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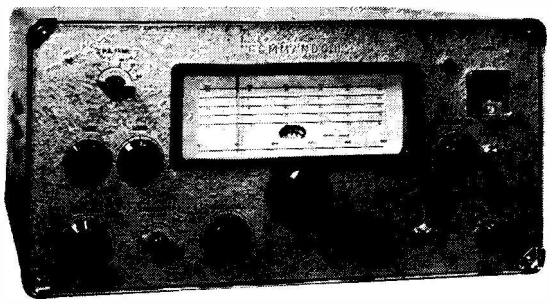
The SHORT WAVE Magazine

VOL. XXII JULY, 1964 NUMBER 5



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E. & O.E.

FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE Magazine

EDITORIAL

Budmarsh *We must return now to our old friend the Budmarsh of Coochpawani, leader (imaginary) of the Afro-Asian bloc on the International Telecommunications Union, Geneva, the body responsible for producing frequency allocations for all the world's radio services and requirements. The Budmarsh was first introduced in this space in the October 1963 issue, in the series of editorials for August-November last, entitled respectively Political, Consequences, Foreseen and Remedy — to which the attention of readers might again be drawn.*

Together, those discussions dealt with a single matter of the utmost importance to us all as radio amateurs — a problem fully recognised and clearly understood in responsible circles throughout the world of Amateur Radio: That of retaining reasonable areas of frequency for AT-station operation. It is, of course, still not at all clear what the solution is going to be, though what looks to us like an eventual outcome was suggested on this page in the October and November issues.

What we have to remember is that the Budmarsh and his friends have a voting power out of all proportion to their true status, which is that of junior members of the League. Many of these nations have populations hardly more than that of an English county — yet they enjoy equal voting rights with the U.K., the U.S.A. and the U.S.S.R. In these circumstances, it could well be that in the process of bargaining against heavy voting odds, the European nations will have to give way in some directions in order to get their requirements met in others.

At the I.T.U. conference table (and this is the point of the foregoing) some of these bargains could well be struck at the expense of the amateur frequency bands, as being one of the easiest channels along which to secure agreement.

Of course, it may never happen — but all the signs are that it very well might. Unfortunately, the central fact emerging from all this is that the greatest menace to the future of Amateur Radio is not the " crowded state of the bands," or the " excessive use of power," or the " irresponsible behaviour of some amateur elements," or even " dis-incentive licensing " — but the Budmarsh of Coochpawani and his Afro-Asian friends.

And what, you may now ask, is likely to be the outcome of it all? The broad answer as we see it is that, whatever decisions may be taken on paper, they will remain paper decisions because Amateur Radio cannot now be destroyed simply be decree — see " Consequences," September 1963.

Austin Forsyth, G6FO.

WORLD-WIDE COMMUNICATION

HIGH-POWER LINEAR AMPLIFIER

AND ASSOCIATED POWER SUPPLY — FOR MULTI-BAND OPERATION AND VHF COVERAGE — DESIGN AND CONSTRUCTION

C. BOWDEN (G3OCB)

Here is another practical design by a well-known contributor to "Short Wave Magazine," this time into the realm of QRO on Sideband, covering all the amateur HF communication ranges and also including two metres. By an ingenious PA tank circuit arrangement, and the use of plug-in coils for the HF bands, performance on VHF is not unduly impaired—indeed, it is possible that this PA could be taken to 70 centimetres, though that is "for suggestion only" at this stage. The Linear Amplifier discussed here by G3OCB is intended to operate (on VHF) with his two-metre transverter as described in our issue for October, 1963. A later article will cover an SSB exciter for the HF bands, as another separate unit.—Editor.

MOST VHF operators have had the very frustrating experience of not being able to raise many of the more distant stations heard, as the latter often go back to locals after a CQ DX call. Either they have poor receivers or they just do not search carefully enough. Any increase in signal strength at these remote stations will pay dividends in increased number of QSO's and lengthen the usefulness of band openings, especially for the more remotely situated.

Experience of operation from a remote location has shown that reports exchanged during a QSO were similar at both ends when comparable equipment was in use, but a lot of replies to phone stations calling "CQ South West" at about S3-S6 remained unanswered. With this linear in operation incoming reports are often much better than outgoing reports, and under poor conditions many additional QSO's are made with these selfsame S3-S6 signal stations.

The linear here described will run to very nearly the full legal SSB output on the LF bands and will give quite a high output on 144 mc. The DC input used by the writer is some 600w. p.e.p. as compared with about 160w. p.e.p. in the Transverter/PA described in SHORT WAVE MAGAZINE for October, 1963. This increase in input, together with the higher PA tank efficiency, should result in some 8-10 dB increase in power output and in practice this seems to be realised.

The reader will see from the foregoing that VHF is the author's main interest and initially it was the intention to build a QRO Linear for two metres only.

Some 4X150A valves were available and also a suitable blower motor. While searching for a suitable source of bases for the valves, several designs for the linear were committed to paper. During this process it became apparent that if the linear could be induced to run on the LF/HF bands as well there would be many advantages—saving in space, equipment and avoidance of much costly duplication.

No information on a suitable circuit could be found from any of the usual sources so the actual construction work was undertaken with some trepidation.

Eventually the necessary bases were obtained for the 4X150A's! * It was thought essential to use the correct bases in this project as the built-in screen by-pass capacitator would probably be quite an asset where neutralization problems and parasitic oscillations were to be avoided.

Design

Since VHF circuitry calls for more careful design and layout, this part of the unit was first built using ¼-wave anode lines and conventional cross-neutralized push-pull circuitry. For ease of tuning and a better Q-factor ½-wave grid lines were employed.

The LF circuitry then had to be fitted in and the tank circuit was considered first. Due to the relatively high capacitance of most switches it was decided to use plug-in coils and the only components readily available suitable for use at the contemplated power level were the Eddystone 5-pin transmitting types.

There were insufficient contacts on these for push-pull use, or even parallel operation into a parallel-tuned tank with link coil, which would have required seven or six pins respectively. Parallel operation in a *pi*-network circuit was incorporated, however, as this could be done with the 5-pin type available.

The plug-in socket was mounted on brackets quite near the valves and short braided connections run from the outer pins to the valve anode clips. These leads have negligible effect on VHF operation. There appeared to be no easy way of disconnecting the two-metre tank from the valves during LF operation and since the valves were going to be strapped in parallel anyway, this would result in the Lecher-line tank being shorted at both ends and thus only adding a small amount of

* *Getting the bases is a rather difficult problem in the use of 4X150A's* — Editor.

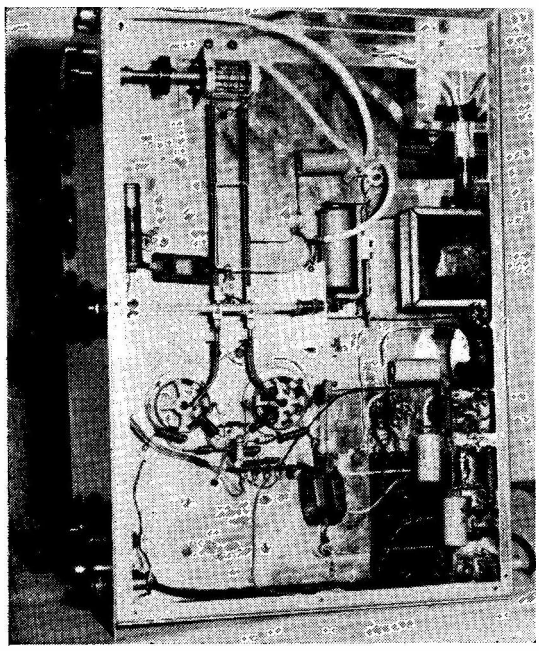
capacity overall to the circuit. It would, however, be necessary to transfer the DC feed point, by direct switching, from the Lecher lines to the *pi*-network in order to prevent loss of RF when used on LF (or loss of HT when operating on VHF). This is easily accomplished by a ceramic switch (S5 in Fig. 1).

The remaining problem was then how to feed the LF energy to the grids. The first method tried was to feed the power from C1 to the junction of R2, RFC1 and RFC2; this was all right on 3·5 mc, but the impedance of the chokes made things difficult on higher frequencies, so the arrangement shown was adopted. This consists of a rather elementary but quite effective switch S1A-S1C which shorts the grid lines together for LF use, but adds just a very small capacity across the grid lines in VHF operation.

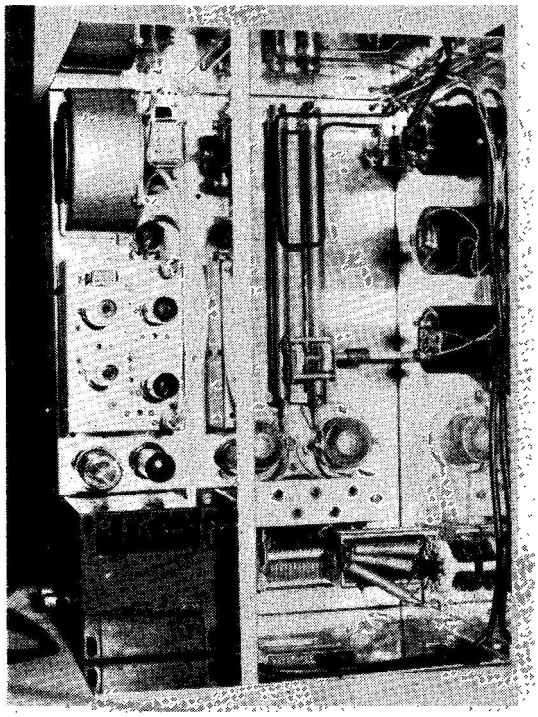
The oscillator/driver section of the original transverter, shown on p.417 of the October, 1963, issue, was rebuilt on a small chassis mounted at the rear, between the blower and the small power supply. This is incorporated to provide bias voltages for the PA and also power for the transverter.

Testing

The power packs should be checked through and, with the blower on, the heater voltages to the 4X150A's adjusted to ensure that it is exactly 6·0v. The resistor R11 in Fig. 1 must be set to give this voltage. The bias to the PA should be 50v. with



Under-chassis view with base panel removed, showing the VHF grid-line layout (L1, Lk1 in Fig. 1) and the base connections to the 4X150A's. The central panel control is the shorting switch S1A-C, for changing the grid side from VHF to HF.



Plan view of the general upper-deck layout of the QRO amplifier, showing the anode ends of the 4X150A's and the L2, Lk2 assembly (Fig. 1) and the coil mount for HF-band operation, which is connected as Fig. 2 (inset Fig. 1) to switch the tank from VHF to HF. The variable capacity alongside the coil mount is C11, with the switching S4 for the condenser bank C12—C16.

the relay contacts closed and HT applied to the transverter. RF energy at 144 mc from the transverter, if used (and tuned as described on pp.417-418 of the October, 1963, issue) or other drive source should now be fed to the grid line. If the dimensions are followed closely resonance of the grid lines will occur at some setting of C1; if the strays are low, however, it may be necessary to add the small capacitor C2 as shown in Fig. 1.

With the transverter giving maximum output, at least 2-3 mA of grid drive should be available, using the grid circuitry shown.

The grid shorting switch should now be selected to the LF position and the application of some 10-30w. from the LF/HF SSB source should result in grid current flowing, depending on the value of R1. If no grid current appears, then the output of the exciter is insufficient and will have to be increased, or R1 increased. It is inadvisable to increase R1 to more than about 250 ohms, as the PA stage may become unstable. The preferred

Main circuit diagram on p.269

value for R1 is:

$$R1 \text{ ohms} = \frac{(V)^2}{W \text{ peak}}$$

Where V = 4X150A bias voltage (about 50v.).

W = Peak watts from exciter.

The next step is to put the valves into operation by application of some 250-300v. stabilised to the screens and about 400-600 to the anodes. (*N.B.* Ensure that S5 is selected to VHF to avoid damage to the valves through running with screen voltage but no anode voltage. *Screen and anode* supplies should *always* be switched off before S5 is operated or coils are changed.)

The standing anode current will be about 100 mA with 50v. bias. Each valve should be checked individually for balance which ought to be within a few milliamps to avoid uneven power distribution and excessive distortion at full drive. The circuit should remain stable at all settings of the tank and loading condensers. Single-tone SSB drive should then be applied until a milliamp or so of grid current flows, and with an 80-ohm load connected, the PA should be loaded to some 200-300 mA. The neutralising capacitors should then be adjusted until grid peak, screen peak and anode dip all coincide. (In practice this adjustment was very simple to perform.) The tank condenser should be approximately half open at resonance, and there should be no trace of instability.

When all is well at this power level the HT can be increased in steps, and the tuning and loading checked each time. The coupling between L2 and LK2 may need slight adjustment to obtain satisfactory loading. There should be no sign of flash-over in the tank condenser and stability should remain unimpaired.

At full drive, *i.e.*, Class-AB1, just on the point of grid current, full loading occurs with a screen peak of about 10-20 mA and an HT anode current peak of 420-450 mA, depending on the particular valves. One peculiarity with valves of this type is that the screen current can be *negative*, especially at low drive levels, and this negative current will be greater at higher anode voltages.

For LF operation, S1 should be selected to the LF position and the correct tank coil plugged in. The HT switch S5 should then be selected to the correct position after which power may be applied to the anodes and screens. Standing current should be the same as in the VHF case and again there should be no trace of instability. No neutralising is necessary as the passive grid resistor R1 ensures stability.

General Constructional Notes

Extra ·01 μF tubular ceramic capacitors are used in each screen circuit to provide additional decoupling at the LF end of the range. No ill-effects need be anticipated by their inclusion. Despite the lumped VHF circuit elements present no parasitic occurrences have been noted. Efficiency is high and distortion is low.

In order to eliminate shot noise and other undesirable effects relay RL1 is incorporated. This mutes the PA valves and transverter during "receive" periods.

The VHF anode lines are made from ½in. copper water pipe. Fuller dimensions are shown separately. For maximum efficiency they could be silver-plated and more elaborate arrangements made for short circuiting the remote ends and for connecting the open ends to the anodes.

Table of Values

Fig. 1. Circuit of the 4X150A Linear

C1	= 15+15 μμF, split-stator	Ch1	= 10-Hy 100 mA
C2	= 2-3 μμF*	RFC1, RFC2,	
C3	= .01 μF, s/m	RFC3	= VHF, 19in. 28g. on 1w. res. body
C4, C5, C6	= .01 μF, tub. cer., 500v.	RFC4	= Tx RF choke, *So-Rad*, *K.W.* or home-made QRO PA type
C7	= .004 μF, rated 2.5 kV	S1A-S1C	= *see text*, and Fig. 4
C8	= 8+8 μμF w/s split-stator*	S2A-S2B	= DP mains, toggle
C9	= .005 μF, rated 2.5 kV	S3	= SPST toggle, input on/off
C10	= 230 μμF, Tx type*	S4	= 1-p., 6-w., ceramic, coarse loading
C11	= 300 μμF	S5	= 1-p., 2-w., ceramic hi-volt. HF/VHF select HT
C12, C13, C13, C14, C15, C16	= .0018 μF, in 300 μμF steps	T1	= 240-0-240v., 100-150 mA, 1/5v., 3/6.3v. windings
C17	= 25 μμF	RL	= Control relay, as required
C18, C19, C20, C21	= 16 μF, 450v. elect.	Blower	= Type 26BT (*Airflow Developments*)
CB1, CB2	= In 4X150A base	M1	= 0-5 mA, grid
Cn	= *see text*	M2	= 0-25 mA, screen
R1	= 100-200 ohms, 10-20w. carbon	M3	= 0-500 mA, plate
R2	= 3,000 ohms, ½-w.	LP	= 6.3v. pilot
R3, R4	= 22 ohms, ½-w.	D1, D2	= OA210, or similar silicon diodes
R5, R6	= 1,000 ohms, ½-w.	V1	= VR-150/30, or OA2
R7	= 68,000 ohms, ½-w.	V2	= 5Z4, or similar
R8	= 12 ohms, ½-w.	V3, V4	= 4X150A, forced-air cooled
R9	= 10,000 ohms, 5w. w/wound		
R10	= 25,000 ohms, 5w. w/wound		
R11	= .06 ohm, 2w.*		
R12	= 50,000-ohm w/wound potentiometer, set bias		

NOTE: For all items marked*, see text for explanation or discussion.

TABLE OF COIL DATA

VHF — 2m.	
L1	— Grid lines: ⅛-in. dia. copper rod, 9in. long, spaced 1-in. centres.
L2	— Tank lines: ½-in. copper pipe, 10in. long, spaced 1½-in. centres.
LK1	— Grid link: 26g. p.v.c., hairpin 2¾in. long, 1-in. wide.
LK2	— Tank output link: 14g. p.v.c. insulated, hairpin 4½in. long by 1½in. wide.
HF Bands	
80m.	— 14 turns 14g. copper on Eddystone Type 1090 2½-in. ceramic coil former.
40m.	— 8 turns 14g. as above.
20m.	— 4 turns 14g. as above.
15m.	— 3 turns 12-gauge copper, silver plated.
10m.	— 2 turns ⅛-in. dia. copper tube, plated.

NOTE: Actual coil sizes for 10-20m. bands will depend on circuit minima, and may require adjustment.

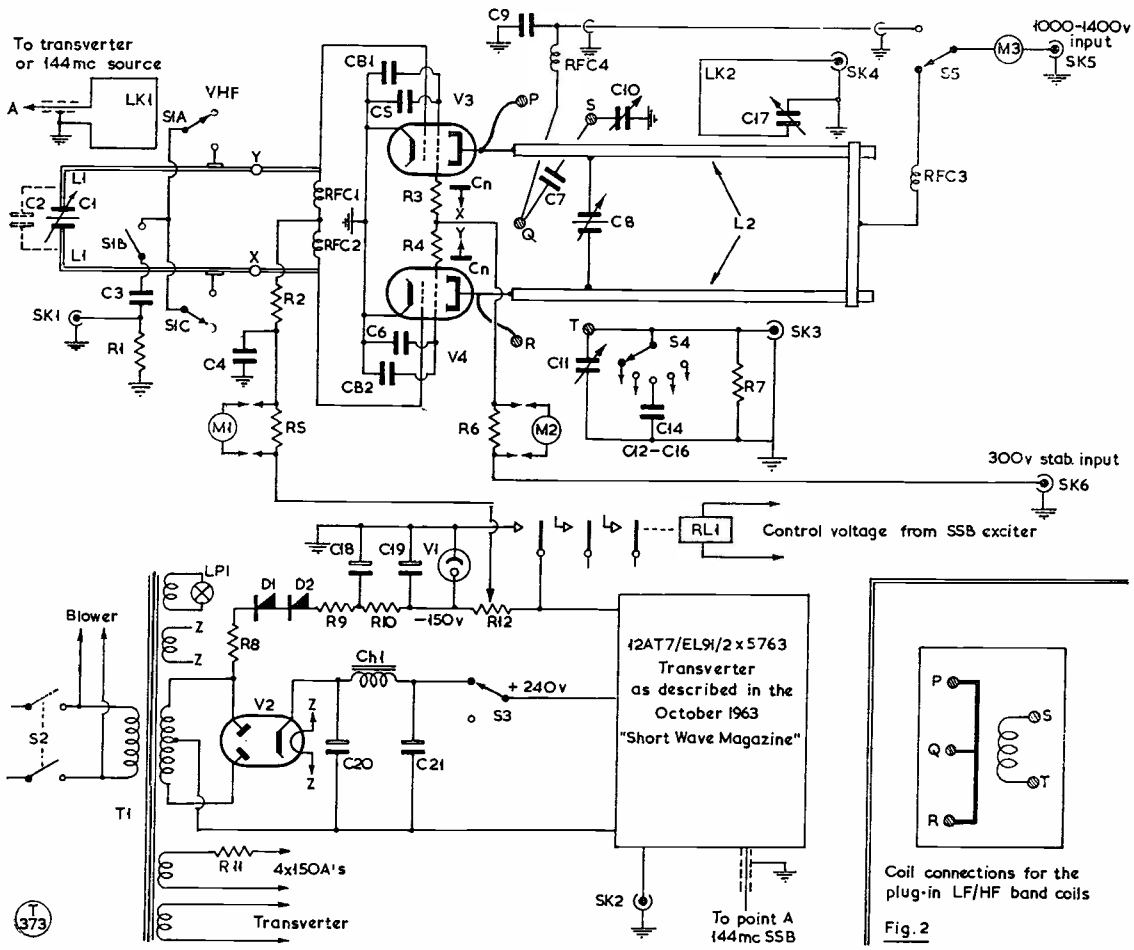


Fig. 1. Circuit of the Linear Amplifier, using forced-air cooled 4X150A's, and designed to operate at full power — 600w. p.e.p. SSB — on the HF bands, and also on two metres at reduced power. This band flexibility is achieved by an ingenious arrangement whereby the VHF grid and tank circuits remain in being when the PA is operated on the other bands using a set of plug-in coils. Thus, all bands two metres to 80 metres are covered. On VHF, the 4X150's are in symmetrical push-pull, while on the HF bands they are in parallel, this switching being effected, on the tank side, by the mere act of plugging in the required HF band coil and, on the grid side, by the shorting action of S1A-S1C; since the valves are then in parallel, the Lecher lines for VHF have no more than a slight capacity effect. Conversely, when the PA is on two metres, the short braid tails V3-P and V4-R are " in the air " and any effect they have can be taken up by the C8 tuning of L2. Sk1 is the HF-band drive point; Sk3 the aerial connection for the HF bands; and Sk4 the RF output point for two metres — and G3OCB says this PA could probably be taken to 70 centimetres as well!

However, any improvement would probably be marginal. The remote ends are short circuited by a clamp made from a ½in. wide strip of copper which is made to grip each tube tightly. Similar clamps are made to provide connections to the valve anodes and these latter clamps are joined to the lines by short lengths of braided copper.

Both anode and grid lines are mounted on ceramic pillars of the type used as condenser mounts in the surplus TU units, formerly available. If these are not to hand stand-off insulators, of ceramic or polystyrene rod, could be used.

The tank condenser C8 for the VHF lines is a wide-spaced split-stator type (as used in the 19 Set) of about 8-8 $\mu\mu$F capacity. (One of the large parallel-disc type neutralising capacitors of the original Eddystone pattern could equally well be used). The RF voltage at the position at which this capacitor is mounted is somewhat less than the maximum occurring at the open ends of the lines and there is no sign of flash-over with the condenser used in the model illustrated. In order to obtain the desirable tank-circuit symmetry, however, the front mounting plate of the specified condenser was trimmed to match the rear plate in shape and size. This also facilitated mounting the capacitor on the lines (by sweating the two stator lugs). The rotor earth connection was also cut away leaving the rotor fully isolated. The front panel control is connected to the condenser by a length of polystyrene rod.

For the output link the wire used should be

well insulated as there is a chance that it could come into contact with the anode lines, thus presenting the full HT voltage at the aerial socket. When the final position for this link has been ascertained it should be fixed into position using ceramic or polystyrene insulators.

The LF tank condenser C10 is one of the "Command" transmitter wide-spaced types. The maximum capacity is in fact rather too low as it stands, but by slight adjustment of the stator end locking screws the air-gap can be altered (increased on one side and decreased on the other) resulting in an increase in total capacity. Using a GDO, some fixed capacitors of known value and a small coil, it is a simple matter, by substitution, to set this tank condenser to a maximum value of about 220 $\mu\mu$F at which capacity the gap is more than enough for the RF voltage involved. The reason for using the condenser suggested was simply that it was available and would fit more easily into the space provided. Any other suitable tank capacitor could equally well be used. The minimum capacity of the circuit as a whole is quite low but slightly too high for optimum results with regard to Q-factor for full efficiency on 10 metres and possibly also on 15 metres. The ideal solution here would be probably to use a separate condenser of about 5-50 $\mu\mu$F for 10, 15 and 20 metres—but this would require the use of a 6-pin coil or separate switch to bring into circuit the larger capacitors necessary for 40 and 80 metres. These points would have to be considered in the design stage as they will affect space requirements and panel layout.

On the LF side, the loading arrangements are quite conventional. A 300 $\mu\mu$F variable condenser C11 is used with several fixed capacitors switched in parallel, giving a wide range of capacity for output matching. These are C12-C16 in Fig. 1, p.269.

Very short leads and the minimum of stray capacity and inductance are achieved by the layout adopted in the unit as illustrated. In order to provide a good return to the cathode for chassis currents, a small hole is drilled through the chassis near the tank condenser and a stout lead is run directly from its frame through the hole to the cathode ground connection beneath the chassis.

The RF choke used is not specified as this was home-made and many constructors will wish to use chokes that are to hand. One point to note, however, is that the mounting bolt at the cold end passes through the chassis *via* a ceramic bush. This bolt is connected to the cold end of the choke and permits a very short return path to cathode through the decoupling capacitor, thus preventing RF currents from circulating all round the chassis, which could lead to instability.

A resistor R7 is connected across the LF/HF output socket in order to prevent voltages from building up across the loading condensers. (Before this resistor was fitted C11 flashed across every few seconds as the charge on it rose!)

The diagrams Figs. 1 and 4 show the method by which the LF tank circuitry is connected. The two outer coil socket connections (P and R), which go to the 4X150A anodes, are short-circuited by the corresponding connections on the coil base. The latter are taken to the centre-pin of the coil base (Q) as well. The corresponding connection on the socket goes to the *pi*-net RF choke and also to the blocking condenser C7. The remaining two sockets—(S and T) are connected to the tank and loading condensers respectively, while the corresponding base pins on the coil unit are joined to the coil.

The neutralising capacitors are made from short lengths of tinned copper wire of about 26g. connected as shown in the diagrams Figs. 1 and 4. Care should be taken during their adjustment to avoid touching these wires against the anodes or anode lines. These very small condensers should be adjusted with an insulated tool, preferably of polystyrene. A small piece of copper shaped to form a hook can be used for this purpose; it can be fixed to the end of the rod by heating and then pressing it into the end of the rod.

Full dimensions of the unit are not given as the size required will depend on the exact layout and dimensions of components adopted in individual cases, but as a guide the Linear as illustrated is built on a chassis of 18in. x 12in. x 3in. deep and the PA compartment measures 18in. x 7½in. x 9in. high. The more critical dimensions are shown in Fig. 4, together with some of the measurements which together give an impression of the overall size. Flanges should be provided around the bottom edges of the chassis to permit a base panel to be fitted using self-tapping screws; this is absolutely essential in order to ensure that all the available air from the blower is directed through the only two exits — the valve anode columns. Any gaps which could permit air leakage must be suitably sealed.

The valves should not be run unblown for more than a *few seconds,* even with only heaters on, as there may be over-heating of the base seals which could lead to fracture. When HT is applied care should always be taken to ensure that over-heating does not occur. The writer has so far been unable to find any data on the limiting temperature for the anodes but the base seals should not be permitted to rise about 150° C. In practice, with a quiescent DC input of about 130-140 watts, the stream of air from the valve anodes becomes noticeably warm when the Linear is "talked up" to some 600 watts p.e.p. input.

Use on Other VHF/UHF Bands

Although no experiments have been tried there is the possibility that this Linear Amplifier could be used on either 70 mc or 70 cm. The following suggestions are offered:

(*A*) *70 mc.* If a very low minimum tank capacitor is used a passive *pi*-network could be tried. The coil required for this band would, however, be very small and efficiency would be

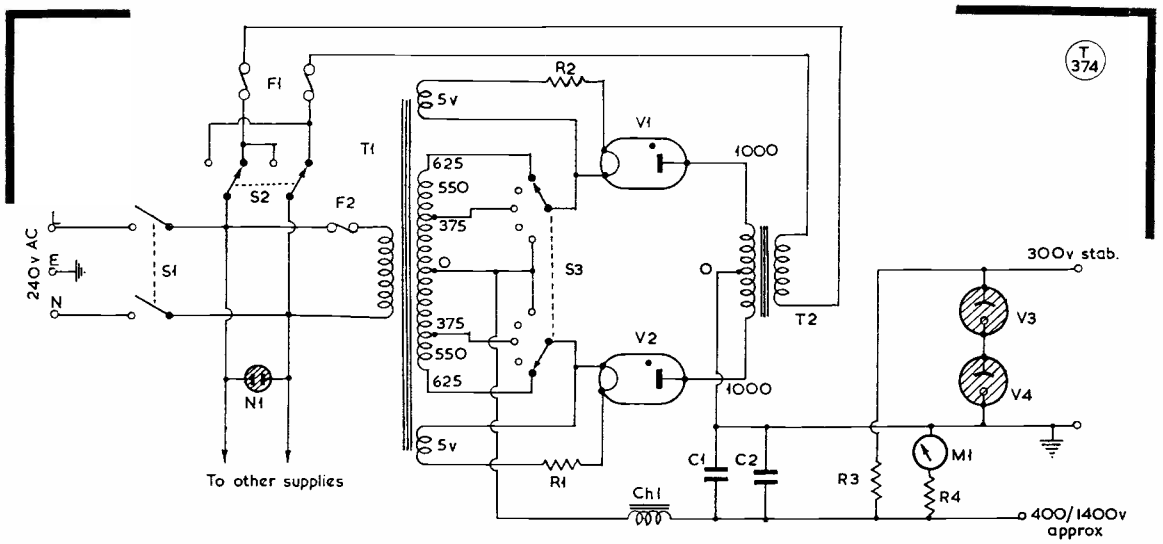


Fig. 3. The EHT power unit for the G3OCB High Power Linear is built as a separate item and, again, shows considerable ingenuity in design, in that two lower-voltage transformers are used to get the final HT of 1400 volts, this being made variable in steps down to about 400v. by the switching in the secondary of T1. Thus, the QRO Linear can be run up from a comfortably low HT for test and adjustment purposes, and power input is variable as required under actual operating conditions. In this circuit configuration, T1 and T2 must be of good quality and the insulation throughout of a high order, with an HV ceramic switch at the S3 position.

poor. A better approach would be to try push-pull; in this case a condenser could be fixed to the 144 mc cold point of the grid lines, this being of sufficient size to resonate the grid lines to 70 mc; this would result in a fairly low-Q grid line as far as 70 mc is concerned, but for Class-AB1 operation drive requirements would be quite low. The anode lines could be resonated to 70 mc by plugging in a suitable condenser across the two outer socket connections of the coil socket. Again the Q would be fairly low, but even with low tank efficiency it should be possible to run the unit to 100 watts or so p.e.p. output. The maximum allowable output on 70 mc is 2/3 x 50 x 4 watts (about 132 watts p.e.p.). The quiescent DC input can be reduced by switching off the heater supply to one of the 4X150A's or by reduction of HT.

