield, 11.

SELLING complete amateur station. RCA xtal wavemeter, Eddystone 504 Rx, condition perfect. VFO Labgear switched unit 5-band Tx 50w 807 PA. 30 watt audio 807's in AB2 mounted on 5ft. rack. Several valves Rx-Tx, CRT and other components. Everything for £60. Prefer buyer collects. Deferred payment can be arranged.—Webber, 26 Torrington Place, North Hill, Plymouth.

WANTED: CR100 or similar Communications Receiver. State price, condition and details any modifications. — J. S. Crone, 210 Kingsheath Avenue, Bankhead, Rutherglen, Glasgow.

FOR SALE: Parmeko Transformer, input 0-220-230-240 output 1500-1000-750-500-0-500-750-1000-1500, 400 mA, £8 10s. Transformer input 0-220-240-250, output 1000-0-1000, 400 mA, £5. Eimac 250TH, perfect, £3.—G6TZ, 21 Ford Street, Coventry.

WIREK portable wire Recorder, £17 10s. ; National 1-10 Receiver and 6v power pack, four coils. £5 ; 1155A, 6V6 output, internal speaker and power pack, £8 10s. ; Canadian Receiver 103A Mk. II, 6v, £8 ; two Tx/Rx 60 CM. (Mk. III control units) less power packs, each £2 10s. ; Douglas 350cc engine-driven alternator, 80v. hi-cycle ; frame will take other generators, spare engine, £8.—Box 1613, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: DST100, Mk. II, 13-valve double-superhet, complete with regulated power pack, LR phones and circuit diagram, £20 — Pantony, Herts Farm, Loose, Nr. Maidstone.

SMALL ADVERTISEMENTS, READERS—*continued*

PANDA PR120V, new mint condition, with filter and instruction book; delivered reasonable distance; first £100; all letters answered.—Box 1614, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

VQ2SK wants for cash: Transmitter (commercial) with 813's in final, such as ET4336. Must be in mint condition and, if possible, complete with speech amplifier and VFO. Anything good considered; also AR88D.—Please send full details to: S. Kirkbridge, c/o Monze Station, N. Rhodesia; and also to Box 1608, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HRO RACK MOUNTING, Collins TCS10 25-watt. Trans./Recr., mobile; AVO testmeter, Taylor 60 signal generator, Taylor 45A valve tester, Morse teacher with tapes, 1132A and 1481 Receivers, Type 3 power unit, condensers, resistors, etc. Low prices to clear surplus gear.—123 Hele Road, Torquay.

SCR 522 complete, 19 valves, control rack, crackle case; as new; bargain; £8 if buyer collects; s.a.e. enquiries. — Lawn, 20 Croft Road, Godalming, Surrey.

SELL or exchange, RT7/APN1, UHF Tx/Rx, 14 valves, perfect, for R1132A and power unit or R1155, R1116, R208 or R44/ARR5. Must be in very good condition. Offers please to.—Button, 7 Upper Flowerfield, Nunney, Frome, Somerset.

URGENTLY required: Class D Wavemeter, in perfect condition. Your price paid.—Box 1612, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EDDYSTONE 640, perfect, £16. Delivered free 50 mile radius. New boxed 832's £1. BC221M Manual 15/-. S.a.e.'s please to.—G3GUP, 12 Saffron Way, Chatham, Kent.

PANDA PR120V Table Top Transmitter, was brand new in May, 1955. The latest model with manual. Offers to.—Capt. C. J. Smith, 82 Framingham Road, Brooklands, Manchester.

C.D.P. Disc Recorder, perfect, £15. 10-watt Hi-Fidelity Amplifier, £12. National AGS Receiver, perfect, £10 10s. — 4 Kimberley Avenue, Crosby, Liverpool, 23.

WANTED: Communications Receiver 200/250v. AC, 50 cycles, in perfect condition, no modifications, full particulars. — Siberry, 49 Coity Road, Bridgend, Glam.

G4ZU. 10/15 dual rotary beam with 45ft. sectional mast £15 or offer. Post-war National NC57 and CR100, £20 each.—*Tel. Springpark 4130.*

SCR 522's Tx, Rx. Complete, new condition, unmodified, with ALL valves, £8; transmitters only, less 832's, otherwise complete, £2 5s.; **832's** guaranteed, £1 10s. Post extra. — B. Cedar, 9 North Drive, Streatham Park, London, S.W.16. (*STR. 1388.*)

WANTED: Two-metre Converter with push-pull 6J6's by G2IQ. Particulars:—James, 1 Hillside Terrace, Blackwood, Mon.

