

# The SHORT WAVE Magazine

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NUMBER 1

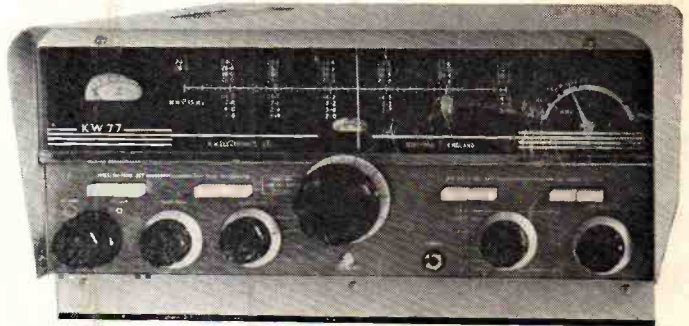
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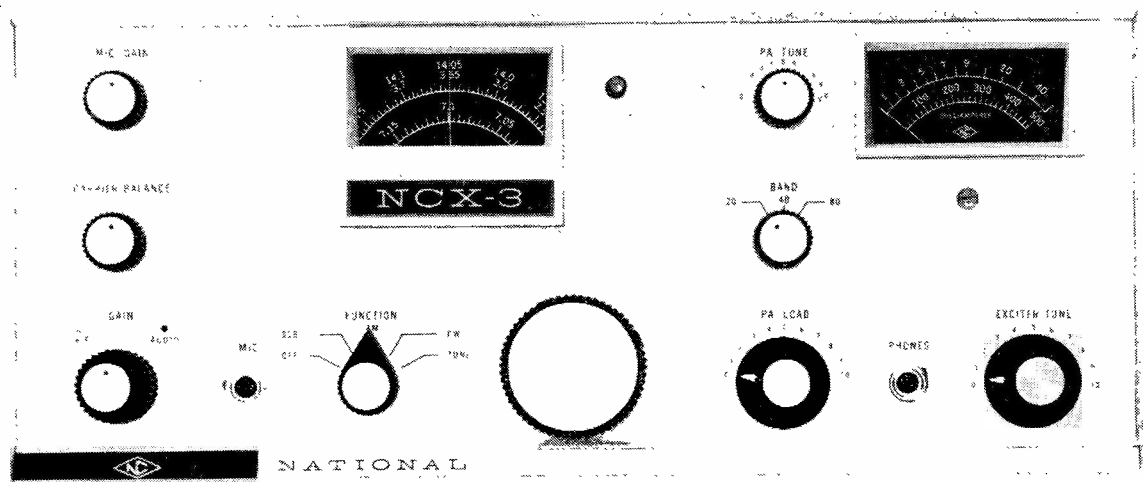
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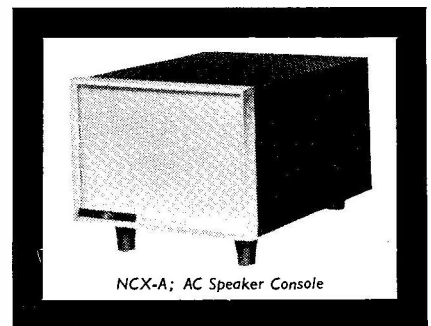
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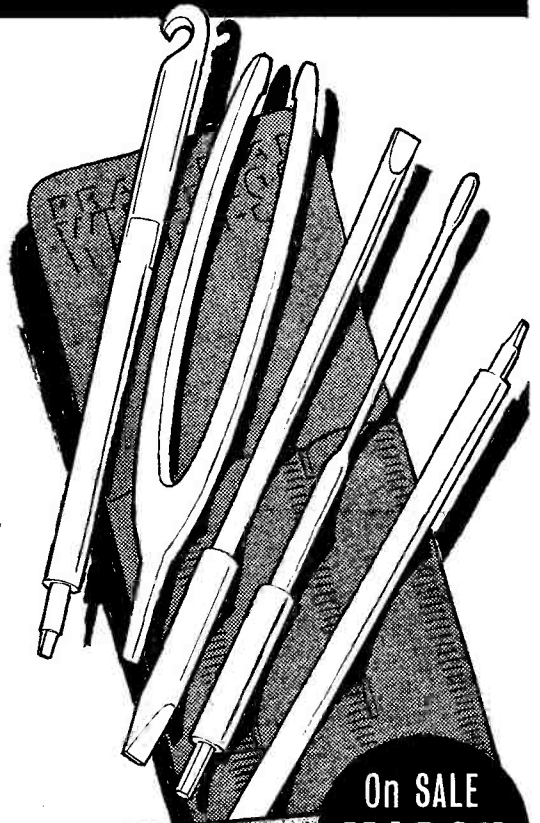
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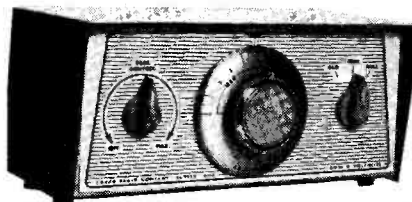
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**Cat. No. R.Q. 10X.** Self powered model for 200-250 volts A.C. fitted with accessory socket to provide up to 25 M/a. at 200 volts H.T. and 6.3 volts 1 amp. L.T. for other accessories. **£8. 8. 0 Carr. 3/6**

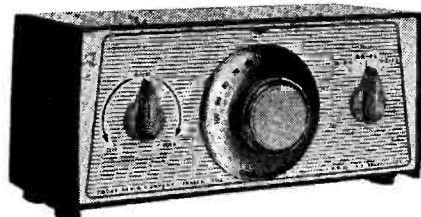
Both models are complete ready for use with all cables, instructions, etc.



## ★ P.R. 30. R.F. PRESELECTOR ★

Frequency range 1.5-30 Mc/s.

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G2LU writes . . .

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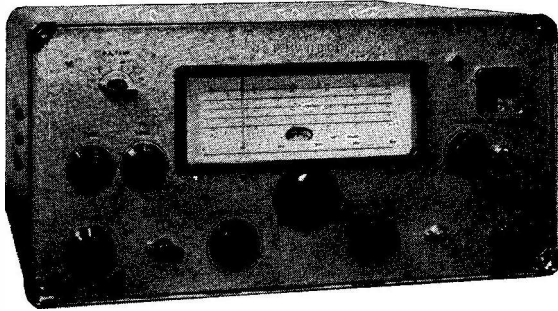
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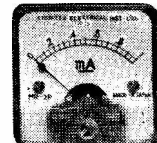
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# SHORT WAVE MAGAZINE

(GB3SWM)

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MARCH, 1964

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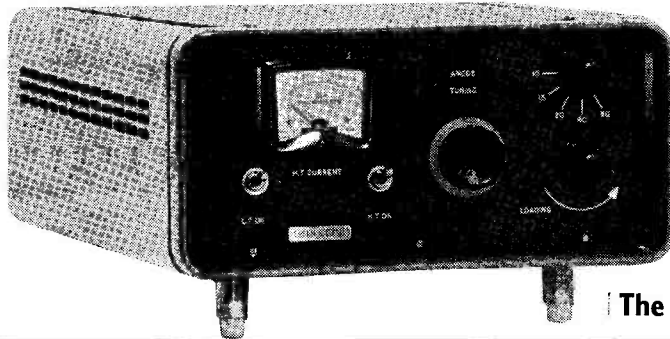
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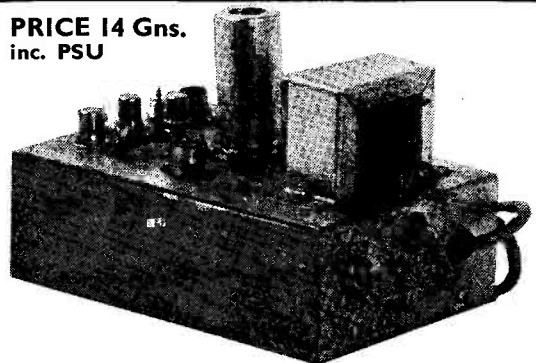
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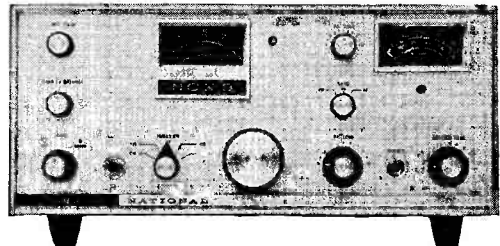
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FOR THE RADIO AMATEUR AND AMATEUR RADIO

# The SHORT-WAVE Magazine

## EDITORIAL

**Mobile** *Even old bones can feel the stirrings of Spring and in the context of Amateur Radio activities — now covering such an immense field, with so many specialised interests, that we are hard put to it to find enough space to do them all justice — Spring means that many a keen amateur's fancy lightly turns to thoughts of mobile.*

*With the large number of U.K. amateurs now licensed |M — nearly 15% of the total of licences in issue — it is a reasonable certainty that, given the weather and the local organisation (with adequate advance publicity), this season's Rally events will draw larger attendances than ever before.*

*But it is not only in connection with Rallies that amateurs go mobile. There is a great deal of |M activity all the year round, and some of those most active on the air as mobiles hardly ever show up at a Rally. This is merely another example of how radio amateurs indulge their interest in the way that suits them best. Lots of people don't want to be bothered "meeting people." To others, personal meetings at a Rally are what makes perhaps even a long journey worth while.*

*Probably everyone concerned is aware of all this. What they may not agree on is the band(s) to use for mobile. Is it time the Top Band concentration was thinned out, and much more attention paid to the higher-frequency bands, in particular 28 and 70 mc? The two latter are just about ideal in terms of obtaining the most effective aerial system — given that the antenna is by far the most important part of any radio installation, fixed or mobile, amateur or commercial. A good band for |M-DX is 15 metres, and again presents no serious aerial problems.*

*Nearly everybody seems also to agree that the HF bands should be more used by mobiles — but the great majority still stick tight to 160 metres, and tour the country with their long, waving, loaded whips, to the consternation of the natives and the astonishment of other users of the road!*

*Austin Foxgk,  
G6FO.*

---

WORLD-WIDE COMMUNICATION

## DESIGN FOR A SIMPLIFIED DOUBLE-SUPERHET

INTENDED FOR AMATEUR-  
BAND CW RECEPTION

M. A. SANDYS (G3BGJ)

*This article will be of particular interest to the receiver constructor because our contributor not only offers a straightforward, practical design for a double-superhet but also explains how he arrives at the chosen tuned-circuit values. He uses an ingenious front-end tuning arrangement (which could be improved) involving the transmitter tank as a passive pre-selector. He shows how a receiver circuit of this kind—because it incorporates commercial coils and covers only the comparatively restricted frequency-areas of the amateur bands—can be very easily set up, without either signal generator or oscilloscope. This is one of those articles which will, as it is intended, offer many ideas to amateur constructors interested in producing their own designs.—Editor.*

**T**HIS amateur band double-superhet was designed mainly for CW operation with simplicity, and thus economy, as the guiding principle. Such refinements as AVC, Q-multipliers and noise limiters have been sacrificed in pursuit of this aim. Nevertheless, a good deal of thought was expended on its design. Some of its features may be of interest to readers though it is not expected, nor recommended, that anyone should reproduce it as described here. What follows, therefore, deals more with the theoretical aspects of the design than with constructional details. It demonstrates, too (though some will never be convinced) that a quite modest standard of mathematics can help in two ways: (a) Showing that a certain course of action is feasible, and (b) The actual calculation of circuit values to achieve a desired effect.

### Front End Simplicity

In most conventional superhets the need for ganging and tracking results in considerable front-end complexity. This problem was simplified by treating the T/R device in the transmitter as part of the first RF stage, thereby reducing the number of ganged switch sections to two. The arrangement used in the writer's transmitter is shown in Fig. 1, the receiver circuit itself in Fig. 2. The cathode follower, feeding the grounded grid stage V1 of the receiver through C1, forms a cathode-coupled cascode. The switching was further simplified by circuitry which allows the use of two-terminal coils. The output impedance of the grounded grid stage being relatively low at HF,

it was tapped down the tuned circuit Ls by a capacitive tap to avoid excessive damping (C3, C4).

### Choice of IF's

The resulting RF section, comprising two fairly low-Q tuned circuits, calls for a first IF as high as possible to eliminate image interference. The IF must also be well removed from signal frequencies; 5.2 mc was thus a natural choice. This is high enough for good image rejection; it is midway between 3.5 mc and 7 mc, and the transformers are easily obtainable.

The rejection of a single tuned circuit may be found with sufficient accuracy from expression (1).

$$A = 20 \text{ Log}_{10} Q \left( \frac{f_s}{f_i} - \frac{f_i}{f_s} \right) \dots (1)$$

where A = Attenuation in dB

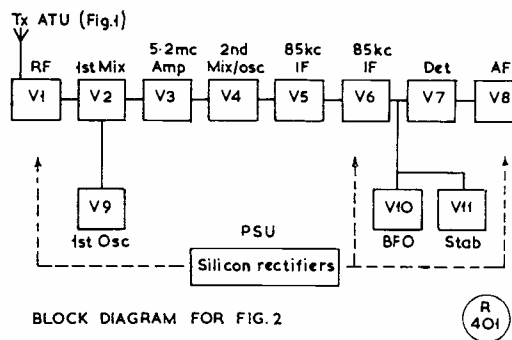
Q = Effective Q

f<sub>s</sub> = Signal frequency

f<sub>i</sub> = Interfering frequency

Assuming an effective Q of 20 for each tuned circuit gives, at 28 mc (f<sub>s</sub> = 28, f<sub>i</sub> = 17.6), a total image suppression of 50 dB, which was regarded as acceptable (60 dB is sometimes quoted for satisfactory suppression). For signal frequencies of 3.5 mc and 7 mc and an interfering frequency of 5.2 mc the rejection, in each case, is just over 45 dB. This would indicate the desirability of an IF rejection filter but it was decided to proceed without, bearing in mind that one might have to be incorporated later. The RF stage feeds the simple and effective double-triode type of mixer, V2, Fig. 2, p.14.

The second IF should be as low as possible consistent with the rejection of images in the second mixing process. Calculations were made to check the feasibility of using 85 kc. It being possible to achieve



BLOCK DIAGRAM FOR FIG. 2

Block diagram of the CW receiver described in the article. It is a double-conversion arrangement, reduced to the essentials (as the intention is that it should be regarded as a basic design) and an RF pre-selector of some kind is an essential addition — unless the idea used by G3BGJ can be adopted. With a first IF of 5.2 mc and a second of 85 kc good image rejection and selectivity are assured. See Fig. 2, pp.14-15.

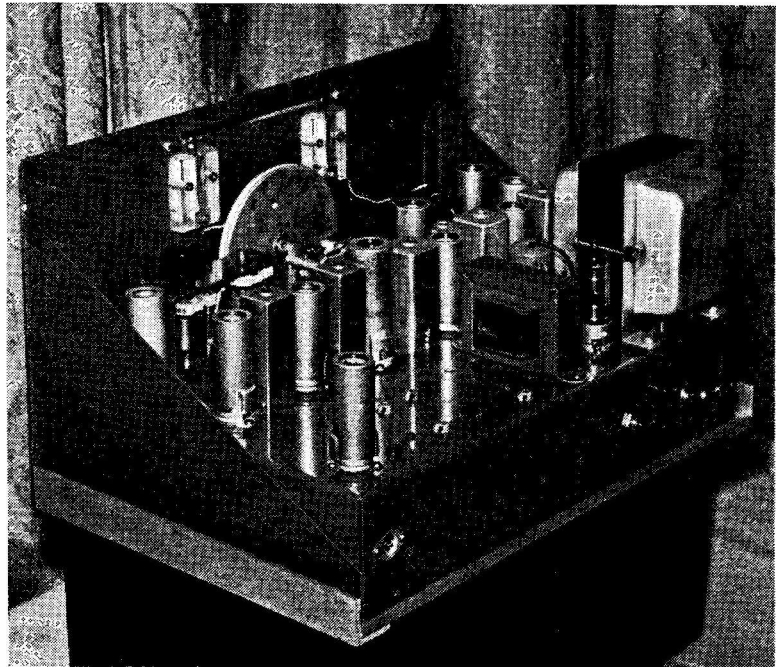
the desired selectivity with one tuned circuit, the first mixer was followed by a single stage of amplification at 5.2 mc. To obtain a figure of 60 dB each tuned circuit must contribute 15 dB. Rearranging expression (1) for Q gives (2).

$$Q = \frac{\text{Antilog } \frac{A}{20}}{\frac{f_s}{f_i} - \frac{f_i}{f_s}} \dots (2)$$

Solving for A = 15,  $f_s = 5.2$ ,  $f_i = 5.37$  gives Q = 85. This must be close to the actual Q of the Eddystone 5.2 mc IF transformers. If not, it was felt that a small degree of regeneration or a simple crystal filter would give the extra selectivity—but neither has proved necessary.

**Fine Tuning**

The second mixer V4 is a conventional circuit but it was decided to make the oscillator tunable over a small range to provide a close tuning control (C15). The extent of this tuning



Upper chassis view of the G3BGJ receiver, out of its cabinet. This is a simplified double-superhet, intended for CW reception only, and can be modified or added to in various ways to suit individual requirements.

must be kept within the passband of the 5.2 mc IF stage. The 3 dB bandwidth of a number of tuned circuits in cascade is given by (3).

$$\Delta = \frac{f_o}{Q} \sqrt{2^{\frac{1}{n}} - 1} \dots (3)$$

Substituting for  $f_o = 5200$ ,  $Q = 85$ , and  $n = 4$  gives  $\Delta = 27$  kc. (The treatment of coupled circuits here and in the preceding paragraph is simplified, only giving accurate results when the coupling is considerably less than critical, but it does indicate the order to be expected.)

It was therefore decided to provide a variation of  $\pm 10$  kc. For small departures from resonance the required capacity may be found from expression (4).

$$dC = \frac{2C}{f_o} \frac{df}{f_o} \dots (4)$$

For  $C = 250$ ,  $df = 10$ , and  $f_o = 5285$  this gives  $1 \mu\mu\text{F}$ . The total capacity swing is twice this ( $2 \mu\mu\text{F}$ ) obtained by using a  $5 \mu\mu\text{F}$  variable in series with a  $5 \mu\mu\text{F}$  pre-set, adjusted to give the desired coverage.