(*B*) *430 mc.* For 70 centimetres, it may be possible, at some reduction in efficiency, to use the Linear simply by tuning the grid and anode lines in the three half-wave and three quarter-wave modes respectively. (It may be necessary to alter the length of the anode lines or the size or position of the tank condenser C8 in order to get to resonance.)

In either case there may be reasons why these proposals may not work, but there is considerable scope for experiment. Even if the Linear could be induced to work at only 15-20 per cent efficiency, the results would be worthwhile for the sake of convenience and flexibility.

Mention has been made above of switching off one of the valve heaters. At one stage in the construction of the Linear the author was left with one good and one rather poor 4X150A. Quite successful results were obtained both at LF and VHF by using just the good valve, the other being plugged in with heater disconnected in order to balance the VHF circuit. (*Note*: Where experimental operation on 70 cm or 70 mc is required the RF chokes RFC1-RFC3 may need alteration, or several chokes in series may be required.)

Table of Values

Fig. 3. The HV Power Unit for QRO Linear

C1, C2	= 8 μF, 1500v.	S2	= DPDT toggle, 3 amp.
R1, R2	= ½-ohm, 15w. (*see text*)	S3	= 2-p., 5-p., HV ceramic
R3	= 30,000 ohms, 60w. w/wound*	T1**	= Tapped HV windings rated 250 mA, with 2.5/5v. heaters
R4	= 100,000 ohms, 25w. w/wound	T2**	= Tapped 300-1200v. rated 250 mA
Ch1	= 10-Hy, 500 mA, low res.	V1, V2	= 866A MV rect., or similar
N1	= 230v. neon pilot	V3, V4	= VR-150/30, or OA2
F1, F2	= 3-5 amp. fuses		
M1	= 0-20 mA, for bleed check		
S1	= DP toggle, mains		

NOTES: Value of R3* depends on HT actually used. **T1, T2 can be series-connected on output side to give required HT voltages, provided both will deliver full-load current and are adequately insulated to withstand increased HT; they can be mounted on s/o insulators, with primary fusing rated for appropriate input current at mains voltage. Both these transformers should run cool under full-load conditions.

Power Supply

Although several transformers were available rated at voltages from 500 to 1,000 volts at about 250 mA, none would deliver the 1,400-1,500 volts which was considered necessary for this RF Amplifier. It was therefore decided to try a circuit (which had been seen in various publications) in which two transformers are used, the outputs being connected in series, and thus either adding together

or subtracting. This circuit has proved a great success in practice and so a brief description is given here.

Both transformers at hand were of good quality, one being rated 1000-0-1000 volts at 250 mA. These transformers were wired to a pair of 866A mercury vapour rectifiers, as shown in Fig. 3. The 866A requires 2½ volts at 5 amps. for the heater, and from a well insulated source. A suitable heater transformer was not available so it was decided to use the 5v. 3 amp. windings of one transformer, incorporating ½-ohm 15-watt dropping resistors in series. This moderate over-running of the 5-volt windings has no noticeable effect on the temperature of the transformer which remains very cool at all times. In addition, the insulation level of these heater windings is more than adequate for the voltage experienced.

The switch S3 enables the transformer taps to be selected at will and S2 permits reversal of the mains polarity to the 1,000v. transformer. Thus, outputs of some 400, 650, 900, 1150 and 1400 volts are available, depending on the position of these switches. As no time-delay of HT switching is included it is suggested that S3 be selected to intermediate positions, *i.e.* to "off," after each period of use and left in this position for a minute or two after S1 is closed. This will ensure that the MV rectifiers have warmed up before HT is applied. It is also suggested that S2 be used to switch to the higher voltages and returned to the lower voltage position, each time it is necessary to change the taps, to avoid excessive burning of the contacts of S3 (S2 being more suitable for this duty due to the higher current rating).

Although rated at 250 mA the transformers will easily supply the high peak currents required by this Amplifier without any sign of distress. The output filter consists of a 10 Henry choke and two 8 μF capacitors which results in low ripple content, and as the impedance of the choke is low (40 ohms) regulation is excellent.

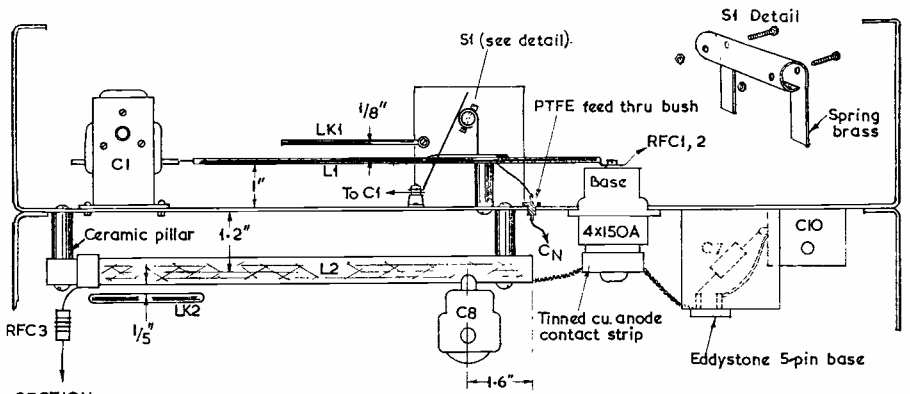


Fig. 4A : SECTION

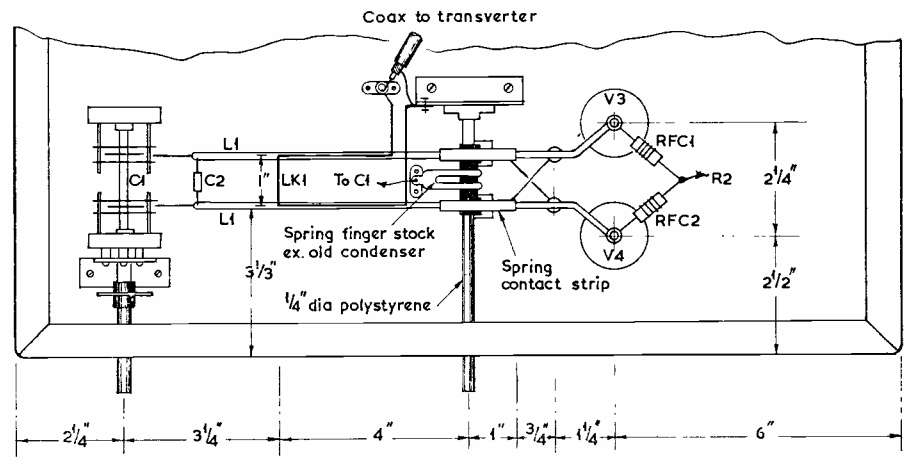


Fig. 4B : MAIN DETAILS - PLAN VIEW (Not to scale).

T 375

Figs. 4A and 4B show the layout details mechanically of the G3OGB Linear Amplifier. Though these drawings are for guidance only, it would be as well to follow them as closely as possible, since they represent an arrangement which has been found to work well in practice over all bands covered by the PA.

The voltage falls from 1460 to 1360v. when the load current is taken from 140 mA (PA and VR chain) to 500 mA. The VR chain supplies 300 volts stabilised to the screens and is capable of giving up to about 30 mA at the higher HT voltages, although the output current range would be less at lower voltages unless R3 (Fig. 3) is reduced.

This Linear Amplifier and its associated power supply have now been in operation for several months, particularly on 80m. and 2m. Performance has been all that was expected. During initial testing the snags were leakage of RF through the original *pi*-network choke, and the flash-over of C11 already mentioned. Some trouble was also experienced with the first 4X150A's tried due to their low emission; substitution of good-quality valves resulted in the currents coming up to expectation. The only other trouble was a breakdown in the screen by-pass capacitor of one of the 4X150 holders. (This was not a new holder.) Since a new base could not be located the trouble was repaired by stripping down the holder and repairing the fault. (This proved much simpler than expected and provided care is exercised in lifting the flanges the operation can be tried on damaged 4X150 bases with confidence.) The repaired base has now been in service almost as long as the Linear without further trouble.

As already explained, operation with this Linear has resulted in much better signal reports and more enjoyable QSO's, both on two metres and at the other end of the spectrum.

Do You Know That —

—— An almost professional-looking lettering job can be done on panels by using draughtsman's *Uno* stencils, their size 1½ or 2 being just about right; the inking can be white on dark panels, or black on grey or aluminium. Then by warming the panel and spraying it with one of the clear aerosol lacquers (obtainable from any good motor accessory stockist) a durable finish is given to the work. The *Uno* items are quite cheap and are always available from office equipment suppliers, and can often be had at large stationers. *(G4LU).*

—— Standard plastic conduit, in sizes from ½in. diameter upwards, can be used to make coil formers for almost any RF application, and is excellent for the purpose. Any electrical contractor, or the local Electricity Board sales office, can supply it—and may even have unwanted off-cuts to give away. *(G3IDW).*

—— Another use for empty ball-point pen cases is as lead-in insulator ducts. Drill a hole through the wall so that the case is a tight fit, and the wire can then be fed through; it will take up to 14g. quite comfortably. An obvious limiting factor is wall thickness, as these plastic cases are barely 5in. long. They also make neat formers for small coils, when cut to the required length. *(G3PMR).*

—— Spreaders for open-wire feeder lines can easily be made from insulated tag boards. Cut the board into strips so that there is a rivetted tag at each end, and pinch it over the wire with pliers; solder to make a solid job. *(G5XD).*

—— Mains adjustment by auto-transformer (*see* item by G3RDC, p.216, June) can be taken further and to closer limits by using correctly-phased 6·3v. secondaries in series with the main primary winding; this enables a greater range of adjustment to be achieved than is possible with the usual selection of primary taps. *(G3OJE).*

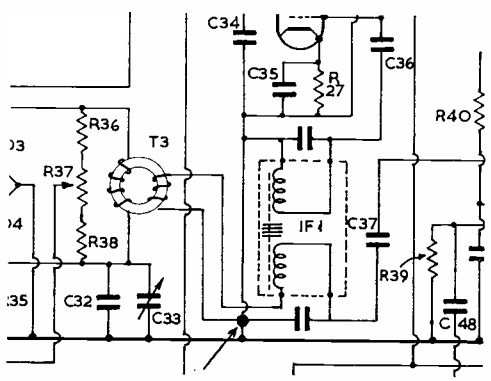
—— The YU7 callsigns are issued not to Yugoslav nationals but to foreign visitors to that country. *(SWL C. Waters, Corbridge).*

—— By placing a silicon rectifier (type OA210, BY100 or equivalent) in series with the heater supply to a high-gain low-noise audio amplifying stage, mains-induced hum on the valve cathodes can be eliminated; the rectifier should be by-passed to earth with a 50-200 μF condenser *(G3PHG).*

—— An attractive "circular frosted" effect can be quickly and easily imparted to aluminium panels by inserting a small pad of steel wood in the chuck of a hand-drill. A few turns will produce a permanent pattern. *(SWL J. Edwards, Leeds).*

—— The pre-etched printed circuit boards obtainable from *Radiospares* (at 3s. each) are a valuable aid to transistor and miniature circuit construction. *(SWL P. Moncaster, Goole).*

If you have an idea you think worth printing, send it in, on a separate slip headed "Do You Know That," with name, callsign and address. Any that can be used will be rewarded to the extent of half-a-guinea, payable on publication.—*Editor.*



CORRECTION NOTE—"SSB TRANSCEIVER"

In the main circuit diagram on p.207, June, an error occurred in the wiring to the mechanical filter. The correction is shown, arrowed, in the diagram herewith of the section of circuit affected. G6VX points out that it is only by earthing the input side of the filter in this way that the toroid can be used to get a low-impedance input from the balanced modulator.

THE HEATHKIT RG-1

COMPACT AND EFFICIENT GENERAL COVERAGE RECEIVER

TEST REPORT

THERE is always a demand for a good general-coverage receiver, and not only by SWL's. Many active amateurs feel rather isolated from the outside world if the only receiver in the shack covers merely the amateur bands. And too often, if there is a stand-by receiver at all, it is an old and inefficient war surplus type which may have been good in its day, but hardly comes up to modern requirements.

The Heathkit RG-1 is a reasonably low-priced general-coverage receiver designed in accordance with today's standards. There is no point in criticising it from the point of view of bandspread in the amateur bands, since the companion RA-1, specifically designed for amateur-band coverage, is excellent in that respect.

The RG-1 ranges from 600 kc to 32 mc in six bands, the only gap being between 1·5 mc and 1·7 mc (the IF used is 1621 kc). The bands are sensibly chosen at 0·6-1·5 mc; 1·7-4 mc; 3·9-8 mc; 7·9-14 mc; 13·9-22 mc; and 21·9-32 mc. The latter range is very suitable for the operation of crystal-controlled VHF converters, tuning the popular 24-26 mc as IF.

Sensitivity and signal-noise ratio are excellent, thanks to the use of frame-grid valves in both RF and IF sections. Selectivity to match is provided by a half-lattice crystal filter—something of an innovation in a receiver in this category. The valve line-up is as follows: RF amp., EF183; Mixer-oscillator, ECH81; first IF, EF183; second IF, ECF82; detector and AVC, OA81's; noise limiter, EB91; first audio and output, ECL86. An EZ81 rectifier and an OA2 stabiliser are also used, and the BFO is derived from the ECF82 in the second IF.

Sensitivity over the HF bands is claimed to be 3 μV for a 10 dB sig./noise ratio (8 μV for the medium-wave band). Image rejection is stated to be 40 dB or better, and the input impedance is quoted as a nominal 600 ohms, which enables aerials of indeterminate lengths to be used with fair efficiency over a wide frequency-range.

The receiver is very compact (roughly 14in. wide, 11½in. deep and 6½in. high) and weighs only 18lb. And remember that it incorporates most of the features that one expects in a true communications receiver.

Layout

The front panel is well designed and pleasing in appearance. The dial aperture gives 9in. of length for each of the six bands, which are very clearly marked and calibrated; to the left of the dial is the small S-meter; and arranged in a row below it are the six main controls. From left to right, these are RF gain, band switch, BFO tuning, main tuning knob, noise-limiter control and audio gain (which is also the on-off switch). Two small slide switches control BFO on/off and AVC on/off. Finally, at the extreme bottom corners are mounted a push-button for the 100 kc calibrator, and the phone jack. A very uncluttered and logical layout of controls has been achieved.

At the rear the only variable control is the S-meter setting; the aerial terminals (and coax socket in parallel) are at one end, and the terminals for a 3-ohm speaker at the other. Between them are two terminals marked "earth" and "mute," normally shorted either directly or by relay. When these terminals are not connected together, the entire HT supply is removed—a rather drastic form of "muting," we felt.

The 100-kc calibrator, supplied as an extra, plugs into an octal valve-holder easily accessible from the rear of the set, and gives very robust "pips" throughout the entire spectrum. The receiver on test was factory-assembled and obviously had been carefully aligned, since WWV (specially marked on the dial at 10, 15, 20 and 25 mc) was practically spot-on in all positions. MSF, the frequency-standard at Rugby, is also marked on the dial at 2·5 and 5 mc, so there is no lack of calibration points.

Performance

Selectivity is largely derived from a half-lattice filter at the input to the first IF stage (crystals at 1619·7 mc and 1621·4 mc are used); and the right sort of response curve for easy reception of SSB seems to have been obtained. The selectivity is not variable (remember the price of the receiver) but is quite adequate for most of the purposes for which

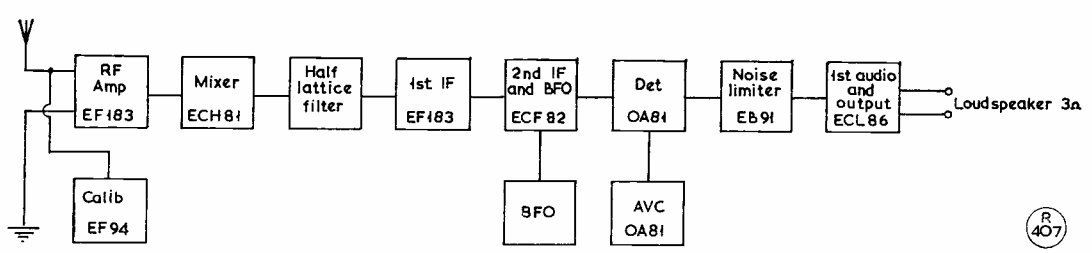
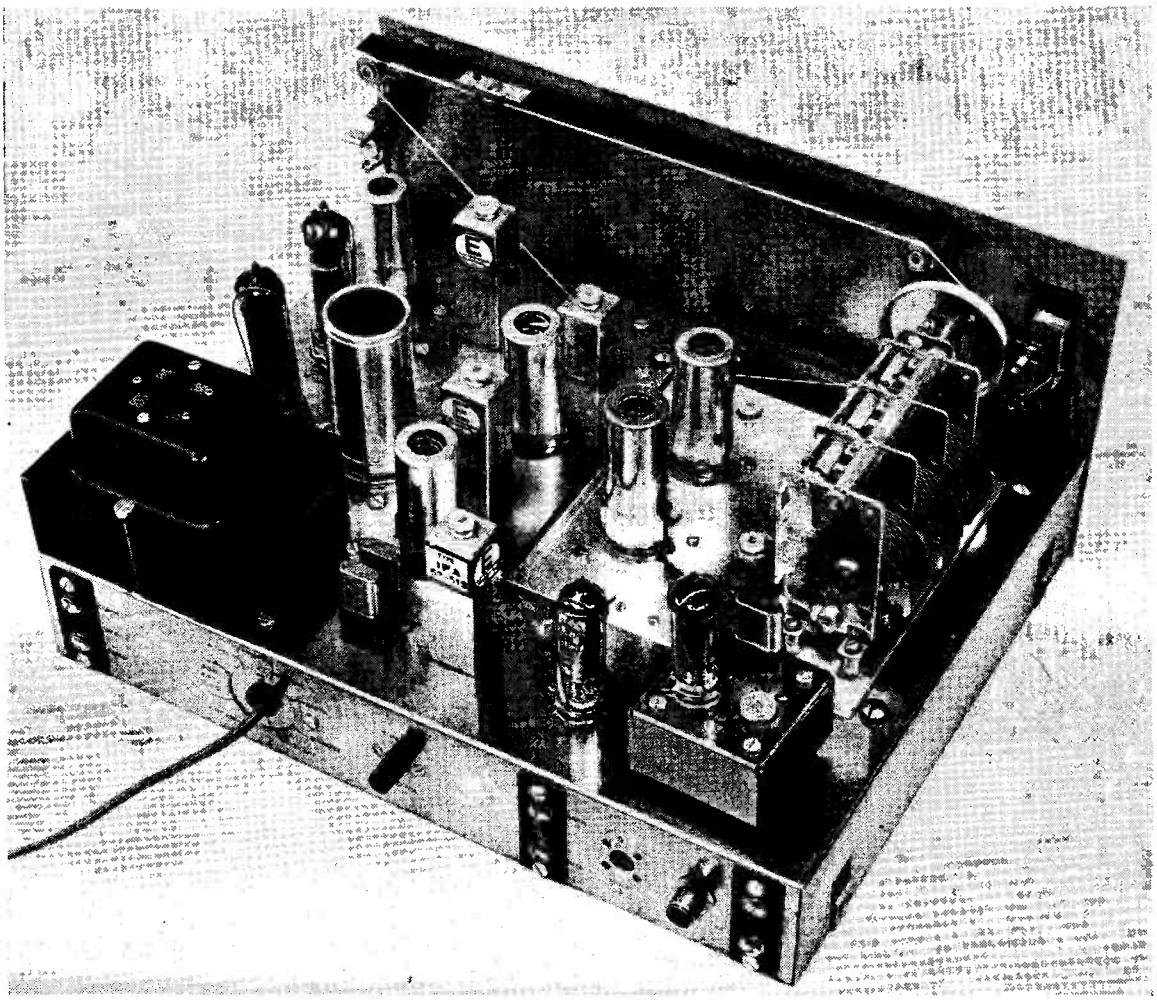


Fig. 1. Block diagram of the Heathkit RG-1 general-coverage receiver, reviewed in the accompanying test report. The crystal calibrator is an optional extra and is coupled to the aerial input terminal through a very small capacity. It gives well-defined marker pips right up to HF range, and would be a very valuable adjunct for serious work since the calibration can be checked continuously. Two valves not shown in this diagram are the stabiliser, an OA2, and the rectifier, an EZ81.

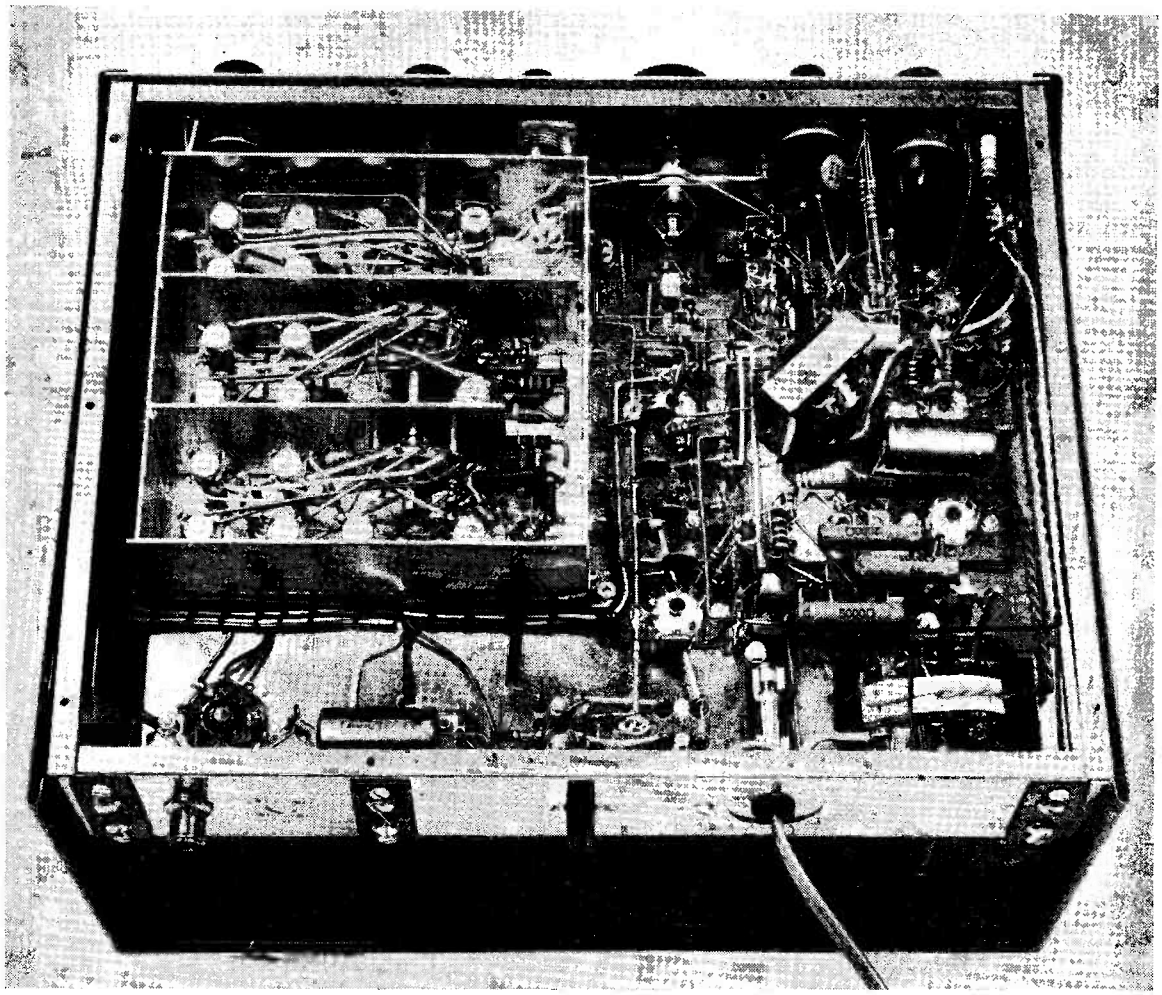


Upper deck view, showing the neat and tidy layout of the Heathkit RG-1 behind the panel. At right is the complete "Electroniques" front-end unit, with an EF183 as RF amplifier and ECH81 as mixer. At bottom right is the crystal calibrator, plugged into an octal valveholder on the chassis. For aerial connection, two terminals and a coax socket, wired in parallel, are provided. The LS sockets are at extreme left, and the third pair are for muting.

the set will be used. The noise-limiter is very effective on sharp peaky noise such as ignition QRM; slightly less so on general *sharsh*.

Even without any bandspread facility, and with the 14 mc amateur band occupying a bare half-inch of dial length, it is possible to tune in weak SSB transmissions and to hold them, since stability is extremely good after the initial warm-up period of about five minutes. The correct BFO settings must be found first, and should then be marked on the panel. (In passing, it might be mentioned that on the receiver supplied for test it was impossible to swing the BFO tuning through zero-beat, which came at the maximum setting of the condenser—thus attempts at switching sidebands merely resulted in finding the same one twice . . . but this was soon rectified with a trimming tool. It might, however, mislead a novice into thinking that the receiver would not cope with certain SSB signals.)

The front-end, ready wired, and the IF transformers and BFO coil are all made by *Electroniques Ltd.*, and the other components are also of comparably high quality. The dial is of the two-speed variety, giving quite a good range at "crawl" speed before going into overdrive, which enables one to traverse the wide expanses of the scale without laborious knob-twiddling. The pointer is commendably rigid, although it was found that after several hours of running it tended to bind against the perspex scale. (However, it is recommended in the instructions that a simple readjustment be made after an initial period of use, to counteract possible



In this under-chassis picture of the RG-1, the wiring is seen to be straightforward when carried out strictly to the instructions — and as is usual with all Heathkit home-constructor equipments, these are explicit and meticulously set out. The front-end unit is supplied complete, its connections emerging through feed-through condensers, visible down the centre line of the photograph. A bottom plate provides effective screening.

expansion and curving of the scale.)

General

As an all-purpose short-wave receiver, intended to cover everything from broadcasting to the reception of amateur CW, AM or SSB within the crowded bands, and to take a VHF converter for any of the usual IF ranges, we feel that an admirable compromise has been achieved. The average SWL, using converted war-surplus gear, would find himself in quite a different listening category with the RG-1; the experienced listener with a more ambitious receiver would not find anything to criticise in the performance; and the amateur transmitter who wants general-coverage standing by on his table-top could hardly do better in the way of a combination of performance and compactness.

Particularly good points are the clear, open scales on the dial; the easy resolution of SSB; the suitability of the pass-band for all types of signal, including CW; and the frequency stability. Points worth criticising are the S-meter (which could not be made to read higher than S5 on even the strongest commercial signals); the relatively low performance on the highest-frequency band; a rather pervading AC hum with the audio gain fully up; and (a personal criticism) the lack of an aerial trimmer.

Taken in all, an intriguing receiver, and excellent value for money.

THE PRACTICAL APPLICATIONS OF SEMICONDUCTORS

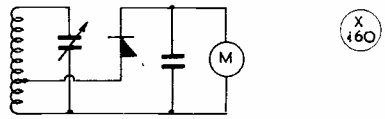
IN THE AMATEUR STATION

Part IV

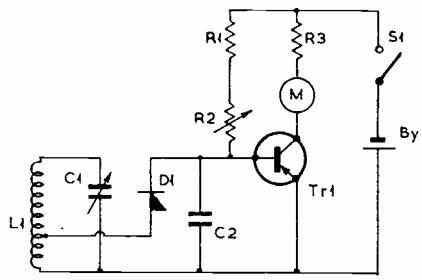
TEST EQUIPMENT (III)

M. I. DAVIS, B.Sc.

CONSIDERING now Absorption Wavemeters in their own right we note that the simple circuit of Fig. 7 (a) lacks sensitivity. This is due to the fact that at low input voltages, similar powers are dissipated in the diode and the meter, since the slope resistance of the diode is high at low levels. Also the fact that it is necessary to trap only some part of the useful voltage across the tuned circuit, in order not to shunt it too much, leads to a reduced sensitivity. If we were simply to add a common-emitter amplifying stage, sensitivity would be enhanced at higher levels of input, but no significant improvement would occur at the low levels at which one frequently works. The simplest solution is to bias the transistor up to a part of its characteristic which has an acceptable slope, by a suitable resistor chain, and to use the rectified RF to reduce the base current. In this way, the problem of low-level amplification does not occur; the price we pay for this is that the meter now reads backwards, and must be set to FSD, in the absence of a signal, before the instrument is used.



(a) Basic type



(b) Improved version

Fig. 7. A transistor absorption wavemeter, another extremely useful piece of test gear on the amateur work-bench. C1 is 100 $\mu\mu$F; C2, .01 μF; L1, for the required range; R1, 50K; R2, 250K pot.; R3, 100 ohms; D1, OA81, or any HF diode; TR1, OC71, or similar; M, 0-1 mA m/c meter; and battery 1.5v. U2.

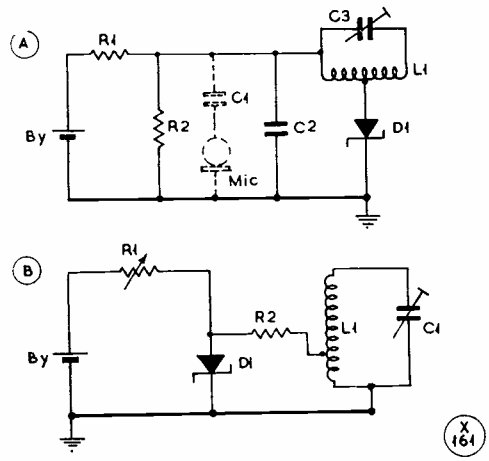


Fig. 8. Tunnel diode oscillators for two metres — see text. These are interesting experimental circuits. Values for (A) are: C1, 50 μF; C2, .01 μF; C3, 3-30 $\mu\mu$F; R1, 100 ohms; R2, 10 ohms; D1, 5 mA tunnel diode; L1, below; B, 1.5v.; and moving-coil mic., for modulation. In (B), the circuitry is even simpler, with R1 as a 200-ohm pot. to adjust for optimum; R2, 20 ohms; and L1 (for 2m. band) 4 turns, ⅜-in. dia., spaced out to one inch, with the tap one turn from the earthy end.