WANTED: Class D Wavemeter, must be in new condition. Please state price, to:—Box 1618, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

GEAR to clear, Bendix RA10, converted Ham use; R1116; R11125's; 1155 coil packs; RF26 modified for 144 mc, also unfinished Transmitter; 522 Transmitter, less valves; 3-valve TU Transmitter; Command Transmitters; Test set BG3, 160-220 mc; Dynamotors, Vibrator packs, Transformers, Condensers, Disc seal Triodes, etc. Require BC-454, 455. S.a.e. details.—J. Armstrong, G3EJR, 40 The Oval, Mirehouse, Whitehaven.

THE Nucleus of a Phasing Rig. 90° Audio Phase-shift Units complete with Speech Amplifier, similar circuit to type used in SSB Junior, etc. Passive networks available separately for Receiver and Transmitter applications, S.a.e. for details. — H. J. Ridge, G3HFS, Carbis Bay, St. Ives, Cornwall.

TAPE Recorder, complete, less cabinet, mike, as new, £20. Perfect order. S.a.e. for lists of gear for disposal. — G3KKC, West Row, Nr. Bury St. Edmunds, Suffolk.

COLLINS AC/DC Rx TCS, 3-12 mc, £5. Tx Phone/CW, 200 watts, 3.5-28 mc, £25.—*Tel.: ROM 5331.*

COLLINS 75AI Receiver, perfect condition, manual speaker. Best offer secures. — Webb, 233 Warwick Road, Kenilworth. *Tel. 679.*

AMATEUR selling up R103A Receiver, £8 10s. Class-D Wavemeter AC, £4 15s. Also transformers, chokes, condensers, meters, over 60 valves and many other parts. Consider *en bloc* offer. Buyer collects. S.a.e. for lists.—Cousens, 38 Collins Road, Wednesbury, Staffs.

HRO-MX. 5 coils, speaker, phones, manual, spare valves and power pack, £26 10s. Motek tape deck, £9.—Graham, 39 East Raby Street, Darlington, Durham.

FOR SALE: BC348P unmodified, offers; BC683A FM Receiver 27-38.9 mc, £8; two BC624 Receivers unmodified, £3 10s. each; BC625 Transmitter, partly stripped less valves £1; two ZB2 Units £1 each; TU5B, £1; two TU10B, 12/6 each; two FL8 Filters, 7/6 each; three BC453 Receivers; three Command Transmitters various conditions; Indicator Unit 1D11/APS4; Amplifier Unit AM5/APS4. Write for details: two Command Receiver medium wave coil packs 5/- each; Signal Generator 1196B £1; Aerial relays; three BC442AM 7/6 each; BCAS198 4/-; Type 3 Power Pack £2; Eddystone Converter 5-10 meters £2; 200 Pye Sockets 3d. each; Pye 45 mc Strip £1 5s.; Parmeko Transformer 350-0-350 120 mA 6.3v., 5v. 15/-; BC605 Inter-phone Amplifier £2. Buyers collect.—Reynolds, 149 Waller Road, London, S.E.14. *(New Cross 1443, after 7 p.m.)*

REAL BARGAIN: Portable O-V-1 SW Bat. Receiver; will cover all bands, fitted set, spread calibrated, very economical, excellent condition, very cheap; s.a.e. for particulars.—Box 1606, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: *Wireless World*, January, 1946, April, 1947, October, 1949. *Short Wave Magazine*, April, 1953, April, 1954. Will pay 2/6 for each copy in good condition. Please write in first instance to:—Gardner, 46 Marlborough Road, Smethwick, 41, Staffs.

RADIOVISION Commander Double Superhet. Eleven valves, BFO noise limiter, S-meter, speaker and phones, good condition, £20.—Brennan, 230 Geneva Road, Darlington.

LOTS of valves and equipment to clear. Send s.a.e. for list please. No dealers.—G2XV, 129 Cambridge Road, Trumpington, Cambridge.

SMALL ADVERTISEMENTS, READERS—*continued*

813 50/-. Photostat copy AR88D Manual, £1. Set of valves for AR88D, £2 10s. 150w Tx, 813 Final, TZ40's mod., 6 meters, etc., gift £15. —G2HAC, 54 Lodge Street, Accrington, Lancs.

EDDYSTONE 640, £14; Class-D Wavemeter, £4 10s.; Avo Signal Generator, £2; two 247 Power units, £4; 3 stage speech amplifier, UM2 transformer, Modulator pair 807, 4 stage Tx, each stage metered, PA pair 807, £7 10s. Buyer pays carriage.—Roberts, 93 High Road, Arrowthwaite, Whitehaven, Cumberland.

CR100, very good condition, £17 10s. Eddystone 358X and 10 coil packs 230v. AC, £11. Universal Avominor, £4. Receiver delivered in Somerset.—Box 1617, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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