Two 85 kc IF amplifiers V5, V6, are used, followed by an anode-bend detector, V7, the latter having the advantage of not damping the input tuned circuit and of providing some gain. The bias VR1 is adjusted for best results on CW. Feeding the detector grid is the output of a conventional BFO,

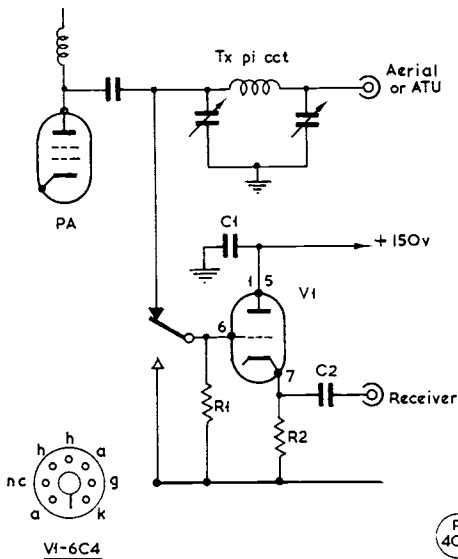
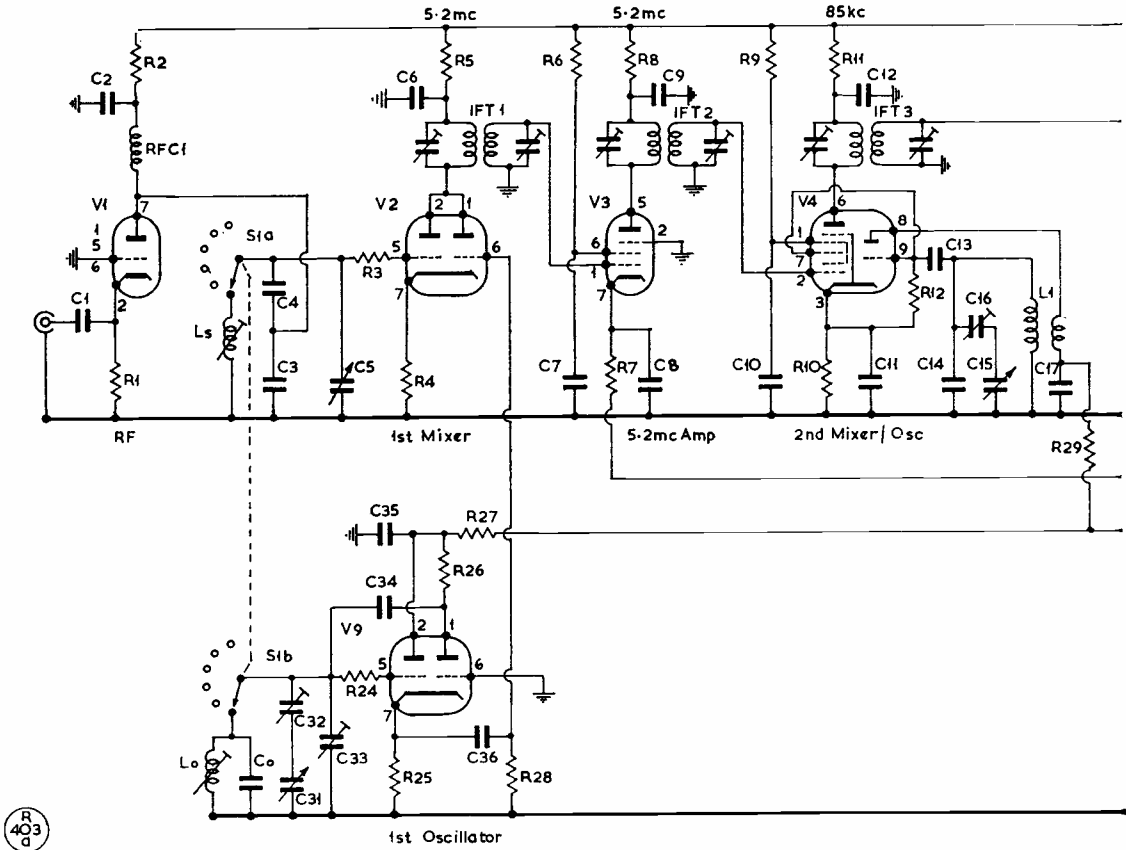


Fig. 1. The input end for the G3BGJ receiver makes use of the Tx ATU as its first tuned circuit. In his set-up, which could be improved by anyone wishing to adopt the same idea, the T/R switch involves a triode as a straight cathode follower. Values are: C1, .01  $\mu\text{F}$ ; C2, .001  $\mu\text{F}$ ; R1, 1 megohm; R2, 330 ohms; and V1, 6C4.



V10, the anode and screen resistors of which were chosen by trial and error for optimum injection. No BFO panel control was deemed necessary. The gain of the three IF amplifiers is controlled and provision for muting is included (VR2, J2). A 6AU6 could be used for V3 to increase the effectiveness of the muting control. The output stage V8 is a 6C4 triode driving a pair of high-resistance phones.

**RF Oscillator**

A cathode-coupled oscillator was chosen for the first oscillator, V9. It has three advantages:

- (i) It uses two-terminal coils.
- (ii) It will oscillate with practically any combination of L and C.
- (iii) The output is reasonably constant.

Full bandsread is provided on each band and the design procedure is as follows: The writer's article in the May, 1962, SHORT WAVE MAGAZINE entitled "The Mathematics of Bandsreading" gave the formula  $C_B = KC$  for determining bandsread capacity, where C is the total circuit capacity and K

is the constant  $\frac{f_H^2}{f_L^2} - 1$ ,  $f_H$  being the higher band

limit and  $f_L$  the lower. Solving for C gives  $C = \frac{C_B}{K}$ .

First, the values of K are tabulated for the oscillator coverage required of each band. Next, a value is selected for the bandsread capacity and

from the expression  $C = \frac{C_B}{K}$  the value of C for

each band is determined. Different values of  $C_B$  may have to be tried until all the C values are within the bounds of possibility. (For example, a capacity of 1250  $\mu\mu\text{F}$  for an oscillator frequency of 12 mc would be rejected as impracticable.) Inevitably some compromise will result but it should be possible to produce a reasonable set of values for C.

The next manipulation is to find values of standard capacities, which, added to that of the pre-set capacity (C33) come closest to the required value. For example, Band 1 requires a total of 344  $\mu\mu\text{F}$ . A possible combination is a fixed 250  $\mu\mu\text{F}$  across the coil and a pre-set adjusted to give the extra 94  $\mu\mu\text{F}$ . Band 3 requires 175  $\mu\mu\text{F}$ . A fixed of 80  $\mu\mu\text{F}$  plus the 94  $\mu\mu\text{F}$  pre-set gives 174  $\mu\mu\text{F}$ . Other combinations of fixed and 94  $\mu\mu\text{F}$  must be sought for



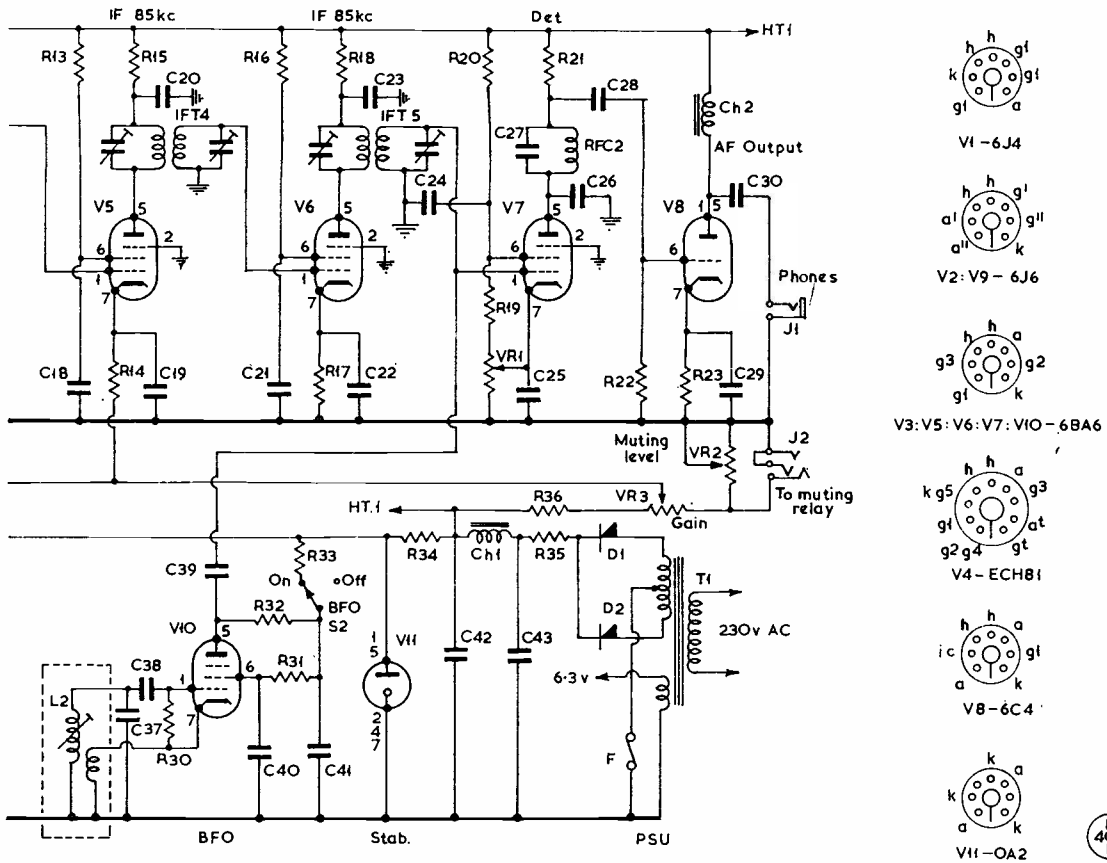


Fig. 2. Circuit of the receiver designed and described by G3BGJ, intended as a "bare bones" double superhet, to which additions or modifications could be made as required. As shown here, the RF stage is coupled into the aerial through the Tx ATU working as a passive pre-selector — see Fig. 1. Since this is an amateur-bands CW-only design, the first oscillator V9 can be arranged to give full bandwidth (C31), with fine tuning on the second oscillator V4 (C15). Each oscillator coil has across it a fixed condenser Co which, with C33, makes up the total capacity required. C32 is adjusted to give, with the swing of C31, the full spreading of each band. Commercial coils are used throughout.

**Table of Values**

Fig. 2. Circuit of the G3BGJ Double-Superhet

C0 = see Tables 1 and 2	C34 = 25 μμF	R31 = 33,000 ohms	IFT1,
C1 = .001 μF	C39 = 10 μμF	R32 = 10,000 ohms	IFT2 = 5.2 mc Eddystone
C2, C6,	C42, C43 = 16 μF	R34 = 6,000 ohms, 10w.	IF transformers
C7, C8,	R1, R25 = 330 ohms	R35 = 100 ohms, 2w.	IFT3,
C9, C11,	R2, R5 = 15,000 ohms	VR1 = 5,000 ohms pre-set	IFT4,
C17, C35 = .01 μF	R3, R24 = 47 ohms	VR2 = 5,000 ohms wire-wound	IFT5 = 85 kc Denco IF transformers
C3, C13,	R4 = 680 ohms	VR3 = 3,000 ohms wire-wound	T1 = Mains transformer 250-0-250 100mA 6.3V. 4A.
C36, C38 = 100 μμF	R6, R9,	RFC1 = 2.5 mH RFC	D1, D2 = Silicon rectifiers
C4 = 47 μμF	R13, R16 = 39,000 ohms	RFC2 = 13 mH RFC	V1 = 6J4
C5 = 10 μμF variable	R7, R14,	Lo = see Table 1 and 2	V2, V9 = 6J6
C10, C12,	R8, R11,	Ls = see Table 1	V3 = 6AU6 or 6BA6
C18, C19,	R15, R18,	L1 = Osmor QO3	V4 = ECH81
C20, C21,	R27 = 2,200 ohms	L2 = Denco 85 kc BFO coil	V5, V6,
C22, C23,	R10 = 220 ohms	Ch1 = 10H 100 mA	V7, V10 = 6BA6
C24, C30,	R12, R30,	Ch2 = 10H 40 mA	V11 = OA2
C40, C41 = .1 μF	R33 = 47,000 ohms		
C14 = 250 μμF	R19, R20,		
C15 = 5 μμF variable	R36 = 100,000 ohms, 2w.		
C16 = 5 μμF pre-set	R21 = 220,000 ohms		
C25 = .5 μF	R22 = 470,000 ohms		
C26, C37 = 470 μμF	R23 = 1,000 ohms		
C27 = 300 μμF	R26 = 22,000 ohms		
C28 = .05 μF	R28 = 100,000 ohms		
C29 = 8 μF	R29 = 6,800 ohms		
C31 = 50 μμF variable			
C32 = 50 μμF pre-set			
C33 = 100 μμF pre-set			

NOTES: All resistors ½w. unless otherwise stated. J1, O/C jack; J2, C/C jack. S1, 1-pole 6-way 2-gang; S2, SPST toggle.

See pp.17-18 for Table I and Table II giving coil and capacity values.

the remaining bands. If an exact solution is impossible the total capacity should always be less than the optimum value. If unable to obtain satisfactory values a fresh start must be made with a new pre-set!

Here, the fixed capacitors were chosen from the range of close-tolerance condensers stocked by *Southern Radio & Electrical Supplies*. The inductance required for each band may now be worked out. Fortunately, in this case, each value of L was covered by one of the Osmor range of coils (see Table 1 opposite).

The whole process is set forth in Table 2 for a bandspread capacity of  $20 \mu\mu\text{F}$ . Any value of bandspread capacity can always be obtained, of course, by using a pre-set in series with the variable. It will be seen that the L/C ratios are reasonable except perhaps on 7 mc, where for an oscillator frequency of 1.8 mc, L is  $40 \mu\text{H}$  and C is  $175 \mu\mu\text{F}$ . This might not be acceptable to the advocates of long term stability. Making the oscillator frequency greater than the signal frequency does not provide a better solution, demanding a capacity of  $1250 \mu\mu\text{F}$  at 12.3 mc!

Whilst on the subject of bandspread, the value of the trimmer across the RF tuned circuit was found by taking the highest value of K for the amateur

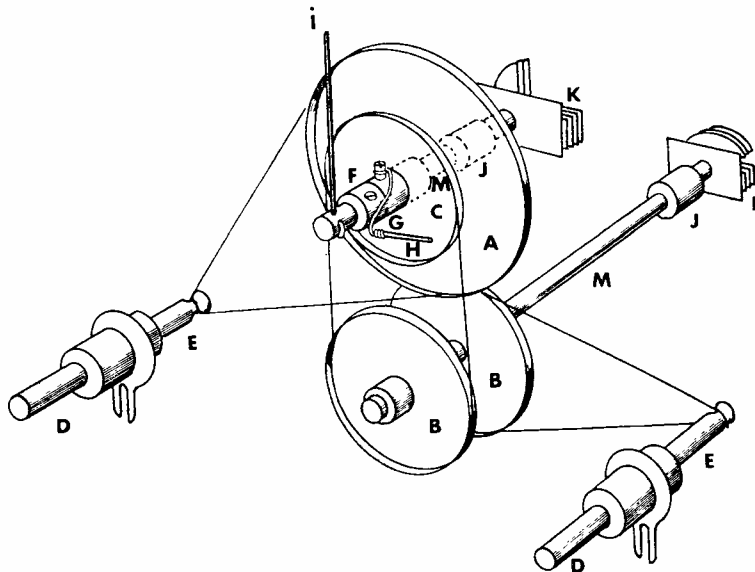


Fig. 3. Showing how high drive ratios are obtained by using a combination of ball drive and drum-and-cord. The fine tuning, on C15 in the circuit of Fig. 2, gives a variation of 10 kc either side of the main-tune frequency. Parts are: A,  $3\frac{1}{2}$  in. drum; B,  $2\frac{1}{2}$  in. drums; C,  $2\frac{1}{2}$  in. drum, free running; D, epicyclic ball drives; E, standard Type H cord drives, bush ends removed; F, bush fixed to main shaft; G, fine pointer fixing; H, fine-tune pointer; I, main-tune pointer; J, coupling bushes; K, main bandspread condenser, C31; L, fine-tuning capacity, C15; M,  $\frac{1}{4}$ -in. connecting shafts.

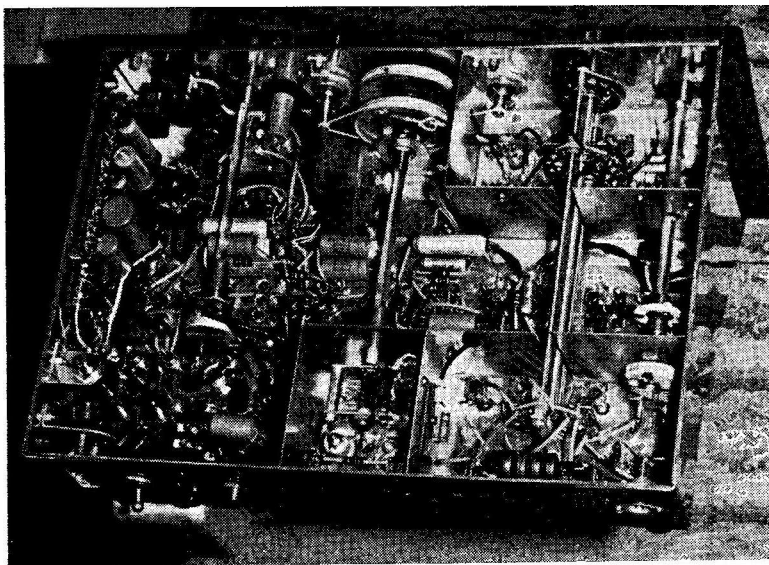
bands—the values are given in the May, 1962, *SHORT WAVE MAGAZINE*—and multiplying it by the total circuit capacity, estimated to be  $45 \mu\mu\text{F}$ . The result,  $45 \times .235$ , is  $10.5 \mu\mu\text{F}$ .

Table 1 gives the Osmor coils used for the RF and oscillator units. The Q44 coil appears to have a maximum inductance less than that specified. Accordingly the main and link windings were connected in series. The link coil was removed from the others.

The receiver is powered by a conventional power supply employing silicon rectifiers and providing 250v. HT and 150v. stabilised for the oscillators. If the p.i.v. of the rectifiers is below 800v. it is advisable to connect two in series with a half-megohm resistor across each.

#### Performance

On CW the receiver compares favourably with expensive models. It is sensitive and quiet in operation and the selectivity resulting from the use of two 85 kc IF stages is exceptionally good. A drive ratio of 80-to-1 on the main capacity C31 and 25-to-1 on the fine C15 greatly facilitates the tuning, searching being done on the main and "holding" on the fine, the latter having a tuning



General construction of the G3BGJ receiver, under chassis, showing also the slow-motion drive to the fine tuning condenser C15; this functions on the second oscillator V4 (see Fig. 2). As can be seen from this photograph, the circuit is constructed in sections, in screened compartments.

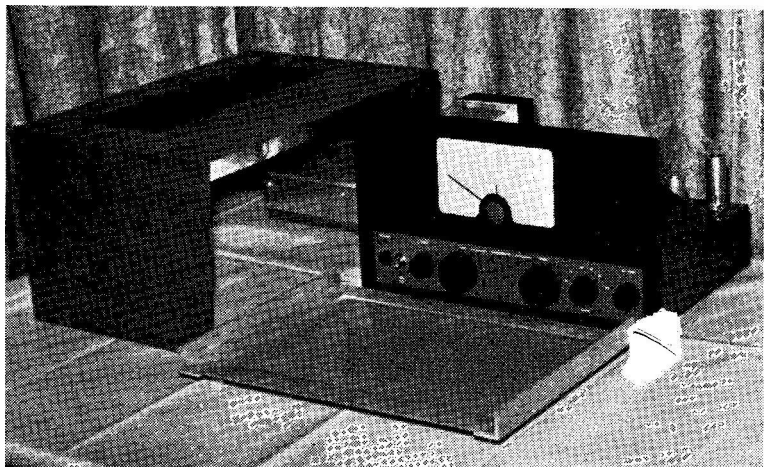
rate of 1.6 kc per revolution.