The tuned circuit was tapped at about one-fifth of the way up from earth, and five plug-in coils were used in the author's version, covering the range 200 kc to 100 mc; only one half-turn was required at the latter frequency. An LF transistor can be used, but the diode should be of the HF type. It is advisable to check Tr1 for leakage current before soldering it into the circuit. In use, the meter is set to full-scale by means of R2, and the unit is then loosely coupled to the circuit under test. Again, the warning about possible damage by large signals should be heeded—don't leave it standing on the Tx tuned to the local net frequency!

Since we are at present considering the applications of semi-conductors to the generation of RF signals, two circuits for VHF test oscillators, using tunnel diodes, are given in Fig. 8. It is realised that few readers will possess any of these devices, and they are included mainly as a matter of interest, since it must be admitted that the circuits are unusual. High-power tunnel diodes are not yet generally available in this country, although devices with a peak current of 20 amps. are manufactured. The circuits here both use 5 mA diodes, so the output is naturally very small. Tunnel diode oscillators represent the epitome of the type of circuit which needs careful adjustment for optimum operation, but fortunately the number of components is small. Simplicity, low supply voltage, and very high frequency operation are the principal attractions of the devices.

Both circuits are designed for two-metre operation, but by replacing the tuned circuits by strip lines, the units will function comfortably in the 70 cm. band and higher. The dotted lines in version (*a*) show how modulation may be applied *via* a blocking

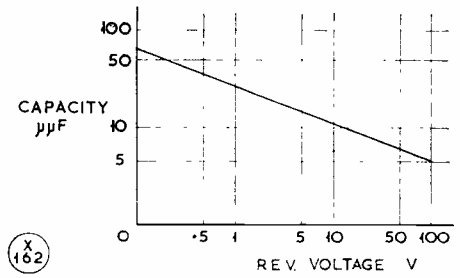


Fig. 9. Showing the characteristics of a typical variable-capacity diode, another very interesting semiconductor device which has a variety of applications. This is a capacity-voltage curve — see text.

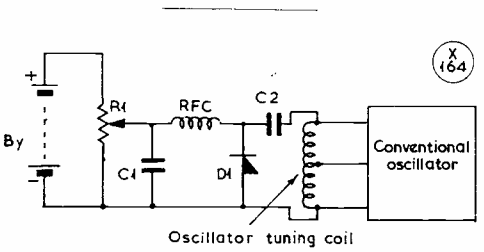


Fig. 11. A variable frequency oscillator using a variable-capacity diode, the frequency being controlled by R1. C1, C2 are .01 μF, R1 is 50K, and D1 is the var. cap. diode.

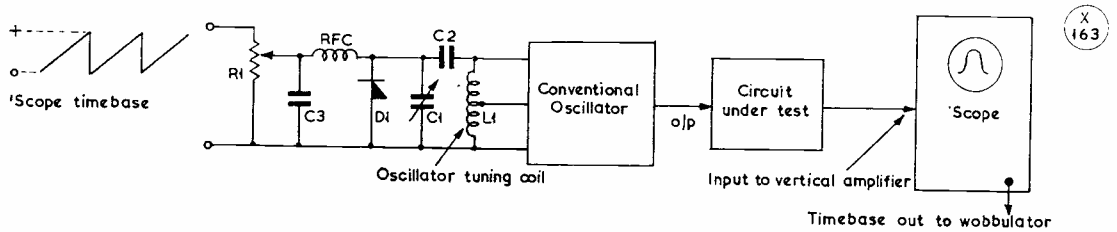


Fig. 10. The wobbulator, transistorised, another essential item of test equipment, for receiver alignment, on which operating notes and other information appear in the article. Values are: C1, to tune the coil to the centre-frequency; C2, .01 μF; C3, .001 μF; R1, to control frequency deviation, 50K; and D1, a variable-capacity diode.

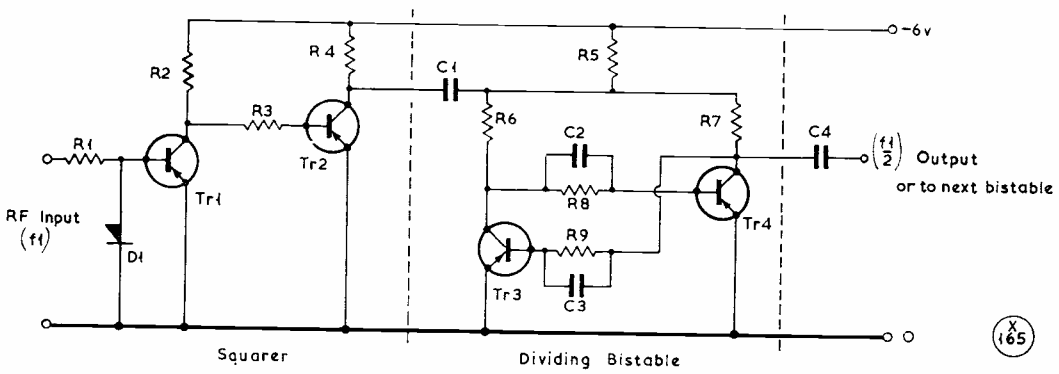


Fig. 12. The bistable frequency divider and squarer discussed in the text. Further bistables may be added in cascade to give F/4, F/8, and so on. Values are: C1, C2, C3, 500 μμF; R1, R3, R8, R9, 4.7K; R2, R4, R5, R6, R7, 470 ohms; TR1-TR4, MA393, 5B240, or similar; D, 0A81, or equivalent. With these transistors, the upper frequency limit is about 2 mc.

capacitor. The coil in this version should be of 4 turns of 16 gauge wire, stretched to about one inch, and ⅛in. in diameter. Silver-plated wire should be used for best results. Output may be taken by tapping a short aerial on to the coil, or by a small coupling condenser of less than 10 μμF. Version (*b*) is even simpler: The resistor R1 adjusts the bias for optimum results. No further details are given, because the rest is best left to trial-and-error.

(The author would like to hear of readers' own experiences with tunnel-diode oscillators.)

Variable-Capacity Diode

From one specialised semiconductor device, we move to another—the variable-capacity diode—and consider very briefly a couple of uses for it in test equipment. A typical graph of capacitance against reverse bias is shown in Fig. 9, from which it will be seen that a large variation of capacitance is obtainable. This makes the devices useful for AFC systems, frequency modulation, wobbulators, and remote tuning. We consider, in outline, the last two.

The use of a wobbulator in alignment is well-

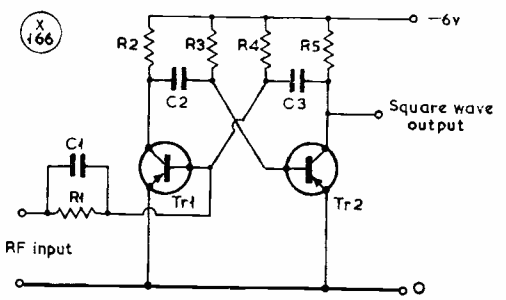


Fig. 13. A simplification of the synchronised multivibrator shown in Fig. 12. As a frequency-divider, this circuit could be made to give 25 kc from a 100 kc crystal with values of .0014 $\mu\mu$F for C2, C3. Using an OC44 or OC45 for TR1, TR2, other values are: C1, 100 $\mu\mu$F; R1, 10K; R2, R5, 1K; and R3, R4, 20K.

known, and all that is basically required is an oscillator whose frequency can be varied by the time base voltage of an oscilloscope, so that the bandwidth and gain of a system may be plotted on the screen. In Fig. 10, the coil is assumed to be part of an L-C oscillator of a standard type (*e.g.* Colpitts) and the diode, together with its biasing circuit, is placed in parallel with this. A variable capacitor controls the centre frequency, and a potentiometer alters the deviation.

In Fig. 11, the circuit has been modified to produce a variable-frequency oscillator, the frequency being controlled by R1. This idea could be developed for a push-button-tuned oscillator, R1 being replaced by a set of fixed resistors which are switchable. A decade oscillator could be constructed on this principle.

Bistable Multivibrator

The last accessory to be mentioned gives the facility of deriving, from one standard oscillator, several output frequencies, with the accuracy of the standard maintained at each frequency. A standard frequency may be divided by two, four, eight, sixteen, *et seq* by use of the circuit of Fig. 12, which is a standard bistable multivibrator. One "block" is required per division. It is necessary to square the standard sinewave to drive the first bistable, and that part of the circuit enclosed by the dotted line performs this operation. Subsequent bistables will then drive each other. The input should be about 2 volts r.m.s., and with the transistors shown an upper frequency limit of about 2 mc is imposed.

A somewhat simpler system is shown in Fig. 13, where a multivibrator is synchronised by the standard oscillator to run at one half, one third, or one quarter of the standard frequency. For instance, a value of 680 $\mu\mu$F for C2 and C3 gave an output of 50 kc from a 100 kc crystal oscillator, while 1400 $\mu\mu$F gave 25 kc. Again, about two volts of RF are required to drive the circuit.

In the next article in this series, some audio amplifier circuits will be considered in detail, and several designs given for various applications.

SPECIALLY ON THE AIR

If you hear or work any of the stations listed here, they will be on for the special reason explained. If plans for any such operations are notified to us, they will be published under this heading, with the necessary details.

GB3SOU, July 10-11: Exhibiton station in the grounds of the annual Southampton Show, with operation on all bands two metres to 160m., and additional talk-in facilities on Top Band and 2m. for /M's visiting the Show. This covers all the activities and sports of Southampton and its countryside, and offers a very full programme of events. GB3SOU is laid on by the local radio amateur group, and visitors will be very welcome. Address for information and QSL's: C. Asher, G3IBJ, 81 Green Lane, Maybush, Southampton.

GB3MWT, July 11: Operated by the Marconi Apprentice Association in connection with the Company's Gala Day in Chelmsford. Skeds for duplex contacts are invited for the 80-160m. and 2m. bands, as these are found to be of particular interest to the visiting public. All contacts will be QSL'd by a special card. B. J. Doel, M.A.A. Radio Club, c/o Education Office, Marconi House, Chelmsford, Essex, will deal with correspondence and QSL's.

GB2LS, July 16-18: Annual show station and Amateur Radio exhibition, organised by the Liverpool & District Radio Society, in connection with the Liverpool Show, which always draws a very large public attendance. Operation will be on all bands, using AM/SSB/CW, and looking for QSO's with all comers at any distance. *QTH:* H. James, G3MCW, 448 East Prescot Road, Liverpool, 14.

GB3WOC, July 18: To celebrate the 1,000th anniversary of the ancient village of Wolverley, near Kidderminster in Worcestershire, a carnival is being held in aid of the *Oxfam* appeal. All-band operation, with 100 per cent QSL procedure, also talk-in on Top Band and two metres. Good car parking and continuous family entertainment. Details from: R. C. Shuck, G3NXD, Tregarron, Lowe Lane, Wolverley, Kidderminster, Worcs.

INTERNATIONAL RADIO COMMUNICATIONS EXHIBITION

Phil Thorogood, G4KD, proprietor and organiser of what we know as the Amateur Radio Exhibition —which he has been running so successfully for many years—announces that this year's event will again be at the Seymour Hall, Seymour Place, Marble Arch, London, W.1, the dates being October 28-31. So put that in your diary. Your entrance ticket could win you a valuable receiver—but even if it doesn't, the Show is well worth a visit, not only to see what is available in the field of Amateur Radio but also to meet so many personalities you may have heard of either on or off the air.

SWL • • • • • •

TEN METRES, AND FIFTEEN — QSL's AGAIN — READERS' NOTES AND QUERIES — NEWS, VIEWS AND GOSSIP

IT'S a well-known fact that many amateur transmitters look on SWL's as beginners who are hoping one day, to scale the tremendous heights to which they themselves have already attained. To some they are merely a nuisance whose unwanted QSL cards arrive from time to time. What is often overlooked is the fact that there are quite a number of very experienced SWL's who actually *prefer* to stay that way. To the youngster, who has just had his first taste of hearing some real DX, the world of transmitting must seem pretty romantic; but with the coming of more experience, it does seem to dawn on a few that they can derive just as much fun and interest from listening as they ever could from transmitting.

A personal friend of your conductor's is one of these types, and has been an SWL since the 1920's. He firmly determined, all those years ago, that he would sooner be a real specialist in short-wave listening than "just one of the thousands who transmit," and he has had such a sense of purpose ever since that he is still just a keen listener. Not without a dry sense of humour, he says "All the time you waste on transmitting, you might be *hearing* something really interesting, and I don't want to miss that." And, sure enough, he is an incredible fount of information on practically everything that happens, or could happen, on the amateur bands. He has literally heard it all; but he has never sent or received a QSL; it's *listening* he is keen on, not writing letters and keeping logs.

Perhaps there are others like him; from their very nature they wouldn't bother to write to this feature unless something of tremendous interest or importance occurred. We just mention this in case there are, among our readers, those who have grown up with the idea that listening is only the prelude to transmitting, and that one has only got half-way when one has become a good listener. Quite wrong—there are many, many transmitters on the air today who would operate much better, and know much more, if they had spent a few more years at the receiver dial first. So don't encourage any sign of an inferiority complex because you are "just a listener."

One of the hardest tasks connected with the regular preparation of "SWL" is to sort out the letters in terms of subjects covered. One tends to receive 60 letters dealing with at least 58 subjects. (the other two are complaining about QSL's or the lack of them!)

This month we have had the heaviest mail yet recorded, and about the only subject that recurs in as many as half-a-dozen letters is the use of the 15-metre band for DX. So at least one heading can be made out of that!

Fifteen Metres

Robert Turlington (Braunstone) joins us for the first time; says he is 16, and started off with an old receiver nearly twice that age! Now he has a completely home-built bandspread job, enjoys his listening, particularly on Fifteen, and joins the HPX Ladder with 211.

Another newcomer is *G. Christie (Gainsborough)*, who is only 14 but first became interested in amateur transmissions about eight months ago; he, too, joins the ladder and says he prefers Fifteen, as it isn't so crowded as Twenty, yet usually open when the DX comes in.

B. F. Hughes (Worcester) remarks that "Fifteen has improved over the last three weeks, and a good job, too, because Twenty is fast becoming a very 'mucky' band." *John Fitzgerald (Great Missenden)* reports that Fifteen has provided some very interesting AM phone, especially from Africa and South America, around 1700-1800 GMT. *He* likes it because one can hear DX, even if it is weak, without "the continual swamping background of Europeans calling CQ DX." True—it is the latter that just about spoils Twenty for many listeners.

Similar opinion from *J. W. Smith (Tunbridge Wells)*, who got home from a club meeting at 2230 one night, switched on and heard six new countries in 30 minutes . . . and four more the next evening! They were all Caribbean, Central and South Americans. Finally, *Martyn French (Highbridge)* says that this band is often dead during the day, but worth looking at late in the evening. At the tail-end of a recent "dead" Sunday he heard four continents in half an hour. By the way, he queries the suffix "Y" used by a YU station—anyone help?

Ten Metres

Quite a few of our "regulars" co-operated in the recent Ten-Metre Activity Sunday (May 10) and heard lots of things they never expected to hear on Ten Metres. We hope they will be out in full force for the next one, which is on July 12, from 0900 to 1700 GMT. You will be most unlikely to hear any exotic DX, but you will at least be assured that there will be plenty of stations on the band. G's on ground-wave, Europeans *via* sporadic-E propagation, and (who knows?) DX by normal ionospheric paths—and, for many listeners, virtually a new band. And, of course, an event in which your logs (to us) and your QSL's (to them) will be of real value.

Concerning this band still further: Some SWL readers who did report after May 10 heard such countries as 9G1, 4X4, 5A1, 5B4, 5Z4 and 5X5, all on AM phone. The opening came late—nothing much happened before 1700 or thereabouts, but the following Sunday the DX arrived in the afternoon.

QSL Comment

This is a subject we simply can't get away from! *Dave Gray (Croydon)* says he keeps a full record of each QSL sent out, and he finds that returns for 1963 (still coming in) are already 60 per cent and those for 1964 look like being even better. Best reason for wanting a QSL, he found, was award-hunting; when he reported on members of the Ex-G Club, aiming at their SWL Certificate, he had a 97 per cent response. Since his move from Easington to Croydon, SWL Gray has started prefix-hunting all over again, and already has a score of 301 on the ladder.

G3SOP (Huddersfield), says he never QSL'd when he was a listener, but he will welcome reports from over 100 miles on Top Band and Eighty, and any distance on Ten. But *useful* reports—those things that go "Heard you working so-and-so, *Pse QSL,*" go straight on the fire.

The *South Birmingham Radio Society (G3OHM/A)* will welcome "SWL reports giving useful information" and so will many of its members. They hold a Sunday-morning net on 1900 kc, and all those who take part would be interested. They QSL in return if the reports are from more than 25 miles (phone) or 50 miles (CW) on Top Band. And you can send yours to the acting secretary (*see* "Month with the Clubs" for QTH).

The Shrinking Bands

B. J. Turner (Westcliff) finds the state of the bands "unpredictable" and says they are being invaded by more and more non-amateurs—what with "Sky-King" at the LF end of Twenty and the new shipping stations on Eighty. He is one of those who believe in home-brew, and says he wouldn't swop his £6-worth of equipment for at least one commercial receiver he has handled.

Short Comments

"G stations have been coming in very strongly on Twenty, some of them with very rough notes and chirps almost as 'good' as the Central Europeans" *(I. Buffham, Spalding)* . . . "I owe much of my SWL interest to a local amateur, GW3RBM, without whose help I would not have obtained my R.1224A, and he also helped me complete a CC converter for it . . . his help and influence also started me off on Two" *(Derek Rogers, Wrexham).*

"I was helped in starting by fellow-SWL S. Howell, and it is through him that I have gained a lot of my present knowledge . . . started with BC stations on the family set, then a faulty R.1155A and now an R.107. It is on this set that my HPX score went up by 100 in one week, and I have not yet recovered from the excitement of logging 15 to 20 new ones every night" *(M. A. Stephens, Hove)* . . . "At the last junk sale at the local club I bought a working (BBC-only) TV set for threepence!" *(D. S. Smith, Stanmore)* . . . "Have not been listening to phone much lately, because I hope to make an entry in the CW ladder shortly" *(M. Woollin, Leeds).*

"Chief construction lately has been a 7-transistor Top Band receiver, which I hope will be useful for outdoor work" *(P. Moncaster, Goole)* . . . "My first time of writing; I started in June 1963 with an old broadcast receiver, and now use a Heathkit Mohican; since Christmas I have heard 185 countries on SSB and AM" *(R. Williams, Birmingham)* . . . "Just been looking at my list of prefixes, and it surprised me how many 'local' European ones I still need" *(M. J. Summers, Market Harborough).*

"Find that not only does Amateur Radio help me with my French, but it can be useful in other languages as well . . . I don't take the *Magazine* on a subscription basis, as I'm still at school, but even if it were 5s. a month I would still try to take it" *(P. A. Cayless, Exeter)* . . . "Forty-metre SSB seems to be at a new peak at the moment; GI6TK was saying that the path to VK has been exceptional between 0530 and 0730; also on in the mornings are many South Americans. I heard five VK's between 0655 and 0715 one morning" *(D. A. Whitaker, Waddington).*

"I feel that these phone-patch W/MM stations should give their calls every five minutes—I listened to a W/MM and a W4 for 43 minutes (51 overs) without callsigns being mentioned. And why can't they call a kW a kW instead of a gallon, a bucket, full power, max. or even a full house?" *(T. R. Popham, Exeter).*

[over

". . . Oh, that's the bit of wet rope I use to work the W's on . . ."

Near The Top

H. G. Shaw (Heswall) headed the HPX Ladder for a very long time, and has now gone into retirement with his score of 700 as yet unchallenged. *A. W. Neilson (Glasgow)* says that he always hoped he might have been able to catch him up, but, as "heir presumptive" with a robust 653, wants to congratulate the "retiring champ." SWL Neilson has just replaced his long-serving CR.100 with a KW-77, but it didn't arrive until conditions started their seasonal falling-off. And he says that he now spends more time on Forty, a band he neglected or even ignored for years, and is finding it quite productive.

Stewart Foster (Lincoln) well in the chase with his figure of 518, says it's now very difficult to move up one rung—but he says "Congrats to H. G. Shaw, and tell him I'll get there if it kills me." He has been successful with several DX-peditions, which have added such nice ones as FG7XT/FS7, VQ8BFC, VS5MH, YV8AJ, three ZC5's, HZ2AMS/8Z5 and 9X5MH. But listening time will be limited for the next few months.

Newcomer

P. A. Holliday (Mapperley), who has joined the Ladder at the other end (153) tells us of his progress, which has been almost on "traditional lines": 18 set, BC set (with RF stage), Bendix RA-10, and now hopes of a double superhet with crystal converter and home-brew tunable IF. Apart from this there is the mobile push-bike, equipped with battery O-V-1 and centre-loaded 8-ft. whip, also being modified by cannibalising a portable battery BC receiver. This will end up as a double-superhet with tunable IF. Some of our newer correspondents certainly don't lack either enthusiasm or ideas!

HPX LADDER

(Starting January 1, 1960)

Qualifying Score—150

SWL	PREFIXES	SWL	PREFIXES
PHONE AND CW		*PHONE AND CW*	
A. W. Nielson (Glasgow)	653	J. L. Pearce (Basingstoke)	255
R. J. C. Coats (Cowie)	624	G. S. Bunting (Birmingham)	242
R. Hunter (Kenton)	597	M. A. Stephens (Hove)	233
D. S. Smith (Stanmore)	544	R. V. Bruce (Norwich)	230
S. Foster (Lincoln)	518	J. P. Fitzgerald (Great Missenden)	228
R. Williams (Birmingham)	501	G. C. Fermor (Exeter)	226
B. Curnow (Plymouth)	500	B. J. Turner (Westcliff)	218
F. Bourne (Plymouth)	455	R. Turlington (Braunstone)	211
C. N. Rafarel (Poole)	448	P. R. Ball (Sligo)	210
D. A. Whitaker (Waddington)	447	T. Bucknell (Chesterfield)	208
M. Vincent (Cheltenham)	431	P. H. Moncaster (Goole)	206
K. C. Staddon (Stroud)	424	R. S. Finley (Harrow)	194
P. Baxter (Winchester)	411	A. E. Beales (Clacton)	194
A. F. Huggett (Lamberhurst)	410	J. N. Eveson (Bromsgrove)	192
T. R. Popham (Exeter)	408	C. Cummings (Manchester)	191
P. E. Etheridge (Hull)	400	J. E. Hart (Leeds)	191
M. Healey (Horsham)	384	H. Wolton-Carr (Cambridge)	191
F. B. Blake (Beaconsfield)	366	M. Shaw (Bromley)	181
M. Woollin (Leeds)	353	C. Rees (Hatch End)	167
N. J. Summers (Market Harborough)	325	A. Parker (Chesham)	165
A. Stone (Kidderminster)	325	D. Rogers (Wrexham)	165
P. A. Cayless (Exeter)	303	P. A. Holliday (Nottingham)	153
D. Gray (Croydon)	301	G. Christie (Gainsborough)	151
S. E. F. Howell (Hove)	299		
I. Buffham (Spalding)	293		
J. R. Daws (Leeds)	284		
A. F. Roberts (Kidderminster)	278	*CW ONLY*	
D. C. Parker (Redditch)	275	R. Hunter (Kenton)	526
M. A. French (Highbridge)	274	B. Curnow (Plymouth)	500
C. Whaley (Cambridge)	269	J. D. Williams (Winchester)	369
R. Garnham (Stevenage)	268	M. Vincent (Cheltenham)	330
J. W. Smith (Tunbridge Wells)	265	I. Buffham (Spalding)	227
		R. P. Smith (Manchester)	225
		M. Healey (Horsham)	223

(NOTE: *Listings include only recent claims. Failure to report for two consecutive issues of "SWL" will entail removal from the table. Next list, September, 1964 issue—deadline, July 31.*)

Queries

F. B. Blake (Beaconsfield) and others ask whether MP4D counts as a separate country from MP4B. It doesn't, and, of course, none of these are a help towards HPX, for which purpose any MP4 is just an MP4 despite the variety of countries covered. Other queries concern Algeria (7X) and its variety of numerals. We know nothing of the licensing system, but it seems possible that almost any figure could crop up there (7X1, 2 and 3 have already been logged).

Regarding 7Z—that is the new prefix for Saudi Arabia, which now has three different licensing areas signing 7Z1, 2 and 3.

General News

Barry Curnow (Plymouth), who has just reached 500 on both the CW and Phone ladders, remarks on the excellent DX on Forty SSB, also on the various DX-peditions already mentioned. He adds "just at this moment I am checking every single screw in the gear, keying it up for the CHC (Certificate Hunters' Club) QSO Party, my biggest event of the year. Last year I topped G, topped Europe and came third in the world; needless to say, this year's aim is to improve the latter!" Barry's 89th award arrived just before he wrote, also a Top-Band QSL from HK4EB and cards from FB8WW, 8XX and 8ZZ.

P. A. Singleton (Blackpool) writes as follows: "If any SWL readers are in Blackpool on holiday I would only be too pleased to meet them, but would like a letter or phone call first, as I am on shift work. Likewise if any SWL's care to write and exchange letters (especially D. A. Pickup of Preston) it would be appreciated." QTH: 8 Appleby Road, Blackpool (Tel: 53365).

R. Finley (Kenton) has spent much time on VHF, with a new two-metre converter, and has hopes of a 5-ele Yagi to go with it. Exam. QRM is imminent, but after that, R.A.E. revision will be the order of the day, and that G3 - - - is the final goal—naturally!

Another VHF convert is *M. Vincent (Cheltenham),* who has built himself a portable super-regen. receiver and has been out several times on the 100-ft. hills surrounding his QTH. Another case of Exam. QRM here, so future projects have to wait a while.

Severe QRM!

This QRM from exams. is a pretty common phenomenon at this time of year, but the most concentrated form was suffered by *Chris Rees (Hatch End),* who frankly tells us that all his gear has been dismantled and stands "in a huge pile, covered by a dust sheet"—by parental order! First things first,

in a big way . . . but he has already taken R.A.E. and is quite hopeful about the result. Another interesting note is that he recently bought an electricity meter at a junk sale (for 3d. !) and looks forward to convincing his parents and friends that the current consumption of his gear is negligible.

D. S. Smith (Stanmore) throws out a fast-scoring challenge—last summer, he says, he logged 186 prefixes in less than two weeks . . . *R. V. Bruce (Norwich)* joins the ranks and gives up his "potted history"—crystal set, single-valver, BC set covering Twenty and Forty, Eddystone 358X and now an R.107. He is away at school and involved in GCE, but the R.107 is with him, and recent loggings (mostly the evening DX on Twenty) show that it is not idle.

R. Hunter (Kenton) comments on the short-skip recently noted on Fifteen, with very strong signals from Barrow and Falmouth, among others; he also notes that Fifteen produces more strong phones from South and Central America on Saturday and Sunday evenings than at other times—it must be just a matter of activity.

J. R. Daws (Leeds) makes sensible comments on the various controversies that are always with us—Phone-versus-CW, QSL-ing, and so on—but refuses to pass over some of the recently-published Readers' Opinions. He thinks that the amateurs who want to do away with this section ("SWL") are pretty narrow-minded, and "probably their own listening technique needs brushing up, anyway."

DX-TV

Finally we come round to the specialised branch of SWL, with the usual report from *Charles Rafarel (Poole)*, the well-known exponent of DX/TV. He has found the last two months very poor for long-distance viewing; disappointing after the good winter. However, he has just celebrated the third anniversary of his regular daily reception of RTF/TV from France; even when he has been away from home; other members of the family have duly logged the daily session. He has been delighted to meet other readers who are keen on DX/TV both in person and through the post. And he is off for another holiday to discuss matters with Jacques Herreman in Belgium and other contacts in France.

SWL Rafarel forwards a copy of *International DX/TV*, published by the "*Europa DX/TV Club*," of which he is the English delegate. It is printed in four languages, runs to about 20 pages, and demonstrates the tremendous enthusiasm of the devotees—not very numerous as yet, but growing fast.

D. Boniface (Ripon) reports "success at last!" Between April 30 and May 27 he received test cards from Italy, Portugal, Spain and Russia, as well as many programmes at great strength. His aerial farm is growing, and he sends a picture of it—unfortunately not quite good enough for publication.

To sign off:— good luck to all those sufferers from Exam. QRM, and also to the many R.A.E. aspirants, who will probably know their fortunes by the time these notes appear. Good listening!

Correspondence for the next appearance of this feature, in the September issue, should reach us not later than July 31, addressed: "SWL," c/o The Editor, Short Wave Magazine, 55 Victoria Street, London, S.W.1. Good photographs of SWL interest are always wanted for illustration, and are paid for on publication.

G9BF CALLING

Real Gen Man Back Again!

Editor unable withstand terrific pressure (well, three letters and a postcard) to give space G9BF—well-known technical contributor, world-wide reputation, guaranteed keep readers right on toes—because G9BF only interested in *results*. No messing with what input used, length of ant in terms frequency, SWR on feeder or any guff like that.

Only one freq. used at G9BF—20 metres, es txm mode right in line modern thinking: Double-Sideband with Inserted Carrier, modulating the lot with wick turned well up, using mike (carbon of course) in cathodes push-pull 813's, or keyed 500-cycle tone for real zizzy MCW xmission. (G9BF very hot on Morse, as ever.)

Many years spent developing this fool-proof, one-off absolutely sure-fire no-trouble amateur-band transmission system, guaranteed raise any DX by use appropriate callsign—no use signing G6-*blob-blob* or G3-*rumble-bumble-stumble* if you wish work Pacific DX weekday mornings on 14 mc. Subtlety is to push up to max PA urge, dap on ant, es put out CQ-DX signing "UZ7FZ/Q call 5 kc low" or something sensible like that. This guaranteed bring back EU's from EA to YU es UA to IT with all reports "Ur sigs 599 RST 599 plus plus FB pse ur QSL mine sure tnx OM vy vy 73 73 es tnx tnx pse ur name es QTH hr vy QRM tnx dr OM pse QSL tnx hi." These QSO's very satisfying as never necessary reply EU's again after 599 report booked into log. Just go on calling CQ-DX on different freq. signing, say, PXØBF/MM, to get new flock EU's eagerly giving "599 plus plus FB pse QSL dr dr OM OM" reports. By these G9BF methods easy to work real DX.