However, the design does suffer from several minor shortcomings. (Strangely enough, the thing it was most feared would be troublesome, image interference in the second mixing process, failed to materialise.) Slight IF breakthrough on 5.2 mc is noticeable at times—on 3.5 mc and 7 mc at night, for instance, but a spot can usually be found on the fine tuning where none is present. On 28 mc some image interference results from the very strong broadcast stations around 18 mc. On 14 mc and above the tuning of the *pi*-circuit (Tx, Fig. 1) is not that which gives maximum received signal and weak signals must be peaked, with the inconvenience that the transmitter must be retuned before transmitting.

It should not be difficult to clear up these troubles. They all point to the need to improve the T/R circuitry of Fig. 1. Something on the lines of that shown in the July, 1963, SHORT WAVE MAGAZINE (p.240, Fig. 5) which includes an extra signal tuned circuit and also gives some gain, should effect an improvement. In fact, the writer feels that the T/R device should be developed to its logical conclusion and the transmitter designed from the start with a built-in pre-selector. So far, however, no cure has been sought for these minor irritations. Having spent some time in planning and building the receiver, the writer wants to enjoy a spell of operating.

**Slow Motion Drive** (see Fig. 3)

This may be of interest to readers as it provides the complexity of expensive drives at a fraction of their cost. Fig. 3 gives sufficient detail to explain the working of the concentric pointers. The very high drive ratios are obtained by using an epicycle ball drive to turn a drum and cord arrangement, a device which is smooth in operation and completely free from backlash. The main bandspread capacitor C31 is mounted above the chassis at the front and the fine tuning capacitor C15 below the chassis at the rear. The shaft to the latter carries another drum which drives a freely revolving drum on the shaft of the main drive. The sole purpose of the free running drum is to carry the holder of the fine pointer. The main pointer goes through a hole in the main shaft. Both pointers are friction fits and can be removed to allow the front panel to come off. A calibrated scale is pasted to the front panel and enclosed by an old Eddystone full-vision escutcheon, the vacant hole of which was covered by a blue-painted R.A.F. button, giving a pleasing effect against the background of black crackle.



Another view of the receiver described in the article by G3BGJ. It has no tuned RF stage in the conventional sense, as the transmitter ATU is used as a passive pre-selector in the "receive" condition. This is an interesting idea, which could be improved and extended by use of a valve-type tunable T/R switch unit.

**The Cabinet**

The cabinet (devised before the article in the September, 1963, SHORT WAVE MAGAZINE) comprises two parts, tray and lid, an exploded view of which is shown in Fig. 4. The receiver sits on the tray and the lid clips down on top, leaving a gap at the bottom rear for access to chassis sockets, and is easily lifted off for inspection, coil adjustments, etc. To ensure a good fit the sequence of building operations is important. It is recommended the lid be first bent to shape, leaving the sides longer than necessary. They can be cut to equal lengths later. The front panel and tray can then be "tailored" to fit the lid, an easier process than bending the lid to fit the front panel.

[over

Table I

Osmor Coils for RF and Osc. circuits

BAND mc	L <sub>s</sub>	REMARKS	L <sub>o</sub>	REMARKS	C <sub>o</sub> μF
1.8	QA8	Main Winding and Link in Series	QO2	Main Winding and Link in Series	250
3.5	QA4		QO2		175
7.0	QO4		QA4		80
14.0	QO3		QO2		150
21.0	QO2		QO1	1½ Turns Removed	250
28.0	QO1		QO1	1½ Turns Removed	30

The Osmor coil series required for the signal frequency and oscillator circuits, respectively L<sub>s</sub> and L<sub>o</sub> in the diagram at Fig. 2. Also given are the values for C<sub>o</sub>, the fixed capacity across the oscillator coil.

Dimensions: 14" wide, 8" high, 10" deep.

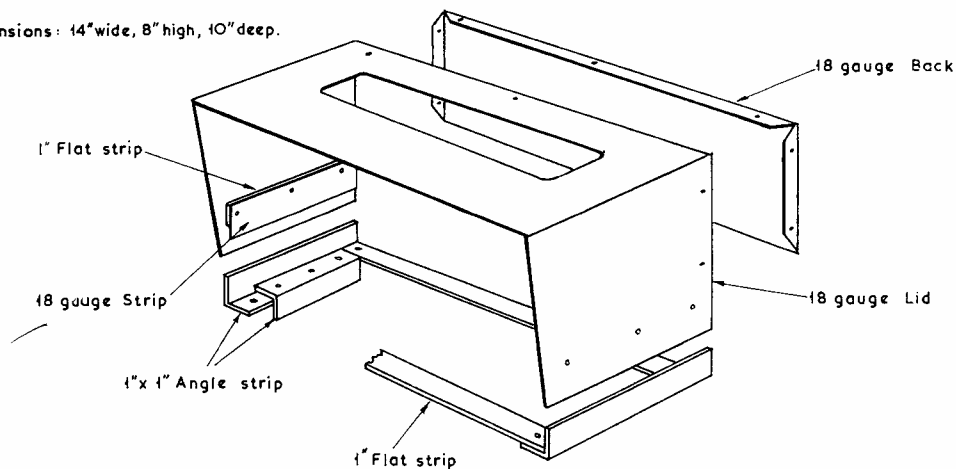


Fig. 4. For the receiver described in his article, G3BGJ has constructed a cabinet, main details of which are shown here. The photographs give a good idea of the general appearance of the metal-work, and how the Rx is fitted in the cabinet. Any other sort of housing can, of course, be used, as there is nothing mandatory about this design.

Table II

BANDSPREAD 20 $\mu\mu\text{F}$ — PRE-SET 94 $\mu\mu\text{F}$						
BAND mc	OSC. RANGE mc	K	$C = \frac{C_B}{K}$	FIXED C ( $C_0$ ) $\mu\mu\text{F}$	TOTAL $\mu\mu\text{F}$	$L_0\mu\text{H}$
1.8- 2.0	7.0- 7.2	.058	344	250	344	1.42
3.5- 3.8	8.7- 9.0	.07	286	175	269	1.17
7.0- 7.1	1.8- 1.9	.114	175	80	174	40.32
14.0-14.35	8.8- 9.15	.081	246	150	244	1.24
21.0-21.45	15.8-16.25	.058	344	250	344	.28
28.0-29.7	22.8-24.5	.155	129	30	124	.34

This table shows the steps required to find the total capacity  $C_B/K$  for each band. The combination of  $C_0$  (see Table 1) and the 94  $\mu\mu\text{F}$  pre-set condenser C33 comes very close to the value thus found.

### Setting Up

There would be little point in presenting what purports to be an economy-class receiver if it could only be aligned with expensive test gear. This receiver was set up with no test gear whatever! The calibrated VFO and receiver of the station rig were the only items used. The first step is to get the BFO on frequency. To do this tune in Plonéis Consul station on 257 kc (callsign FRQ) and beat the third harmonic of the BFO with it, thereby placing the BFO on 85.666 kc. The station receiver is then set to 5285 kc (calibration error having been checked at 5000 kc) the fine tuning C15 set to centre and the core of L1 adjusted for zero beat. Now transfer the phones to the output, connect an aerial

to the second mixer grid, rotate the fine tuning until a signal is heard (no shortage of stations around 5.2 mc!) and peak the 85 kc IF transformers. Transfer the aerial to the first mixer grid and peak the same signal on the 5.2 mc IF transformers. To set up the first oscillator V9 listen on the station receiver on the required frequency and adjust the appropriate core for zero beat. Transfer the phones to the double superhet, set the main tuning and VFO to the first calibration mark on their scales, key the VFO and adjust the core for zero beat. Finally peak Ls. Repeat for each band.

The bandspread was unexpectedly easy to set up. C33 was set near maximum and C32 adjusted until the higher limit of the 14 mc band came to about 10 degrees from the end of the scale. The lower band edge of the other ranges was then reset and the upper band edges checked. All finished within the last 20 degrees of the scale.

Finally, a caution—the receiver front end should not be used as it stands with the aerial connected direct to V1 cathode. It requires the added protection of another signal tuned circuit. Used with a passive pre-selector, it should give excellent results.

### THE "NEW QTH" PAGE

Readers becoming licensed for the first time, or changing address if already licensed, are reminded that they should use "New QTH's" as this ensures eventual appearance in the U.K. section of the international *Radio Amateur Call Book*, for which we are the agents. When notifying a new callsign/address, or a change of QTH, please use a separate slip, addressed "New QTH Dept." A request for publication contained in a letter on other matters is liable to be overlooked. We deal with literally hundreds of pieces of paper in the course of only a week, and the more orderly the procedure the easier it is for us to give good service.

## PHASE MODULATION ON TWO METRES

DISCUSSING CIRCUITRY, FOR  
TRANSMITTER AND RECEIVER

B. SYKES (G2HCG)

*Those who frequent the two-metre band will be aware that our contributor has been following a line of his own as regards modulation. The product of these labours can be heard by all who are able to receive either G2HCG or G3FAN. Having arrived at a workable and satisfactory phase modulating system, using circuits which have been repeated equally successfully by his collaborator G3FAN, this article explains how a phase modulator can be constructed for transmission, with the appropriate discriminator for the receiving side.—Editor.*

THE increasing popularity of frequency-modulation on two metres has led the writer into a great deal of interesting development work over the last few years. The field for experiment is very wide, covering all aspects of modulator design for the transmitter, as well as limiter and discriminator circuits for the receiver.

Narrow-Band Frequency Modulation (NBFM) is nowadays used almost exclusively by amateurs, and the available literature is very limited. This, combined with the relative simplicity of the circuitry, makes the whole subject one of the greatest interest to the amateur.

The notes following represent the "state of the art" as seen by this writer at the present time.

### Transmitter—Basic Concepts

Frequency modulation methods on the transmitter at G2HCG have, over the years, passed from amplitude control of the VFO; through various reactance modulator circuits on the VFO; then rather unsatisfactory methods of forcing a crystal to frequency modulate—to the present system of phase modulation, which has turned out to be far simpler than all the others, and much more effective.

Phase Modulation is inherently safe in that with some very simple precautions in initial design, over-deviation is impossible. Though frequency modulation is almost a dirty expression in many quarters, it is not perhaps generally realised that sideband power on NBFM is considerably less than with AM. This alone is a very important consideration, with the two-metre band filling up as rapidly as it is these days. Malfunctioning of a phase modulator can only arise when incorrect circuitry gives non-linear deviation, and also by the use of too much deviation to obtain what is thought to be "adequate talk

power." This rather nebulous concept of "talk power" first came into use when phase modulation appeared on the air, and is taken to indicate maximum use of the spectrum available.

The basic difference between FM and PM is simply that with FM, deviation is proportional in degree to the *amplitude* of the audio modulating signal, while with PM deviation is proportional to the *frequency* of the audio modulating signals. Taking a simple example: An uncorrected PM signal will have a deviation of say 1 kc at 200 cycles audio, 2 kc at 400 cycles audio, 4 kc at 800 cycles audio and so on, this characteristic being called a treble lift of 6 dB (twice) per octave (double the frequency). The known characteristic of PM—that of sounding thin and "tippy"—is therefore not surprising, and correction of the audio frequency response of the modulator is necessary. This correction is applied by the resistor-capacitor network C8, R13, R14, C9 in the grid circuit of V3A, the reactance modulator of Fig. 1, and the values specified should be adhered to strictly.

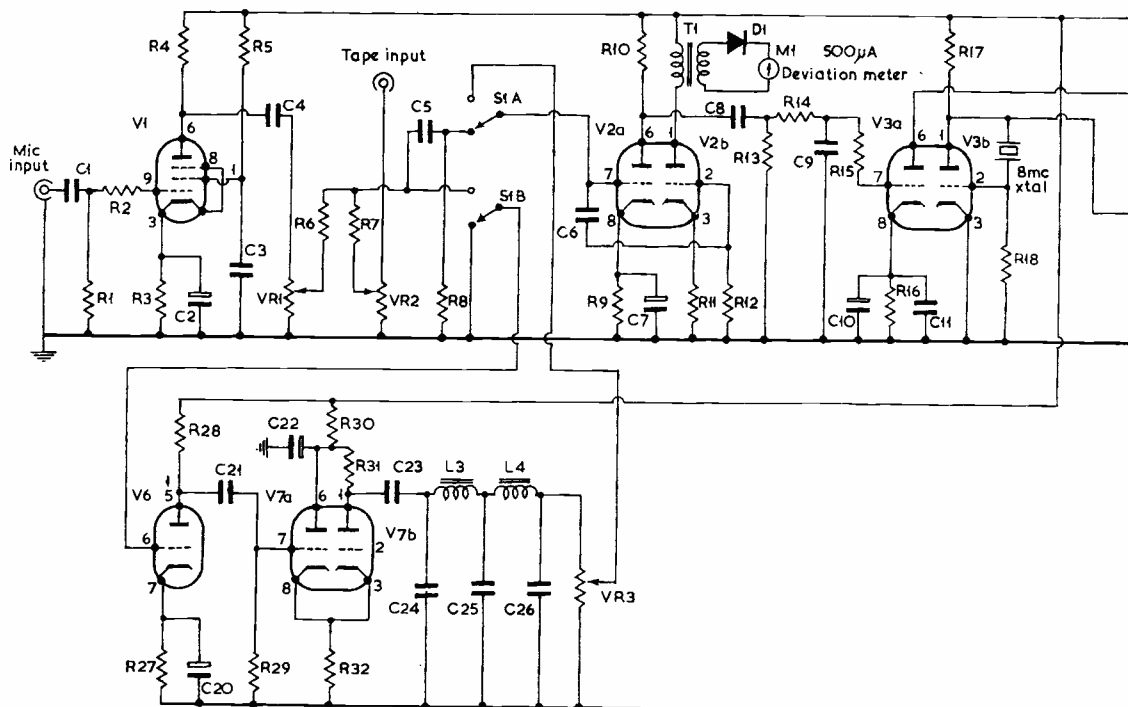
The maximum deviation obtainable with a phase modulator is the product of the modulating frequency and the phase swinging radians. The greatest possible phase swing is  $90^\circ$ , therefore maximum deviation is  $90/57.3F$ , where F is the modulating frequency.

Taking 200 cycles as the lowest modulating frequency required, a maximum deviation of 316 cycles is obtainable. This deviation may be applied at 8 mc and since a multiplication of 18 times is then required to 144 mc, the deviation will be  $316 \times 18$ , which is just over 5 kc, an ideal limitation. Deviation at higher audio frequencies will be held at substantially the same level by the correction circuit at the grid of the reactance modulator, as previously mentioned.

For transmission on 144 mc, 8 mc is therefore the highest frequency at which PM may be applied. The circuit of Fig. 1 is for 8 mc, but exactly the same values, with suitable coil changes, may be used on 6 mc; here, of course, maximum obtainable deviation will be  $316 \times 24$ , which is nearly 8 kc and still a reasonable limitation.

A further advantage of PM is that the same modulator may be used for various drive systems. In the case of Fig. 1 the basic circuit around V3B is crystal controlled with the optional change-over to VFO when required—a valuable facility with the increasing occupancy of the two-metre band.

The use of phase modulation with a VFO is not quite as easy as it seems since on no account must actual frequency modulation of the oscillator occur, otherwise the transmission will sound extremely "bassy" as a result of the top-cut network used to compensate the phase modulation. Complete isolation from frequency pulling is therefore necessary on the output of the VFO (a good thing anyway) and this is achieved by the circuit itself and the two buffer amplifiers before the actual application of PM at the anode of V4. Even after two buffers, RF amplitude is still very low and this is again a necessity in PM, as any attempt to apply a reactance modulator to the anode circuit of the average 8 mc xtal oscillator—

VO  
75a

probably a 5763 or similar 40 mA valve—will only swamp the reactance valve with excessive RF and no PM will be achieved.

The circuit of Fig. 1 is quite straightforward, V1 and V2A being a standard speech amplifier and V2B an amplifier and rectifier to operate a meter to indicate the amount of deviation. V3A is a reactance modulator without the customary  $10 \mu\text{F}$  capacitor between anode and grid (the actual inter-electrode capacity provides enough C). V3B is a simple low power CO and V4 is a buffer the anode circuit of which is phase modulated by V3A.

L1 in the anode of V4 is the vital part of the circuit and no liberties must be taken here. The requirement is for a wideband circuit to provide level drive throughout the band when on VFO, and to this end the coil is made self-resonant at 8 mc with the circuit capacitances. Adjustment to resonance at 8 mc with a grid dip oscillator while HT is off is ideal and provides the correct setting for optimum PM. (The damping of the reactance modulator prevents a dip on the grid dip oscillator being obtained if measured with HT on.) Should a GDO not be available L1 should be adjusted on the air for optimum speech quality and it cannot be too strongly emphasised that this *does not occur at the setting for maximum RF output*.

V5 is a frequency tripler, again with a self-resonant output circuit L2 at 24 mc, link coupled to the main transmitter. Output of the unit is sufficient

### Table of Values

Fig. 1. VFO Crystal Oscillator, Phase Modulator and Clipper for Two-Metre Transmitter, after G2HCG

C1, C4,	R2, R40,
C5, C6,	R41 = 4,700 ohms, w/w
C8, C9,	R3, R27 = 2,200 ohms
C24, C25,	R4, R6,
C26 = .01 $\mu\text{F}$ , 350v.	R7, R10,
paper	R13, R19,
C2, C7,	R36 = 220,000 ohms
C10, C20 = 25 $\mu\text{F}$ , 12v. elect.	R8, R29 = 470,000 ohms
C3, C23 = 0.5 $\mu\text{F}$ , 350v.	R9, R23,
paper	R26 = 1,000 ohms
C11, C13,	R11, R21,
C14, C16,	R25, R33 = 220 ohms
C17, C18,	R14, R20,
C19, C27,	R22, R24,
C28, C30,	R35, R37,
C31, C37,	R44 = 100,000 ohms
C38 = .001 $\mu\text{F}$ , disc cer.	R15, R17,
C12 = 10 $\mu\text{F}$ , cer. tub.	R18, R28 = 47,000 ohms
C15, C32 = 30 $\mu\text{F}$ , cer. tub.	R16 = 330 ohms
C21 = .002 $\mu\text{F}$ , 350v.	R31 = 33,000 ohms
paper	R32, R34 = 4,700 ohms
C22 = 8 $\mu\text{F}$ , 350v. elect.	R38, R43 = 150 ohms
C29 = 1.5 $\mu\text{F}$ , cer.	R39, R42 = 10,000 ohms, w/w
C33, C36 = 3-7 $\mu\text{F}$ , trimmer	VR1,
C34 = 200 $\mu\text{F}$ , 2-gang,	VR2 = 500,000-ohm
band set	potentiometer
C35 = 20 $\mu\text{F}$ , VFO tune	VR3 = 5,000-ohm
R1, R5,	potentiometer
R12, R30 = 1 megohm	T1 = 10:1, min. type
	Valves = see diagram

### TABLE OF COIL DATA

L1	— 50 $\mu\text{H}$ 80 turns close-wound, 36g. enam. on $\frac{1}{4}$ -in. Aladdin former with dust core.
L2	— 30 turns 26g. enam. close-wound on $\frac{1}{8}$ -in. Aladdin former with dust core.
L3, L4	— 0.8 Henry choke, electronic organ part (Clyne Radio).
L5	— 6 turns 16g. spaced wire diameter on 1-in. ceramic former.