For benefit old readers *Magazine*—am astonished so many still hanging on in view absence G9BF, real gen man, these many years—have mobilised original DX chums MO1FFI (no connection R.A.F. medical branch); XX2XX (from near Midlands, almost as famous as me G9BF); es AV2PBE ("'ave two permanently bloodshot eyes"—mnemonic, hi!) to help ur adviser G9BF keep this feature going with real up-to-minute tech gen es DX info. (Es if 40m. station signing SUSIE abt 1947 still QRV—*pse* QSL.)

CU next month with lots hot news es real DX. 73 de G9BF es all the DX group.

(Well, the space has got to be filled somehow—but not like this, if we can help it.—*Editor.*)

HF-BAND TRANSMITTER

GENERAL CONSTRUCTIONAL NOTES—POWER SUPPLIES—SETTING UP—PORTABLE/MOBILE OPERATION

Part II

A. J. SHEPHERD (G3RKK)

Part I of this article, in our June issue, discussed the design and gave full circuit details for the Exciter, PA and Modulator sections. It will be found to cross-refer to the pages following, in which all the further information necessary is given for getting this very compact 50-watt transmitter on the air.—Editor.

BEFORE proceeding, and referring to Part I, the PA valve in the prototype is, of course, a 6146, as shown in the block diagram in Fig. 1 on p.218, and in Fig. 3 on p.221, of the June issue. The caption to Fig. 1 mentions the PA as being a 5B/254M and though this valve could indeed be used, the value of R21, Fig. 3, and the modulation transformer ratio would need adjusting accordingly.

Also in Part I, in the exciter circuit on p.219, the resistor R57 should be across L5, and not as shown, while in the table of values for the PA, on p.220, R21 should be rated 2 watts. And the Eddystone dial actually used is their Type 598.

Construction

It is recommended that the transmitter be built on a 16g. aluminium chassis, size 2½in. x 12in. x 10in., fitted with a 13in. x 8½in. front panel. That used in the prototype was slightly smaller, accounting for the cramping in the speech amplifier and VFO compartments. The chassis is sub-divided above and below into various screened compartments, as shown in the pictures. Apart from the obvious purpose of preventing instability in the transmitter caused by stray coupling, it greatly adds to the rigidity of the structure and reduces the possibility of TVI caused by radiation from the transmitter itself. Bottom plates (not shown in the photographs) are fitted to the VFO and PA loading compartments.

It is recommended that all the metal work be bent and completely drilled before the wiring is commenced. At this stage the main components can be mounted to ensure that everything fits properly. It is very much easier to correct a mistake at this stage than after final assembly has taken place. All the screening is bent from 16g. aluminium. In the prototype the VFO was built on a sub-chassis for experimental purposes. (This will not be necessary unless it is desired to experiment with mixer VFO's.) The positions of all the main components for which holes must be drilled are shown in the pictures, but detailed drilling diagrams cannot be given in view of the lack of standardisation of some components.

Exciter

The first three stages are built in a medium-size Eddystone diecast box (650), which provides a very rigid framework together with a high degree of electrical screening, and protection against temperature variation and draught.

The box should be drilled first and then used as a template to drill the chassis. Good quality ceramic or nylon-skirted valveholders, with screens for V1, V2, V3, should be used. The bandswitch must be assembled at the same time as the box is mounted on the chassis, and before the screens are fitted. The screen inside the diecast box is an integral part of the bandswitch assembly and must be fixed at the same time as the bandswitch. The later wiring will be much easier if the switch wafers S1 a-e are wired up before assembly. The coils should be mounted as far from one another and from the sides of the box as possible if the Q is not to be seriously impaired. (There is room for improvement on the prototype in this respect.)

Wiring is point-to-point where possible, but the use of tag-strips is essential if a reasonably neat layout is to be achieved. The valveholders should be orientated for the best wiring run and care taken to ensure that the grid and anode circuits are isolated from one another. When wiring up the VFO, heavy gauge wire (at least 18g.) should be used, and all components especially rigidly mounted. The tuning condenser is mounted on a screening bracket above the chassis and connected to the drive mechanism by a flexible coupler. A single earthing point should be used for each stage, and all decoupling capacitors should be fitted as close as possible to the valveholder pins. Care must be taken when soldering to the coils to avoid melting the polystyrene insulation.

The wiring of the PA is quite straightforward, and the same considerations about earthing and decoupling apply here also. In view of the high voltages present, it is essential that conservatively-rated components as specified be used and special care taken to prevent shorts and arcing. Also, above the chassis full precautions must be taken to ensure that the operator cannot accidentally touch a point of high voltage.

The anode RF choke should be of the type specially wound for HF PA use, *e.g. K.W.* or *So-Rad.* Ordinary types are apt to have series resonances inside one or more of the amateur bands, with disastrous results. The *pi*-network coil used in the prototype was the K.W. design which is ready wound and fitted with a ceramic bandswitch. Other suitable assemblies are the *Geloso* 4/112 or the *Codar* PI-NET575. The latter requires a separate bandswitch, which should be a good quality ceramic type. For those wishing to wind their own PA coils, the details are: 30 turns, wound 12 t.p.i. on a 1½in. diam. former, tapped at the 27th, 12, 8, 5 and

3rd turns. This will give above optimum inductance in the 80m. positions, to allow the use of a standard ·001 μF loading capacitor; and below optimum on 15 and 10m., because of the difficulty of limiting stray and minimum capacities to the optimum values.

Parasitic stoppers, which should be soldered directly to the valveholder or top cap, are made by winding a few turns of 22g. enamelled wire around a half-watt resistor. These are designated L10, R19 and L11, R20 in Fig. 3. The compartment containing C48 is fitted with a bottom plate to prevent RF from leaking round the screen into the grid compartment. Complete screening of the PA above chassis is unnecessary from the point of view of stability, but may be desirable as regards TVI suppression. If the PA is to be completely screened, mesh must be used for the top of the screening box to allow adequate ventilation.

The lamp on the front panel labelled "RF out" was originally connected to a loop wound round the PA *pi*-coil, and by its brightness gave a rough indication of the tuning. After burning out a large number of bulbs in an attempt to achieve uniform coupling on all bands, its use was abandoned in favour of an SWR meter! The TVI trap consists of a Philip's trimmer and an air-spaced coil and should be mounted close to the output socket.

In the speech amplifier, which should be carefully constructed, particular care must be taken to avoid mains hum in the early stages. All earth returns for the entire modulation are taken straight to a bus-bar of 16g. tinned copper wire, which is earthed at one end only, to avoid hum loops.

Similar comments apply to the phase-splitter stage. High stability resistors should be used where stated to maintain a good balance and, for the same reason, corresponding components in each half of the push-pull modulator should be carefully compared. The parasitic stoppers R42, R47, R41, R40, R48, R54 must be wired straight on to the valveholders.

The modulation transformer should have a rating of at least 25 watts AF, and must match the modulator valves to the PA. A pair of 6146's in Class-AB1 and 400 volts HT require an anode-to-anode load of 9000 ohms—the corresponding figure for other modulator valves is given in Table I. A 6146 operating at 50 watts input with an anode current of 115 mA has an anode impedance of 4000 ohms. The transformer used on the prototype is manufactured by *Banner Electronics* and is sold by *K.W. Electronics* as a spare part for their "Vanguard" transmitter. A slightly more expensive multi-ratio type is the *Woden* UM1. This has the advantage that it can be used with practically any combination of modulator and PA valves.

Metering

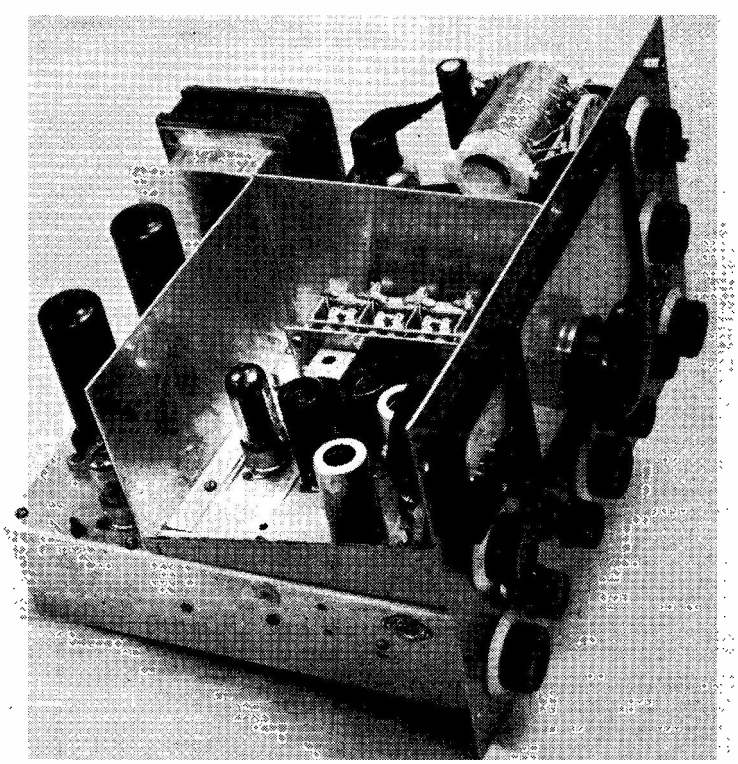
The shunts for the meter are fitted directly in the earth returns of the stages to which they belong—not on the meter switch. The connections from the shunts to the switch need not be made using screened cable provided that they are carefully routed and decoupled at each end.

The ranges required are: 0-5 mA (grid current), shunt R16; 0-150 mA (PA and Modulator cathode currents), shunts R17 and R46; 0-1000v. (PA HT voltage), multiplier R49. Any meter with a full scale deflection of less than 5 mA may be used, the shunts being adjusted accordingly.

Power Supplies

The basic power requirements for the transmitter are: VFO, 150v. 10 mA stabilised; Buffer, 250-300v., 10 mA preferably stabilised; Exciter, 300-400v. 50 mA; PA, 450v. 120 mA; Modulator, *see* Table I. 120 mA. *Heaters* 6·3v., AC or DC, at 8 amps. or 12·6v., AC or DC, 4 amps.

[over



Construction behind the panel of the G3RKK Tx. The exciter section is in the foreground screened compartment, also containing V7, the speech amplifier, which is the canned valve in nearest view. The driver stage V8 and the 6L6 modulators are behind, with the modulation transformer at upper left. The 6146 PA is in the upper right-hand compartment, with the tapped coil L12 and the switch assembly S4 — see circuit Fig. 3, p.221, June. The three-gang tuner is C3A-C3C in Fig. 2, p.218, June.

There are many possible designs for suitable power supply units. The reader will usually wish to use transformers and chokes that he can obtain on the surplus market, so these notes will be kept as general as possible.

Several apparently obscure faults can result from bad power supply design, particularly from interaction between the different supplies. Many of these arise from a combination of the following factors:

(1) The current taken by a Class-AB modulator varies with the amplitude of the speech input.

(2) When the PA or exciter is keyed, there are large variations in the current taken by the stage in question and the PA.

(3) If an HT supply is not adequately decoupled at all frequencies, it may be modulated by either RF or AF which could then be passed to the low level stages. Reasonable protection against this is included in the present design.

(4) When the current taken from a power supply is varied, the voltage of the supply varies in opposite sympathy by a degree depending upon the regulation of the supply.

(5) The frequency of the VFO is dependent upon its HT voltage.

Thus it can be seen that poor regulation and consequent interaction can lead to downward modulation (PA voltage reduced on speech peaks), frequency modulation and certain types of instability. Effects upon the VFO frequency are reduced by stabilisation using a gas stabiliser, but this is only effective at very low frequencies, and adequate decoupling is also required.

Ideally, then, the three HT supplies should be independent of one another. Fig. 5 shows one way in which they may be combined without unduly affecting the performance. The circuit does not call for very much comment. Conservatively rated components, at least as specified, must be used; and the hardware and general mechanical design of the power pack should be chosen bearing in mind the high voltages present. Silicon rectifiers are used for the PA supply in order to obtain good regulation, which is necessary if the stage is to be modulated correctly. A valve would probably be quite satisfactory, provided that its emission is not low and the transformer and choke are of good quality. If desired, of course, silicon rectifiers of suitable rating could be used instead of V1 and V2, but they would be very much more expensive. The transformer T1 need not all be one unit, of course, but could consist of several separate transformers with their primaries wired in parallel.

Mains dropper resistors in the primary of the transformer must be avoided as it will lead to interaction between the outputs. A surge limiter, such as Brimistor (R11) may, however, be found necessary to prevent the fuses from blowing when the equipment is first switched on.

The chokes Ch.1-Ch.4 must be low resistance types of good quality; the potted C-core type are recommended. The mains filter should be built in a small screened box, with good earth connections. Its purpose is to prevent TVI from occurring by conduction through the mains.

Portable and Mobile Operation

If sufficient space is available, the transmitter may be used portable or mobile in the form described. The power consumption (and, of course, the output) can be reduced by suitable adjustment of the HT supply voltages.

However, if the transmitter is to be built specifically for this application, there are several small modifications that can be made to reduce both the size and power consumption.

The first is to cut the power input to 30 watts or less and use EL84's in the modulator. The necessary changes of component values are given in Table I, and the PA HT supply should be lowered to about 350 volts. In view of the small physical size of the 6146, there is no point in replacing it by another valve. The heat generated is reduced by the lower power input. These modifications permit considerable reductions in power consumption and the sizes of the modulator and PA compartments. It is recommended that the smaller *Geloso* or *Codar* mobile *pi*-coil units be used in the QRP version.

It may also be advisable to use a relay in preference to a valve for protection of the PA. The circuit is the usual one. As the load on the RF section heater supplies is reduced, PL1 should be removed to restore the balance for 12·6v. operating, resulting in a saving of 6 watts.

If (for mobile use) a phone-only design is required, further reductions in size may be achieved by omitting the phone/CW switching. It is not recommended that the exciter section be made smaller than suggested, but with careful design the other compartments could all be reduced in size, the limiting factor being ventilation for the required power input.

Setting Up (Part I refers)

When construction is complete, after a thorough check of the wiring has been made and all loose ends and solder have been dislodged from the wiring, the initial testing can be begun.

After fitting the valves and switching on the heater supplies, the main supply cable and non-reactive dummy load may be connected. The dummy load can consist of a number of carbon resistors connected in parallel.

First F1 should be removed and the exciter HT only switched on. L1 and L2 are set to give the required coverage, using a calibrated receiver to pick up the output of the VFO, and the coils and wideband couplers are then aligned in turn to give maximum V5 grid current. The wideband couplers must be adjusted to produce, as far as possible, constant output over the entire band. Small 1-10 $\mu\mu$F air trimmers connected across the "hot" ends of the wideband couplers are helpful in obtaining

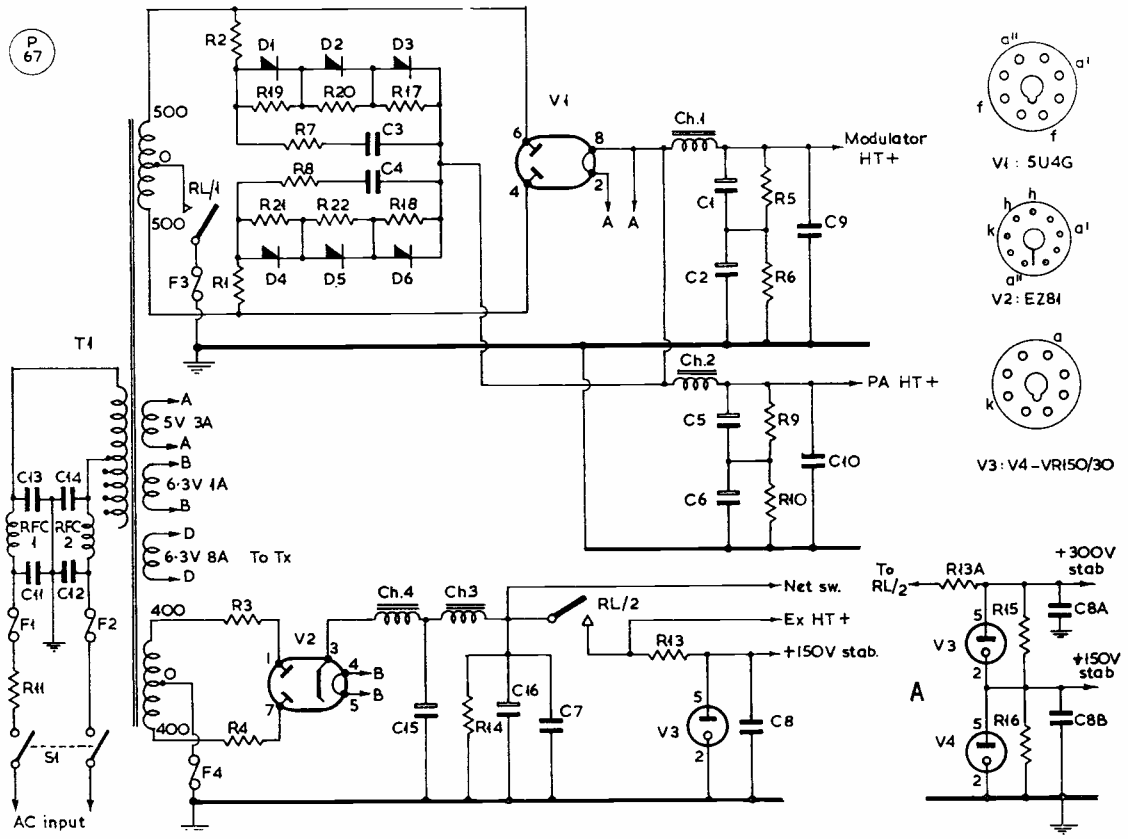


Fig. 5. A power supply layout for the AM/CW transmitter described in the article by G3RKK, giving all voltages and currents required and incorporating the necessary precautions against TVI. Of course, provided the loadings can be met, any other sort of power supply would be equally suitable, though the control and change-over system would have to conform to the circuitry around RL1, RL2 in this diagram. Conversely, this PSU arrangement could be adapted for other types of AT-station equipment calling for about the same sort of loading.

the best performance.

The screen resistor of the VFO (R3) must then be adjusted on the 80 and 40m. ranges so that reliable oscillation is just obtained on both bands without falling off at the edges. For convenience it may be noted that the strongest oscillation is obtained with a value of about 22K, the gain decreasing as the value is increased. A DC voltmeter connected from the grid of V3 to earth *via* an RF choke at the probe end is a useful output indicator. Having done this C12 is then adjusted so that the maximum output is obtained without driving V2 into grid current. Increasing the drive to V2 further will adversely affect the stability without a significant increase in the drive to the PA.

With both bandswitches put to 80m. and VR1 set to give 2·8 mA grid current, the PA can be switched on. It should be possible to load it so that the cathode current dips from about 130 to 110 mA as C47 is tuned through resonance.

With the VFO valve removed, V6 should hold the anode current of V5 to about 30 mA. Under these conditions C28, C47 and C48 should all be

Table of Values

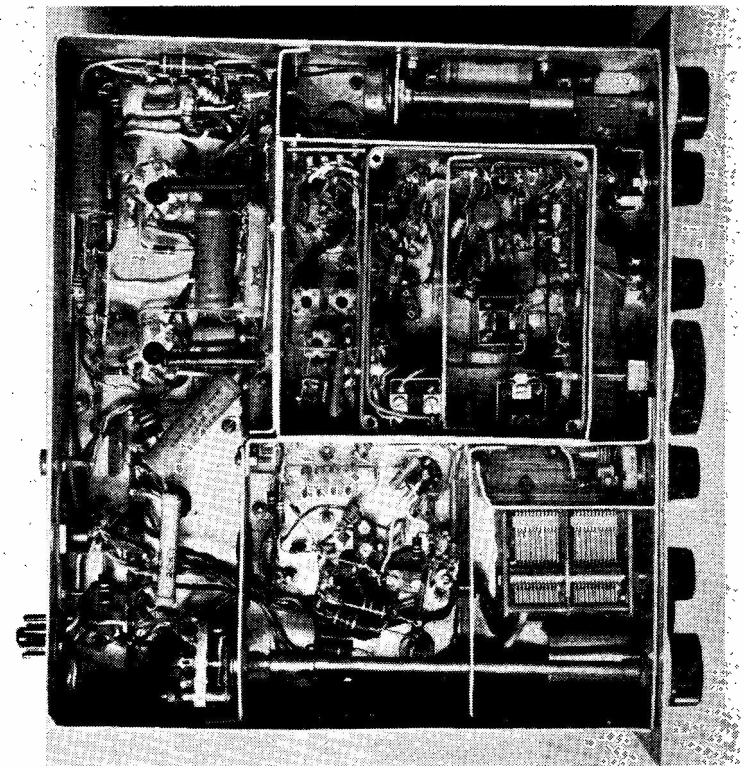
Fig. 5. Power Supply Unit for HF Tx

C1, C2, C5, C6	=	32 μF, 450v.
C3, C4	=	.02 μF, 1 kV
C7, C8	=	.01 μF, 500v.
C9, C10	=	.01 μF, 1 kV
C11, C12, C13, C14	=	.01 μF, 300v. AC
C15, C16	=	16+16 μF, 600v.
R1, R2	=	47 ohms, 2w.
R3, R4	=	100 ohms, 2w.
R5, R6, R9, R10	=	39,000 ohms, 2w.
R7, R8	=	10,000 ohms, 2w.
R11	=	1 amp Brimistor, type CZ11
R13	=	4,700 ohms, 5w.
R13A	=	470 ohms
R14	=	82,000 ohms, 2w.
R15, R16, R17, R18, R19, R20, R21, R22	=	470,000 ohms
Ch1, Ch2, Ch3, Ch4	=	20 Hy 150 mA
T1	=	Pri. 200-250v., Secs. 500-0-500v. 250 mA, 400-0-400v. 80 mA., 6.3v. 8 amps. 6.3v. 1 amp. 5.0v. 3 amps.
Ry1, Ry2	=	Relay coil to suit Tx/Rx switching, with 500v. 250 mA contacts
RFC1, RFC2	=	1.5 mH, 1 amp., mains type
F1, F2	=	2 amp. fuses, anti-surge
F3	=	500 mA fuse
F4	=	200 mA fuse
S1	=	DPDT, 250v. AC 2 amp.
D1, D2, D3, D4 D5, D6	=	800 p.i.v. silicon rect., 200 mA.
V1	=	5U4G, or similar
V2	=	EZ81
V3, V4	=	VR-150/30, or similar

rocked from side to side. If the PA is stable, no variations in anode current should occur and, of course, no grid current should be registered. Also, under normal conditions, variations of grid current when the anode circuit is tuned through resonance should be very slight and minimised by adjustment of the neutralisation control if fitted. The voltages at the points given in Table II (to appear next month.—*Ed.*) should be measured, and the circuit conditions adjusted if any differ by more than about 10 per cent.

When the RF section is functioning correctly the modulator may be set up. With the PA still running into a dummy load. an audio oscillator with a frequency of about 400-2000 c/s should be fed into the microphone socket and VR2 adjusted to give about 95 per cent modulation. The AC voltages from the grids of V9 and V10 to earth should now be measured using a valve voltmeter or a good rectifier type multimeter and VR3 adjusted until they are identical.

With a microphone now connected, the volume control should be adjusted so that 95 per cent modulation is just reached on speech peaks. This condition must be maintained whenever the transmitter is used.



Under-chassis wiring and layout in the Tx designed and constructed by G3RKK. The detail in this view is such that the placement of most of the parts can be followed by reference to the main circuit diagrams. The condenser at lower right is C48 in Fig. 3, with C49, to tune out the local TV channel, immediately above. Circuit p.221, June, refers.

The TVI trap is best aligned by very loosely coupling the output of the transmitter to the aerial socket of a TV receiver tuned to the local B.B.C. TV channel—in the sense of "showing it some RF" —and adjusting C49 for minimum interference.

When loading up the transmitter, the best procedure is first to adjust C47 for a dip in anode current with the dummy load connected. C48 is then tuned for maximum RF output, and the procedure repeated until no further improvement can be obtained. The loading may then have to be reduced very slightly to give the best modulation characteristics. Then connect the main aerial and adjust the aerial tuning unit for maximum output, using an absorption wavemeter or SWR meter as indicator (the latter is to be preferred). A well-matched coax-coupled beam or dipole may be fed directly from the output socket of the transmitter.

When first setting up the exciter and noting the approximate setting of C47 and C48 for the higher frequency bands, it is as well to use an absorption wavemeter to make sure that none of the tuned circuits is set up on the wrong harmonic.

The transmitter as described and illustrated here has now been in operation at G3RKK, with several different VFO systems, over a period of six months, and reports on stability, speech quality and general performance have been most favourable. All that is required now is an aerial system that will do justice to it!

The writer hopes that anyone who copies this design will have many years of trouble-free service from it, and that other readers will at least have found something in this article to interest them.

(Some final points will be covered next month)

THE LICENCE FIGURES

We are informed by the G.P.O. that, as at May 31, there were 10,683 U.K. amateur transmitting licences in issue, of which 1,584 were also for amateur mobile installations. The amateur TV licence figure was 163. Another figure of interest, outside the Amateur Radio context, is that 588,838 cars are now licensed for BC radio. (It is not always remembered by some of the keen types that such a licence is necessary !)

IMPORTANT APPOINTMENT

The new Director *(interim)* of the International Radio Consultative Committee, one of the most important of the "Geneva bodies," is Leslie Hayes, who joined the C.C.I.R. from the BBC in 1949.

COMMUNICATION and DX NEWS

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

FIRST, a word of thanks to all those who have expressed their opinions on the new set-up of this feature, both through the post and over the air. At least nine out of ten are wholeheartedly in favour of it, and look forward to learning rather more about "the chaps" and a little less about what they have managed to work. Thanks also to those readers who have co-operated by sending along some interesting details of their stations. We hope to welcome many new ones into this feature from now on—especially the types who never bothered to write before, thinking that the insignificant amount of DX they had worked would hardly qualify them for a mention.

From now on, your Conductor can ride his favourite hobby-horse and assume that practically *everything* worked is DX of some kind or other; that the DX-index of any particular QSO depends upon a vast number of factors; and that the mere striving after hit-and-run QSO's with rare ones is just a specialised form of activity which interests a pretty small percentage of the population.

Now, you will hardly find a more DX-conscious tract of land than California, nor a higher proportion of DX-chasers than those fabulous W6's who put a signal into any part of the world when nothing else is audible. And you will hardly find a more DX-conscious assembly of amateurs, anywhere in the world, than the Northern California DX Club. Yet in the current issue of their magazine, *The DX-er*, is an editorial by W6HVN which really puts the big boys in their places.

Dubbing them the "Big Guns," he puts them right under the microscope, and they emerge as a cross between some pestilent type of bacteria and mere amoebae. To quote: "One can only assume that this tendency on the part of some DX'ers is a need for approval that is denied them in other areas of their lives . . . some tend to make a national shrine out of their stations, instead of using the gear for what it was intended to be used for—simply to talk to somebody . . . an almost insatiable yet pathetic need to command attention among a small group . . . the DX'er who at any cost—to his home, his family life, his job, loss of friends, loss of real respect merely to acquire the awe of a few valueless individuals—strives to become a 'big gun' is not only impoverishing himself and those close to him, but ironically is missing out on the real challenge."

Final paragraph: "To any as yet uncorrupted members of our group who think that getting to the top of the heap is all there is to life, be assured that becoming a 'big gun' among DX'ers is too easy a mark to shoot for, and the price is too high. All it takes is the kind of rudeness on the bands that marks you as a boor; some money; and that pitiful need to be a Big Frog in a Small Pond."

So says W6HVN, in some of the strongest words that have ever been published in these columns. He is quoted at length, as a warning not to let it happen over here. Those who remain convinced that the purpose of their station is basically "to talk to somebody" have a good chance of remaining sane; those few (very few) who think the main object of life is to demonstrate their superiority *at all costs* are doing nothing but harm to our hobby. And they are unlikely to be reading these words, anyway . . . so, if you know one, spread a little happiness and draw his attention to them! But avoid contamination at all costs . . .

Early Risings

Once upon a time (many, many years ago, children—before *you* were born) it was an accepted fact that DX worked and sleep lost were inevitable corollaries. After all, the very first DX worthy of the name was on 150-200 metres, and later on 115-130 metres; and not much could be found on either band until midnight. Those who really collected the plums usually did so on all-night sittings. Not until the exploitation of Forty (or Forty-Five, as it was then) was there any real DX working in daylight.

Nowadays there are not so many night owls; even the early risers are pretty rare birds. Furthermore, many of those who keep peculiar hours are strangely reticent about it; but we do happen to know of the odd customer who is up *every* morning before 6 a.m. (meaning

TEN-METRE ACTIVITY SUNDAY — JULY 12

The second of our special Test Periods is arranged for Sunday, July 12, between the hours of 0900 and 1700 GMT. It is hoped that as many as possible, throughout the world, will simply tune up their gear on Ten and stay there for as long as they are able. DX could come up at almost any time, but in the Region 1 area European stations are likely to be in evidence for most of the period.

Inter-U.K. ground-wave QSO's are also of interest, so there should be something to be worked all the time—CW, AM or SSB. SWL's are invited to co-operate, both by QSL'ing direct to stations heard and by reporting to us on what they hear.

All results in, please, by July 17 at the latest, so that they may be written up for the August issue.

WHEREVER YOU ARE—Use Ten Metres on July 12. And if you happen not to be hearing anything, call a CQ rather than switching off!

Deadline — July 17

0500 GMT), happily filling up page after page of his log with good DX on Forty and Twenty.

Just to get the flavour of all this, your conscientious Conductor joined the ranks of the insomniacs for a few nights, and investigated the goings-on. Late at night (from midnight onwards) it seemed that W's could be worked like shelling peas on Forty and Twenty—and more than once on Fifteen, too. Sometimes on Twenty the Caribbean stations and those in Central America and the northern parts of South America were outstanding —but not always. On Eighty the QRM and QRN were often so horrific that interest was discouraged.