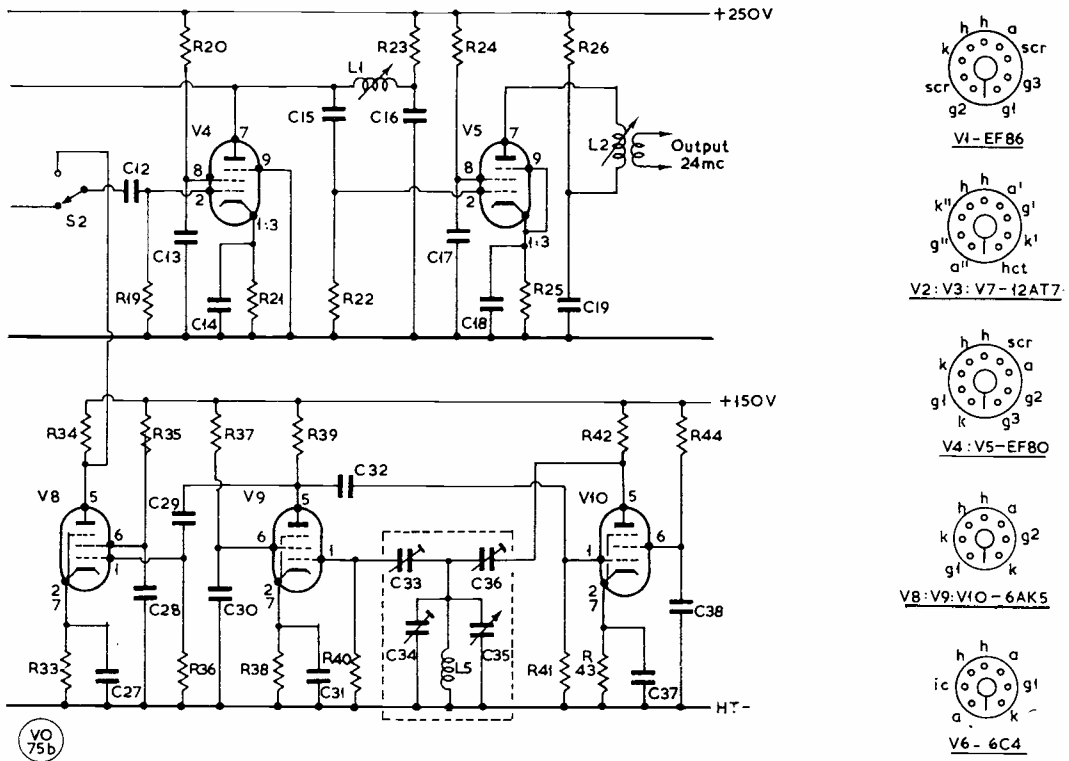


Fig. 1. Detailed circuit arrangement for the VFO, crystal oscillator, phase modulator and clipper for a two-metre transmitter, as evolved by G2HCG and discussed in his article. All values are given in the table; those for the reactance modulator V3A should be strictly adhered to, as the resistor-capacity network C8, R13, R14, C9 in V3A grid applies the correction for audio frequency response. (Note: In the circuit on p.20 opposite, the grid (pin 2) of V7B should go to earth.)

to drive, via a further link-coupled tuned circuit, on the grid of an existing xtal osc.-multiplier of the 5763 class giving output at 24 mc to the normal power multipliers.

The VFO section V9 and V10 operates as a Franklin oscillator, at very low power, in Class-A at 8 mc. The tuned circuit L5, C34, C35 must be rigidly built in a separate box mounted on stand-offs from the main chassis, and kept as far away from sources of heat as possible.

Output from the VFO is taken from the anode of V9 via a 1.5 μF condenser to the untuned buffer isolator V8, the output of which is switched to the phase modulator by S2 when required. It should be noted here that unless S2 is a very low-capacity type leakage of signal will occur from the continuously running VFO, which may if close enough in frequency cause a beat note to appear on the carrier when operating on crystal. This can be overcome by arranging further contacts on S2 to cut the HT to V8 when on CO.

V6 and V7 make up the clipper circuit for which no originality whatever is claimed—it is simply the best of many types which have been tried. Speech clipping on VHF is a debatable advantage. Some station reports are highly enthusiastic when the

clipper is switched in, while others prefer the better fidelity of speech obtained without clipping, even when signals are weak. Applied to a frequency modulated signal, clipping holds the deviation constant and is probably worth while for this alone. Clipping level is governed by the relationship between the settings of VR1 and VR3—maximum VR3 and reduced VR1 giving no clipping action whatever, while reduction of VR3 gain when compensated by increasing VR1 increases the degree of clipping. The HT supply to the clipper is critical as to clipping level, and R30 may have to be reduced below one megohm if the HT is low.

**The Receiving Side**

The undoubted benefits of FM in the reduction of noise, especially car ignition, are only obtainable when a suitable discriminator is used on the receiver. Complaints of lack of audio are inevitable when a standard receiver is tuned to the slope of its pass-band in order to resolve FM. Like the transmitter, the home AR88 receiver at G2HCG has progressed through the years from the first simple Foster-Seeley add-on discriminator, through various designs of ratio detector, with a tremendous amount of work on limiters, which are by no means as easy as they

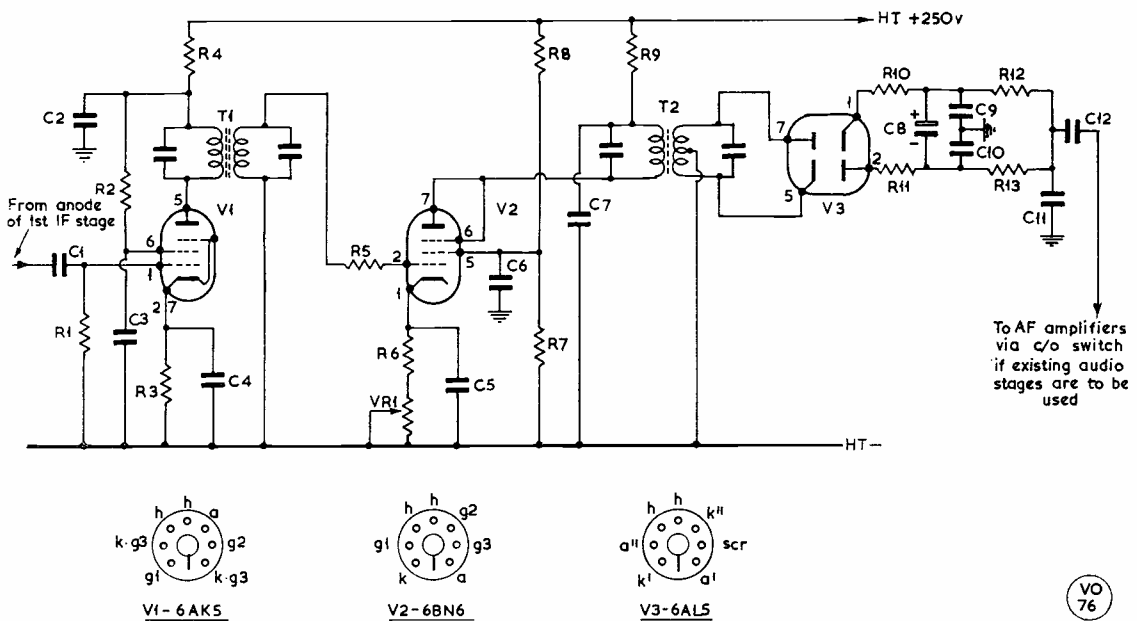


Fig. 2. To make the best of phase modulation, a suitable limiter-discriminator should be available at the receiving end — though a good PM signal, with not too much deviation, can be copied on an ordinary AM receiving set-up. The circuit shown here can be regarded as an add-on unit suitable for most receivers, that in use at G2HCG being an AR88. This arrangement consists of an IF amplifier, limiter and discriminator, fully described in the article. The author has done a great deal of experimental work in evolving this design, which has been successfully repeated by G3FAN. (Note: In this circuit, a coil L1 should be shown in series with the centre-tap of secondary T2 and coupled back to the primary of T2.)

seem from the circuitry.

The big problem with NBFM limiting lies in the words "Narrow Band." The main requirement is the elimination of the very sharp spikes of ignition interference and the normal sharply-tuned chain of receiver IF's cannot, by their very nature, maintain the HF response necessary to retain the sharpness of the original ignition peak. This is very evident if the IF output is displayed on an oscilloscope, when it will be seen that even if one is successful in chopping the peaks off with the normal limiter circuit there is still left the following overshoot waveform in the shape of a large hole in the response. This hole shows up as interference just as much as the peak does; thus, the normal methods of limiting are ineffective. One solution to the problem is to amplify with broad band transformers to a level where limiting is effective and then increase selectivity with further narrow-band IF's. It might be possible in the case of the modern double-superhet receiver to limit at the first IF, leaving the second IF to perform its normal duty of providing selectivity. More than 3-5 kc of selectivity is, of course, not possible with FM, since severe distortion sets in the moment the deviation of the signal exceeds the receiver pass-band. Acute selectivity is not in any case such a necessity with FM since the capture effect always results in the complete elimination, without even a heterodyne, of interfering stations.

In the writer's experience, the only limiter which has proved worth while in the normal position calls

### Table of Values

Fig. 2. IF amplifier, Limiter and Discriminator as add-on Unit suitable for most Receivers

C1*	= about 5 $\mu$ F	R7	= 15,000 ohms
C2, C3,		R9	= 330,000 ohms
C4, C7,		R10, R11	= 1,500 ohms
C12	= .01 $\mu$ F	VR1	= 1,000-ohm potentiometer
C5, C6	= 0.1 $\mu$ F	T1	= 455 kc IF xformer (standard type)
C8	= 1 $\mu$ F	T2**	= IF xformer with c.t. sec. (see text)
C9, C10,		V1	= 6AK5
C11	= .001 $\mu$ F	V2	= 6BN6 (see text)
R1	= 500,000 ohms	V3	= 6AL5
R2, R5,			
R12, R13	= 47,000 ohms		
R3, R6	= 220 ohms		
R4, R8	= 10,000 ohms		

(Notes: \*C1 is few turns insulated wire wrapped round anode lead  
\*\*L1 pile-wound on outside of T2 primary, about 25% of T2 primary turns (see text).)

for a special valve type 6BN6, which is gated beam, and is the type used in the circuit of Fig. 2 above.

Should it prove impossible to obtain a 6BN6 (the only source known in this country is K.W. Electronics) the limiter may be omitted entirely from Fig. 2 and the anode of V1 simply connected to the discriminator transformer primary. This is permissible since the discriminator used is of the ratio type, which is inherently insensitive to amplitude modulation. Many experiments were conducted with the Foster-Seeley type of discriminator and associated limiters, since the only requirement is an IF transformer with a centre tap, and this is easily obtainable — a crystal filter type is quite satisfactory. Stories



of the difficulties with stray capacity and such on 10·7 mc standard ratio transformers were a strong deterrent against trying the ratio type. It was, however, finally realised that at 455 kc stray C and layout problems should be negligible and this proved to be the case. Any IF transformer with a centre-tapped secondary, or capable of being centre-tapped performs quite satisfactorily with a coupling pile-wound close to the outside of the primary of approximately a quarter the number of primary turns.

The actual ratio circuit evolved is by far the best of the many types tried and is strongly recommended. A double diode valve is used and here a word of warning is necessary. Do not use xtal diodes unless you are quite sure they are of a suitable type for discriminator use, as many types quite definitely are not suitable.

VR1 of Fig. 2 in the cathode of the 6BN6 controls the level at which limiting occurs and thus in effect controls the amplitude of input to the discriminator. Audio level of an actual transmission will not vary with adjustment of VR1 due to the ratio discriminator being insensitive to amplitude, but actual noise level in the absence of a signal is controllable by

VR1 and this should be set at a convenient level for comfort and optimum rejection of ignition.

Alignment of the discriminator is quite simple, but worth while doing accurately. First, align all trimmers roughly for maximum noise output; then connect a high resistance voltmeter between the junction of C11, C12 and earth. A signal should now be tuned in and it will be seen that the voltmeter swings positive and negative as the station is tuned. Tune the signal accurately by reference to the receiver S-meter and adjust the discriminator secondary trimmer so that the voltmeter reads zero. Now detune the signal each side of resonance noting the maximum voltage reading (negative one side and positive the other). These readings should be equal and may be balanced by minor adjustment of the discriminator primary trimmer, rechecking the secondary after each adjustment.

Acknowledgements are due to G3FAN who has built equipment to these circuits to prove their practicability with other layouts—and he has kept daily schedules with the writer over a 120-mile path on two metres for more than ten years to prove the advantages of FM on VHF.

## Do You Know That —

— Battery chargers as obtainable very cheaply from the *emporia* of Messrs. Woolworth make very good PSU's for GPO-type relays. Most have 6v./12v. taps and give anything up to 2·5A, ample for all the relays likely to be needed in the average station.

— Light composition curtain runner, cheap to buy in do-it-yourself stores, cuts up into very good spacers for open-wire feed lines. The ends should be drilled to take the wire, and the spacers can be fixed by melting the plastic material into the wire with a hot iron.

— The best way of washing crystals is to bathe them in the ordinary household cleaner known as *Thawpit*, which is carbon-tetrachloride. It is quite harmless. Use an egg-cup as the bath, and a pair of tweezers (from the XYL's make-up kit) to handle the crystal.

— In a transistor, the *emitter* is the circuit element always marked with an arrow-head. If the tip of the arrow rests on the base, it is a p-n-p type; if the arrow looks outward from the base, it is n-p-n, involving a reversal of supply polarity.

— Heater transformers can be used back-to-back to provide low-voltage HT, for receiver or bias supply. Thus, HT up to 230v. can be obtained from an unused LT winding on a mains transformer by feeding the "secondary" (LT side) of the additional xformer from the spare 6·3v. section.

— The only certain way of making your station safe is have one, and one only, heavy-duty, fused,

double-pole mains switch socket wired to serve the whole layout, and from this switch to follow L, N, E, all through the mains wiring for the gear. Every member of your family should know where this switch is, and why it is there; and in a properly designed wiring layout, it should be at the door, not down on the skirting board behind a lot of heavy junk!

— For home-made plug-in transmitter coils, good end connectors can be made from the round-brass pins of old 2A and 5A domestic power plugs; we all have some in the junk box!

— An effect known as cathode-poisoning can be brought about in valves left running on LT only for very long periods. The chemical composition of the cathode is disturbed because normal emission is not taking place. In this context, "long periods" can be defined in terms of days.

— The braided type of thin (though very strong when new) aerial wire often used nowadays at amateur stations crystallizes much sooner than the old 7/22's, and is far more susceptible to the effects of smoke, grime and frost. As the crystallization seriously weakens the wire and also increases its RF resistance, it should be examined every few months, depending on local site conditions. On the other hand, 7/22's can be put up—and left there for years.

(We shall be glad to have similar hints, tips and ideas from readers, for publication. Half-a-guinea will be paid for those that can be used, and the item credited by call-sign. No circuits, and on a separate piece of paper, please, with a covering note giving name, call and QTH.—*Editor*.)

# MODIFICATIONS TO THE EDDYSTONE 888

## IMPROVEMENTS AND REFINEMENTS

I. WOOD, A.M.I.E.E. (ZE3JJ)

Though the Eddystone 888/888A receivers, manufactured by Stratton & Co., are now out of production, they are post-war designs and large numbers are in use at amateur stations at home and overseas. The 888 preceded the 888A and this article explains some steps that can be taken to give the former type an entirely new performance rating.—Editor.

**S**INCE the Eddystone 888 appeared about ten years ago, there have been advances in circuit technique, and in the availability of semiconductor devices. Wishing to improve the performance of his 888, the writer has carried out a number of modifications which may be of interest to other users of this well-known receiver.

No attempt has been made to give step-by-step instructions in these descriptive notes, and it will be noted that the diagrams are basic, as it is assumed that the reader will possess the manual and be familiar with construction techniques before attempting the alterations described.

Warm-up drift was found particularly severe on 7 mc, an initial drift of 20 kc in 30 minutes being observed. This was greatly reduced by removing the wax-coated capacitors on the oscillator coil assembly, and fitting domestic-type replacements.

To reduce drift still further, and generally to conform with modern practice, it was decided to cut down on heat losses. To this end, the N78 output valve was removed, and a 6AK6 fitted, making the necessary alterations for pin connections, bias and

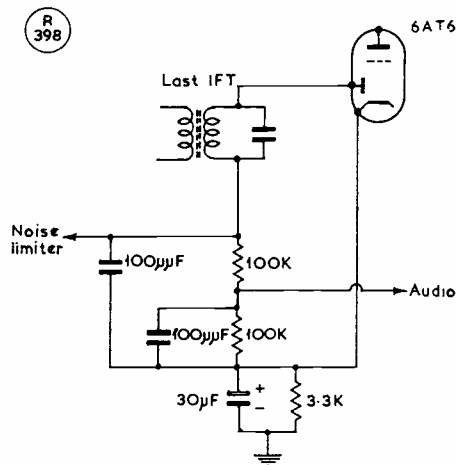


Fig. 2a. Original detector

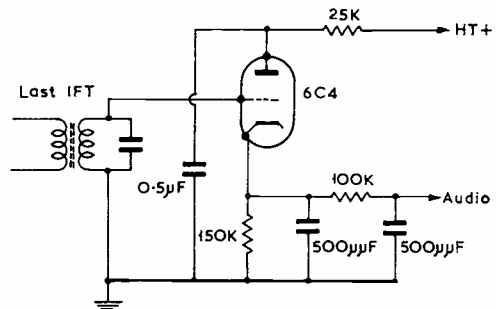


Fig. 2b. Infinite Impedance Detector

Read with the text, these circuits are self-explanatory. The Eddystone 888/888A receivers (now out of production) tend to be quiet on the HF bands. The modifications suggested by ZE3JJ put the Eddystone 888 into the modern-receiver category.

screen volts. The optimum anode load for the 6AK6 is around 10,000 ohms, and the existing output-transformer ratio permits adequate feed for a 3-ohm speaker. The reduced heater consumption and anode dissipation of the 6AK6 together save several watts. Opportunity was taken to replace the output valve socket, which had tracked from anode to earth, by a ceramic type not prone to this trouble.

In the power supply section the 5Z4G rectifier was scrapped, and replaced by silicon rectifiers rated at 800 p.i.v., assembled on a plug-in octal base, thus saving another 10 watts of heater power, and cutting down on the heat dissipation.