In the early mornings (0500 onwards) some surprising things were discovered. On the actual morning of writing this, the strongest signal on Twenty at that time was FB8YY—a real rarity. But every time he signed he was buried under a mound of W6's, who were not terribly strong in Europe but were obviously blanketing him from hearing anything else. Dozens of W5, 6, 7 and 9 stations were gradually building up, and seemed to reach a peak around 0630-0730. Meanwhile, on Forty one could choose from all districts U.S.A. and a few Central Americans (TG9, T12, CO, HK were heard).

The main effect of the lack of sunspots seemed to be the almost complete absence of the Pacific stations, although on one morning a couple of KJ6's and a KM6, all on Twenty SSB, did break through. But VK's and ZL's were as scarce as ever.

What was most striking was the fact that one can *never* avoid European QRM, nowadays. At 0100 they were at it—Boris, Ivan and Vlad predominating; at 0500 they were still there, but a little weaker; and, of course, by 0730 the whole lot were in full cry, Lids and all. Quite indiscriminating, they called every single station they could hear, whether it was a W6, an I1 or a G; and those who couldn't hear anything (one presumes) were calling CQ DX, non-stop. All very interesting, but not exactly thrilling. If one *has* to be up early, though, it's worth sacrificing an extra half hour of sleep for the sake of a session on the air . . . conditions change rapidly and you never know what *might* turn up.

Back to the Fold

We have often wondered what impression today's conditions would make on someone who has been completely off the bands for a few years, and the answer comes in the form of a letter from G3AIM (Liverpool). His first impressions are of a much slicker QSO routine, thanks to SSB; but somewhat spoiled by the "top brass" with their "no breakers" technique. With only a small amount of time available, he finds it pretty frustrating to have to hang around after having obeyed the law (often, we might add, to find that a breaker *does* get in first after all).

G3AIM adds that another vast change (even in five years) is the great number of top DX'ers who are using commercial equipment . . . he says that some operators seem to regard him as a second Marconi, or Popov, when he tells them that everything at his end is home-brew. The transmitter is an SSB job (crystal filter) with a pair of 6146's at the tail end; receiver, a BC-348 stripped of everything but the coil unit, and rebuilt as a double superhet with bandspread. With a ground-plane, 65 countries have been worked on Twenty SSB. CW on Twenty and Fifteen has swelled this total. But is there an award for *not* working Gus at any of his stops? If so, G3AIM would like to claim it!

ZONE-BAND TABLE

Station	Zones Worked						Total Zones
	28 mc	21 mc	14 mc	7 mc	3.5 mc	1.8 mc	
G2DC	40	40	40	36	25	5	186
G6QB	38	40	40	34	20	7	179
G3DO	39	40	40	25	24	2	170
G3IGW	36	37	37	31	17	11	169
OH3NY	32	30	40	25	10	7	144
G3NOF	34	38	39	6	8	1	126
G3PEK	2	21	35	30	17	4	109
G3OLN	2	7	11	16	3	4	42
G3RDC	3	14	38	11	3	1	71
G3PLQ	1	8	7	3	3	5	29

(Entries for this new table are invited; scores are post-war, *i.e.* starting from any time back to January 1946.)

Success with No Space

G3RDC, recently moved into digs. with no horizontal space available, managed to put up a pole on a balcony and erect the "No-Space" aerial system (p.84. April 1964 SHORT WAVE MAGAZINE) and reports it as the best DX aerial he has ever had. Basically it is only a sloping doublet for 14 mc, but G3RDC managed to work African and South American DX on Fifteen (both phone and CW), quite a bunch of European phones on Ten, and six countries on One-Sixty! All with a DX-40U (except Top Band, of course) with 40 watts of CW and AM.

From Overseas Readers

5B4JF (John Farrar, R.A.F. Episcopi) was unable to be on for the last Ten-metre Activity Sunday, but means to be there on July 12. During May and June he has found the activity much increased—there has actually been serious QRM on the band at times! In the DX line, he has worked AM phone with ZE1AV and 2JA, 5H3JI, CX1AAM, 5H3JJ, 9Q5TJ, ZE1JJ and G3NIR

Mal Geddes, ZE3JO, P.O. Box 2462, Salisbury, Southern Rhodesia works his DX in an unusual way — he has an artificial leg and, on the principle that you can load anything to radiate if you know how to do it, uses it as an aerial with his Viking Ranger Tx! The leg is detachable and can be seen here hanging on the wall to the right in the picture. On the HF bands he has worked 25 countries in all continents, including DL, G, W6 and stations in the Antarctic; and on 40m. phone, locals like VQ2, ZE and ZS6. The "tin leg" loads on all bands from 50 mc to Top Band and Eighty (he has had a local contact on 6m. but has yet to work a station on the LF bands) and on 20m. 579 reports have been received from Europe under good conditions. And this is all quite true — no leg pulls!

/MM (aboard H.M.S. *Dido* in the Indian Ocean). There is also far more doing on Fifteen, out in 5B4-land, than there is in the U.K. Not short of good DX on Twenty, either.

"Operating from MP4BEO was *sheer hell*!" writes GW3PPQ, who was doing just that, not so long ago. "No job for a shaky 12 w.p.m. man," he adds, "but the station was operated on CW only with a CR-150 and a DX-35." QSL's are under way now.

VS9ASP is the station of the Amateur Radio Club at R.A.F. Comcen (Steamer Point, Aden, BFPO 69). They are back on the air "after a long relapse" with an LG-50, an assortment of receivers, and are putting up more aerials. No transmission in the direction of U.K. until the latter are finished.

A special award will be available for the duration of the Johannesburg Festival (August, September and October, 1964). Every contact with the city during that period will be rewarded by a special QSL, and the sheepskin will go to those who make five QSO's with Johannesburg stations. SSB, AM or CW—minimum report RS-33 or RST-338. Certified list to Box 7227, Johannesburg—no charge.

Farthest North

GM3KLA was nearly included in the "overseas" bracket; his QTH at Haroldswick, in the Shetlands, is further from London than all the ON's and PA's, most of the F's and many of the DL's! He now scores the nice round figure of 96/96 on the Top Band ladder—but only because G3APA visited Berwickshire especially to give him that county! And G3APA himself firmly shoots us down for suggesting, last month, that GM3JDR might be the most northerly station on the mainland. Apologies to the boys in Thurso (about seven of them) and also to another just south of Thurso and another one in Wick. GM3JDR (Golspie) is in Sutherland, but right at the southern end of that very northerly county.

Talking of GM's, G3KEP has notified that he will temporarily become one, from various rare counties, during the period August 10-14. Readers are invited to write and tell him which counties they require . . . it sounds like transference of land on a large scale, but you know what we mean.

Long Letter

A full-scale bulletin has arrived from Ken Randall, G3RFH/MM, who is, by now, back on dry land after an exciting trip. He visited Tristan da Cunha on the way home from Antarctica, and explains that even if there's anyone on that island who is interested in Amateur Radio, there are stringent restrictions on the use of power, which is usually on for two hours only each evening. The same applies to Gough Island, where the station operator is ZD9BB, active on Twenty for those two hours each evening after completing his weather sked with Cape Town at about 1800 GMT.

The volcano on Tristan is now officially pronounced "extinct," but it still emits the odd puff of smoke or steam now and again, and will take about 20 years to cool off completely.

Regarding *Ten*: G3RFH/MM had not heard a signal on the band between leaving Cape Town (April 14) and arriving at St. Helena (April 26). Only five stations were logged from that date until May 6—a CX, a 5A1, a 5Z4, a 9G1, an F7 and G3RMF, when near the Canary Is. On the final leg to the U.K. Ken was expecting, or at least hoping, for more activity. Any lack of QSO's will not be due to slackness on his part.

While on the subject of Ten Metres, we note that G3IDG logged G3IZD/MM (Gibraltar), VQ2WR, 4X4MR, 5A5TR and 5N2JKO, all on CW, on various dates between May 23 and June 7; on phone the DX came from CR6GO, VQ2DT and 2HK, 9G1DM, 5A5TR and 5N2JKO. In the list of non-DX countries heard, there is more CW than phone,

which is surprising, but a good sign. (On several recent Sundays there have been a whole crowd of SM's and an occasional OH on CW . . . but it's still too scarce where DX is concerned. If only some of the types with under-modulated AM phone would realise that people who can't begin to resolve their speech would identify them at once on CW—after all, that's really what CW is for, or are we mistaken?)

Operating Notes

G3IDG comments "While it seems to be the trend nowadays to rip everything out faster and faster (and have to send things like name and QTH two or three times to make certain the other chap gets it), I find it quicker in the long run to send such details slowly *once*."

Agreed—but isn't it infuriating to have a lot of clobber thrown at one three times when signal reports were such that once, even very fast, would have been sufficient? And isn't it sometimes a bit of an insult to the intelligence? We have in mind a W1 with S9 signals who sent "QTH Bos . . ." (all right, we know already where you are!) "QTH Boston comma Mass full stop repeat Boston comma Mass full stop." A W8 has only to send "QTH Det . . ." for one to know that he's in Detroit, but we *have* got to have the town twice and the State twice (or even three times).

Another little annoyance, while on this topic: You are told that the chap's name is Wilbur, and so you reply "OK Wilbur, tks for report" and so on. He comes back and sends "solid"—but did he really copy? Highly doubtful, because he has to tell you twice more that his name really is Wilbur! It's surely time that we credited *some* AT operators with a reasonable degree of intelligence? It would be a pity to have to say, paraphrasing a recent remark (actually it was about TV advertising) that "Amateur Radio caters for every level of intelligence, up to and including the moron."

Final kick, before we leave off grousing: Is this "RR solid copy FB" business really necessary? It must be ten years since the story was quoted of the Service operator who copied about eleven newspaper columns of press news in one over. And what was his reply, do you suppose? "R." And why not? That's what it means, and the "solid copy FB" is just hot air and waste of space.

We wouldn't bother to mention all this, if it weren't for the fact that so many people are busy complaining about the narrow bands and then wasting great chunks of them with unnecessary guff.

Top Band

G3PLQ worked SP6XR from G3GRL's QTH over Whitsun. Card still awaited. Meanwhile, G3GRL has a new vertical up in readiness for next season. G3PLQ himself had a bit of a shock when he received a QSL (SWL report) on his Top Band phone from WB6KAV, but the latter's QTH turned out to be in Herts.! Recent trips have taken G3PLQ no farther than Rotterdam, Bremen and Hamburg, but several G's were heard in those parts, despite summer conditions and QRN.

G3REA found a "F3BUH" calling CQ on 1845 kc one night, but he didn't reply to any calls. G3JEQ/P was worked on May 28, at Bala—otherwise county tours seem scarce this season. Only Kirkcudbright is now needed for the magic figure of 98.

We happen to know of several quite ambitious skeds being fixed on One-Sixty for the coming season. If only half of them come off, there will be some pretty exotic DX worked. More of this later . . .

TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
Phone and CW		
G6VC	98	98
G3GGS	98	98
G2NJ	98	98
G3REA	97	97
G3NPB	96	98
GM3KLA	96	96
G3LWQ	95	96
G3PLQ	92	94
GM3PPJ	86	86
GM3IKD	83	87
G3RJH	76	83
G3NTI	76	79
G3RHM	72	75
G3NLR	67	67
G3NOW	65	69
G2BP	57	64
G3PPE	56	73
G3IDG	50	54
GW3ITZ	35	61
G3SNU	26	59
G3SXW	23	45
Phone only		
G3NPB	86	86
G2NJ	51	51
G3REA	48	64
G3RJH	33	54

(Failure to report for three months entails removal from this Table. New claims can be made at any time.)

The "CQ" Contest

The results of the CW half of the *CQ* Worldwide DX Contest prove yet again that these big affairs are not popular in the U.K. A bare 30 entries went in from all our six prefix areas, compared with 98 DL's and very large numbers of OK's and JA's.

However, despite no appearances on the Roll of Honour we did put up some creditable scores. In the main category (All-Band, Single-Operator) G3FXB led with 425,216; G3HDA was second with 190,848 and G2DC third with 155,008. By way of comparison, the highest score in the world for this category was 5A1TW with 871,750; and the next places, down to tenth, were filled by W3GRF, 9Q5AB, KP4AOO, W4YHD, JA1BRK, UB5CI, VK6RU, W4DHZ and OK1ZL. The latter came up with 474,978—so G3FXB probably missed the Roll of Honour by only a few points.

Other credits go to G3HCT (best G on 21 mc with 70.035); G3POI (leading G on 14 mc with 48 838); and G3HCL (first U.K. station on 7 mc with 29.323). VP8GQ really hit the high spots, being the world's highest scorer on 14 mc with 356,760—a magnificent performance.

The Multi-Operator, Multi-

Transmitter category (now known as the Million Club) went to CX2CO, with W3MSK, W6VSS, UA9KDP, K2GL and DJ3JZ all topping the million mark! And the Multi-Operator, Single-Transmitter section was won by the well-known Old Timer VK5NO.

W1WY reports that nearly 2,000 logs were received for the Phone and CW contests, more than 1,200 of them being for the CW section. When one realises that the *CQ* event is probably the biggest AT-station contest in the world, and that the world amateur population is getting on for 400,000, one sees in true perspective how much competitive-DX interest there is even in the best-organised contests—an entry of 0·5 per cent is hardly a sign of tremendous enthusiasm! But of course there are many thousands of DX-minded amateurs milling around the bands during these events, with not the slightest intention of writing out a log. They want the contacts, without the paper-work—and that again changes the picture in terms of the interest in DX.

Comment on DX

Someone or other having now been to every spot in the world that could conceivably count as a "country," the only thing to do is obviously to proclaim new ones (Rockall is still a possibility!). So out come the atlases and the history books, and someone has found a square of land in Hawaii which was deeded to England after its discovery by Capt. Cook! Other precious spots are the various Neutral Zones adjoining Saudi Arabia, although a rumour is rife that they will cease to exist later in the year.

Then there's the Tansan Federation (Tanganyika *plus* Zanzibar) and the other African nations in a state of change . . . and doubtless, in due course, more colonies which will cease to be colonies, but "countries with a vote in the United Nations." If you are completely won over to DX-collecting, the future looks bright, and the goal of 350 (or even 400) "countries" quite possible.

Meanwhile, among the rare ones actually there and operating, plenty is going on. FB8WW is reported as moving to a better QTH (still on Crozet Island, of course); VR1B was on from British Phoenix Is., and left early in June, with a promise to return; ZS2MI (Marion Is.) is on 14280 kc SSB; VK4JQ (Willis Is.) is returning to Australia, and there seems to be no replacement for him.

FO8AA is said to be looking for Europe on 14030 kc CW, 0600-0800, but he has actually been heard in Europe at the strange hour of 2300 . . . KJ6's are still well represented, but all on SSB (high end) in the mornings . . . VK9DR (Christmas Is.) seems to be stronger on Forty than on Twenty (if you can find him) . . . VKØGS gives his QTH as Windmill Is., Wilkes Land—pretty remote.

JA1BRK promises an expedition to Cambodia (XV) in July or August; he will not be able to work W's, as Cambodia is on their "banned list," so Europeans should have quite a *fiesta* . . . BY1PK (Peking) is now actually working Western European stations . . . DUØDM (WPX-hunters were pleased) was on from Corregidor, Philippines.

Another spot that is *sub judice*, so to speak, is Perim Island, whence some VS9's have been operating as VS9P's—but they are too busy (with real work) to be on the air much . . . VP8GQ is due home around now, after his phenomenally successful operations from those remote southern parts. His greatest success, only just made known and already mentioned, was probably that of being the world's highest scorer on 14 mc in the CW half of the *CQ* Worldwide DX Contest, 1963.

Socorro (XE4 or XF4) has probably been worked by fewer DX'ers than any other rare spot in the world. So if Hammarlund can go ahead with their activation plans, their project will be enormously popular. Apparently, XE1AE has obtained a licence.

Just to clear up the Arabian business, about which there have been lots of queries: 7Z1 is Western Arabia; 7Z2, Eastern; 7Z3, Riyadh; 8Z may also appear from these same places, but meanwhile 8Z4 and 8Z5 are the two Neutral Zones. (The Kuwait one, 9K3, is quite separate.)

AC5PN has been worked on 14080 kc CW; AC5SQ on 14285 kc SSB . . . More Albanian activity (doubtful as ever)—ZA1AD says "QSL *via* SVØWZ" . . . 6Y5XG, also well-known as VU2XG and 4S7XG (not to mention that shocking "6YAXG"!) returns home shortly, where his call is G3HVG.

One of our Bright Boys, reading the item about Gus Browning's Collins equipment having been encapsulated in plastic, remarks that it should be *Gus* who ought eventually to be so treated. After all, the equipment was an ordinary

Ken Ellis, G5KW, is a well-known signal from the Middle East, under various callsigns. He will be coming on again this month, signing either HZ1KE or 7Z2KE, and will be in those parts for some time. Ken speaks Arabic fluently and has been representing Redifon, Ltd. in the area.

off-the-line commercial job, but Gus, as globe-trotter and operator, is obviously unique!

In June *QST* there is a letter suggesting that the time has come for a good look at DXCC with a view to starting afresh. The writer says "We have 'created' something over 330 countries . . . a 'jam' accumulates at the top of the list as more and more have worked them all." And who writes this letter? Why, none other than Charlie Mellen, W1FH, who has been top of the list for a very long time!

Personal Notes

G3FPK compares some operators with motorists; in one case a hand with a microphone, and in the other hands on steering-wheel, can convert normally "charming chaps" into raving idiots. As he says, "the rare ones" can stop all this by refusing QSL's to bad-mannered clots—if they have worked a new one but can't prove it with the precious card, it avails them nothing! G3FPK adds "Delighted to read that you aren't going to bore us with long lists of calls worked. I used to do just that, but by the time it was published it was old hat, and anyway, who cared?"

W6AM, having worked 4U1ITU and FB8WW on phone, now has the amazing phone-only score of 333.

G3POI reports that he now has a home-built transmitter running at 150 watts with grid-block keying and full break-in; and the receiver is also a 15-valve home-brew affair, based on an old Eddystone 358X.

G3SXW shares a rig with his mother (G3NQD); the main transmitter is a "much-modified LG-50" with a TT21 in the PA and a pair of 807's for the modulator. Receiver is a G.209. For Top Band an "ancient home-built VFO/PA" rig and a BC-342 suffice, and a small-scale aerial farm includes dipoles for Eighty, Forty and Twenty and a 20-metre ground-plane. The little Top-Band rig will double to Eighty, and was originally intended to keep a local sked if the main rig went off colour; soon after getting his licence, Roger was amazed to work W1NF, and, more recently, VE1ZZ. This with 10 watts to a doubler, no *pi*-tank, no ATU or any modern conveniences!

On the less happy side, a groan from G3SXW about the present state of Eighty: AM stations operating below 3600 kc, SSB below 3700, and phone commercials occupying more and more channels in between. What a mess!

G5ZK is playing around with various aerials, mostly vertical, and says he used to get excellent results with a 14 mc ground-plane suspended from his mast, with radials sloping at 45 degrees and 50-ohm coax feed. He is now experimenting with a 34ft. vertical and various devices for multi-band operation involving bottom loading. The problem is band-changing from the shack without a lot of complicated relays and the like—or going out in the rain. Progress reports promised!

G3NOF gives full details of his gear. On the Tx side he runs a Heathkit DX-100U, a Viceroy and a PGLA-1 Linear; the receiver is a Hammarlund HQ-170; the aerials a TA-33 Jr., 35ft. high, and a K.W. trap dipole, fitted somehow into a 30ft. garden. A 7-mc ground-plane is projected, as per last month's article on the subject. Ancillary equipment includes an SWR bridge (invaluable), a Z-match ATU, and a transistorised speech compressor.

G3NOF adds the information that a European DX Net meets most evenings at 2100, around 7045 kc; that 14 mc was good up to a few weeks ago, and even now the South Americans are very consistent (along with the Europeans!) in the evenings; and that 21 mc has been very patchy, although a recent CQ call produced several W's on SSB.

Details from G3IDG reveal that his Tx is a much-modified seven-year-old Panda Cub; receiver a fully-miniaturised HRO-MX; and aerial a bent, end-fed 150ft. wire. He was licensed nearly 13 years ago, since when the longest period off the air has been 39 days! a confirmed CW enthusiast, G3IDG has found his QSL returns to be 67 per cent.

Late Flashes

G3MVV will be signing EI9AE (WPX-hunters note) until July 8; all bands 1·8 to 144 mc, with SSB on the HF bands . . . HC8FN (Galapagos) is on 14110 kc SSB (0600) with a good signal . . . HZ2AMS now has his licence to operate from YI, whence he hopes to transmit in the near future.

K1KSH, who was on from Guam, Marcus Is. and Papua, says that anyone short of a QSL from those places should contact W1ETF . . . Florida DX Club hope to operate KC4AF from Navassa this summer . . . ST2AR, who has been off the air owing to licence difficulties, hopes to be back shortly, but will probably be signing 6U2AR.

More Lord Howe Island activity is promised by VK2AI and VK2AAK; probably August, and mainly SSB . . . The relief operator on Macquarie Island may shortly be supplied with SSB gear by Hammarlund . . . Harvey, VQ9HB, is still activating VQ8BFC from Chagos, and has been working Europe fairly regularly in the afternoons; his plans for working from Rodriguez and the other islands have gone by the board, owing, we gather, to weather conditions . . . A ten-day expedition by the VS1 R.A.F. types to Nicobar Is. (VU5) is now scheduled—possibly for July; VU2NR is said to be hoping to make a similar trip in October.

Sign-Off

Thanks, again, to the readers who have helped to make this month's offering interesting. We hope to hear from many new correspondents, and in particular we would appreciate details of their stations. It is not intended to reduce the DX aspect any further, but just to keep it down to the right proportions! For next month, the calendar being kind to us for once, the deadline is **first post on Monday, July 20;** no excuse for missing that one! Address everything to "Communication and DX News," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. *All* news is welcome, as long as it concerns the bands between Ten and One-Sixty. So we wish you an interesting month . . . *73 and BCNU.*

• • • The Mobile Scene • • •

HAREWOOD AND HUNSTANTON RALLIES REPORTED. WITH PICTURES—ANOTHER INCREASE IN U.K. MOBILE LICENCES—FURTHER EVENTS PLANNED—THE RALLY CALENDAR

WE are informed by the Post Office that by the end of May, there were 1,584 AT-station operators licensed mobile under the G prefixes—which is nearly 15 per cent of the total of U.K. amateur licences in issue, and once again shows that /M licensing is increasing at a faster rate than the general issue of amateur transmitting permits. Presumably, this must be to do with the condition of affluence in which, it is said, we are all now basking! Anyway, however that may be, undoubtedly it is a good thing for Amateur Radio in general and mobile working in particular.

And thinking of motoring, there is an interesting offer in this month's Reader Small Advertisement section—someone would like to exchange an Armstrong Siddeley Sapphire for a complete station, and somebody else wants a good receiver in return for a scooter. One hopes they both find takers, to the mutual satisfaction of all concerned.

With the idea of avoiding the sort of unfortunate clash occurring on July 5—with three major Rally events taking place on that day—we are informed that the R.N. Amateur Radio Society Mobile Rally (their first on a large scale) is booked for May 30 *next year*. This certainly is forward planning, and the R.N.A.R.S. hope that as a result of this early

Gathering round for the prize draw at the Northern Amateur Radio Mobile Society's Rally at Harewood House, near Leeds, on May 24, for which they had a hot and sunny afternoon and a large attendance. There were nearly 100 cars fitted mobile for Top Band, but only seven had two-metre /M installations. There were no less than 300 prizes for the draw, which meant that nearly everybody had a chance for one. *A G3GMN print*

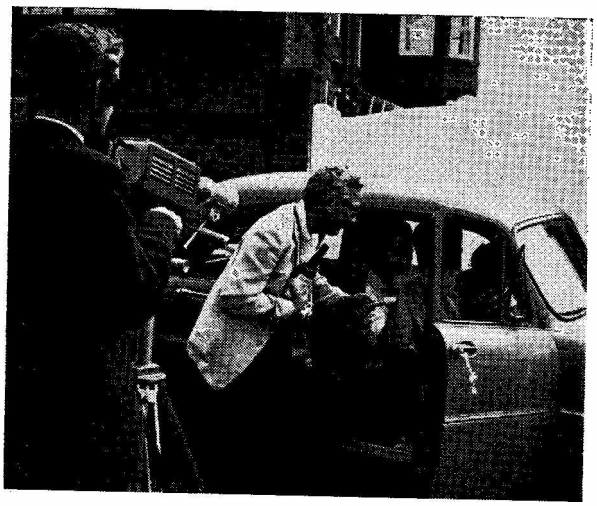
notification, they will be given a clear run and no clashing with anyone else's event. Accordingly, all concerned with Rally organising are asked to note the date.

On this particular point of clashing it now seems that, for a number of good reasons including the availability of the site, the Amateur Radio Mobile Society (Barford) had no other date open to them, and that in fact they had decided to cancel this year's event altogether in order to avoid just such a clash. However, the U.S.A.F. authorities (who operate Barford as a radio station) were so keen that the A.R.M.S. rally should be held as usual it was agreed to go ahead. Incidentally, the May issue of their *Mobile News* shows that A.R.M.S. has as members about 400 of the U.K. /M's licensed.

Meeting of the mobiles at Hunstanton on June 14. They had a mainly fine day for it, with quite a good attendance having regard to the weather conditions generally over Southern England. *A G3GMN print*

* * *

Going back to May 24, we find the report on the N.A.R.M.S. (no connection with any other firm !) Rally at **Harewood**, near Leeds, this being the Northern Amateur Radio Mobile Society's seventh annual event, for which — note this — they have always had a warm and sunny day ! With about 350 cars fitted mobile, nearly all on Top Band, they had a larger attendance than last year, the total being estimated at around 2,500 including general public. For the Rally itself seven marquees were put up in front of Harewood House, five of which were taken for trade displays. The 160m. talk-in station G3OGV/A worked 98 of the visiting mobiles, while G3NAO/M on two metres found eight /M's to work. Their farthest-travelled visitor was the indefatigable G3JFH/M, all the way from Cheltenham, who can be seen at most of the Rallies these days, and one of the competition winners was G3ESP/M from Ackworth, Yorks. The raffle was highly successful, with plenty of prizes—and what with that, the entertainment offered, and the lovely weather, the visitors departed feeling that they had had a really good day, while G3LHQ and the N.A.R.M.S. committee could likewise reflect on the successful outcome of their efforts, for the seventh successive occasion.

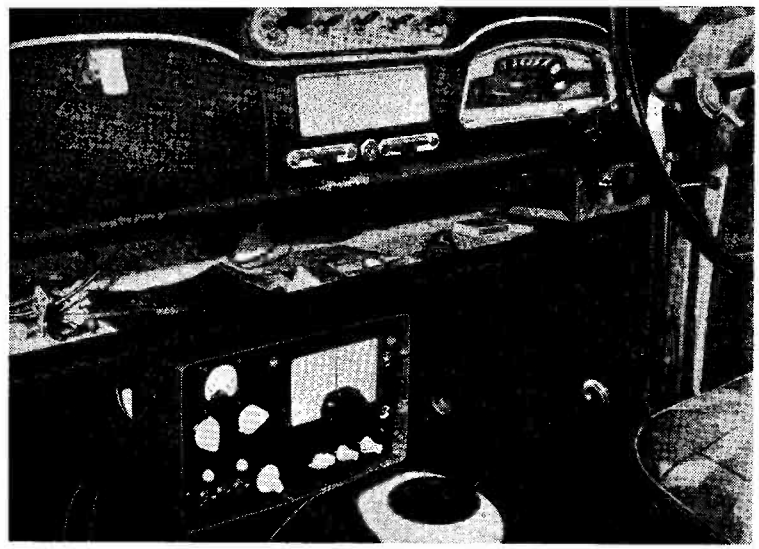


As the arrivals came in for the Hunstanton Mobile Rally, they were televised (G3OAT/T on the camera) and interviewed by G3KPO. This was also his opportunity to sell a raffle ticket for that bottle. *A G3GMN print*

* * *

The meeting at **Hunstanton** on June 14 was a very much smaller affair, though not without great interest. For one thing, it is rather a distant place to get at, and for another the Wx over the southern part of the country was pretty bad on that particular Sunday. In spite of that, they had a total attendance of about 150, and the mobiles came from as far away as Gloucester and Newcastle, there being some 50 cars in the pier car park at peak time. The 160m. talk-in station was G3ANM/A, and kept fairly busy. The main attraction was the really excellent amateur TV display put on by the March and District Amateur Radio Society, those actually concerned being members of the British Amateur Television Club. A mobile TV transmitter on 430 mc (the ATV band) was housed in a Volkswagen truck, located at a strategic point near the main approach road into Hunstanton. Visiting mobiles were televised and interviewed, picture and sound being relayed back (by the 430 mc radio link) to the rally site, where three TV receivers were set up for general viewing. These were working on Ch. 1, with a 430 mc converter. The picture quality was quite excellent, and the photograph-off-screen shown on p.298 hardly does it justice. The general opinion seemed

Running the Rally for the N.A.R.M.S. at Harewood on May 24 was Denis Binns, G3MGI. It was his voice that was resonating the PA. *A G5CP print*



Seen at the N.A.R.M.S. Rally at Harewood on May 24. The Austin A40 owned by G3RNX/M (Leeds) has the 160m. mobile rig stowed under the parcel tray; the Tx/Rx are combined and the PA valve is a QV04/7. *A G3GMN print*

G6SN/M, now living retired in Harrogate, was at the N.A.R.M.S. event at Harewood. He is here seen contemplating somebody else's /M outfit. *A G5CP print*

General view of the Northern Amateur Radio Mobile Society meeting at Harewood, Leeds, on May 24 — with the big house, the home of H.R.H. The Princess Royal, in the background. They had a very good attendance in warm and sunny weather, with many visitors from long distances. *A G5CP print*

to be that it was all "better than the BBC"—and who could say more than that! The ATV operators responsible for the gear and the display were: G3KKD/T, G3OAT/T, G3PGF/T, G3REH/T and G3RGX/T. The interviewing was done by G3KPO, hon. secretary of the Peterborough and District Amateur Radio Society, and responsible for the Rally arrangements, assisted by the /T boys from the March (Cambs.) A.R.S.