### Other Modifications

To reduce the general HT level, a 1K resistor was fitted in the filter choke lead, and the dropping resistor for the stabiliser increased to 4,000 ohms. A VR-105/30 was subsequently used in place of the VR-150/30 originally fitted. This change to the

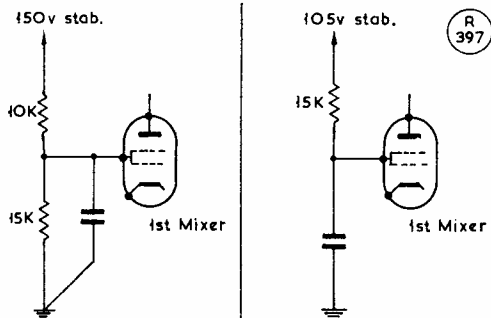


Fig. 1a. Original screen feed

Fig. 1b Modified screen feed

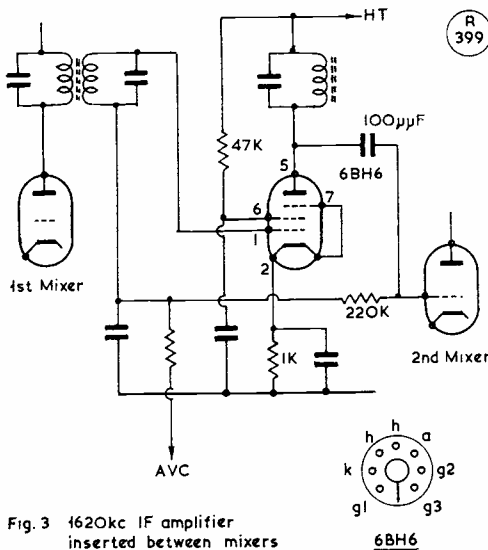


Fig. 3 1620kc IF amplifier inserted between mixers

stabilised rail caused the screen potential on the first mixer to fall from 82v. to 52v. As this voltage exercises a close control on the effectiveness of conversion, its feed was altered as shown diagrammatically (Fig. 1).

As the second mixer oscillator, self-excited on 1535 kc, is not required to be altered in frequency, its reaction coil was disconnected, and a 1535 kc crystal fitted between the (triode section) grid condenser and ground. This involved some rather delicate work after removing the can surrounding the ECH-42 assembly. If trouble is experienced in getting the crystal to oscillate, try adjusting the slug, and/or putting a low value capacitor (1-5  $\mu\mu\text{F}$ ) between grid and anode of the triode section. This modification eliminates one variable (useful when re-aligning) and gives an even cleaner response when receiving CW (a much-favoured mode at ZE3JJ).

Diode detection is used in the original version, which loads the last IF transformer, and allows less than half the available audio output to be passed to the following stage, due to the network associated with it (Fig. 2A). The detector diode was disconnected, and the last IF transformer fed to a 6C4 connected as an infinite impedance detector (Fig. 2B). This gives much more "life" to the receiver, and is effective for CW, AM, and SSB. In case the reader may be wondering where to find space for the 6C4 detector, it should be mentioned that the D77 (6AL5) noise limiter and S-meter diodes were replaced by OA85's suspended in the wiring, thus leaving a valve holder available after the diode connections had been removed from it. (In point of fact, the use of a noise-limiter had been discontinued earlier, and further experiments with noise-limiters are contemplated.)

A certain amount of loading still occurs on the last IF transformer due to the AVC diode, but no changes have been considered here, as this diode does not operate on small signals, due to the

"delay" provided by the cathode resistor of the DH77 (6AT6).

The Eddystone 888 in its original state is very "quiet" on the higher-frequency bands, even with all gain controls wide open. A vast improvement in performance can be obtained by fitting an additional IF stage at 1620 kc between the two mixers (Fig. 3). Consideration was given to providing extra gain elsewhere, but this proved to be the most convenient point, and a 6BH6 mounted on a bracket under the chassis in the vicinity of the selectivity-control mechanism has given outstanding results. The tuned anode load is made from the 1620 kc rejector circuit components removed from the aerial input section, as a rejector has been found to be an unnecessary refinement (in ZE, at any rate). The anode load may have to be resistor-loaded to prevent oscillation.

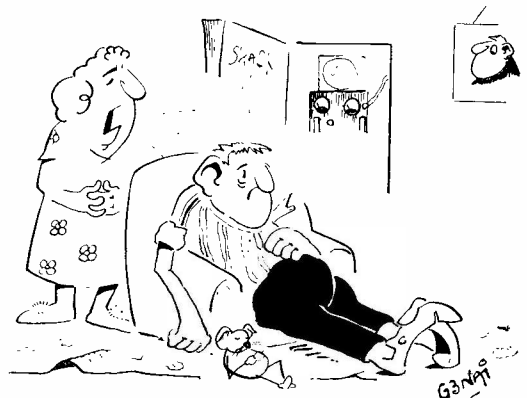
These modifications have brought the receiver performance into line with that expected of contemporary types, and may save the writer the expense of buying a new receiver for several years to come.

INDEX TO VOL. XXI

Each copy of this issue of SHORT WAVE MAGAZINE should contain, as a free loose supplement, a complete Index to the volume just concluded, with the February issue. If by any chance your copy missed the insertion, you can get the Index free of charge on request, with an s.a.e.

"TWO-METRE TRANSCEIVER FOR PORTABLE/MOBILE OPERATION"

With reference to this article, started in the February issue, the following amendments should be noted: In Fig. 2, p.661, C12 should go to L3 tap, not to TR2 base. On p.662, Fig. 3, the C12 in that diagram should be between the hot end of IFT5 tuned circuit and TR2 base. The concluding part of this article, dealing with the Tx side, testing, setting up and the results being obtained by G3OCB, will appear in the April issue.



"... Just because Fifteen is dead, no need for you to be..."

# DX COMMENTARY

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

THE accent is still on the LF bands, and particularly on *One-Sixty*, which has carried an incredible amount of real DX. It seems very strange that this band, which has been in regular use for more than forty years, should have developed so much during this particular sunspot cycle; even one cycle back it was not looked upon as a possible vehicle for such stuff as VP8, W6, VS1, VK and the like, although its Trans-Atlantic possibilities were well realised. But the goings-on of early 1964 would hardly have been looked upon as possible, even in 1957. All very strange, and most exciting.

*Eighty* and *Forty* have also been teeming with DX, and one can only speculate in sorrow on what they might have been, were they still "amateur" bands. Reflecting on what can be done, even now, by the keen types who are prepared to find one small crack in the QRM, one realises what the potentialities must have been when we had neither the knowledge nor the efficient gear to make use of those wide-open bands. (Forty, populated only by amateurs, and 300 kc wide—what a gift it would be right now!)

One sympathises with the correspondent who writes "The small handful of DX'ers make a noise, both on the bands and in print, which is out of all proportion to their numbers." True, to a certain extent; but they *are* the people who get the results, and they are also the ones who write to tell us all about them. While there are far greater numbers of people on the bands to whom the really

exotic DX means nothing at all, if the keen-DX types just retire into their shells we shall never know much about what they are doing. They make the news!

But the chasing of "rare" DX leads to many abuses and quite a lot of bad feeling, at times, as do the vast numbers of contests that tend to spoil the bands at weekends; but both phenomena lead to the operation of a station at full stretch, and present a real challenge to the operator. If he prefers to sit back and treat it as a "lazy man's hobby," who can blame him; but there are always a large number who do *not* take their fun this way. And at least they are the pacemakers who show the slow, comfortable types what is possible. Anything completely new (working VR2 on Top Band, for instance) is always "impossible"—until someone goes and does it.

While sitting in the shack, working (or, more often, calling) DX, your conductor has a close-up view of a bird table on which there are usually some tasty scraps. (No, we're not changing the subject.) A blue-tit discovers the food and hops on to the table to prospect; a chaffinch appears on the other side; and suddenly a dozen starlings appear. By brute force they chase the smaller birds off; and then, one by one, they try to grab something for themselves. But as soon as one has got his beak into a piece of something, half a dozen others mob him, and he flies off unrewarded. This is repeated by each one of the gang, with all the others bullying him away. The result usually is that they all fly off, and nobody gets anything. Anyone who has ever listened to the first appearance of a nice piece of DX, on almost any band, will know all about this phenomenon.

This is the debit side of the

DX-chasing business. Exit courtesy and manners; enter the small-boy "it's *mine!*" mentality. Top Band has been a sad sufferer from this; and the "select" few, making a noise quite disproportionate to their numbers (and you can read two different meanings into that phrase) leave the more moderate types smouldering with resentment. Some of them will speak for themselves under the appropriate heading.

What we are up against, really, is the problem of over-population—too many people chasing too little DX. It's as simple as that, and as difficult to solve. Once we had wide bands and 20,000 amateurs using them; now we have narrow bands and 350,000 occupants. In the future we may have narrower bands still, and over half a million of us will be trying to squeeze in, somewhere. What is the next technical advance that will make it possible to carry on? Your guess is as good as ours.

## DX-peditions to Come

Latest news from VP8HF, received direct: the *South Sandwich* operation should run from March 6 until March 27; 14 mc only, SSB and CW. Candlemas Island, the scene of the operation, is only four miles long, with an active volcano 700 ft. high at one end, a frozen mass 2,000 ft. high at the other, and a plateau of volcanic ash 80 ft. high in between. It is on this that camp will be set up, the party being landed by helicopter. (And they will probably be the first ever to have set foot on the island.)

Ken, G3RFH, who will be at the centre of all this, will be using two Swan transceivers, one as Tx and the other as Rx; two transistorised power-packs; a three-el. beam; and crystals on frequencies of 14024, 14112,

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## ACTIVITIES ROUND THE BANDS

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14123, 14130 and 14140 kc. This equipment is all on loan from Hammarlund, and all QSL's go to:—Hammarlund DX-pedition, PO Box 7388, GPO New York, N.Y. 10001. They will be handled by the New Jersey DX Association, working with Hammarlund.

VP8HF will take calls either 10 kc high or 10 kc low, indicating the procedure from time to time. This operation will doubtless cause the biggest pile-up in history, and we can only hope that sense will prevail! Ken is at present storing up some sleep in readiness.

The Antwerp CW DX Club have a full programme ahead of them:—March 28-31, *LX3AX*, operated by ON5AX, all bands, CW only; July 18-22, *LX3AA*, by a large group of ON's, CW all bands, also SSB on some, and two operators handling 144 mc; August 23 to September 2, ON4QJ and ON5AX from Monaco, all bands, CW only; same period, ON4QJ may possibly operate from *San Marino*, but if the licence gives trouble, he will stay in Monaco. *LX3AX* QSL's to Box 331, Antwerp; others via W2CTN. (Thanks to Bob, ON4QX, for all information.)

*Lord Howe Island*: VK2AGH will operate CW and SSB on 3.5, 7 and 14 mc, April 15-29. Preferred frequencies are 3505, 7005, 7025, 14025, 14070 kc on CW; 3695, 7095, 14120 and 14300 kc on SSB. Call 5 kc up or down, and QSL to VK2AGH.

#### DX Gen. from Readers

From *G2DC*: Dave, ZL1AV, will be operating the Antarctica station ZL5AA from now on. He will use a rhombic, mostly on 14 mc but also 7 mc CW . . . W4KKA/V59 (Cocos) on 14 mc CW; cards via K4SCT . . . FB8WW promises to open up daily, 1630-1730, 14040 or thereabouts. Call 5 kc up.

From *G3NOF*: HZ3TA has not been operating from Jordan. He explains that his QTH is Taif, Saudi Arabia, but QSL's go to Box 646, Amman, Jordan . . . 9L1HX (Police Hq, Freetown) is ex-VQ4HX . . . ZP5DD (US Embassy, Asuncion) was formerly H18XAA, HH2P, YN1TAT, HKØHCA and others . . . The

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
G3DO	39	40	40	25	24	2	170
G3IGW	36	37	37	31	13	11	165
OH3NY	32	30	40	25	10	7	144
G3NOF	34	38	39	6	8	1	126
G3PEK	2	20	35	29	15	4	105
G3OLN	2	7	11	16	3	4	42

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

highly confusing 6YA prefix for Jamaica will be changed to 6Y5 in March (good news!).

From *GW3AHN*: T19FG on shortly from Cocos—QSL via VE4CP . . . FB8ZZ will soon have an SSB rig, ex-HB9TL, and at present at FR7ZD; later it will go to FB8XX and possibly to FB8WW . . . FR7ZJ is on 14120 kc SSB with an HX-50.

From *VP8HF*: He can generally work Europe at 1900-2000 on 14 mc, and sometimes 1600 on 21 mc . . . 74 countries worked so far (only 33 confirmed) . . . VP8GQ is busily operating VP8HJ and handing out the first SSB QSO's from the Falklands . . . VP8HO on 14 mc most days . . . VP8HD will be on 14 mc for another eighteen months or so . . . KC4USK and 4USB both active from the Antarctic continent . . . One of the former VP8's is now on Tristan da Cunha and is expected to come up from there.

From *SWL Dave Gray*: 9M2DQ on 14120 SSB, week-ends at 1500, his 80 watts much in demand . . . 9L1HX and IRO both on 14 mc SSB, 0900, week-ends . . . YA1AN heard on 14110 kc SSB . . . VK6QL active daily, 0900-1300 on 21 mc AM; rarely misses at least one G contact.

From *SWL Doug Bowers*: CEØX DX-pedition now off until April . . . FP8CB/FO8 (Tahiti) on 3786 kc SSB, 0800 . . . ZL1AIX, same frequency, now there again most mornings, 0745.

#### More Coming Events

VQ1MH, who lost all his gear in Zanzibar, hopes to be on from Brunei (VS5MH) by March; he may show up first as VS1MH . . . G3HCL is bound in the same direction, and WA2WUV has loaned a complete SSB rig to the RAF-ARS, which will be used from VS1, VS4, 9M2 and then, possibly, the Andaman and Nicobar Islands . . . CEØX (San Felix Is.) — the DX-pedition planned by W6HAW may happen during March or April.

Harvey, VQ9HB, was due to leave on his trip by February 28, arriving at the first port of call (probably Chagos) around March 10. Callsigns now likely to be VQ8BFC (Chagos), VQ8BFR (Rodriguez), VQ9BFB (St. Brandon) and possibly VQ8BFA (Agalega). QSL's to G8KS, and for further details refer back to p.680, February issue.

#### More DX, Present and Past

Most popular customer at present is probably FB8WW, activating pile-ups almost daily from Crozet Is. (14040 kc CW). FB8XX and 8ZZ are usually on the frequency, too . . . 9Q5AB very active, 7 mc and 3.5 mc CW . . . W4KKA/VK9 working hard from Cocos-Keeling at time of writing . . . LU2XL/9K3 showed up on 14270 kc SSB, mid-February; he works for an off-shore drilling concern and is off duty for one week in every three.

5N2RSB/TY2 reported on 14020 CW, 14120 kc SSB . . . TU2AQ and 2AU promise activity from TZ2 and XT2 during ARRL Contest week-ends (March 14-15, Phone; and March 28-29, CW) . . . CR8AD appears spasmodically on 14 mc, mostly CW . . . KC6AA (Western Carolines) on 14280 kc SSB, 0600 onwards.

Gus did not return to Sikkim as planned, but was due to operate from Laos as XW8AW, last week in February. If he has kept to schedule, he should now be *en route* for home, via KH6 and W6, after which he will tour the U.S.A. for about three months.

### Sark Again!

Hardly a DX-pedition, perhaps, except for Top-Banders, but interesting, as always—one of the rare activations of Sark. This time it will be by two separate parties. G3NQF, G3RFS and G3NPB will operate from March 27 until April 7, all bands 14 mc to 1.8 mc, Phone and CW, with Top Band the main interest. And G3ROP, G3ROO and G3PCR will be there from March 24 until April 2 or 3, working 21 mc to 1.8 mc and also (they hope) 70 mc, on which band they will concentrate if all goes well. We hope the little island can support an active amateur population of six over the Easter holiday! (Sark rates as a county.)

### Top Band Super-DX

What can one possibly say about the recent events on One-Sixty? Phenomenal, incredible, miraculous? Well, let us say "surprising." Pride of place must be given to G3GRL's achievement in working 69 W and VE stations during the contest week-end, and rounding this off with an undoubtedly genuine (verified) two-way QSO with VS1LP at 2330 GMT. G3GRL had his balloon up throughout the hours of darkness; and apart from the W's and VE's, he made 88 five-point QSO's which included the VS1, a 6YA and an OHØ, to say nothing of 102 G's, giving a multiplier of 33 and a total in the region of 44,000. Does the mind boggle?

Next comes G3PU, who achieved one of his ambitions when he raised W6ML on February 2 at

0745. He has now worked 27 States on 160 metres, including Texas, North Dakota, Kansas and Kentucky.

G3SED is, as far as we know, the first of the G3S's to claim contacts with the U.S.A.; he has also raised 9A1, OH3, HB9, DJ-DL and the like, and is now making a 50ft. vertical which he hopes will get him "in amongst the DX boys." *Phew!*

Selected items from W1BB's massive bulletin: VS1LP and W6ML worked each other for an undoubted "first" on January 26 . . . W1BB himself scored another "first" with 9A1VU, and on another occasion worked DL1FF as early as 2309 GMT . . . GM3NYY made the first GM/VP8 contact by getting VP8GQ on December 6 . . . 6YACZ collected a fine number of Europeans, several G's among them.

W1BB's yearly QSO records for *different* stations worked each season show the effect of the sunspot cycle on the 160m. band. In 1954-55 he worked 19; 1955-56, 26; 1956-57, 20; 1957-58, 10; 1958-59, 4; 1959-60, 5; 1960-61, 11; 1961-62, 31; 1962-63, 34; and this season, so far, 99! (Yes, we did say ninety-nine—but that's doubtless out of date by now.) This phenomenal increase confirms previous remarks about the band, one would say?

On this side, of course, many G's have had the benefit of Stew's superb aerial and receiving technique by working him for their first and only W contact (if *he* can't hear you, none of the others can).

G3IGW also had an excellent log for the contest (from GM3IGW/A) and totalled nearly 40,000 points. He worked 38 W/VE stations, including some "rare" ones such as W8YBZ in West Virginia and a couple of W5's. He says "Operating under the QRM was generally of a high order from all stations. However, the usual brickbat to some 40 stations who chose to compete using frequencies between 1800 and 1810 kc."

G13PDN worked VOIDX and W1BB for his first cross-pond QSO's (during the contest), and the following week-end raised W2GGL, 2FYT, 2IU and 8HRV—

so he's really in the business now.

G3RFS accounted for twenty W/VE's on the great morning, and heard many more, together with 6YAXG, VP7NS, 5N2JKO and OHØNI. He has tried out many types of aerial, but has settled for a 134ft. Marconi type with a 52ft. vertical section, tuned against radials of various lengths.

An interesting letter from G3KMA, at present in Tehran (EP) lists the stations he has *heard* on the band, with an Eddystone S.840C and an aerial 100ft. long, not very high. On January 25 he was surprised to hear an OK, who alerted him to the good conditions, and then between 1945 and 2145 GMT and again between 0345 and 0415 he logged six DL's and G2LB, 3CNM, 3GRL, 3RFS, 5ZT, 6QB, GI6TK, GM3IGW/A, GW3FSP, PAØPN and a huge bunch of OK's. DL1FF was the outstanding station, and the only G to be logged throughout the whole of both periods was G3GRL. No sign of W's or VE's, though. G3KMA will be in Tehran for another two years, so more reports are promised.

VE3BWY had a good contest week-end, working DL1FF and 9KRA, OK1ADM, HK4EB, HR3HH and G3PQA, 3PU, 3CVM, 5ZT, GI6TK and GM3IGW/A. The following week-end he raised 6YACZ, DL1FF and G3OLI, 3RFS, 3RPB, 5JU and 6QB, and heard G3PQA, 5ZT and GI6TK. These are the best results Ham has ever achieved, and he is very pleased with his new QTH. He's a nice operator, too.