* * *

Next month we hope to cover the Longleat, Wethersfield, Weston-super-Mare, South Shields, Barford and Reading mobile rallies and meetings (*phew* !)—or most of them, anyway (*Editor*)—and also give such notes and news of general mobile interest as may come along. Readers are, of course, invited to write in with any gen they may think worth passing on.

CALENDAR OF MOBILE EVENTS

There are some additions to the Rally Calendar appearing on pp.234-235 of the June issue of SHORT WAVE MAGAZINE. Everything of which we had been notified as at close-of-press for this issue

At the Harewood N.A.R.M.S. Rally, an enterprising contribution was made by the R.A.C.— they provided free battery-charging facilities (probably needed by some of the /M's!), using a portable P-E set. The costume of the onlookers is a sufficient comment on the Wx they had for Harewood on May 24.
A G5CP print

Those who were present at the Harewood Mobile Rally were invited to pin their cards on the QSL Tree.
A G3GMN print

The roving-eye amateur TV unit operated at Hunstanton by the Cambridge group of the B.A.T.C. Interviews were conducted with the arrivals and very good pictures were shown on local TV receivers.
A G3GMN print

An un-retouched photograph of the received ATV picture, taken straight off the screen. Standard TV receivers were used on Ch.1, with a converter for 430 mc. The display was put on by the Cambridge group, B.A.T.C., for the Hunstanton Mobile Rally.
A G3GMN print

is now as follows :

July 4/5 : South London Mobile Club week-end camp at Cackets Farm, Cudham, near Biggin Hill, Kent—at which visitors who see this in time will be very welcome.

July 5 : Major rally events at Weston-s-Mare, South Shields and Barford St. John, details as notified on p.234, June issue.

July 12 : Rally and picnic, organised by the Plymouth Radio Club, on the A.384 about two miles beyond Two Bridges, towards Ashburton, on Dartmoor. This is a get-together of the Exeter, Kingsbridge, Torbay and Plymouth Clubs, at which mobiles and any others interested will be very welcome. Details from : R. Hooper, G3SCW, 2 Chestnut Road, Peverell, Plymouth, Devon.

July 12 : Mobile Picnic arranged by the Reading Amateur Radio Club in conjunction with the Mortimer & District Motor Cycle Club Scramble at Padworth Common, just off the A.4 near Aldermaston, Berks. Police will control the entrances, there will be a charge for admission, talk-in is being arranged, and screen stickers are available for those who intend coming, to ease the parking problem. For details, and stickers, apply : R. G. Nash, G3EJA, 9 Holybrook Road, Reading.

July 18 : Loughton & District Radio Society's Rally, with GB3LOU providing talk-in on Top Band

and two metres. The map reference for the exact location is given as TQ.438965—if you want to know where this is, write: A. W. Sheppard, G3JBS, 11 Barfields, Loughton, Essex. Note that this is a *Saturday* event.

July 26: Mobile Rally organised by the Cornish Amateur Radio Club, at Pentire Headland, Newquay, Cornwall—a magnificent site, overlooking fine stretches of sand. Talk-in stations, all signing GB3CRC, will operate on 160, 80 and 2m., opening at 11.0 a.m. As well as the usual raffle and lucky-programme prizes, some new and unusual events will be staged; there will also be a display of equipment constructed by the locals. including gear recently described by G3OCB in the *Magazine*. Refreshments will be obtainable on the Headland. For further information, write: W. J. Colclough, G3XC, Highview, Indian Queens, St. Columb, Cornwall.

August 9: Mobile Rally at the Royal Naval College, Dartmouth, Devon—one of the loveliest sites in south-west England—organised jointly by the Britannia R.N. College Radio Society and the Torbay Amateur Radio Society, with G6VJ on 1880 kc talk-in and G3LMG/P available for /M contacts on 4m. (70·27 mc) and 2m. (144·13 mc), both stations opening at 10.0 a.m. There will be numerous attractions and competitive events for all comers, with various awards for attending mobiles. Further details from: B. E. Symons, G3LKJ, 52 Reddenhill Road, Babbacombe, Torquay, Devon.

August 16: The annual Derby Mobile Rally, at Rykneld Schools, Bedford Street, Derby, with all the usual facilities and attractions. *Further details later.*

August 30: The U.B.A. (Belgian) International Mobile Rally, near Namur, in the Ardennes. Foreign visitors may obtain a temporary ON/M licence and callsign on application, *before August 1*, to: Monsieur le Directeur-General des Radiocommunications de la RTT, 42 Rue des Palais, Bruxelles, 3, Belgium, giving your full name and address, and U.K. callsign; dates while in Belgium; make of car and its registration number; photostat copy of your U.K. amateur licence. The Rally itself is a highly competitive event, and if you want to enter, send a remittance for 100 Belgian francs to: CCP 753825, Monsieur Lentz André, Rue de Neufchateau, Villeroux-Sibret, Luxembourg, Belgium. This also must be in before August 1, and he will give full details about the Rally on request, together with information regarding hotel rates, camping facilities, etc.

September 13: RSGB Mobile Rally at Woburn Abbey, Beds.

September 13: Annual Mobile Picnic, Reading Amateur Radio Club, Childe Beale Trust Pavilion, Lower Basildon, near Pangbourne, Berks. (*Further details later*).

R.A.E. INSTRUCTION COURSES

Starting with the August issue of SHORT WAVE MAGAZINE, we shall be publishing our usual lists of centres at which instruction will be offered, during the winter session, for the Radio Amateur's Examination, to be held in May next year, with possibly a supplementary early sitting (for those who are ready to take it) in November or December. The R.A.E. is Subject No. 55 in the Examination Syllabus of the City and Guilds of London Institute. We would like to hear, by *July 20 latest*, from all authorities arranging this instruction, with the necessary details. (Those already notified are being held for the August appearance).

NEW U.K. LICENSING REGULATIONS

We duly received from Radio Services, G.P.O. their drafts of the new regulations being brought into effect respecting U.K. amateur licences. The changes are mainly of an administrative nature. For instance, the new UHF "B" Licence will carry callsigns in the G8AAA sequence (several have already been issued) and will eliminate the /T anomaly; the strictly amateur TV licence will be issued with callsigns in the series G6AAA/T. An important variation in the regulations for the Sound "A" Licence (which is the one most of us have) is that a more detailed log must be kept, showing the actual frequency used for particular transmissions, and entering time-on/time-off for each individual QSO;

THIS MONTH'S SMALL ADVERTISING

If you look over the columns of Small Advertising in this issue—pp.311-319 refer—you will find a very large number of attractive items on offer, to say nothing of some interesting exchange suggestions. In addition to a car and a scooter, somebody else is interested in a telescope. What all this comes to is that if you want to buy, sell or exchange amateur transmitting or receiving apparatus —either as an AT-station operator or as an SWL— the Readers' Small Advertisement section of SHORT WAVE MAGAZINE is your market-place. For many years now, the re-sale value of every item of commercial (and most surplus) amateur-band equipment has been established through the supply-and-demand influence of this advertising. For the price of a few shillings, £100's worth of gear changes hands.

WE MUCH REGRET THAT—

Because of space demands and considerations for this issue, two items have had to be held over: "RTTY Topics" and "Miscellany." Both will reappear in the August issue, and henceforth G3CQE's RTTY feature will alternate with "SWL." This was the ruling as it used to be some time ago. Whatever licence you may already hold, you take no action until it comes up for renewal, when you will automatically receive the new permit appropriate to your category.

VHF BANDS

Moon Reflection Results!

A. J. DEVON

THIS month it is a tale of the most extraordinary VDX and EDX with just a little GDX—briefly, since last we met EA, KP4, LZ and PX have been worked on the two-metre band, with the KP4 also accounted for on 70 centimetres. The chief protagonists in these remarkable feats—each one of which makes VHF history—were G2HCG, G2JF, G3CCH and G3LTF, with a certain number of others also in on it in various ways.

Early in June, it was announced that KP4BPZ, Puerto Rico, using plenty of power and the right sort of dish, would attempt E-M-E working with Europe during the week-end June 13-14, trying both 70 cm. and two metres. Though the notice was short, it was sufficient to alert Bill Sykes, G2HCG, Northampton; Johnny Stace, G3CCH, Scunthorpe; and Peter Blair, G3LTF, near Chelmsford. They have all been actively engaged in plans for the E-M-E (earth-moon-earth, or moon reflection, or "moon bounce," if we have to use such an idiotic term) type of VHF/DX operation, so it was a matter of getting the gear tee'd up and spot-on in time for the KP4BPZ tests.

He was first heard by G3CCH on 432·00 mc at 1931 GMT on June 13, with a weakish and rapidly fading signal, but having a near T9 characteristic. In the meantime, G3LTF was busy aiming his dish (with the help of his wife) and, with his Tx on 432·03 mc, made contact with KP4BPZ at 2020 GMT, reports being RST-459 each way; Peter actually held the signal till 2125, when KP4BPZ closed down. It was arranged that he should try two metres on the Sunday evening, 14th, and though KP4BPZ was heard very weakly on 144 mc around 2030 by both G3CCH and G3LTF, no QSO resulted—they were, of course, using dipoles in dishes rather small for the frequency.

Which is where G2HCG comes in. He had fixed up the gainy two-metre beam shown in the picture and described in the caption, and was hearing KP4BPZ at violently varying signal strength, peaking to perhaps S4, but most of the time in noise. All those who heard the two-metre signal describe it as very difficult to read—due to echo, his freq. drift at the beginning of each transmission, and the noise competition. G2HCG called KP4BPZ nineteen times during the evening and, when Bill thought he was in QSO (subsequently confirmed) handed out a 337 report. It was not actually until a day or two later that KP4BPZ (*via* a 20m. contact with the U.K.) said that he had indeed heard G2HCG—in other words, the G2HCG/KP4BPZ contact on two metres was a QSO, but not as solid a one as G3LTF/KP4BPZ on 70 centimetres; in fact, Peter worked him twice on 432 mc on the Saturday evening, 13th.

On the receive side, G3ENY (Bridgnorth, Salop) also heard KP4BPZ on two metres, but no QSO was attempted. For one thing, he was a very scratchy signal, and for another they were having PSU trouble in Bridgnorth—isn't it marvellous how, in Amateur Radio, something vital is certain to go u/s just when you need it most!

Apart from the main facts of these remarkable achievements—on which everyone concerned will have the congratulations of all interested in VHF communication—there were a number of intriguing side-issue problems involved. First of all, there was the little matter of finding out (from under the cloud cover) just where the moon was, so that beams could be accurately aligned. G3CCH did it by calculation, and got a brief visual just before the tests started, proving that the maths. were right. G3LTF was feeling about with his dish while his XYL managed the Rx; a little later, G3CCH was able to confirm that KP4BPZ was there and gave him a heading. These two work closely together on VHF/DX problems, and Peter's success can fairly be regarded as a joint effort. It is noteworthy that all their gear is home built, from their dishes back to Rx and Tx.

G2HCG also builds his own gear and, moreover, has a receiver with a 100-*cycle* bandwidth—this proved to be too sharp altogether for the KP4BPZ signal. Bill was able to check that the moon-reflected transmission was definitely circularly-polarised; it was quite unmanageable when he switched his beam to horizontal or vertical polarisation. The long echo caused the dots of the Morse characters to merge and blur the letters, and this made slow sending essential. Both G2HCG and G3LTF have tapes of all they heard, on two metres and 70 centimetres respectively, so we have a solid record of these exciting events. Peter describes his tape as "particularly glorious"—well he might!

With an input of 80w. on 432·03 mc and a gain with his dish of about 20 dB, the e.r.p. at G3LTF is in the region of 1·6 kW. His Rx has an AF139 transistor preamplifier. The dish at G3CCH is 12½ feet in diameter, and was found to have the slight mechanical disadvantage that it could not be pushed round far enough to follow the moon all the way; Johnny is taking steps to rectify this forthwith. His Rx is also an AF139 transistor pre-amp., with an A.2521 RF amplifier into a G3BKQ-type 70 cm. converter (this is a *Magazine* design of some years ago). An interesting point

about his set-up is that the oscillator for the xtal chain is *buried* (yes, in the earth), this being to ensure the utter stability that is necessary for operations of the kind we have been discussing.

As yet, nothing much is known of the gear at the KP4BPZ end—except that he was using a large dish borrowed from the U.S.A.F., and so presumably available at week-ends only. Perhaps because he himself was not given much notice of its availability, the whole operation was laid on in rather a vague and slap-happy way, so far as European participation was concerned; there were no skeds for the U.K. stations (which makes a test of this sort about ten times more difficult) nor even any positive information as to exactly when he would be on. So their results are all the more creditable to our boys. KP4BPZ himself apparently did very well with the W's, and was also heard (by G3CCH) working HB9RG on 70 cm.; and Johnny was able to confirm that on two metres he was copying KP4BPZ working a station he took to be G2HCG.

—And Now the EDX!

It will be remembered that in the last two issues we have spoken of the PX1QX expedition to Andorra, from a location at 8,000ft. a.s.l. G2JF (Ashford, Kent) worked him on two metres (144·73 mc) at 2219 GMT, June 16, on AM phone, with R5 reports both ways, and Jim has had the QSL to prove it. So far as we know at the moment of writing, this has been the only U.K. contact with PX1QX and, in any event, is a "first."

Santander, on the Biscay coast of Spain, is a very lovely place, still largely untouched by cars with GB plates—and what makes it even lovelier is the fact that EA1AB is on two metres from there, and with CW, too. Again, it was G2JF who found this out by working EA1AB, for another "first," at 2224 GMT on June 11, with 559/569 reports. The Wx set-up at the time suggests that this was probably a fleeting-opportunity QSO, with not much coverage into southern England for EA1AB's signals. But whether or not this was so, the point is that they were both there to take it, and to make a contact which, really, was a good deal more difficult on two metres than G2JF's later QSO with PX1QX. To these three operators, too, congratulations on having broken new ground on VHF. We have been waiting for years for a 2m. signal from EA, as there have been many occasions in the past when tropo. conditions extended right down into south-western France. A glance at the map will show that EA1AB in Santander should be a push-over for the Cornish boys when conditions are right—it is virtually an all-sea path.

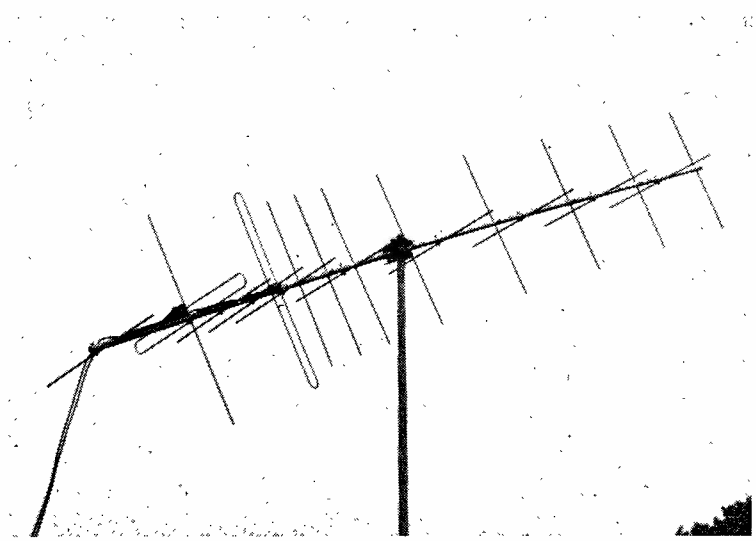
And still on the theme of EDX, it has been reported that G6UT heard an OE5 on June 3—for which the mode could have been sporadic-E.

G3LTF—Another MS Epic

As if all that has gone before is not enough excitement for one month, G3LTF worked LZ1DW (Sofia) by meteor-scatter on June 6. This was rather a long and difficult QSO—it took more than four hours to complete, LZ1DW being S23 and G3LTF S25. So, what with one sort of DX and another, Peter has been having a pretty good time! And let it be said that none of these quite outstanding results—in different ways and on different VHF bands—would have been possible without specialisation; a great deal of patient work and know-how; a real determination to get results; and the ability to use CW. And not the least creditable element about his results is that Peter is achieving them on entirely home-built gear.

Successes on 23 Cm.

And once again it's Peter Blair, G3LTF, who worked G2CIW (Northfield, B'ham) on June 9, with RST-56/39 reports both ways over a path distance of 119 miles. This is a great success for G2CIW, Jack having been working away on 23 centimetres for a long time now, in co-operation with several other stations in the Midlands area. G2CIW says that though sporadic-E has been evident almost daily at lower frequencies, it did not appear to extend as high at 144 mc—and, of course, it would mean listening all day, every day, to find out. It hardly



G2HCG also worked KP4BPZ, Puerto Rico, by moon reflection on two metres on June 14. Bill says it was a difficult QSO because of the slurring of the CW characters, and there was also considerable fading; however, he got a good tape record and it has since been confirmed that KP4BPZ was copying G2HCG. The aerial used at Northampton consisted of a pair of J-Beam 10-ele long Yagis, mounted on the same cross-boom at right angles, with quarter-wave spacing, and both sections fed in phase to give circular polarisation. The KP4BPZ signal was in noise most of the time, with occasional peaks to S4 or so.

needs saying that this is just not a practical possibility for most of us.

In Bletchley, G3GWL has got it all going on 23 cm., the Tx line-up being EL91-EL91-EL91 to 2m., 6J6 tripling to 70 cm., QQV02-6 straight on 430 mc, with a DET-22 as a power tripler to 1296 mc; at this frequency it takes 10w. input, the tank being a resonant cavity, and gives a measured one watt of RF out. The Rx at G3GWL is a 12AT7 giving 71 mc from a 35·5 mc xtal, then a 6AK5 tripling to 213 mc, followed by another 6AK5 doubling to 426 mc, and then a GEX66 used as a varactor tripler, in a trough-line cavity, to 1278 mc, with a nominal IF of 18 mc. The aerial used with all this lot is a corner reflector arrangement. Operations have been somewhat held up due to lack of time, but Colin is in business on 23 centimetres, and no doubt we shall be hearing more about results from time to time.

DX-Pedition Dates

Working VDX *via* moon is one important and interesting aspect of amateur VHF operation—but there are plenty of keen types who want to extend their GDX coverage by the more usual methods.

For them, GM2ASF/P will be on the top of a mountain to the south of the main island of **Shetland** (nearly as far north as you can get in the U.K., and of course a county) during **July 15-24**; they will be on both 2m. and 4m., be it noted, the operators being G3PQQ, G3RKA and G3ROD of the Coventry A.R.S. (G2ASF is the Club callsign). This should be a very interesting trip for them—and for us, too, if conditions give them a break.

That well-known London group signing GB2GC will take themselves over to Alderney, C.I., for the period September 5-7, and also will be on 2m./4m. They are prepared to take gear for 70 centimetres, too, if sufficient skeds are offered; the 4m. freq. will probably be 70·50 mc. As the intention is that GB2GC shall play in the VHF contest over September 5-6, it is suggested that skeds be fixed for Monday 7th. Write: GB2GC, c/o D. A. Evans, G3OUF, 80 Argyle Road, Ealing, London, W.13.

Notes on the Tabular Matter

In Countries Worked, G3LTF with 24C is in an almost unassailable position — and, with the intelligent assistance of his wife, can be relied upon to find any loose ones there may be still around.

One of the most active, and consistently successful, AT-stations on the two-metre band is G2JF, "John Fox," of Ashford, Kent. He is at 18C in Countries, and it is worth a note that they have all (including EA and PX) been worked by tropo., the normal DX propagation mechanism for the VHF bands. Possessed of a very good location, and activity concentrated on two metres, G2JF is a well-known contact—in fact, he has worked more than 2,000 different stations in his 11 years on the band, which puts him 'way ahead of any other contender in this category!

Gerry Jeapes, G2XV of Cambridge, probably one of the most senior of our VHF operators, with an experience going back to the early days of "squish" on five metres—long before Hitler's War—sits fairly securely at the top of 70 Cm. Counties. But he has close competition.

In the 4-metre All-Time, G3EHY (Banwell, Som.) still leads quite comfortably but—with the much-increased activity we can expect now that the band has been opened out from 70·1 to 70·7 mc, an ideal frequency-area for inter-U.K. working, fixed and mobile—he will have to keep quite hard at it from where he is to hold his lead.

As regards the Two-Metre Annual, our key table, Tom Douglas, G3BA (Sutton Coldfield) can probably at any time knock off enough to keep him in the lead. Tom also is very well situated, geographically and location-wise, to cover all the U.K. whenever conditions permit. He has very good gear, is fully coherent in any mode CW/AM/SSB, and is one of our most consistent VHF operators.

It having been intended to show the All-Time this month, an extra page of space was made available. But it is again a casualty because other and—as readers would no doubt agree — more important matters have come up for discussion. But it will re-appear yet, never fear, so keep your figures up-to-date.

And that reminds your A.J.D. to ask that, with four different VHF bands now on the go, involving five tables, it would be

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
41	G2XV
36	G2CIW, G3JMA
35	G3KPT, G6NF
33	G3JHM/A, G3LTF
32	G3JLA, GW3ATM
31	G3JWQ, G5YV
30	G3KEQ
29	G3LQR
28	G3HAZ, G3HBW, G3NNG
26	GW2ADZ
23	G3BKQ, G6NB
21	G3AYC, G3IOO
18	G5UM
17	G3BA, G3BNL, G3MPS, G5QA
16	G2DDD, G3BYY. G3MED
15	G2OI, G4AC, G4RO
14	G2BDX, G2HDZ, G3FAN, G5DS
13	EI2W, G6XA
12	G3HWR, G3NJO/T, *G5BD*
11	G3HRH
10	G3IRW, G3LZN
7	G2HDY, G3JHM, G3OBD/P, G3RAX/T
6	G3EKP, G3FIJ, G3KHA, G3WW
5	G3FUL, G3IRA, G3IUD, G3LTN, G5ML
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.

a great help if each band-report (as well as the table claim) could be put on a separate sheet under the appropriate heading, with call-sign/QTH, and the sheets sent in pinned together. This feature is always produced under some pressure, and anything that helps A.J.D. to keep his papers in the right order is an immense help at a critical period in the month.

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1963

Starting Figure, 14

From Home QTH only

Worked	Station
60	G3BA
56	G3GWL
55	G3LRP
52	G3NUE
49	G3CO
46	G3SAR, G4LU
44	G3AHB
43	G2AXI
42	G3PTM
41	G3LAS
40	G3HRH, G3PSL
36	G2CDX
35	G3DVQ
34	GM3LDU
33	G2BJY, G3SML
32	G5JU
30	G3CKQ
29	G3CCA
28	G3KQF, G3PKT, G5UM
26	G3GSO, GW3PWH
25	G8VN
24	G2BDX, G3IOE, G3ONB
21	G3EKP
19	G3KPT
17	GW3CBY
16	G3HWR, G3OJY
15	G2DHV/P
14	G3OZF, G5FK, G5ZT

This annual Counties Worked Table will run till August 31, 1964. Between now and that date, only movement-claims for those already standing in the Table can be accepted.

Four-Metre Band Planning

A reasonable suggestion, put forward by the RSGB VHF group and discussed with them, is that with immediate effect we should sort ourselves out as follows: *70·1-70·3 mc*, all stations in EI, south-west G and GW; *70·3-70·5 mc*, London, Home Counties and southern G generally; *70·5-70·7 mc*, all northern G, GI and GM.

Now, obviously, this is not going to suit everybody, and there will be anomalies. But it does at least attempt an orderly development of the band, so that—as was the original intention with the two-metre Plan—all concerned will know in what direction to look for wanted contacts. It also establishes suitable frequency areas for portable and mobile operation, and should encourage single-channel group working. It seems obvious that for /M, the aerial should be a vertical ¼-wave rod.

Remember that for 70 mc, the max. permitted input is 50 watts which, with a 4-ele Yagi, should get you all round the U.K. when conditions are right—and this will be quite often. The band is, of course, also very susceptible to sporadic-E effects but unfortunately this is not going to yield anything in the way of EDX because the U.K. is about the only country in Region I with a 4-metre amateur allocation.

Some 4m. Reports

G2AXI (Basingstoke) found G8SK for a new county (Essex), putting him up to 13C in the Table. Ron Plant, G5CP (Wingerworth) is also busy on 4m., and has got to 12C, with GM3EGW worked (some little time ago) for his second country. G3EKP (Belthorn, Lancs.) has been working mainly on 70 mc, and has now accounted for 32 different stations in 7 counties; he reports G3SHJ as a new one in Blackburn, with plans to appear as GD3SHJ/P during the latter part of July. G3LZN (Rowington, Warks.) moves to 22C, and the Lancashire group — G2OI, G3AYT and G3PMJ — maintain steady progress. From Liverpool, the club station has been out in Caernarvonshire signing GW3AHD/P. And, believed to be the first to achieve it, G3OHH (Macclesfield) now has 100 cards for 4m.-only contacts.

G3BOC is at a new QTH, Manley in Cheshire, and has got going on four metres; with only 10w. input and a 3-ele flat-top, he has already worked 23 counties, most of them during the recent 70 mc contest, which produced a very satisfactory level of activity. For G3BOC, the log included EI, GM and GW worked, and GM's 3EGW and 3GDU heard.

GDX on Seventycems

From 70 mc to 70 cm.: For a long time now G2XV (Cambridge)

FOUR METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8

From Home QTH Only

Worked	Station
41	G3EHY
37	G3IUD, G3OHH, G3PJK
34	EI2W
33	G5JU
31	G2OI
30	G3JHM/A
29	G3NUE
27	G3PMJ
26	G5FK
23	G3BOC
22	G3LZN
21	G3AYT
19	G3BNL
16	G3BJR, G3FDW, G3OWA, GI3HXV
14	G3OKJ
13	G2AXI
12	G3LQR, G5CP, G5DS
11	G3HWR, G3SNA
10	G2BDX
8	G3PRQ

This Table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required.

has been keeping a steady sked with GM3FYB (Dunfermline)—in fact, they have been at it for nearly 18 months, with bits heard both ways on many occasions. On June 15, they finally made it solid, and the 41st 70 cm. county for G2XV.

Gerry brings out the rather interesting point that no two-metre signal from GM has ever been heard at the same time that he was getting GM3FYB on 430 mc—which seems most odd. The G2XV Rx set-up is now 2/EC88 g.g.t. RF with a GEX66 mixer, the IF being tunable over 32-35 mc on an SX-28. He says that the EC88 is worthy of much more attention for VHF work, it being "within a very narrow margin of more publicised types, and about half the price."

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

24	G3LTF (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UR)
22	ON4FG (DL, EI, F, G, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UR, YU)
21	G3HBW, G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP)
19	G3CCH
18	G2JF, G6NB, ON4BZ, OK2WCG
16	G3BA, G3BLP, G3CO, G3GHO, G3KEQ, G5MA, G6RH, G6XM, PAØFB
15	G2CIW, G2XV, G3AYC, G3DKF, G3FZL, G3RMB, G4MW, GM3EGW
14	G2FJR, G2HDZ, G3AQX, G3FAN, G3HAZ, G3HRH, G3IOO, G3JWQ, G3KPT, G3PBV, G3WS, *G5BD*, G5DS, G6LI, G8OU
13	G2HIF, G2HOP, G3AOS, G3DMU, G3DVK, G3EHY, *G3GPT*, G3IIT, G3NNG, G3NUE, G3OHD, G4LU, G6XX, G8VZ
12	EI2A, EI2W, F8MX, G2BJY, G2CDX, G3BNC, G3GFD, G3GHI, G3GWL, G3JAM, G3JLA, G3JXN, G3LAS, G3OBD, G3WW, G5CP, G5JU, G5ML, G8DR, GW2HIY
11	G2AJ, G2CZS, G3ABA, G3BDQ, G3BOC, G3GSO, G3IUD, G3JYP, G3JZN, *G3KUH*, G3LHA, G4RO, G4SA, G5UD, G6XA, GC2FZC, OK1VR, PAØVDZ
10	G2AHP, G2AXI, G2FQP, G3BK, G3DLU, G3GSE, G3JHM/A, G3KQF, G3LAR, G3LRP, G3LTN, G3MED, G3OSA, G3OXD/A, G5MR, G5TN, G5UM, G8IC, GW3ATM, GW3MFY, GW5MQ
9	G2BHN, G2DHV, G2DVD, G2FCL, G3BOC, G3BYY, G3FIJ, G3FUR, G3OJY, G3PSL, G3PTM, G4LX, G8GP, GC3EBK, GI3ONF, GM3DIQ
8	G2BDX, G2DDD, G2XC, G3AEP, G3AGS, G3AHB, G3CCA, G3EKX, *G3GBO*, G3HCU, G3HWJ, G3KHA, G3PKT, G3MPS, G3VM, G5BM, G5BY, G8SB, GM3JFG, GM3LDU

Two-Metre Extracts

G2AXI (Basingstoke) worked G3OCB in Cornwall on June 9, for his 43C in the Annual; another interesting QSO was with GC2TR/M, in Jersey.

From West Denton, Newcastle, G3IOE reports new stations worked in the shape of GI3GXP, GM2TW and G3GWL (to the great relief of them both, it appears), also G3MPN in Norwich. The G3BA and G5MA skeds continue solid, and though it is over a much greater distance, the latter is always full communication value on CW—they could chat away for hours if they wished. G3IOE would like to open a schedule with a GM station, early evening time. G3SML (Earl Shilton, Leics.) moves up in the Annual, reporting G4LW, Trowbridge, for Wilts. as a new one—new to us, too.

Up in Oswestry, Stan is getting things sharpened up for the GW4LU/P foray with GW3BA/P, as reported in our last. Remember, it will be on July 26 that they bid their weeping families a brave farewell before venturing into the GW unknown, to start a week's intensive operating (and travelling) through seven Welsh counties —and no doubt there will be several keen 2m. operators who will in fact work them in all seven.

G3KQF (Borrowash, Derbys.) reports three new ones worked—and says he hopes this feature will never be lumped in with colleague L.H.T's piece, which he also reads. Well, the way things are beginning to shape up on the four VHF bands now in occupation, that would hardly be possible.

G3PSL (Burton-on-the-Wolds, Leics.) has made a good start from his new QTH, with a 10-ele long Yagi at 25ft. and 100 watts or so in the PA. He will be in Westmorland, one of the less VHF-populated counties, as G3PSL/M during July 23-31, and hopes to make some QSO's off a 4-ele flat-top on the baggage grid.