### Top Band Manners

Many comments have been received over the air and through the post about the deterioration of the once friendly Top Band into yet another arena for the DX rat-race. Human nature being what it is (what is it?) one can only blame the phenomenally good conditions for bringing out the worst in those very same people whose gentlemanly behaviour was once a source of such pleasure. "Man is by nature a competitive animal" and it could be that if these types weren't busy bashing each other's brains out on Top Band, they would probably be beating their

wives and children. So the rest of us suffer—but not in silence.

G3REA says that his blood pressure would be kept down if only we could have a “gentleman’s agreement” to limit calls to a DX station to thirty seconds. The present game of playing “last across” in the hope that you will eventually be the only one to survive the mass QRM is stupid and time-consuming. Call for 30 seconds, then listen and call again—that would make sense. (But why as long as 30 seconds? If *everyone* made short calls, the habitual short-callers wouldn’t be faced with the problem of reading the DX station through all the long-winded types still on the frequency.)

G2CUZ joins in the fray, and asks “Who are *really* the clots, and who is the judge?” He heard a G call a W on 1804 kc. at which a well-known operator came up with “Get HF, you b . . . fool.” demonstrating the manners now current. This was not during an organised test, and if *everyone* were to dive into the 1825 kc region, then all the non-W DX would be lost in the QRM. Another nice type told G2CUZ he was outside the band, and while he was checking it, jumped on the same frequency and called the same DX station! (Oh yes, they are pretty slick these days.)

G2CUZ writes “Can we sort it all out before Top Band gets into the awful state of Twenty when the artificial DX-peditions are on, or the MC-ridden state of Eighty SSB?” And he adds a word of thanks to the “three well-known experts” who worked KP4ALD and then sat on the channel discussing whether he was a phoney or not. Those who were waiting were just so many clots, no doubt—“depending on their 813 status.”

G3IDG says the only time he can get a decent type of QSO on the band is a Saturday morning; at all other times DX is the one criterion.

Grafton Radio Society will be running their annual Top-Band Contest on March 14 (CW) and March 21 (Phone), both days 2230 until 0100 the following morning. Exchange RST, or RS, plus serial

number starting anywhere between 001 and 100. Final score, the sum of both sections. Logs to G2CJN (*QTHR*) not later than March 31.

GM3OGJ/A will be active from Kinross for roughly a week, starting March 30. CW, 1815-1830 kc, 2230 to midnight. Meanwhile he is on every evening from Dunbarton, usually after 2300.

Other Top Band news in brief is acknowledged from many readers, but we have already overrun our space for this band.

### DX on Eighty

The SSB end of Eighty has been really hotting-up, but the band remains pretty disappointing for the CW types. G3DO worked SSB with OHØNI, OX’s, TG9FA and 9SC, XE1IL, YA5A, YV’s, ZB2AH, ZL’s, 5N2CKH, 2JKO and 2RSB, 7X2VX and 9Q5RK.

G2DC, on CW, found conditions good from around 2230, with reasonable signals from W/VE, and occasionally the Caribbean. He found the jingle-jangle merchants pretty quiet at this time, but they were replaced by “the mid-European boys who delight in answering G stations’ CQ DX calls.” Despite all this he worked VP7NT, VP8GQ and 8BM, VO, VE 1-3 and all W districts except 5, 6 and 7.

Eighty attracts an enormous amount of SWL attention, and here is their news, in brief: FP8CB/FO8 worked ZL2BU and G3FPQ on 3786 kc at 0807; ZL1AIX good at 0745 (*Doug*

*Bowers, Saltash*). PJ2AA, PZ1AX, PY’s, FG7XT, KZ5FC and 5GI, KP4OV, TG9FA and 9SC, XE1IL and 2OM, YV’s, VP7NY and 9FE, as well as several ZL’s logged (*David Hayes, London, N.3*); OY8RJ, VP7NS, 4U1ITU, PZ1AX, VP9FH all logged, 2200-2300; and numerous ZL’s, OX, YV, XE and the TG’s at 0700-0800 (*David Whitaker, Waddington*).

Most of the foregoing, *plus* YA5A, EA9AZ, 9Q5RK, VP3HAG, 5N2JKO and VS9AAA—a total of 26 DX countries heard. January 19-February 14 (*Barry Cushing, Whyteleafe*); W2ZPO, already a wonderful signal with his inverted-Vee, has parts on order for a two-element beam on Eighty (*Dave Gray, Evesham*).

### Forty Metres

SSB on Forty is becoming very popular—not surprising, when one sees some of the DX worked. G3DO says one can get VK and ZL every morning around 7090 kc. between 0800 and 0900, and another good period is the early evening, when North and South Africa can usually be raised. He has worked SSB with OHØ, UO5, YA5A, ZL2WS, ZS2HI, 3E and 6AOW, 5A1TW and 5TR, 5N2JSC, 9G1DY and many VK’s. He feels that most people condemn Forty without bothering to listen.

G2DC, speaking of CW, says “from around 1500 to 1930 anything in the DX line is liable to



When the boys of the Antwerp CW/DX Club—probably one of the only groups of its kind in the world—found their 5th anniversary coming up, they arranged a get-together. Here we have, left to right, back row: ON4ZY, ON4AZ, ON4QJ, ON4QX, ON4IM. In the middle, 1. to r.: ON4DI, ON4QV, ON4IT, ON4EK, ON5AZ, ON4GK; and at centre, ON4NM.

show up—W6 in the afternoon, East Coast a little later, and VK/ZL in the mornings." He worked HZ1AZ, KC4USK, SM5BKK/9Q5, TL8SW, VU2GG, VK4YP, VS1LP, W6ULS, YA5A and ZL3OR.

G3NOF says that VK's and ZL1AIX have been heard regularly on SSB, around 0800, and VS9AAA was very active at 2300 or thereabouts. And SWL David Whitaker contributes the following, all SSB: 1800-2000 GMT, 9G1DY and 1EO, ZS3E, 5N2JKO, ZS's, 5A1TW; 0800-0900, VK2AKC, 2AVA, 2NN, 2NS, 3VJ, 3XM, ZL2WS.

In short, not a bad band, if you can stand the racket—and what a racket it is, sometimes!

### Twenty Metres

The everlasting stand-by, Twenty, continues to yield practically everything at certain times of day, although it has bad fade-

outs lasting for a couple of days, every now and then. Devotees of the LF bands admit that it is good by their back-handed compliment—"Of course, if you want the DX the *easy* way, stick to Twenty." But it's not always easy, at that.

The mid-day period is often interesting for the Caribbean area; then the W's take over, usually with a welter of West Coast stations during the late afternoons—and there are still some old squares like your conductor who think W6 is DX! After about 1700, anything may happen, from a complete fade-out to a dazzling display of miscellaneous DX which comes in well but seems very difficult to raise.

G2DC sums it up as "dominated by the U.S.S.R. & Co. during the morning, and by the U.S.A. in the afternoon and evening—but surprising what one can unearth, especially with a beam. Put it on Africa between 1600 and 1730 and a whole pack will be found waiting for QSO's. All the FB8, 5R8, VQ8 and FR7 boys are there for the calling."

G3NOF, on SSB, raised OHØ, OX, TI2VW, VE5RU, VP9's, ZD6PBD, ZE, ZS, 5N, 5T5YL, 5Z4AA, 9G, 9L1HX and many W's. He missed out on CR7GF, ET3AV, FM7WQ, LA9MI/P, VP2KM, 3HAG, 7NS, VS4RS, YN1AW, ZP5DD, ZS2MI, 9L1RO and 9M2DQ. Too bad, those misses, but interesting just the same.

The SWL's lists for this band are too long and too numerous to reproduce, but it is worth noting that David Whitaker heard the following on *AM phone*: 5H3JL (1830), 5R8SR (1800), ZS8X (1813) and WA6BMG (1550). AM is still there—don't ignore it—yet!

### Fifteen Metres

The situation on this band is becoming ridiculous. It is wide open for DX on many days, but no one seems to do anything about it. Recent contest activity brought out wonderful signals from such spots as ZD3, 9L1, 5H3, 5Z4, VS9, VU, ZD6, ZE and the like, but on the ordinary day there is nothing happening.

Here, again, the SWL's help to put things in their proper perspective, and they don't neglect the AM phone on the band. John Smith (Tunbridge Wells) sends a report devoted entirely to this mode and this band, and his log is strong in Africans, such as ZE1JR (1000), CR6FN (1115), 9G1EC (1130), VQ2DT (1140), EL5D (1200), ZE3JJ (1215), VK6QL (1245), ZS1AB (1440), 9Q5SL (1530), 9Q5EI (1555), CR7FN (1110) and 5N2FEL (1150).

SWL Dave Gray writes "On February 9 the band was open all day, with all continents logged between 1340 and 1420, and yet G's and Europeans repeatedly mouthed in parrot-fashion to DX stations 'Conditions are very poor today.'" He adds "that Europeans should stare good DX in the face and ignore it because 'Fifteen is no good these days' takes some beating for real stupidity."

David Whitaker, listening around mid-day, logged EL2S, ET3FF, TN8AD, VK6QL and ZD3A; other SWL's comment on the terrific number of African stations logged on AM phone.

G2DC writes in the same vein: "Don't let us write this band off yet—half of its dullness is due to inactivity. Whenever there is sufficient reason, such as a major test, you will find it open and very nice DX contacts can be made without QRM." To prove it, he quotes CW QSO's with EL2AD, 5N2JKO and 2RSB, 6W8DD, 9G1AC, 9L1AN, ZD3A, ZE6JS, 5Z4IV, VK2GW and 3RJ.

G3NOF, on the other hand, did think conditions were poor, and made only one SSB contact—with ZS6ALI. He heard AM from CR6 and 7, ZE, ZS and Europe, and SSB from VQ2AB, 6O6BW and 9G1DV.

### General Chat

G3WW writes to tell us that the Isle of Ely, in which he is located, will shortly cease to exist, and become part of Cambridgeshire. He thinks it would be a pity to let it go without some sort of "death certificate" for QSO's with stations in the Isle. Since

### TOP BAND COUNTRIES LADDER

Station	Confirmed	Worked
<i>CW and Phone</i>		
G6VC	98	98
G2NJ	98	98
G3GGS	97	98
GM3KLA	94	95
G3LWQ	94	95
G3REA	94	94
G3PLQ	92	93
G3OLN	86	92
G3PHO	76	92
G3RHM	72	75
G3RJH	67	80
G3REP	65	77
G2BP	54	63
GM3PPJ	52	69
G3IDG	50	54
G3SNU	47	47
<i>Phone only</i>		
G3FS	88	89
G3NPB	85	86
G3RHM	64	67
G2NJ	51	51
G3REA	34	42

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



November, 1938, he has worked nine bands and five modes (including RTTY) and adds that G3BK and G3CDV can supply even more. Conditions for a very difficult award (including RTTY and contacts on 56 mc) could be drawn up! It could, in fact, be made so difficult that no one would claim it . . .

G3IJU (now at Netheravon, Wilts.) will soon be active from El Adem, Libya, where he will be stationed for two years; he will try to work all bands, Eighty to Ten, with his Viceroy, and hopes to get the call 5A3EB.

G3IDG would like an "AMY" code, covering Age, Marital Status and Years spent in Amateur Radio. For instance, AMY 39/U/12 would mean "Age 39, unmarried, 12 years licensed." Anyone interested please follow it up and start using it . . . G3IDG would be thrilled to have it thrown at him during a QSO!

GM3OGJ asks "Can anyone devise an abbreviation for 'I QSL by return only'?" Well "QSL" means "Please QSL and I will do the same"—not quite the same meaning, but perhaps near enough.

### New Hammarlund Award

W2GHK, on his recent visit to Venezuela, where he was fêted by the Club for his collaboration with the Aves Island (YVØAA) DX-pedition, announced "The DX-pedition of the Month All-Continent Award"—for contacting the Hammarlund sorties on all continents. Full details soon, but meanwhile you can get on the Hammarlund special mailing list by dropping a line to PO Box 7388, GPO, New York, N.Y. 10001.

### Late Flashes

CR8AD leaves Timor for Lisbon, some time in March . . . FH8CD is the former FB8CD, again on Comoro Is.; receiver and beam are there; an HX-50 awaited . . . FU8AG also holds the call YJ1JG; said to be active 0730-1030 . . . KC6BO (Western Carolines) worked by two G's on 3507 kc, 2335 GMT.

LI2C is the call of the Norwegian Expedition planning to



Station G3CSE, operated by C. W. Smith at 41, Stanley Avenue, Hornsea, East Yorkshire, who was licensed in 1947. His activities cover a wide range of amateur interests — DX on SSB/CW, with 310 countries confirmed; Top Band mobile in the summer months; and two-metre working to make a change. The gear now in use includes a K.W. Viceroy with the appropriate linear, a K.W. 77 receiver, and a Mosley TA-33Jr. outside. On VHF, the Tx is a Heathkit Sennica and the beam a slot-fed 4/4. And the project in hand is an SSB transceiver for mobile.

cross the Arctic Ocean and the North Pole on skis, starting from Ward Hunt (Canada) early in March. The twelve members will divide into three parties; LI2C will be the call of the Pole party, and LI2C/2, /3 and /4 the others. They will use 5 watts SSB and 10 watts CW on 7015, 7045, 14000, 14115, 14120 and 14345 kc. Amateurs are asked to avoid QRM'ing these QRP stations when traffic is being passed to NRRL, but also to be ready to QSP if and when necessary.

VP8HF/MM—all ready for the South Sandwich affair, the only reservation being that if that volcano erupts, they won't be able to land on the island at all. . . .

The Neutral Zones: LU2XL/9K3 is operating (14270 kc SSB) from the Eastern Zone (Kuwait/Saudi Arabia); Angus, HZ2AMS, holds the call 7Z2AMS for this same zone, and 8Z2AMS for the Western Zone (Iraq/Arabia). The LU operator may also sign WA5VKA/9K3 . . . CEØZI/MM is en route for Easter Island.

### The Tables

More entries, please, for the Zone-Band table; and also from

the many newcomers to the Top-Band county-chasing business. It appears that the G3S-- stations are holding off until a table is started specially for them, and we are not sure that this will happen. So . . . meanwhile, why don't they send in their scores for Counties Worked in the normal table? But please remember to send figures for "Confirmed" and "Worked"—and countries don't figure in this table—counties only.

### Sign-Off

And that seems to round it up —another good month of DX-ing in these sunspot-starved times. Acknowledgments and thanks, this month, to the WGDXC *Bulletins*, to W4KVX's *DX Magazine*, to the NCDXC's *DX-er*, to W1BB for his *Top Band Bulletin* and to all our direct correspondents who fill the gaps so well. Deadline for the April issue is **first post on Monday, March 16**. Address your letters "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1 and please don't be late. Until then, continued Good Hunting, 73 and—BCNU.

## RTTY Topics

### CONTEST RESULTS—

#### OPERATING NOTES AND NEWS—

#### TYPES OF POLARIZED RELAYS, AND THEIR ADJUSTMENT

W. M. BRENNAN (G3CQE)

*This feature appears every other month and is devoted to the interests of those who operate radio-teleprinters on the amateur bands. Though the users of RTTY (which means "radio teletype") are at present distinctly in a minority, their numbers are increasing as equipment becomes available. Our contributor is one of the world's best-known exponents of the mode.*  
—Editor.

**T**HERE is quite a lot to report this month—activity seems to have been pretty high both at home and abroad, with the result that the mail has brought some interesting comment and news items.

#### The RTTY Sweepstakes Contest

Sorting out the logs and checking the scores for this contest is quite a task even for three or four people. This year, due to illness and other reasons only one member of the contest committee was available for the task—W6CG. He reports that it was something of a nightmare and at times he wondered why we call this a hobby! Anyway, with thanks to W6CG, here are the results: For the second year running IIRIF is the winner. There can be few RTTY DX operators who have not worked this station for his signal stands out like a beacon on the HF bands. The punch in the signal is due to the siting of the aerial (a Tri-Band beam) on the top of a 350-foot building in Milan. Although it certainly helps, the ability to put out a powerful signal does not alone win a RTTY contest. It requires a great deal of planning, operating skill, judgement and a very good idea of day-to-day propagation conditions in order to gain the maximum number of multipliers available for working the various continents, countries and states on the different bands. Add to this a reasonable amount of luck and for the second year running it adds up to IIRIF. Hearty congratulations to him—it will be interesting to see if he can pull off the hat trick later on this year!

W2RUI was once again in second place and, being an old hand at RTTY contest work, was able to make use of all five HF bands to run up his score. In fact, he worked the greatest number of countries and had the highest number of contacts. The rules of this contest are loaded against the W stations in order to offset the advantage they have at the centre of the highest RTTY activity in the world. There is also the other side to this picture—namely that they also have to put up with the "local" QRM (RTTY and CW) whilst digging around for the DX countries. In the light of these facts it seems

only fair to say that W2RUI's performance was at least equal to that of the winner.

Third place went to K8MYF and fourth was W0NFA, this station being run on a multi-operator basis. K3GIF, one of the leading RTTY DX operators, came fifth, with another well known DX man K0DOM close behind at sixth. ZS6UR was one of the only two stations to work all continents during the contest and he gained seventh place.

Although most operators agreed that conditions during the contest were poor, the scores were only very slightly down on those of the previous year. This is most likely due to the fact that about 25% more stations were participating. Unfortunately, it appears that only about 50% of the stations taking part in the contest actually completed the job properly by submitting logs. This particularly applied to U.K. stations. There were at least eight G stations active for some part of the contest period and yet only one sent in a log—G2HIO, who worked six countries in four continents during the brief period he was on. DJ4KW found conditions very poor and apparently made less contacts during the test than he normally does during a non-contest weekend. On the other hand DL1VR worked 16 states, 12 countries and five continents, collecting enough points to give him tenth place. Both VK3KF and VK4RQ were on almost throughout the contest and ZL1WB reported that European signals were very good indeed in New Zealand whenever his beam was looking this way. KW6DS worked all continents and was the top scoring station in the Pacific Area. Taking the sunspot cycle into consideration conditions appear to have been much better than a number of people had forecast. It is a pity that a few more stations didn't jump in and try the water temperature, instead of just guessing at it! Those that did seemed to have derived a great deal of pleasure from the event and several of the contestants have suggested that there should be a second annual contest held in the Spring of each year.

#### Operating News

Perhaps the most interesting news this month is that, thanks to OZ5JT, the Danish Government has agreed to release between 20 and 40 surplus T/P's to Danish amateurs at a price of just over £3 each. Twenty-five of these machines have already been booked by interested OZ stations and so it seems that we can look forward to quite an increase in activity from Denmark very shortly. Meanwhile, both OZ5JT and OZ8US are active on 80 and 20m., OZ5JT using a Model 15 T/P supplied by none other than Captain Carlsen, W2ZXM/MM—the latter has of course been on RTTY for several years.

Just across the channel, F8KI added France to the list of RTTY countries after receiving permission to use FSK. His first U.S.A. contact was with K3GIF. F8KI runs only 20 watts and does not appear to have much difficulty in raising W on teleprinter. This fact should encourage some of the U.K. stations who have never tried their luck on 20m. F8RQ and F3PI also have their RTTY tickets and the necessary gear. Thus the licence problem seemingly now overcome, F9RY/FC can be expected to appear on the keyboard at any time.

Another European country to add to the list is

Sweden. SM6CSC is the first one to export a few bauds from there. The Swedish authorities permit RTTY, using any shift or speed, on 14100—14110 kc. They do, however, suggest that their amateurs should use the international amateur standards for both shift and speed. SM6CSC is active from 1600 GMT onwards throughout the week and has already worked some DL stations.

On 20m. FG7XT has been fully occupied in supplying a new country for stations in America, Europe and Africa. 5A5TR is a regular on this band but is rather difficult to raise. DL3IR and VK3KF have been running regular skeds at weekends with great success. DL3IR recently collected RTTY/WAC number 39. I1DBK is another newcomer. KR6BE is once again in business and will be on Okinawa until May or June this year. ON4HW is also back on the board.

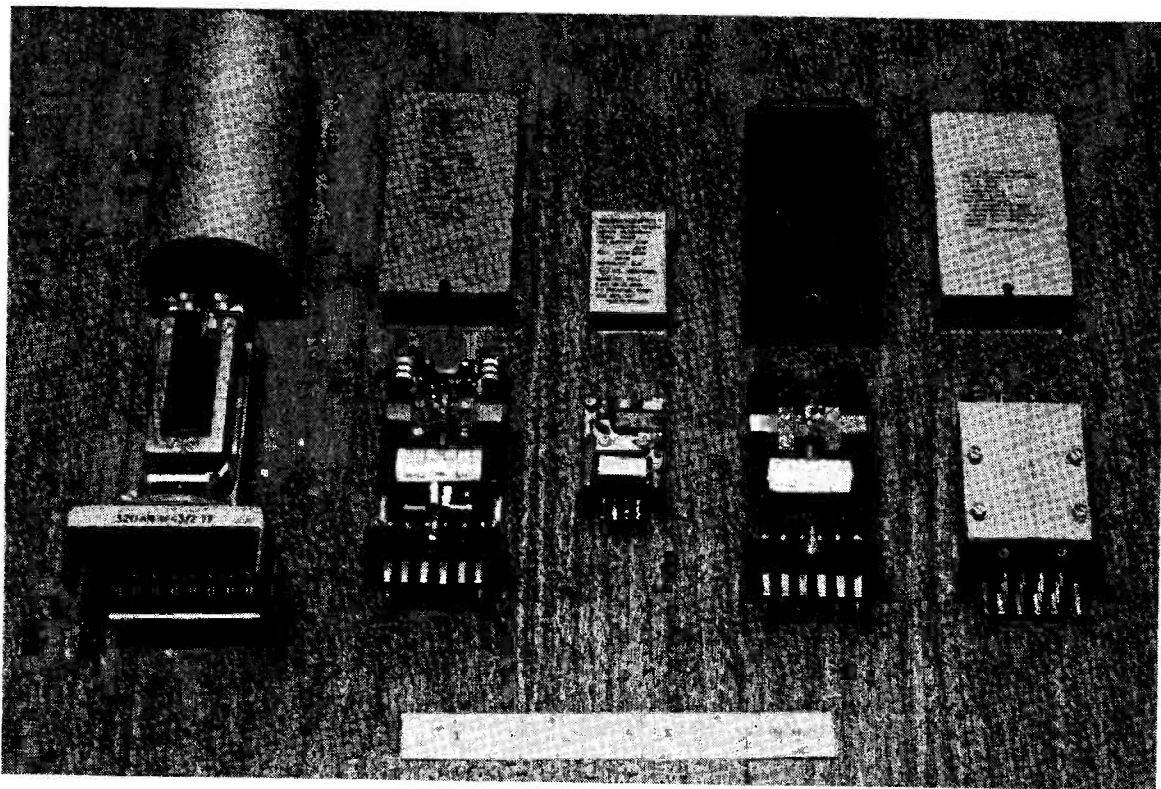
#### U.K. Picture

In this country, activity has been building up on both the LF and the VHF bands. In particular, the weekly test transmissions put out by G2HIO and G6CW at 110 GMT on Sundays on 3575 kc have become the focal point for Sunday morning activity. Among several newcomers to RTTY is G3BGL (Reading). This is a school station and apparently the boys of the school have completely re-built an old Creed Model 3 machine

and now have it running on two metres. Recently conditions have been quite good on this band and among those enjoying the opportunity to work other than local stations have been G2DZH, G2HIO, G3CRH, G3GGH, G3IIR, G3LAY, G6CW and G8DD.

During the recent openings on 2m., several radio T/P operators reported good reception of the RTTY bulletin from PA0AA (the V.E.R.O.N. Hq. station) on their VHF transmission. This bulletin is transmitted simultaneously on three bands: 145-14 mc, 14-10 mc, and 3-6 mc at 2030 GMT every Friday. The bulletin has now passed its 100th "edition" and to celebrate the century the three operators responsible produced a rather special effort and reception reports of this transmission were acknowledged with a special QSL card.

G2FUD is back on the keyboard once more after time off for a complete Tx overhaul. He mentions that G3HVB and himself were recently fortunate enough to lay hand on new commercial T.U.'s. These are the A.T.M. Type FSY (AP.100386), an improved version of the FSR.1.1X. (AP.66862) already described in this feature—see April 1963 issue, *SHORT WAVE MAGAZINE*. There are several improvements incorporated in the FSY equipment but perhaps the main one is the provision of a bias control which enables the receiving operator to compensate for telegraphic bias distortion on the



Polar relays play a very important part in the mechanics of radio-teleprinters. They respond to current reversal, to make contact in either the "positive" or the "negative" direction, and their correct setting-up calls for very accurate adjustment — see text. Shown here are the types most frequently encountered in T/P equipment. Left to right: Permaloy 320AN; Carpenter 3SE1, the very small 5C9, the 3N1 and the 4B. Though they should be adjusted using a relay test set, they can be set up quite satisfactorily by the method described by G3CQE in his article—See p.34.

received signal. Unfortunately, there were only two of these units available but those who are able to keep an eye on the surplus market would be well advised to make a note of the AP number of this excellent RTTY Converter.

#### Schedules Overseas

K3GIF is interested in setting up skeds with European RTTY stations on 80m. and would like to hear from anyone who is prepared to burn a little midnight oil. Actually, around midnight and 0730 GMT have been the most favourable times for such skeds. In case there are any doubters, the writer can testify that excellent copy has been exchanged with K3GIF on 3-5 mc in previous years. The main difficulty is in finding each other in the 80m. bedlam prior to switching in every available filter! The solution to this problem is accurate frequency measurement at both ends. Anyone who would like to try this exercise can either QSO K3GIF on 20m. between 1400 and 2000 GMT—or failing this there is always the slow method—an airmail letter! *QTHR.*

#### Polarized Relays

In amateur journals at least, there has been very little said about polar relays. Although some RTTY'ers refuse to use them at all (preferring valves or transistors to key the T/P and Tx) most stations have at least one polar relay keying circuit, usually controlling the DC loop which operates the receiving mechanism of the T/P. The usual objections to the use of relays are that the spark produced at the contacts causes interference to the received signal and also that any relay introduced into the chain causes distortion of the signal. The quick answer to both objections is that the T.M.C. Carpenter Polarized Relay Type 3E will operate at frequencies up to 350 c/s without any contact bounce or serious bias distortion. Moreover, the type 3SE is the same relay with built-in radio interference suppression circuits. Since the maximum speed used in amateur RTTY is 50 bauds (representing a keying freq. of 25 c/s) it is obvious that such operation is well within the capabilities of this particular relay. In actual fact the manufacturers claim a 92% contact time and a bias of zero  $\pm 1\%$  at 50 c/s. Admittedly this performance will only be achieved with an accurately adjusted relay and these types do require regular attention to maintain a high performance. However, taking into consideration the distortion introduced by other items of RTTY gear—such as the T/P sending contacts, a slightly mistuned receiver or even the T/P electromagnet—distortion due to even an indifferently adjusted polar relay will make little (if any) noticeable difference to the copy. The alternative to the relay is a valve or transistor keyer stage which operates the T/P electromagnet direct. Such a stage must key quite a high current. In the case of single-current operated T/P's with a current changing from 0 to 60 mA, a square waveform at 25 c/s is required. Such heavy current changes at this low frequency creates power supply regulation problems. In some cases a separate power supply has to be used in order to prevent the keyer stages from adversely affecting the operation of earlier stages in the T.U. With either double- or single-current operated machines the switching-in of either a reperforator, or another T/P into the keying circuit changes the



G2FUD, Hale, Cheshire is a well-known radio T/P operator, with a fine array of gear. The main Tx is a Heathkit DX-100U, with a Hammarlund HQ-120X receiver. The teleprinter apparatus consists of a Lorenz T6LO printer, a 7TR reperforator, and an FSR.1.IX terminal unit. Also available are a Creed 7B, a Creed 1B auto-transmitter, and a Perferator Type 44. G2FUD may be said to be very well set up for RTTY!

loading on the keyer valves. With the use of a polar relay these complications are avoided since the relay requires only a few milliamps to operate it and the keyer stages are quite modest triodes or RF pentodes. The relay in turn keys a DC supply for the various machines required and any changes in loading merely varies the current through the contacts.

There are three types of commercial T.U. in use by amateurs in this country and all of them incorporate T.M.C. Type 3 Carpenter relays.

A polarized relay is of course one in which the direction of movement of the armature depends upon the direction of the current applied to the relay coil. The relay armature and contacts form a single-pole change-over unit and with the current flowing in one direction the armature connects with one contact; when the current direction is reversed the armature moves over to the other contact. The relay's ability to respond to current direction is due to the inclusion of one or more permanent magnets in its magnetic circuit. Polar relays are either of the "centre stable" or the "side stable" type. A side stable relay is one in which the armature stays over in its last operated position after the energising current is removed. The centre stable variety are those in which the armature moves to the neutral position midway between the two contacts when the current ceases. The difference between the two types is purely in the strength of the armature spring in relation to the force exerted upon it by the permanent magnetism of the magnetic circuit. The type most often used in RTTY is the side-stable relay.

Some of the several different types of polar relay are shown in the photograph. The large one on the left is a Permaloy 320 AN. It is similar in appearance to the Permaloy 299 and the Western Electric Types 215A and 255A, both of which are in widespread use in the U.S.A. The four other types shown are (from left to right) T.M.C. Carpenter Relays Types 3SE1; the very small 5C9; and then the types 3N1 and 4B. The types most suitable for RTTY are the 3E, 3G and 3N and fortunately they are available on the surplus market. All three types

are fitted with a Jones plug base. Another type, the 3W, is a 3E mounted on a Western Electric base. All of these may be fitted with interference suppressors and this is denoted in the coding by the letter "S" immediately after the type number—for example, a type 3G relay with R.I.S. becomes a type 3SG. The number following the letters indicates what sort of winding the relay has. The windings used for the relays in the commercial T.U.'s mentioned earlier are the type 1 variety. Other windings that would be suitable for relays used in T.U.'s are the numbers 8, 36 and 49.

The Type 3 relay is made up from over 150 separate parts! Two of these are bar magnets and they are an accurately matched pair. These magnets should never be allowed to come into contact either with each other or with any other magnetic material, including metal tools. Once set up properly these relays give very little trouble though it is worthwhile burnishing the contacts from time to time. This can be done by rubbing them with a clean 0-005in. feeler gauge. A relay which is suddenly performing badly is more than likely to be doing so because of iron dust which has found its way into the magnetic gaps. Any such trouble can be cured either by blowing the dust out or by pushing it out with a stiff piece of paper. The relay contacts should always be adjusted with the aid of a relay test set in order to obtain the most accurate adjustment. However, as few people have access to such instruments the following procedure can be carried out with reasonable results.

- (1) Remove the relay cover,
- (2) Loosen both contact locking screws and turn both contact adjusting screws two divisions of the calibrated scale on the screwhead in an anti-clockwise direction, so as to increase the contact gap,
- (3) Move the bias magnet to the upright central position,
- (4) Connect an ohmmeter between the armature connection on the base and one of the side-contact connections (on the base). Using light finger pressure on the armature, check that it meets the side contact, as indicated on the ohmmeter,
- (5) Repeat this procedure for the other side contact,
- (6) With the armature on either of the side contacts, slowly advance the adjusting screw (turning in a clockwise direction) of the contact against which the armature is resting, until the armature trips over to the opposite contact. This adjustment is *very critical* and the operation should be repeated until the exact point is found,
- (7) Turn back the contact adjusting screw exactly half a division on the scale and tighten the contact locking screw,
- (8) Repeat operations (6) and (7) with the other side contact,
- (9) Replace the relay cover.

This procedure will work out quite well providing that a little time is spent in finding the exact tripping point on

the contact scales.

In conclusion your scribe would like to thank those who for the last six months (during which he has been QRT as far as RTTY was concerned) have kept him in touch with "Affairs Of The Printing Brigade." Thanks in particular to G2FUD, W6CG and G6CW. About the time you read this, a new shack should be just about becoming operational. The sound of "Jinglebells" mixed in with the roar of the "mill" is something you can miss quite a lot. The tapes are already punched up—BCNU. 73 de G3CQE.

### STIRRINGS ON THE MOBILE FRONT

As usual at this time of year, organisers up and down the country are getting busy with their plans for the Mobile Rally season. As in previous years, we hope to be covering at least the major of these events fully in *SHORT WAVE MAGAZINE*, with reports on as many others as possible. Organisers are asked to let us have, as soon as may be, the date for their event, so that a full list can be published in our next issue.

In the meantime, the following dates have already been booked: *April 5*, Texas Instruments, Bedford; *April 18*, North Midlands, Trentham Gardens; *May 10*, Thanet, Pegwell Bay, Ramsgate; *May 24*, Wethersfield, Essex; *June 14*, Hunstanton; *July 5*, Weston-super-Mare; *August 9*, R.N.C., Dartmouth; *August 30*, U.B.A. Rally, Ardennes; and *September 13*, Woburn Abbey.

With nearly 1,500 U.K. amateurs now licensed /M, it is again going to be a very big Mobile Rally season—even greater than last year. The established Rally events are assured of large attendances, and experienced organisers start their planning early.

*For Readers' Small Advertisements,  
see pp.55-63.*



*"... For the last time, Rudolf, will you come and have your lunch..."*

# SWL • • • • •

## ETHICS OF QSL'ing—LF BAND DX—PHONE AND CW—DX/TV NOTES—READERS' OPINIONS—PREPARATION FOR THE MAY R.A.E.

A RECORD mail covers a wide variety of subjects, and once more we must do our best to fit all the necessary comments into the available space, which never seems to be sufficient! First, we would like to take a large number of letters collectively, and to congratulate our SWL readers on their sane attitude to the QSL business. On the whole, amateur-band SWL's do now realise that the mere fact of hearing somebody transmitting is not going to result in a QSL from that station being received. (Why should it? If this were so, every SWL could have tens of thousands of QSL cards all over his walls, meaning nothing except that his receiver and the other man's transmitter both worked!)

An amateur-band SWL has to *earn* his QSL's by sending reports which are of some value to the transmitting man; which tells him something he didn't know before. If you can do that, you have earned your QSL, which should therefore be of some value to you, too. Compare the attitude of certain SWL's on the broadcast bands, who deluge every station they hear with reports, and are full of resentment if no replies are received. The VOA organisation receives so many unwanted reports that its reply is simply a printed card with the reception date on; yet some SWL's think they are entitled to a full acknowledgment giving date, time, frequency and all. And what have they got then? A printed certificate that they have actually heard a station which *anyone* with a receiver can hear! Why not collect bus-tickets?

At least one amateur-band SWL known to us has succeeded in acquiring a QSL from every country he has heard—and some 225 of them, at that. Now *that* is an achievement, and shows that he had something worthwhile to send in every single case. Period reports, comparisons with others coming in at the same time, information about DX stations calling, general DX news . . . all help to produce something of value. Compared with this, the rubber-stamp thing which says "Heard your station on January 15" is just pitiable.

Keep the standard up by *never* sending reports which common-sense tells you will be useless to the fellow at the other end. They will merely be a nuisance, and if he replies, he must be very good-natured indeed. Let the British SWL's be known as a group who take pride in their reporting, and they will automatically avoid the waste-paper basket into which the useless kind of reports are deservedly thrown.

### Home-Brew

There seems to be a surprisingly small number of home-built receivers in action, judging from the mail. For this, one must blame the excellence of many types of war-surplus receivers, which, with a few modifications, out-perform anything but the very best of home-brew. However, *D. H. Doff (Wallington)* writes: "Our interest is amateur *radio*, not just amateur listening. Please give the SWL's credit for building their own equipment, even if there are some amongst them who boast of hearing ZL's on Top Band when most of the credit should go to the designer of the receiver."

On the subject of home construction, *N. A. Maxwell (Swansea)* reports "surprisingly good results" with the crystal converters he has built and used in front of his HRO—taken from this feature in the July, 1962, issue; he also has the Nuvistor pre-amp. as described in *SHORT WAVE MAGAZINE* for August, 1962. And now he is at work on the G3BDQ Receiver, for which he has devised a few mods. and improvements, such as sideband selection, a nuvistor cascode RF amplifier and a VFO switchable to cover 5.46 to 7.46 mc; a 2-metre converter is also on the stocks. N.A.M. visualises the home-built amateur-band Rx of the future as comprising a single-conversion tunable unit itself covering two bands only—one 500 kc and the other 2 mc wide. Into this one could build all manner of CC converters as front ends, switchable as required. This is the direction in which he himself is working. (Having passed the R.A.E., he will be taking the Morse Test when he has finished with professional exams.)

*David Cree (Newark, Notts.)* is another successful home-constructor. He has built the High Performance Communications Receiver described in the February 1963 issue of *SHORT WAVE MAGAZINE*—except that he is using plug-in coils, because the turret he was able to obtain had very poor spring contacts. Other variations are a tunable Q-multiplier; germanium diodes in the detector and AVC stages; and a 100 kc xtal calibrator. Further work contemplated includes a product detector for SSB. The PSU has been made up separately—in the original design it goes in with the receiver—as this power unit is combined with a PSU for future use with a transmitter (when the ticket comes through). The Tx itself will be built into a cabinet to match the receiver. It sounds to be a very nice layout, making the best use of a number of different ideas. And good luck to him, too, for the Morse Test, R.A.E. being already in the bag.

### New Readers

It is interesting to know how some of our "first-timers" got started. *Michael Fisher*, a 16-year-old from Halifax, was triggered off by a demonstration station at the Halifax Gala, put on by the Northern Heights Radio Club. After that, a friend gave him a home-built receiver which "occasionally picked up twenty metres"! He is now set up for all bands, including two metres, and takes the R.A.E. in May. He raises some queries about HPX, which are dealt with in a general paragraph, later on, for the benefit of others.

Another newcomer is *J. R. Pearce (Basingstoke)*, who uses a Marconi 52-set and joins the HPX ladder after a lot of listening on Twenty and Eighty. And yet another is *Terry Bucknell (Chesterfield)*, who has an HRO-MX with a pair of 6BA6's in the front end and "a variety of wires," inside the house and out. His QTH is 600 feet a.s.l., and he will shortly be on two metres with a suitable converter.