On June 9, G2CDX in Cambridge was hearing G3XC in Cornwall and GW8NP in Cardiff, but no joy; he says that G3TEJ is now on from Godmanchester, Hunts.—who should be much in demand for a rare-ish county.

News Notes

Some of the correspondence mentions G3YH, Bristol, as having shown up again—he used to be very active on two metres at one time.

From far away in Australia, ex-G6OH, always a very keen two-metre man, writes that he is now VK3OG and is getting going on the band; prudently, he has taken the precaution of keeping his G-call in the list.

G5ZT (Plymouth) is now concentrating much of his VHF effort on amateur TV transmission, on which he was one of the early starters; in fact, G5ZT/T is still among the very few amateurs actually able to transmit TV (as distinct from those who hold a /T licence).

According to the IQSY forecasts (*per* G2DHV), meteor shower activity can be expected during July 28-29, August 9-13 and October 19-21—for those wanting to plan ahead.

Conclusion——

It has been a rather meatier and (your A.J.D. hopes) a more interesting VHF offering than usual—at any rate, it seems to have been a good deal harder on the typewriter! — and as it happened it looked as if a GDX situation could be opening up just as this went down. So we hope for another exciting mail for next month, for which fortunately the calendar allows one of those periodical respites which give A.J.D. a chance to get things sorted out. The deadline is **Friday, July 24,** with everything VHF addressed: A. J. Devon. "VHF Bands," *Short Wave Magazine,* 55 Victoria Street. London. S.W.1. So, till we meet again on August 7, *73 de A.J.D.*—and go carefully over Bank Holiday.

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 U.K. section 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.

EI9AR, F. T. Crosbie, Chez-Nous, Ballinasloe, Co. Galway.

G2AFB, B. H. Douthwaite, 25 Parkwood Avenue, Esher, Surrey.

G3RJE, J. D. Hunt, 76 Edge Street, St. Helens, Lancs.

G3SVI, D. H. Davis, 11 Tyrrell Road, South Benfleet, Essex.

G3SXO, R. Chalmers, 17 Manor Drive, Upton, Wirral, Cheshire.

G3SYI, G. F. E. Hodinott, 29 Vale Road, Seaford, Sussex.

G3SYM, D. R. Coltart, 58 Fairfax Road, Old Woking, Surrey.

G3SYZ, A. W. G. Rogers, 143 Phillipers, Garston, Watford, Herts. *(Tel. Garston 4577).*

G3SZV, B. C. Ward, 79 Norwood Road, Southport, Lancs.

G3TAL, M. Hamilton, 20 Weetwood Avenue, Leeds 16, Yorkshire. *(Tel. Leeds 53896).*

G3TBA, A. Barsby, 217 Manor Road, Brimington Common, Chesterfield, Derbyshire.

G3TBK, J. D. Cree, 89 Charles Street, Newark, Notts.

G3TBT, R. S. Hodgson, Forest Lodge, Horton Road, Ringwood, Hants. *(Tel. Ringwood 3541).*

GM3TBV, W. H. Vann, 52 Urrdale Road, Glasgow, S.1.

GM3TCM, D. J. Munro, 8 Rose Street, Wick, Caithness.

G3TCS, J. T. Riley, 10 Haddon Avenue, Skircoat Green, Halifax, Yorkshire.

GM3TCW, J. F. Kelly, 61 Westwood Road, Newmains, Wishaw, Lanarkshire.

G3TDB, R. G. Hodgson, Loralai, 14 Downsway, Great Bookham, Surrey. *(Tel. Bookham 3247).*

G3TDC, J. Yates, Wellfield, Mount Pleasant, Kingswinford, Brierley Hill, Staffs.

G3TDG/T, W. E. F. Green, 12 Kenilworth Road, Penge, London, S.E.20.

G3TDH, R. W. Stevens, 27 Harold Road, North Acton, London, N.W.10.

G3TDJ, A. J. Cawthorne, 1 Field Terrace, Rodborough Hill, Stroud, Glos.

G3TDL, R. C. Davis, 91 Hanbury Road, Dorridge, Solihull, Warks. *(Tel. Knowle 2413).*

G3TDN, J. M. Barlow, The Pippins, Lake Lane, Liskeard, Cornwall.

GM3TDO/T, M. D. Ritchie, 99 Forest Avenue, Aberdeen. *(Tel. Aberdeen 37823).*

GM3TDS, J. A. Shelton, 22 Cardowan Drive, Stepps, Glasgow, E.3.

G3TDU, F. L. Judges, 10 Mayday Gardens, Blackheath, London, S.E.3.

G3TDV, G. Fidler, 10 Sharpe Road, Wallsend - on - Tyne, Northumberland.

G3TDW, W. G. Western, Sunnymead, 72 Bedford Road, Sandy, Beds. *(Tel. Sandy 2077).*

G3TDZ, J. R. Hey, 8 Armley Grange Crescent, Leeds 12, Yorkshire.

G3TEP, B. Atkinson, Brada, Beadnell, Chathill, Northumberland.

G3TEW/T, L. P. Smith, 48 Pitt Avenue, Witham, Essex.

G3TEZ, R. E. Spencer, 29 High Petergate, York. *(Tel. York 23582).*

CHANGE OF ADDRESS

GM3BGW, T. W. Homewood, 1 Montrave Avenue, Cupar, Fife.

GM3CFS, J. M. Robson, 6A Lochlea Road, Cumbernauld, Nr. Glasgow.

G3EBU, K. C. Woodman *(ex-GC3EBU),* Sunset, 7 Mount Pleasant Road, South Woodham, Chelmsford, Essex.

G3FQN, R. F. Gilding, 43 Cromwell Road, Hove 3, Sussex.

G3HEA, J. U. Burke, 2 Abbots Quay, Wareham, Dorset.

G3IDW, R. Reynolds, Orchard Cottage, Hook, Swindon, Wilts.

GM3JHL, J. H. Lepper, 42 Inch Crescent, Bathgate, West Lothian.

G3JJU, R. E. Hurst, 7 The Laurels, Burnside, Fleet, Hants.

G3JVL, M. H. Walters, 157 London Road, Horndean, Portsmouth, Hants.

G3KPB, S. A. Moore, 17 South Court Drive, Wingham, Canterbury, Kent.

GW3LEW, G. Weale, 4 St. Margarets Road, Whitchurch, Cardiff.

GM3LRG, J. F. Gray, 47 South Street, Greenock, Renfrewshire. *(Tel. Greenock 24022).*

G3MPS, D. Pack, Five Elms, 6 Chestnut Lane, Ashcott, Bridgwater, Somerset.

G3NOO, B. R. Jessop, 1 Pine Close, Gillingstool, Thornbury, Nr. Bristol, Glos.

G3ODC, D. A. Martin, 7 Seaview Avenue, Eastham, Cheshire.

G3OZU, A. A. Brind, 21 Princes Road, Dartford, Kent.

G3PNR, W. Higgins, 13 Falcon Road East, Sprowston, Norwich, Norfolk. NOR.88.R.

G3PQF, D. H. Dell, 81B Westheath Road, Cove, Farnborough, Hants.

G3SAG, R. T. Matthews, 220 Birmingham Road, Redditch, Worcs.

G3SAH, R. J. Matthews, 220 Birmingham Road, Redditch, Worcs.

GM3SDZ, R. D. Langston, 3 Park Place, Lossiemouth, Morayshire.

AMENDMENTS

G3CB, B. Orme, 65 Gardendale Avenue, Clifton Estate, Nottingham. *(April issue).*

G3SWV, E. P. Tompkins, 37 Oak Avenue, Shirley, Croydon, Surrey. *(April issue).*

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for August Issue: July 17)

(Address all reports for this feature to "Club Secretary")

IT seems that June and July are usually the slackest months of the year for Club activities; at least this is certainly so if one can judge by the number of Activity Reports received for this feature. They always fall to a low figure in the July issue, and usually increase considerably from August on. Just why this "trough" should occur, at this time of year, we have no idea; it would be understandable if it happened in August or September!

Which leads us to the subject of summer activities and how to keep the members interested. One secretary points out this month that mobile work and visits to mobile rallies are all very well, but they don't fetch members along to meetings . . . on the contrary, a really fine summer evening may find more people out with their mobiles than sitting around in the clubroom.

To that, our reply is that "sitting around in the clubroom" should not be the criterion of a club's success; if the club has implanted an enthusiasm for mobile operation into a large group of members, by talking about it in the winter, what better than that they should go out and *do it* in the summer?

A possible mobile activity that doesn't seem to be made enough of is the inter-Club visit. One club, with its own transmitter, either fixed or mobile, could surely arrange in advance for a visit from another club, with all possible mobiles "mobilised." The meeting could then start long before the two contingents met; and the advantages of talk-in are obvious—whether to the actual clubroom or to some congenial meeting-place in the locality.

Inter-club meetings, in fact, seem to be restricted to a relatively small group; more of them could easily be arranged, especially in the areas of high population density, where clubs flourish although only a few miles apart. (But perhaps in such places the various members already know each other so well that they don't need to arrange special meetings?)

If there is any inter-club activity going on, of which we have not yet been notified, we should be glad to hear of it.

ACTIVITY REPORTS

The May meeting at **Torbay,** which fell on the 31st, was well attended. G3PEJ, from the Scarborough club, was welcomed, and arrangements for the Dartmouth Mobile Rally were discussed. **Midland Radio Contest Club** meet on our publication day, July 3, for a talk on the Middle East by G2RO; on August 7 they will discuss their plans for the various contests in the coming season.

Acton, Brentford & Chiswick will be getting together on July 21 (as usual, at the AEU Club, 66 High Road, Chiswick) to hear a talk on Test Equipment for Transistors. Visitors and prospective members welcomed, 7.30 p.m.

Dorking report a new callsign in their ranks—G3TDB of Bookham; two other members are still "in the throes." On July 14 they meet at the Wheatsheaf, and on the 28th at the Star and Garter—both in Dorking, and both at 8 p.m. Visitors welcome, as always.

Midland (*MARS News Letter,* May) will have a talk from G4LU on Transistor Practice for Amateurs, on July 21—7.45 p.m. at the Midland Institute, Paradise Street, Birmingham 1. **Southgate** (*Newsletter,* June) will be meeting on July 9 for a Junk Sale and also on July 23, the latter being their "second meeting" and an open night. QTH: Atlasta Lodge, Tottenhall Road, N.13.

Cray Valley (*Newsletter,* June) held their AGM and elected G3JJC chairman, G3KYV secretary and G3ANK treasurer. As they now have 35 licensed members they have devised an award (WCV) and will organise an Activity Weekend on October 3 and 4, when it is hoped that most of the 35 will be on the air. Details of the award from G3MCA (*QTHR*).

The July meetings at **Cambridge** include a Junk Sale on the 3rd; a talk on Travels in Europe (G2CNT) on the 10th; "Modulation Evening" on the 17th; and an informal evening on the 24th. No meeting on the 31st, but they will be operating a station at Bottisham Church Fete on July 11.

Civil Service will be holding an informal meeting at the Science Museum on July 20, and will run the tape-recorded lecture on Astronomy and Cosmology, by Dr. Woolley, the Astronomer Royal.

Uxbridge now meet on the first and third Mondays, 8 p.m., and much of the time is being spent on building the club transmitter. On July 20, however, there will be a Junk Sale. **Surrey (Croydon)** (*SRCC Monthly News,* June) report a turnout of over fifty for the judging of exhibits at the Annual Constructional Contest. G3GRK won the cup for his multi-band transmitter and receiver; G3GHI was second with his two-metre transmitter. On July 14 there will be two talks—one by David Stirling on VHF Weather and one by G3OFJ on Chemistry

and Electronics.

Silverthorn will be operating under canvas on July 11, when G3SRA/A will be on Top Band and Two, from Ridgeway Park, Chingford, on "Chingford Day." On August 1, likewise, they will be in the Memorial Hall, South Woodford, for the opening of the World Wild Life Fund. Normal meetings, 8 p.m. on Fridays (except the first of the month) at Friday Hill Community Centre.

The programme for **Chester** includes a Net Night (July 7); a talk by G3ATZ on Aerials (mobile and otherwise) on the 14th; a Radio Quiz on the 21st; and a lecture by G3DRB on the 28th—all at the YMCA, 8 p.m.

Loughton had a very successful session with GB3LOU at their local Community Centre's "At Home" in May; they will be in operation again from July 11-18, ending up with their first Mobile Rally (*see* "The Mobile Scene"). Meetings are on alternate Fridays at Debden Community Centre, Rectory Lane, Loughton.

The Stratford-on-Avon group laid on GB2WS for the Shakespeare Quatercentenary celebrations — a considerable undertaking for a small society aiming to make a contribution on so important an occasion. Generous assistance was given them by way of loans of equipment — by Racal, G.E.C., Heathkit, Labgear, Mosley and K.W. Electronics — and this was used mainly on the 80 and 20m. bands. On 3.5 mc, 428 different stations were worked under 10 prefixes, the pile-ups being considerable. The figures for 14 mc were 89 contacts with 32 call areas, and the DX coverage was representative of a well-operated station using good gear under distinctly poor conditions. With something happening all the time GB2WS was on the air during April 22-25, public interest was intense; the display included lists of countries worked, the progressive total of contacts and QSL cards as they came in. The station was well sited in a shop window (Hunt's Radio) opposite the Shakespeare birthplace, and could hardly have been bettered. The operators behind GB2WS for this enterprising and successful event were: G3AUF, G3FTG, G3MDU, G3MOU, G3OMP, G3OOG, G3ORI, G3SOA and G8TO.

The meetings at **Kingston** are now held on Thursdays, 8 p.m., at the YMCA Annex, Eden Street. On July 9, Navigational Aids will be described by Mr. Jones of Decca. The **Echelford** Amateur Radio Society (Ashford, Middx.) was formed last January with a target of roughly 30 members; they now have over 50, many of them licensed. Meetings are held twice a month, the main one being on the last Wednesday, with an R.A.E. Course two weeks earlier. On July 29 there is a full meeting at Ashford Grammar School—all visitors welcome. (*See* panel for Secretary's QTH.)

Making the first QSO from GB2WS — G8TO, a principal in the local brewery (Flowers), and president of the Stratford-on-Avon and District Radio Club, puts out a CQ, with the Mayor of Stratford-on-Avon looking on (left). He has the QSL card for G3PTB (Cambridge), logged as the first official contact with GB2WS, on 80m. The station was a fine co-operative effort by the Stratford-on-Avon group, and became one of the central features of the town's celebration of the 400th birthday of William Shakespeare.

At **Newbury,** the June meeting was a Junk Sale, held at their Hq. at Elliotts' Canteen; note new Secretary's QTH. **Plymouth** (*QUA*, June) are very keen that anyone near their picnic site on July 12 should make himself known. The location is on A.384 between Two Bridges and Ashburton, and various mobiles should identify them. Likewise any mobiles in the area are invited to call in on the club's Sunday-morning net (1910 kc).

Northern Heights will have a talk and demonstration on Civil Defence on July 8; on the 15th, their second visit to the BBC at Moorside Edge; on the 22nd a Ragchew and committee meeting; and on the 29th a third visit to Moorside Edge. On August 1 they are running their demonstration station (G3OMM/A) at the Warley Charity Gala, and August 16 is booked for a visit to Jodrell Bank.

South Hants (*QUA*, June) will be active from the Southampton Show with an operational station and a big display. This will be on Southampton Common on July 10-11, the previous three days being spent on preparations.

Worcester (*Newsletter* No. 9) will hold their usual Saturday meetings (7.30 p.m. at Hut 35, Perdiswell Park, Droitwich Road) during July, but the programme was not fixed at the time of writing. June was busy, with two exhibitions at local fetes. Several members have the popular B.44 transceivers on four metres.

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South Birmingham (*QSP*, June) will discuss club business on July 16—possibly followed by a lecture. The idea is to give all members a chance to voice their personal opinions, instead of keeping them suppressed or giving them out over the air!

On July 21, **Sutton and Cheam** will be meeting at The Harrow, High Street, Cheam, to hear about Transistors, from G3KIK. **Wolverhampton** (*Newsletter*, June/July) have Morse practice sessions on July 6 and 20, and a Treasure Hunt on the 13th (meet at 7.45 p.m. at Hq.). On August 21 they will visit Slade for the return match in the Inter-Club Quiz.

South London Mobile Club have formed a new committee (*see* panel for new secretary). On the week-end of July 4/5 they will be holding a camp at Cacket's Farm, Cudham (near Biggin Hill), and interested visitors will be welcomed.

Guildford, who now meet at the Model Engineering Society's Hq. at Stoke Park, will hold a D/F event in the Park on July 10; on July 24 the meeting will cover the subject of Test Equipment. No regular meetings during August except a "Holiday Rag-chew" on the 14th.

Crawley will assemble on the Hog's Back, near Guildford, on July 22, and hope that friends from other clubs will join them for a natter. Mobiles will be operating on 160, 4 and 2 metres. **Reading** will meet on July 25 to discuss Simple SSB Gear—The Palmer Hall, West Street, 7.30 p.m.

Yeovil report that their calendar is left open at this time of the year, because of members' holidays. However, they will certainly be visiting, as a party, the Longleat, Newquay and Weston super-Mare mobile rallies.

Reigate (*Feedback*, May) had a visit from G3JKY, of Clifton, who gave a talk on D/F and showed his two home-built 80-metre portables. On July 18 they will be hearing about Amateur TV from Mr. Noakes of the B.A.T.C.—7.30 at the George and Dragon, Cromwell Road, Redhill. A new call in the club is G3TDT, and three other members await R.A.E. results.

East Worcestershire look forward to a visit from G3GVA on July 9, when he will be talking about Self-Tracking Units. Meetings on the second and fourth Tuesdays continue at **Preston,** where the subject on July 14 will be "Early Days of Amateur Radio," by G3PJ.

Huddersfield is a recently formed (or re-formed) club, with a present membership of 45, including 25 licensed amateurs. Fortnightly meetings are held at Lockwood Conservative Club, and include Morse classes and talks on R.A.E. subjects. Among future plans are visits to places of interest, lectures on Hi-Fi, and mobile operation. Anyone interested is cordially invited to get in touch (*see* panel for secretary's QTH).

Burnham-on-Sea held their AGM, at which the officers were re-elected and the subscription reduced.

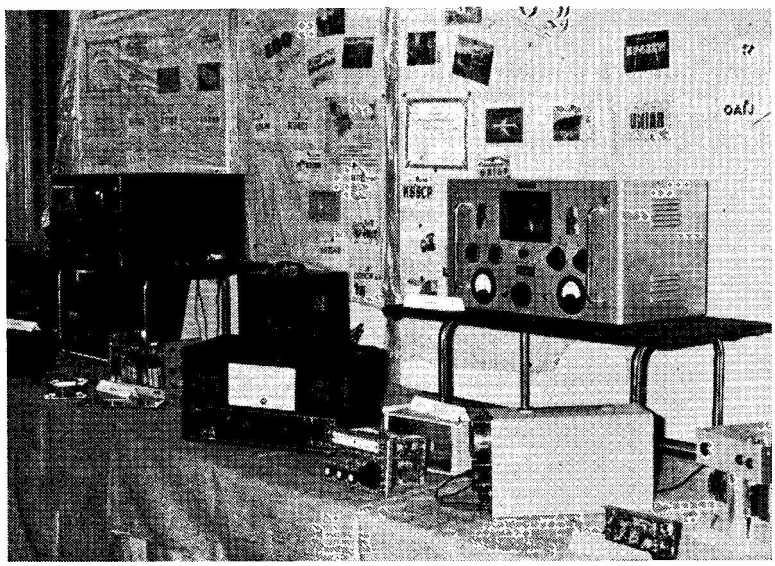
Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, W.3.
A.E.R.E. (Harwell): C. Sharpe, G2HIF, Building 347B, A.E.R.E., Harwell, Berks.
A.R.M.S.: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10.
BARNET: F. Green, G3GMY, 48 Borough Way, Potters Bar.
BLACKPOOL & FYLDE: J. Boulter, G3OCX, 175 West Drive, Cleveleys, Blackpool.
BURNHAM-ON-SEA: D. W. Birt, G3GIW, 99 Stoddens Road, Burnham-on-Sea.
CAMBRIDGE: S. Clarke, 47 Hurst Park Avenue, Cambridge.
CHESTER: R. Trickey, G3DRB, 31 Penzby Avenue, Chester.
CIVIL SERVICE: G. Lloyd-Dalton, 2 Honister Heights, Purley.
CRAWLEY: R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley.
CRAY VALLEY: S. W. H. Harrison, G3KYV, 30 Plaistow Grove, Bromley.
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
DORKING: J. Greenwell, G3AEZ, Eastfield, Henfold Hill, Beare Green, Dorking.
EAST CHEAM: M. D. Bass, G3OJE, 42 Clevedon Road, London, S.E.20.
EAST WORCS.: M. J. Nicholas, 12 Crabtree Close, Lodge Park Estate, Redditch.
ECHELFORD: L. Seaman, G3ATF, 40 Park Road, Ashford, Middx.
GREENFORD: E. C. Gray, G3CPS, 111 Ravenor Park Road, Greenford, Middlesex.
GUILDFORD: H. Mead, G3OXI, 41 Egley Road, Woking.
HUDDERSFIELD: A. W. Green, G3NPV, 334 New Hey Road, Oakes, Huddersfield.
KINGSTON: A. G. Wheeler, G3RHF, 22 Meadow Road, Ashford, Middx.
LOUGHTON: A. W. Sheppard, G3JBS, 11 Barfields, Loughton.
MAIDSTONE: B. G. Harker, 41 Cork Street, Eccles, Nr. Maidstone, Kent.
MIDLAND: C. J. Haycock, G3JDJ, 360 Portland Road, Birmingham 17.
M.R.C.C.: J. Lockyer, G3OVA, 23 Beechwood Road, Birmingham 14.
NEWBURY: R. A. Fuller, 6 Pleasant Hill, Tadley, Basingstoke.
NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax.
NORTH KENT: B. J. Reynolds, G3ONR, 39 Station Road, Crayford.
PLYMOUTH: R. Hooper, G3SCW, 2 Chestnut Road, Peverell, Plymouth.
PRESTON: W. K. Beazley, G3RTX, 9 Thorngate, Penwortham, Preston.
READING: R. G. Nash, G3EJA, 9 Holybrook Road, Reading.
REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.
RODING BOYS: R. J. Phipps, 51 James Lane, Leytonstone, London, E.11.
SCOTLAND: A. Barnes, GM3LTB, 7 South Park Terrace, Glasgow.
SILVERTHORN: B. A. Lea, G3ICY, 9 Balgonie Road, Chingford, London, E.4.
SOUTH BIRMINGHAM: A. E. Bishop Jr., 40 Cecil Road, Birmingham 29 (Acting).
SOUTHGATE: R. E. Wilkinson, 33 Amberley Road, London, N.13.
SOUTH HANTS: G. J. Meikle, G3NIM, 34 Victoria Road, Netley Abbey.
SOUTH LONDON MOBILE: L. W. Wendon, 112 Leathwaite Road, London, S.W.11.
SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
SUTTON & CHEAM: F. J. Harris, G2BOF 143 Collingwood Road, Sutton.
TORBAY: Mrs. G. Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay.
UXBRIDGE: A. Duell, Treetops, Bakers Wood, Denham, Bucks.
W.A.M.R.A.C.: Rev. A. Shepherd, G3NGF, 121 Main Street, Asfordby, Melton Mowbray.
WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington, Wirral, Ches.
WOLVERHAMPTON: J. Rickwood, G3JJR, 852 Stafford Road, Fordhouses, Wolverhampton.
WORCESTER: G. W. Tibbetts, G3NUE, 108 Old Hills, Callow End, Worcester.
YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.

A country membership rate was also introduced, to attract members from outlying districts. The main monthly meeting is at the Crown Hotel on the second Tuesday; on July 14 G3NUK will talk on Fifty Years of Fun with Morse. Informal meetings at the club-room (The Hall, Berrow Road) continue every Tuesday and also on Sunday mornings.

The plans at **Wirral** include a Junk Sale on July 15; a talk on the Uses of Valves, August 5; and on August 19 there is to be an Evening D/F Contest. It is hoped that this year an R.A.E. class will be arranged at Birkenhead Tech. Coll.—those interested are asked to signify either to the hon. secretary (as panel), or to L. Roberts, G3EGX, 18 Croxteth Avenue, Wallasey.

At **Blackpool & Fylde** they have things very well organised—with a *weekly* programme, taking them right through to February 1965! And there are some very "attractive items" in it, too—for instance, on July 6 and 13th, a visit to a deep-sea trawler; and on August 8 they go round Police Hq. at Hutton, Preston. Both these visits should be extremely interesting, and not only from the radio angle.



It is not uncommon for Amateur Radio clubs and societies to be invited to participate in local exhibitions, held in the town hall or community centre, and described as "Hobbies," or "Arts and Crafts," or having some such cultural connotation. This is part of the static display put on by the Swindon and District Amateur Radio Club at the recent Leisure Time Exhibition at the Swindon Town Hall; as is usually the case on such occasions, the exhibit attracted much public interest.

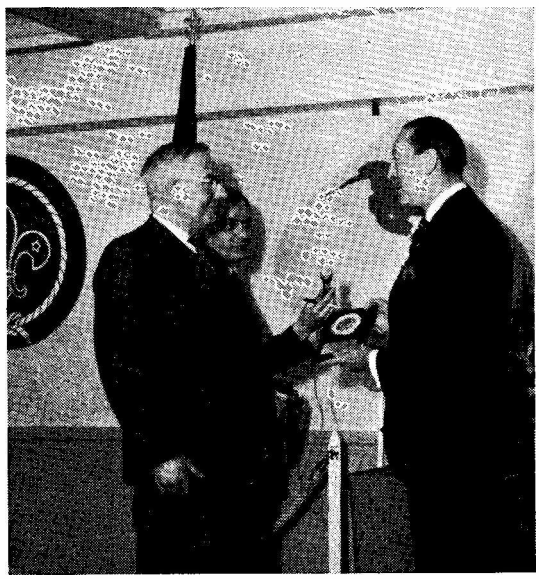
Crystal Palace feel they did pretty well with their single-station entry, G3OOU, for the recent field-day, when 285 stations were worked on the LF bands; membership support for the event is reported as having been very good. A new departure for the Crystal Palace group is an active interest in D/F, in which they are being helped along by members of the Clifton Club, recognised as having the know-how in this field.

Ever looking for new lines of activity, **Roding Boys** are investigating the subject of amateur printing! (They find that, like radio, it has a strange jargon of its own!) However, they are not neglecting Amateur Radio and will be running a stand at the local Borough Exhibition next month, and also have plans in hand for their (radio) camp in August.

Likewise pursuing a line of their own **East Cheam** specialise in VHF—portable, fixed and mobile and covering 70 cm. as well as two metres. To support their /P activities they now have no less than four P-E sets—this is in case the one on duty passes out at a critical moment!

Another group keen on D/F, the **Greenford A.R.S.** have a talk on the subject on July 3 and then a hunt through Burnham Beeches on July 26. On the 17th the meeting will discuss the rather odd but nevertheless topical problem of "Electronic Traps for Petty Thieves!"

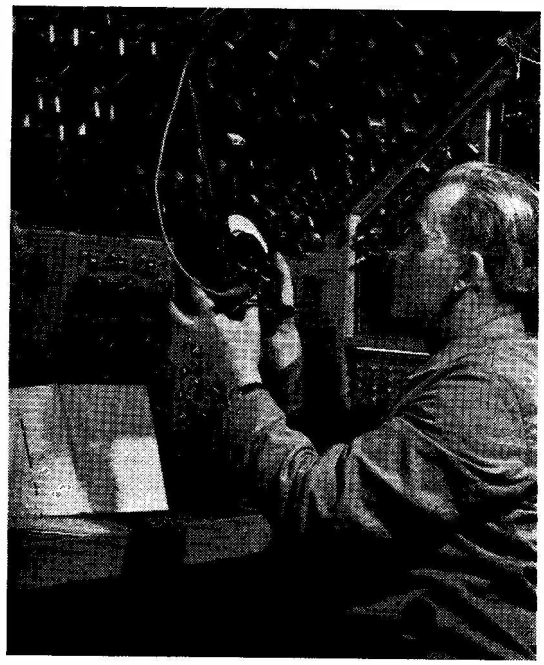
At their recent AGM **Maidstone** elected SWL Barry Harker as hon. secretary, other officials being



For several years now, we have been mentioning G3BHK (Wareham, Dorset) as the U.K. organiser for the Scout Jamboree-on-the-Air, a world-wide communication party laid on each October to bring Scouts together by Amateur Radio. Over the years, this has become an important event in the calendar of our activities — and it is not too much to say that G3BHK was the originator of the U.K. and Commonwealth participation, if not of the whole idea. His contribution to the international success of the Radio Jamboree was recognised by the presentation to him of a plaque, on May 8 at Baden-Powell House in London, by Major-General D. C. Spry, director of the Scouts World Bureau, Ottawa. In this picture, G3BHK is on the left.

G3ERY, chairman; G3ORP, vice-chairman, also responsible for publicity and R.A.E. lecturing; G3ORH, committee member for transmission and CW instructor; and G3REM, contest matters; they are supported by SWL's Gibb (hon. treasurer) and Holder (committee representative for SWL interests). This seems to us a very sensible allocation of duties, right in the context of an Amateur Radio club. The Maidstone group meets weekly on Wednesdays and the programme is fixed right through until September. Their Hq. is the YMCA, Hollingworth Hall, Union Street, Maidstone, 7.45-10.0 p.m., and they have library facilities for R.A.E. study. The group includes five members who are licensed and active.

The following Club Publications are also acknowledged: **North Kent** (*Newsletter*, No. 79); **Radio Club of Scotland** (*"GM" Magazine*, May); **WAMRAC** (*Circular Letter* No. 43); **A.R.M.S.** (*Mobile News*); **A.E.R.E., Harwell** (*QAV*, June); **Wirral** (*Newsletter* No. 5); and **Crystal Palace** (*Newsletter*, June).



A B.A.C. technician using the Model 8 Mk. III test-meter, the latest instrument in the AVO range, to go through the flight engineer's panel on a VC-10 jet aircraft. Its layout will give any AT-station operator ideas about the economical use of space; there is a vast amount of circuitry behind those panels in the cabin roof.

SMALL ADVERTISEMENTS

(" SITUATIONS " AND " TRADE ")

9d. per word, minimum charge 12/-. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). No responsibility accepted for errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

SITUATIONS

LABGEAR LIMITED have vacancies for both junior and senior communications engineers for designing and building transmitting and receiving equipment. Excellent working conditions in a modern laboratory, with really attractive prospects for sound, practical men. Applications, which will be treated confidentially, should give full details of previous experience, whether professional or amateur.—Labgear Limited, Cromwell Road, Cambridge.

TRADE

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

WEBB'S LOG BOOK for recording signals heard and worked; 112 pages 9¼in. x 8in. approved format, semi-stiff covers. Excellent value; 6s. 0d. post free, or callers, 5s. 4d.—Webb's Radio, 14 Soho Street, London, W.1.

CASES, chassis, panels. ANYTHING in metal; send your drawings for quote. Stove enamelled, hammertone, or plain, in any colour.—Moss Watson, 40 Mount Pleasant Street, Oldham, Lancs. *(Main 9400.)*

METAL Supplies. Aluminium, Brass, Copper, Steel —in sheets, tubes, rods and sections. Write for free price list.—Senmor Metals, Dept. R/5, 35 St. Johns Road, Isleworth, Middlesex. *(Tel. ISLeworth 6017.)*

CATALOGUE No. 15 Government Surplus Electrical and Radio Equipment. Hundreds of items at bargain prices for the experimenter and research engineer, 2s. 6d. post free; catalogue cost refunded on purchase of 50s.—Arthur Sallis Radio Control Ltd., 93 North Road, Brighton.

QSL CARDS: Buff, blue, pink, green, 100, 15s.; 250, 25s.; 500, 40s.; 1,000, 75s.—Samples (s.a.e.); Reilly, Panxworth, Norwich, 56.Z.

WANTED: Business Radio base station and one or more mobiles. Must be Post Office approved type.—Deery, Railway Road, Strabane, Co. Tyrone, N.I.

BUSY amateur TV transmitting. Sale: Hammarlund HQ-170, £100. K.W. 500-watt 80-10 metre SSB Linear Amplifier, £50. EXCHANGE: R.E.E. 2-metre transceiver (working but needs overhaul) complete with mobile power pack, for 70 cm. 4X150A or 4X250 cavity PA, suitable grid modulation amateur TV with associated power pack.—G5ZT, *QTHR.*

HALSON 3FIF MOBILE ANTENNA, Coils for all Bands, Telescopic Whip and coil of your choice, £6 10s.; extra coils, £3 10s. each, C.W.O.—Halson Radio Services, Dover Road, Blackpool, Lancs.

FOR DISCERNING ENTHUSIASTS. Exotic semiconductors for short waves, UHF and power. 2N1742, 14-19 dB gain at 200 mc, 24s. 6d. RCA 2N3053, NPN silicon planar, 60v., 5w., f_t = 100 mc, 15s. 6d. S. T. & C. thermistor R53, 21s. Tunnel diodes and other components, etc. Postage 6d. C.W.O. Please send 6d. stamp for new catalogue.—J. Williams & Co. (SW), 208 Hagley Road, Birmingham 16.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 Extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

SALE: K.W. Viceroy Mk. III with extra filter section, little used, in new condition, £115 o.n.o.? Also high-power passive-grid Linear Amplifier with two 4X150A valves in parallel and self-contained PSU, £50 o.n.o.? HRO and Top Band AM rig, £25 the two.—H. S. J. Kellaway, GW3CBA, 24 Hywel Crescent, Cadoxton, Barry, Glam.

TCS-12, Rx and Tx, with pre-amp. for crystal mic., mains PSU, all cables and rack, ready for use, £15. Buyer collects.—Halstead, 9a Rosebery Road, Boscombe, Bournemouth. *(Phone Bournemouth 46851).*

EXCHANGE: HRO Senior table model, as new, 9 coils GC and BS, HRO p/pack, manual. WANTED: Good four-speed auto record player.—G3JUM, 1a Princess Terrace, Ripon, Yorks.

SWOP: 150 c.c. N.S.Y. scooter, 1959, extras, value £35 FOR good commercial receiver; AR88LF/D, Eddystone.—Leigh, 12 Lower Church Lane, Farnham, Surrey.

WANTED: Electroniques Qoilpax type QP166, also circuit for AR88LF.—A. Jones, 33 High Street, Treorchy, Rhondda, Glam.

FOR SALE: Eddystone S.640 with Eddystone speaker and S-meter, £22 10s. Also pair of 38 Walkie-Talkie for 50s.—G3KTL, 30 Sudbury Drive, Cheadle, Cheshire.

FB Radiocraft preselector, RF amplifier 10 to 160 metres, enclosed power supply, £3. Class D-Wavemeter/Monitor with valves and crystals, needs slight attention, 25s. AC power pack, 350v. and 6·3v. out, complete in metal case, 25s. Xtal microphone, new, 7s. 6d.—Brand, 78 Broad Walk, Hockley, Essex.

22 SET, complete station with spare set, £10; 19 Set Mk. III complete, £5; both perfect. Radar tube tester/reactivator, £4. Various handbooks; AR88, HRO, 19 Set, Racal 216, etc.; s.a.e. enquiries. Carriage extra.—Hirst, 27 Cumberland Road, Devonport, Plymouth, Devon.

HRO senior, 9 coils, 50 kc-30 mc, PSU, phones, speaker, perfect condition, £18.—L. Chiodini, 38 Hillrise, Sundon Park, Luton, Beds.

SALE: 888A, S-meter, mounting blocks, good condition, £65 or nearest offer? — Gibbs, 4 Yew Terrace, Claverton Down, Bath, Somerset.

FOR SALE: in good working order, Minimitter 120-watt Phone/CW, £25. 36 Set sender 100-watt Phone/CW and PSU, with R.208 Rx, £10. Inker and tape, £3. 36ft. mast with new 2-metre 6-over-6 and 36ft. coax, £3. "Tiny Tim" 300-watt petrol generator with self starter, nearly new, £10. Buyer collects. —G2FM, *Derwent 3122.*

SMALL ADVERTISEMENTS. READERS—*continued*

HRO Senior table model, including PSU and all coils + 21 mc BS, exceptional offer, one owner since new, original packing case and spare valves, £30 o.n.o. ? WANTED: 25-0-25 μA 2in. Weston meter and relay for AP.66862 TU.—Addie, Corner House, Sulgrave, Banbury, Oxon.

HALLICRAFTERS SX-17 Receiver, 550 kc to 62 mc, £12 10s., carriage paid.—P. Brown, 3 Cresta Drive, Scunthorpe, Lincs.

FOR SALE: R.107, good working order, £10 o.n.o.? Buyer collects. *Short Wave Magazine* December '58 to February '63—offers ?—Hill, 138 Ainsdale Road, Leicester.

HALLICRAFTERS S40B general coverage Rx, 6 amateur bands, bandspread, £15. Geloso converter, 5 amateur bands to 4·5 mc, £12. Ceramic coil formers, 3in. diameter, plug bases and sockets ; loudspeakers ; crystals ; transformers, etc., s.a.e. for list. WANTED: Panda ATU.—Box No. 3033, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CANADIAN No. 52 Receiver, good condition, complete with transformer, handbook and variometer, £9 (carriage 25s. extra).—Ridgley, 80 Eden Park Crescent, Carlisle, Cumbs.

EXCHANGING four brand-new boxed QQV03-10 valves and £1, for Top Band Command Rx or similar for mobile use, 12v.—Box No. 3034, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

840C in mint condition with S-meter, ATU and 32ft. vertical aerial. Inspection at this QTH desirable but free personal delivery within 40 miles could be arranged. Starting price £45.—Gillett, 10 Ernicote Close, Ambrosden, Bicester, Oxon.

WANTED: K.W. Valiant, in good condition, with or without PSU. Please state if built from kit. Will collect if local.—G3RVQ *(QTHR)* **or phone** *Wytenshawe 3437*, **day.**

BC-453 PSU, £5. McElroy *de luxe* Bug Key, £3 10s. Collins mechanical filter, narrow series 6 dB 500 c/s 60 dB 2·5 kc maximum, £10. Box Number 3035, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Manual and S-meter for AR88D ; state price.—B. Smith, 17 Sutton Road, Kidderminster, Worcs.

WODEN UM0 mod. transformer ; four Top Band crystals ; excellent German key ; two meters 0-5 mA, 0-100 mA; new 6L6M; 1942 ARRL *Handbook;* 1948 *Radio Handbook;* 150 *Magazines* and *Bulletins,* first £6, lot. Delivered North West.—Garner, Barbon, Aigburth Hall Road, Liverpool, 19.

WANTED: Buy or borrow manual for R.107.—Yallop, 10 Farley Hill, Luton, Beds.

HALLICRAFTERS S38, S-meter, handbook, spare valves, £6 10s. Buyer collects.—Tivey, 64 Tilford Road, Farnham, Surrey.

FOR SALE: Labgear 300 Tx, with PSU and mod. unit, as new, going SSB, £60 o.n.o. ?—G3OUQ, 53 Watling Street, Nuneaton, Warwickshire.

UNUSED Meters: 0-15 amp. mc, 2in. round flange, fitted with external shunt, basic 5 mA, 6s. each, post paid.—J. Cooper, 13 Churchfield Road, Outwell, Wisbech, Cambs.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: One Joymast and Joystick aerial, cost nearly £10, sell £8 ; complete all-nylon guy ropes with manufacturer's testimonials ; in use one month, must sell, change in plans. Signal Generator, commercial manufacture, new, £5. New Heathkit GDO, cost £13, sell £11. Mobile aerial commercial manufacture, cost £6, sell £4; never used 160 metres. Typewriter, one month old, cost £24, sell £19, plus leather case. On holiday two weeks from July 6. — Hurst, 7 The Laurels, Burnside, Fleet, Hants.

WANTED: Top Line Engineer to hot up and modify McMurdo Silver to EF183's. No bodgers please. Circuits available.—Details Box No. 3036, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HELP: Manual or circuit of UHF Receiver R.1359 and power pack urgently required. Prefer buy, grateful to borrow.—Shepherd, Clareville, Westerland Avenue, Canvey Island, Essex.

RE-ORGANISATION and RE-EQUIPMENT SALE. All in generally good mechanical and electrical condition and external appearance. *Below.*

LG.300 250w. CW Tx, 10-80m., spare 813, less PSU/Mod. unit. *Below.*

K.W. "Viceroy" 150w. SSB/CW Tx, 10-80m., Mk. II version, complete with external PSU/Control unit (new 6146's recently). *Below.*

DX-100U 150w. all-band Phone/CW Tx ; has Top Band mod. (needs superficial attention). *Below.*

DX-40U 60w. Phone/CW Tx, 10-80m., unmodified (no VFO, less xtals and 6146). *Below.*

K.W. "Valiant" 65w. Phone Tx, 10-160m. version, with gimbal mounting for /M installation (requires external PSU), factory built. *Below.*

K.W. "Vanguard" 50w. Phone/CW Tx, incorporating Top Band mod., older model (requires VFO re-calibration). *Below.*

LABGEAR Top Bander, screen-mod. model E.5051 (some slight attention needed). *Below.*

WITHERS 10w. two-metre Tx (original design), with mains PSU and control unit. *Below.*

RECEIVERS: Minimitter MR-44/I ; Eddystone 888 ; Codar CR-66 with PR-30 Preselector. *Below.*

RADIOVISION two-stage Preselector, continuous coverage 3·5-30 mc in five switched bands, internal PSU, gives enormous front-end gain (shabby, but working). *Below.*

KIT-BUILT Cossor single-beam 'scope, Model 1045K with 3½in. tube, faulty on one range. *Below.*

ALSO quantities good components, including condensers, transmitting variable ; meters, in numerous ranges ; transformers, EHT, HT and Mod.; good hardware (clean cabinets and chassis, unused); speakers and LS units; and useful miscellaneous parts. On offer to callers for major items. *Below.*

ALL above available for inspection, South Midlands district, by appointment. Cash-and-carry basis only. Firm offers for major items (mentioning when convenient to call, with phone number) to: Box No. 3037, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. *(Sale remains open until July 18; all letters answered in due course; no lists, packing, delivery or h.p.)*

SMALL ADVERTISEMENTS, READERS—*continued*

RTTY: 7B Page printer, cover, 50 and 45 Baud governors; 66862 Converter and matching PSU; Type 26 and Motor PSU's. Demonstrated, only sold complete, £50; delivered London area. Smart WØHZR Phase Shift Indicator, £10. WANTED: 51J3, S-36.—*Phone COLindale 9315.*

MANUALS CR-100, BC-312, R.220, R.221, Wavemeter 1360 kc to 7510 kc coverage.—Webb, 5 Farrant House, Winstanley Road, London, S.W.11.

SALE: Heathkit SB-10U, as new, £30 o.n.o.? Angle Iron Tower, £3.—Ginder, 222 Whetstone Lane, Aldridge, Staffordshire.

SALE: Mosley CM-1 with Q-Multiplier, in new condition, £55.—Gill, 84 Chevinedge Crescent, Exley, Halifax, Yorks.

SALE: AR88D, S-meter, excellent order, cost £75 three years ago, manual, speaker, phones, possible transport, £35; genuine reason sale.—Call 6.30-10.00 p.m. or write R. J. Smith, 81 St. Mary's Close East, Littlehampton, Sussex.

EXCHANGE: McElroy *de luxe* model Mac Key (Bug) for good air-rifle.—A. J. Lloyd, G3AKY, 425 Hastilar Road South, Sheffield 13.

TWO-METRE CONVERTER, crystal controlled, cascode circuit, complete with crystal, valves and built-in power unit, IF output 23·8-25·8 mc, £5 10s. Another similar, but IF output 14·7-16·7 mc, £5 10s. Another, suit beginner, not crystal controlled, 24-26 mc, £4.—G. A. Jeapes, 165 Cambridge Road, Gt. Shelford, Cambridge.

HRO (mint), p/pack, 7 coils, manual, £22 10s. or EXCHANGE refrigerator, furniture, telescope W.H.Y.?—*Phone Crompton 366 (Lancs.)*

WANTED: FB 70 cm. AM Tx, with or without PSU, not below 20 watt input. Also WANTED: 405-line TV S.P.G. up to Broadcast standard. Also 28 cm. Rx or converter. W.H.Y.?—Box No. 3038, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Mains 25-watt Modulator, 19in. rack mounting, with UM3, £5. 750-0-750v. 200 mA mains transformer, £5. 3ft. x 4in. x 19in. rack with ex-equipment panels and chassis, £1. Heathkit VF-1U, mint, well built, virtually unused, £7.—G. J. Knights, Ashar, Cross Road, Tadworth, Surrey. *(Tadworth 3247.)*

VALVES: EF80, EF91, 10F1, 10P13, 20F2, 20L1, ECL80, all at 6d. each (postage and packing 6d.), or 5s. dozen (postage and packing 1s.). Pair 4X150's, 30s., unused. 12BH7, EL81, 12AT7, 6AT6, PL81, PY81, PZ30, EBC33, 2s. 6d. each (postage and packing 6d.).—J. D. Simpson, 50 Vicarage Road, Norwich.

WANTED: BC-375 Tx, complete PSU's and TU's.—Webb, 5 Farrant House, Winstanley Road, London, S.W.11.

TWOMOBILE Transistor Rx, as new, £25. TR1986 (no valves), perfect condition, £3. BCC transceiver with PSU and manual, easily converts to 2 or 4 metres, £4.—Box No. 3039, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: PYE "Reporter" Radio-Telephone type PTC-116. WANTED: Signal Generator, also Receiver covering 160m. for SWL.—G3PWV, 48 Paganel Road, Minehead, Somerset. *(Minehead 1529.)*

SMALL ADVERTISEMENTS, READERS—*continued*

DRAKE 2B, xtal cal. and Q-mult, speaker, immaculate, unmarked condition, performance superb, and in original transit boxes, £95. Commando Tx, as new, 80-100 metres, SSB spec. excellent, silicon power supply all built-in and excellent VOX, sideband switching, etc.; demonstrated on the air, photo available, £90. 813 SSB Tx, 200 watts output, 350 watts input, 10-80 metres, self contained in cabinet 20 x 11 x 10in., uses G2DAF 2 x ½-Lattice filter, exciter and Kendon mixers and driver; metered, easy to set up and very stable, complete with 1400v. power unit 20 x 7½ x 10in., in grey; this can be stowed under bench or table; photo available, complete, to work off 200-240v., AC mains, with mic., £85. Collins TCS-12 Tx and Rx, with rotary generator to match, all genuine cables and plugs and mike, as new, no mods done; would sell separately, photo available, complete outfit, £25. 70 cm. converter 28-30 mc IF, xtal controlled, in Philpotts case, 6AN4 RF stage and copper cavities, mixer current meter, etc., needs 200v. HT and 6·3v., £10. T.W. 2-metre converter, 28-30 mc IF o/p, as new, £9. AVO signal generator, 50 c/s i/p, 500 kc-80 mc, built-in diebox type with turret and accurately calibrated attenuator o/p; new condition, with spares box, manual and leads, £10. Photos available of this equipment.—G3EKX, 92 Belper Road, Derby.

EDDYSTONE S.640. 75w. AM/CW Tx, complete supplies, etc. SSB "Natterbox" and PA. Lots of gear; s.a.e. for details or ring *Barrow 41619*.—G3KKJ, 1 Orcades Green, Barrow-in-Furnace, Lancs.

HALLICRAFTERS S.19R Rx, 540 kc to 46 mc, realigned and some new valves, £11. Valves: 6SQ7, 7s.; 6K6, 2s. 6d.; 6K8G, 4s.; 6K7G, 2s. 6d.; 4D1, 4s. Heater transformer 0/250v., 6·3v., 1·5A, 6s. R.S.G.B. *Bulletin*, Vol. 37, Nos. 4, 6, 7, 8, 10, 12, 1s. 3d. each. *Short Wave Magazines*, Vol. XX, Nos. 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 1s. 6d. each. Power Pack 250v. 60 mA, 6·3v., 2A, £1.—Livermore, 30 Johnson Road, Barrow, Bury St. Edmunds, Suffolk.

VALVES, type 6060 (heavy duty 12AT7), £1 for six, post paid.—Jeapes, 165 Cambridge Road, Gt. Shelford, Cambs.

WANTED: Contents, complete amateur shack, buy or swop my Armstrong Siddeley 346 Sapphire, an excellent example of this model.—Box No. 3041, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: DX-40U, excellent condition with handbook, £20. Geloso VFO 4/102v., unused, tested, with valves and dial, £6. Prefer buyer arranges collection.—G3RDC, 30 Baldslow Road, Hastings, Sussex.

B33 Tx/Rx, circuit, component valves, and alignment details, available at 5s. post free from—G3IUG, 39 Curlieu Road, Oakdale, Poole, Dorset.

EDDYSTONE 840C, April 1964 model, mint condition, £42, s.a.e. pse.—Box No. 3040, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

LOADS of gear at give-away prices, including complete 19-valve Transceiver, s.a.e. lists.—E. H. Towell, Hamlyn, Saxon Avenue, Minster, Sheppey, Kent.

K.W. "Viceroy," mint condition; K.W. LP filter; and all-band dipole. Offers?—G3NLD, *"Call Book" Address.*

SMALL ADVERTISEMENTS, READERS—*continued*

COLLINS 75S-1 Receiver with accessory 500 c/s filter and extra crystals, £165. Collins 30L-1 Linear Amplifier, new 1963, £175. Heathkit HO-10 Monitor 'Scope, £30. Hammarlund HK1-B Electronic Keyer, £12. Jennings Vacuum Variable Capacitor, 5-100 $\mu\mu$F, 7·5 kV, with dial, £10. Lots more gear, books, etc. All in new condition.—G5RP, Old Gaol House, Abingdon, Berks.

BATTERY tape recorder, tapes, £4. Magazines, s.a.e. list. WANTED: AR88D handbook, your price. EXCHANGE: P.104 (100-150 mc), conversion data, parts, loudspeaker, AC power pack for BC-348, HRO or similar. All offers answered.—Hardy, Ballindoney, Berry Lane, Haughton, Stafford.

BC-348C Receiver, 1·5 to 18 mc, AC mains, speaker, working order, £8.—Phone *Trevelyan 8141*, Briscoe, 335 Eton Road, Ilford, Essex.

SALE: AR88D with handbook, £40. Also Heathkit OS-1 'scope, £17 10s. Both mint condition, £55 the two. Buyer collects (Durham).—Box No. 3042, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HEATHKIT 10-12U 5in. CRO, perfect condition, £21. Taylor Signal Generator Type 68A, 100 kc-220 mc, CW/AM, £12 10s. Manuals and leads for both. 1960 *ARRL Handbook*, 7s. 6d.—Fry, G3NDI, *Shirley 3730*.

TA-33Jr, 6 months old, lacquered, £12 10s. Also 2/4X150A with "airflo" bases, new, £6 each or, £10 a pair.—G3PTN, 3 Toronto Place, Leeds, 7, Yorks.

SALE: AR88 excellent condition speaker/manual, £40. R.107 ditto, £10. Codar PR3OX preselector, £6.—Westwood, 114 Pettits Lane, Romford, Essex. *(Romford 47577.)*

FOR SALE: SR-40 Rx with preselector, excellent condition, £22 10s. o.n.o.?—Winnard, 15 Barleycroft, Westbury-on-Trym, Bristol.

FOR SALE: Coaxial Plugs for R.216 AM/FM Receiver: Aerial Input 7s. 6d.; IF output, 4s. 6d. RF-26B Unit, 35s.; BC-453A, £5; both new and unused. Manuals for HRO and AR88D, 25s. each, postage extra. Spares available for HRO and AR88D/LF; send s.a.e. for list.—A. J. Reynolds, 139 Waller Road, New Cross, London, S.E.14. *(Tel. New Cross 1443*, after 7.30 p.m.)

CT-53 Signal Generator, new, £8 10s. Hallicrafters R.19 Rx's 115v., 70 to 100 mc, £2 10s. each. Two Wavemeters Type 1185A 20 to 100 mc, £2 10s. each. Aerial tuning unit for Canadian 52 Set, £1 10s. IF alignment oscillator, £5. Two 1540 Tx's, covering 144 mc, £6 10s. each, 832 final. FM-AM Generator by Boonton Radio, £5 each. 19 Set Variometers, 6s. each. Interested in exchange for Apache Tx or Panda PR-120V.—J. Sharratt, 12 Pebblemoor, Edlesborough, Dunstable, Beds. *(Tel. Eaton Bray 297.)*

WANTED: Receivers type R.308, R.1132, R.1084, also Receivers for VLF and UHF. A small 7 and/or 14 mc Tx.—Box No. 3043, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE: Brand new unopened Philips Stereo Tape Recorder EL3534 (cost £97), for KW-2000 or similar Transceiver; cash adjustment arranged. —Box No. 3044, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: Complete SSB/CW/AM station. Hallicrafters HT37 Tx and SX-101A Rx, with matching speaker; Dow co-axial relay, K.W. LPF, and heavy duty auto transformer. Best offer secures.—Hughes, GM3EDZ, 455A Great Western Road, Glasgow, W.2.

SALE: BC-211 frequency meter with spare valves and crystal, £14. Class-D Wavemeter, new, £2 10s. *Short Wave Magazines* March 1962 to May 1964, 55s., R.S.G.B. *Handbook*, £1.—Hogan, 4 Park Villas, Crowton Colliery, Whiston, Lancs. *(Tel. Huyton 1933.)*

SALE: Top Band Tx, size 6½in. cube, 12AT7 Osc/Buffer, 5763 final. Circuit page 420 R.S.G.B. *Manual*. No PSU required; 12v. and 300v., 100 mA, £5.—C3RDG, *QTHR*.

WANTED: Manuals for G.E.C. Miniscope M860B with wobbulator, and Mullard RC Bridge GM 4140/1. January to May 1945 (incl.) issues *CQ*, your price paid. SALE: Heathkit "Tener" 10m. transceiver with auto xformer, immaculate, £16. 339 'Scope, £10. Weston 785 multimeter, £10. 14 mc CW Tx (no PSU) 6C4-6AK5-5763-6146-6V6 (Clamp.) in table-top cabinet, £5. Bound volumes of *CQ*: 1949, 1950, 1951, 1957, 25s. each. First 15 issues *73 Magazine* (exc. January 61) 55s. 12 issues *QST* 1941/2/3, 24s. Large re-entrant horn LS, slightly dented, 35s. Delivered Greater London area, otherwise buyer collects or pays transport.—G3JDP, 111 Canfield Gardens, London, N.W.6.

HOME-BUILT Tx using Geloso VFO, 10-80 metres, 150-watt; and Class-D Wavemeter, £12 10s. s.a.e.—Jones, 40 Harvey Crescent, Wellington, Salop.

MOHICAN GC-IU wanted, £22 offered.—Britton, Wynyard, Leys Road, Oxshott, Surrey. *(Tel. XSO 2565.)*

EXCHANGE: KW-160 (see Top Band Counties Ladder) for best offer of Tx covering 10 metres.—G3NPB, Springfield, Haydon Bridge, Hexham, Northumberland.

FOR SALE: Cossor 1035 double-beam Oscilloscope. Best offer over £15 secures. Buyer collects.—S. J. Cook, Sunnycroft, 26 Mount Harry Road, Sevenoaks, Kent. *(SEV. 52410* after 8 p.m.)

WANTED: R.107 with manual, preferably no mods., must be v.g.c. electrically, state price, will collect within reasonable distance of Brighton.—E. N. Marsh, H.M. S/M *Rorqual*, c/o G.P.O., London.

FERROGRAPH Type 5A Tape Deck, in original packing, as new, £33. Endless-Loop Cassett for above, £2. Planet U1 Tape Deck, 3 Miniflux heads, new condition, £25. Heathkit (U.S.A.) RX-1 Mohawk receiver, good condition, has had very little use, £100. Eddystone loudspeaker, £2. RCA Wavemeter TE-149, £4. Ronette RFC DX Microphone, £2 10s. WANTED: VVM with mV ranges, must be as new.—Box No. 3046, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

ANTENNA Tuning Coils ex-TCS, new, 10s. 6d. (2s. 6d. p & p). Valves at amateur prices: 807, 5763, 12AT7, 5U4G, 12AX7, 6CH6, 6BW6 and plenty more; list.—G3LSD, Netherton Cottage, The Elms, Stoke Damerel, Plymouth.

SMALL ADVERTISEMENTS, READERS—*continued*

K.W. VANGUARD Mk. II, factory-built, only one year old, £45. Eddystone 888A with feet, £65, both as new.—Box No. 3045, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Marconi 52 Set, ATU, PSU, as new, £11. PYE PCR-2 internal PSU, v.g.c., £5 10s. 19 Set Mk. III, fair, £3. Prefer buyer collects.—Ridgeway, 13 Sunnyside Gardens, Upminster, Essex.

WANTED: TA-32Jr. or TA-33Jr. Beam. G8KW trapped Dipole with 97ft. coax. CDR Beam rotator. SALE: 80v. PSU suitable T/P.—G3MEW, 17 Testcombe Road, Alverstoke, Gosport, Hants.

SALE: A COMPLETE MOBILE STATION. DX-40U with high-level plate modulation; with single switch control, silver and front blue, external 30-watt modulator with pair of KT77's and also the VF-1U VFO, all done by Tiger Ltd., never been used, £45. Also the RA-1 Receiver, 10-160 metres, with Q-Multiplier and crystal calibrator and speaker, £45; or £90 the lot (all factory-built). (Any answers sent after July 20.)—James Ash, 9 Craigpark Street, Faifley, Clydebank, Scotland.

SX-28 115v./230v. with speaker and manual, £26. BC-224 (12v. BC-348) almost as new, circuit, £15. Nombrex signal generator, £6. Joystick, £2. 9v./450v. dynamotor in carton, £3. BC-348, suitable rebuilding, with valves and diagrams, £3.—Box No. 3047, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: PR-120V Tx, 150-watt, manual, £30. Panda Cub, manual, £25. AR77 Rx with Radiovision Preselector, £18. Mohican, manual, £18. Minimitter, mobile Tx with control box, whips 160, 40, 2 metres, mobile PSU's, £18.—Partridge, 68 Manor House Lane, Birmingham, 26.

AR88D Receiver, good condition, £25. LG.300 style 5-band Transmitter with PSU and Mod., £20. 3X teleprinter, complete, £5. Type D Wavemeter, mains powered, £2. Labgear 2-metre converter, 4-6 mc IF, mains powered, £5.—12 Leslie Road, Winton, Bournemouth. *(Tel. Winton 1681.)*

TELECOMM 10-valve VHF/Rx, 78-176 mc, built-in LS and mains supply, brand new, outstanding performance, cost £110, selling for £70. RF Amplifier AM912/TRC, unique American 110w. PA, 100-220 mc, with 4X150A, perfect condition, £35. WANTED: Marconi Deviation Meter TF-934.—Box No. 3049, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

£12 OFFERED for R.206 (with mains PSU) or CR-100, must be electrically 100%. Manual or handbook also wanted. Cannot collect, but will pay carriage. Details to—Wilkinson, Graigydon, Conway Road, Penmaenmawr, North Wales.

COLLINS 30L-1 linear amplifier, in unmarked condition. Price, with three spare 811A's and free delivery (England), £150. This is £75 saving on new.—Box No. 3050, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Mohican GC-1U Rx, just aligned and tested, in excellent condition. Also power supply unit UBE-1 and manual for same. The lot £25 o.n.o.? (carriage paid).—GI3SOO, 79 Prehen Park, Londonderry, N. Ireland.

G3BDQ Rx for sale. Eddystone dial, working, needs attention, £20 o.n.o.?—Trefor Jones, Watchmaker, 612 Foleshill Road, Coventry.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: MCR-1 SPY Rx, P/pack dis. on LT, £3. *Amateur Radio Handbook* RSGB, £1. Signal straight key, 10s.—Box No. 3048, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OPERATION "CLEAR-OUT" reveals hordes of new and used unwanted Rx and Tx components and equipment. Too numerous to itemise; s.a.e. for full descriptive list and prices. Parcels for Club Junk Nights.—A.R.T., 11 Fourth Ave., Carlton, Nottingham.

SALE: Over 100 *Short Wave Magazines, Bulletins, QST, Wireless World,* etc., December 1960 to April 1964; RSGB *Handbook;* K.W. LPF, Chan. 4; lot £5 5s., carriage paid.—Box No. 3051, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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