### The LF Bands

The early closing hours of Twenty have induced a number of SWL's to show more interest in the LF bands, especially Eighty. Most of them have discovered that VE's, VO's and W's can be heard on SSB by 2215 GMT or thereabouts, and have been gathering DX in a big way. One of them is *D. A. Pickup (Preston)*, who also logged such good ones as VS1LP (2325) and 9Q5RK (2330). But he makes the point that Forty SSB is badly neglected, and good DX can be logged there around 1830-2000 GMT most nights. (9G1DY, ZS3E, 9Q5AB, 4X4DK and JA1AEA are quoted to prove it.)

*A. W. Nielson (Glasgow)*, one of the high scorers on the HPX Ladder, says that Eighty doesn't yield many *new* prefixes but has given him some very interesting DX. He regrets that "shoals of W's, 1-4" operate in nets with a marked absence of readable call signs. He, too, has explored Forty, and heard some good things, but says it is no great pleasure because of the commercial and CW interference.

*John Daws (Leeds)* became interested in Eighty, but didn't bother to put a "decent aerial" up. Instead, he wound 75 feet of wire round the roof space, and built the ATU described in *SHORT WAVE MAGAZINE* for January 1963 (p.605, Fig. 3). This, he says, added two or three S-points and introduced him to DX on the band. He adds a pleasant note about operating manners, saying that they are not always as bad as one is sometimes led to believe. He heard a station "apologising profusely for causing QRM by calling CQ on someone's frequency."

*Barry Curnow (Plymouth)* winkled out several new ones on Eighty SSB (VS1LP, HZ1AT, 5N2JKO, 7X2VX among them), and also some outstanding DX on Forty (FB8XX, VP2AV, KC4USK, AP5GB and YA5A show what this band is capable of).

*Barry Cushing (Whyteleafe)* reports for the first time, and he, too, has been keen on Eighty SSB, which has already brought him 81 countries. Conditions on the band, he thinks, have been down on last year, but he has a beautiful log of DX on his CR-100 and 132-ft. wire.

*Roger Western (Torquay)* is another who has been covering the LF bands, and one of the few to report real DX on Top Band—fifteen W's and four VE's one Sunday morning. He has now heard 31 countries (23 confirmed) on 160 metres. He finds he can copy the Top-Band W's with only a wet finger as an aerial! (This is, of course, a well-known effect due to indirect pick-up of signals already on some adjacent aerial.)

*Stewart Foster (Lincoln)* writes "I've taken to 80 metres in the late evenings, and it's proved very

profitable." He has heard most of the SSB DX that's going around 3800 kc, and shares his listening between this band and Twenty.

*David Whitaker (Waddington)* says that the SSB enthusiasts "who care for a little surprise should tune to 7040 kc about 1830 GMT." Just recently he has heard 9G1DY, ZS3E and others, not to mention VK's at 0830.

So, if these few notes encourage a few others to brush up their LF-band technique and tear themselves away from the easy DX on Twenty, they will have served a useful purpose.

### VHF Enthusiasm

From LF to VHF—and quite a few SWL's are breaking new ground for themselves by exploring the two-metre band, and, in a few cases, 70 cms. also. One of these is *Malcolm Healey (Horsham)*, who has just finished a new converter for the latter band. He uses an A2521 GG RF stage into a PC88 (also GG) into a PC86 mixer and an ECC84 IF pre-amp. It sounds lively—just as much so as the two-metre set-up.

*M. Vincent (Cheltenham)* has also spent most of his spare time on Two, but he wishes there was much more CW on the band—those unresolvable carriers are *murder!* He has put up two dipoles at right-angles as well as his beam, and finds them useful for omni-directional reception.

### Phone or CW—Again!

This business of mike-or-key figures so largely in the correspondence that we simply must return to it, despite a "gentlemanly protest" from *Gil Bunting (Birmingham)* who thinks it is a waste of space. He feels that radio as a hobby should be followed as the individual operator desires, which is fair enough. However, that doesn't preclude the airing of various points of view. So here is a drastic condensation of some other people's opinions:

"One thing I dislike about CW is the large number of Central Europeans (T7 or worse) who perpetually call CQ DX without seeming to raise anything" (*I. Bufam, Spalding*) . . . "Can you imagine what our bands would be like if there was no compulsory Morse test?" (*R. G. Hunter, Kenton*) . . . "90 per cent of the Morse on the SSB and AM frequencies comes from those S9-plus, T5 commercial stations who either send Chinese Morse or are continually sending QSA? K . . . QSA? K . . . all day long" (*Martin Tetley, Scarborough*). A good point, this—so many listeners to phone blame all the CW interference on to amateurs. Not being able to read a word of it, they can't tell that *commercials* are usually the trouble.

"I think in our hobby it is very much better to enjoy both modes than adamantly to stick to one, if only from the practical point of view. On some bands both modes cannot be heard at the same time; why leave a band because 'your' mode isn't available?" (*Roger Western, Torquay*) . . . "While the phone boys kick around on a dead band, I will steadily increase my score of the more exotic varieties that telephony has never dreamed of" (*Barry*

Curnow, Plymouth).

R. R. Loe (Colchester) says "I can now manage a shaky 15 w.p.m.," and he hopes to be licensed by Easter . . . R. P. Smith (Manchester) is already a convert, who now intends to add a Q-multiplier and converters for the HF bands to his Collins TCS-13 . . . and Chris Reed (Hatch End) reminds us that the Morse test (and, of course, R.A.E.) are necessary for the Hobbies Section (Radio) at the Gold Level of the Duke of Edinburgh's Award scheme—in which we wish him good luck.

### DX-TV Notes

It is now evident that 1963 was a bumper year for the DX/TV enthusiasts, what with the tropospheric openings and much more ionospheric (sporadic-E) activity in the winter season, normally slack. Charles Rafarel (Poole) is steadily improving his gear, and has now fitted single-stage AF102 transistor pre-amps., one per aerial, at the top of the mast adjacent to each dipole—ten of them have been made and fitted to date. He is also going to tackle the UHF pre-amp. problem, since DX/UHF stations have been giving surprising results.

Tele-Luxembourg, never seen before this winter,

## HPX LADDER

(Starting January 1, 1960)

Qualifying Score—150

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
H. G. Shaw (Heswall)	685	P. R. Doughty	
A. W. Nielson (Glasgow)	631	(Loughborough)	226
D. Douglas (Dundee)	619	T. R. Popham (Exeter)	225
R. J. C. Coats (Cowie)	619	P. Etheridge (Hull)	222
R. Hunter (Kenton)	562	D. H. Doff (Wallington)	214
D. S. Smith (Stanmore)	514	I. Buffam (Spalding)	212
R. R. Loe (Colchester)	502	M. J. Gilding (Kenton)	212
B. Curnow (Plymouth)	471	C. G. Ivermee (Reading)	205
S. Foster (Lincoln)	468	P. R. Ball (Sligo)	201
R. K. Western (Torquay)	462	J. P. Fitzgerald	
F. Bourne (Plymouth)	450	(Gt. Missenden)	198
C. N. Rafarel (Poole)	448	J. Ball (Leicester)	197
D. A. Whitaker		P. H. Moncaster (Goole)	196
(Waddington)	428	P. Houlston (Solihull)	183
D. A. Pickup (Preston)	428	H. Wolton-Carr	
J. E. Pither (London, N.6)	408	(Cambridge)	182
K. C. Staddon (Stroud)	402	P. Robinson (Ruddington)	180
M. Vincent (Cheltenham)	399	A. E. Beales (Clacton)	179
P. J. Lennard (Wartling)	398	C. R. Garnham (Stevenage)	178
M. Healey (Horsham)	382	P. A. Cayless (Exeter)	178
P. Baxter (Winchester)	380	C. Cummings (Manchester)	176
M. D. Stapleton		K. M. Duggan (York)	173
(London, W.13)	373	T. Bucknell (Chesterfield)	169
C. M. Palmer (Birmingham)	373	B. J. Turner (Westcliff)	167
A. F. Huggatt (Lamberhurst)	360	C. Reed (Hatch End)	167
R. G. Evans (Swansea)	344	J. R. Pearce (Basingstoke)	151
B. Cushing (Whyteleafe)	340		
P. A. Whitchurch (Bristol)	327		
N. J. Summers			
(Market Harborough)	313		
A. J. Birch (Lichfield)	309	R. K. Western (Torquay)	529
M. English (Yeovil)	301	R. Hunter (Kenton)	494
D. Cree (Newark)	284	P. J. Lennard (Wartling)	449
A. Stone (Kidderminster)	267	B. Curnow (Plymouth)	444
A. F. Roberts		G. Thomas (Salford)	368
(Kidderminster)	255	J. D. Williams (Winchester)	322
S. E. F. Howell (Hove)	254	K. M. Duggan (York)	320
J. R. Daws (Leeds)	251	M. Vincent (Cheltenham)	292
M. A. French (Highbridge)	250	D. W. Rowan	
M. Maxfield (Solihull)	241	(Farnborough)	260
G. S. Bunting (Birmingham)	229	V. Lindgren (Hull)	229
M. Woollin (Leeds)	227	M. Healey (Horsham)	214
		R. P. Smith (Manchester)	206
		D. Douglas (Dundee)	157
		A. J. Birch (Lichfield)	151

(NOTE: Listings include only recent claims. Failure to report for two consecutive issues of "SWL" will entail removal from the table. Next list, May 1964 issue—deadline. March 20.)

# SWL • • • • •

continued

has become the star performer, and once gave full programme value for a whole evening. And the target C.F. has now set himself is 150 stations for 1964 (the previous one of 100 stations for 1963 was handsomely exceeded).

D. Boniface (Ripon), also reporting on this subject, has added three more TV sets to his collection of gear; but results during the past month (DX-wise) have been *nil*. He looks forward to the coming season, and we wish him more success.

Another correspondent very interested in DX/TV is Roger Bunney (Romsey, Hants.) who says he has had much assistance from Charles Rafarel. R.B. has two 14-in. receivers, modified for fringe reception by the use of "flywheel" synchronisation, fed by a two-band (Band I and Band III) hand-rotated aerial system consisting of three arrays, the third being horizontal for Band III, to which a 23-element section is to be added for the UHF channels. Roger remarks that he has also had "astounding results" with no more than a dipole mounted on a rotatable bamboo pole—it was this that inspired further experiments with the much more elaborate and gainy aerial set-up. His DX/TV now includes pictures from Spain, Portugal, Hungary, Poland, Finland and Russia—all identified by their test cards, of which he has sent photographs taken off the Rx screen. But he says he is more interested in getting results of good quality from distant TV stations than in compiling a DX log. Having seen his test-card prints, we would say his DX results are pretty impressive!

### WPX and HPX

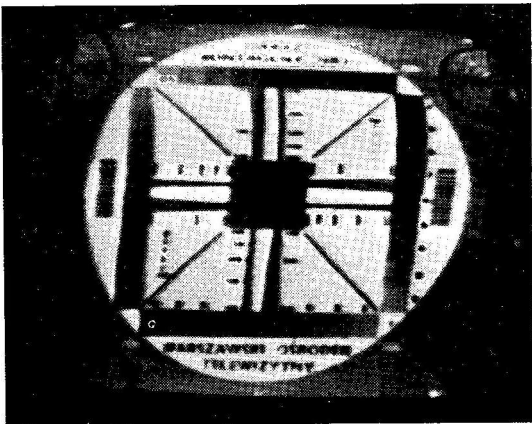
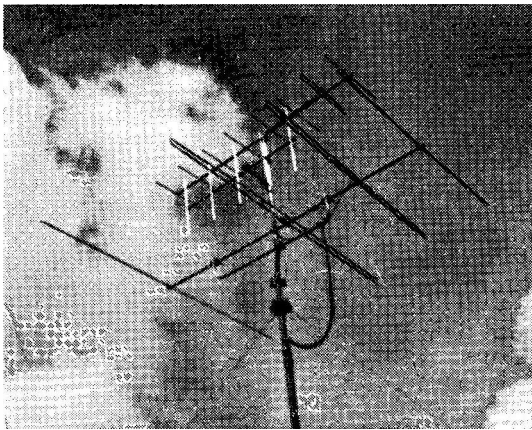
We have had a bumper crop of queries about HPX (they never stop, but with so many new readers coming in, it is inevitable). M. Fisher (Halifax) asks "What does HPX stand for?", and to that we cannot give a literal answer! The American magazine *CQ* originally introduced an award called "WPX," which, supposedly, meant "working prefixes;" and from that we have gone to HPX for hearing them. A prefix, as we have had to state so often, is (for this purpose) the country prefix *plus* the figure in the callsign; thus, G2, G3, G4 are all different, and so are GW2, GW3, GW4 and so on. W2, K2, WA2, WV2, though all in the same place and even the same street, are likewise all different.

When a prefix is changed (this is always happening) the new one is *added* to your list and the old one is not deleted. Thus VQ4 and 5Z4 both count, so do ZC4 and 5B4, or ZD4 and 9G1.

Incidentally H. G. Shaw (Heswall), the man at the top of the ladder, remarks "It has almost got to the stage where I have to wait for a colony to become independent before I can increase my score." This very operation recently gave him four new ones!

And more than one reader queries a station signing LJ2S (Bardufoss) and wonders where it is. The answer is "Norway;" for that country the





Above, the DX/TV aerial system used by R. Bunney, Trelawne, Cupernham Lane, Romsey, Hants., who has been doing very well in this field — see notes on p.38. The antennae shown here cover Bands I and III (both polarisations) and a 23-element array is shortly to be added for Band IV. The picture below is the reproduction of the test card, photographed off the screen, used by Polskie Radio I Telewizja (Polish TV). We have seen a number of his other test-card pictures, received from various European DX/TV stations.

amateurs normally use LA, portables LB, and you may also hear LF, LH and LJ from “semi-amateur” stations, e.g. University radio clubs, Naval training stations and the like. LJ is just another Norwegian, therefore (but counts another point towards HPX, of course).

There are similar arrangements in other countries; for instance, UA3, UV3 and UW3 are all the same district of the U.S.S.R., but you have three prefixes for your score, just the same. PA, PE and PI are all used by stations in Holland, the latter two being

**Correspondence for the next appearance of this feature, in the May issue, should reach us not later than March 20, 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.**

special categories (as explained by colleague A. J. Devon on p.690 of the February issue).

#### R.A.E. May 1963

With so many readers getting worried about the way that May, 1964, is approaching rather faster than they had hoped . . . perhaps a few comments on the Examination in Subject No. 55 (“R.A.E.” to you) held in May, 1963, will not come amiss.

There was a 70 per cent pass, compared with 67 per cent in 1962 and 69 in 1961; so one could say “no change.” And the failures were stated to be “mainly due to general weakness in all questions.” This may savour of the obvious, but it is interesting; it shows that there was no particular question or group of questions that floored a lot of candidates, but rather that failures were just due to generally bad preparation of the whole subject.

Question 1 is invariably the stumbling block, although usually less technical than the others. You really have to know the terms of the licence, which have to be studied at least as carefully as the Highway Code! In May 1963 the question was: “For what purposes may a U.K. amateur radio station be used? What types of messages and signals may be exchanged between amateur radio stations? Is an amateur radio station permitted to broadcast messages to amateur stations in general?”

One would have expected any aspiring candidate to be really word-perfect with an answer to that one . . . but most answers were described as “just barely adequate” and many “contained much irrelevant information.” The obvious moral is—study the terms of the licence. They *do* matter!

Another surprising thing is that the two questions on Aerials were both badly done; too brief, lacking in detail, weak and sketchy. The first was “With the aid of sketches describe a directional aerial system suitable for use on the higher frequency amateur bands, i.e. 14 mc or above.” And the second, “Describe how an electro-magnetic wave is radiated from a simple vertical aerial.” All the other questions were given fairly favourable comment by the examiners, so it looks as if the elementary aerial theory also needs brushing up somewhat.

#### “CALL BOOK,” SPRING EDITION

We should have the Spring *Radio Amateur Call Book*, in the “U.S. Listings” and “DX Listings” versions, by about end-March or early-April. The U.K. section, incorporated in the “DX Listings” edition, will alone have about 1,300 amendments, changes of address and new G callsigns, making the U.K. listing by far the most up-to-date and accurate available in print. The “DX Listings” part of the *Call Book*, available separately from the American section, also includes callsign/addresses in most countries of the world outside the U.S.A. It will be available only from us, as sole U.K. and European agents, at 27s. post free. As the *Call Book* appears quarterly and the print-order is limited, copies should be reserved in advance. Orders, with remittance, to: Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

# VHF BANDS

A. J. DEVON

THOUGH not a lot has happened since last time out, conditions for general GDX continued good until about February 11, when the sustained high-pressure area started to collapse. The barograph trace shows some remarkable shapings during the period. While generally high, there were considerable variations above the 30in. (1016 mb.) level and for the three days February 6-8, the reading was just over 31in., which is about as high as it has ever gone where your A.J.D. watches—in fact, the pen was being pushed right off the scale. On the Sunday morning of February 9 the two-metre band was wide open north-south, and a number of good GDX contacts were being made, e.g. G5TZ (I.o.W.) was working G6US (Oswestry), with "5 & 9" both ways. There was another uplift in conditions towards the end of the period, coinciding with the sudden change from cold to very mild weather. On February 23, the GB3VHF beacon at 75 miles was well up on its normal level.

### Interesting Idea—Transponders

Arising from discussion with G2HCG on an idea offered by G3BA and inspired by the method of functioning of the proposed *Oscar III* satellite (which is to pick up signals in one part of the two-metre band and re-transmit them in another) it would seem

feasible to use the same procedure with fixed transponders, on the ground. If these were suitably located, one envisages GDX contacts taking place over the U.K. under any conditions! Like *Oscar III* (when and if that project can ever be brought to life), these transponders would be automatic send-receive stations. It would simply be a matter of siting them to get the required coverage—siting, and a few other things as well, of course! However, the idea is not as fanciful as it may seem, because the BBC uses just such a system for boosting TV signals locally in districts where direct reception does not give reliable service. Their installations, which are sited to obtain a good signal from some convenient main TV station, operate automatic-unattended, picking up the required signal on that channel and re-transmitting it, with much boost, on the local TV frequency.

One can imagine, therefore, well-placed transponder (or translator) units—requiring the minimum of maintenance and sited at or near amateur stations already well placed for good U.K. coverage—in action on a regular basis, and designed for receive-transmit in defined band areas which would be used for no other purpose. Well, anyway, it's an idea, even if we did have to revise the whole system of scoring-by-counties!

This approach would be a good deal more effective than any passive reflector system, or (as once proposed) the excitation of a remote aerial array. A translator scheme for the two-metre band would take a good deal of working out, both technically and as regards siting, but it is feasible, and therefore worth considering—perhaps somebody would like to do a design study for a practical system?

Which brings us to *Echo II*, a passive reflector of immense size (135ft. diameter) and now in orbit. This balloon carries milliwatt transmitters operating in the 136 mc satellite band, used for tracking purposes only. It is available for anyone who cares to try using it as a reflector, and its transit with respect to the U.K.

is given every day in the *Daily Telegraph*, on the weather page; the data are such that one knows exactly where and when to look for it, and for how long. Though it is unlikely that the puny powers we run on VHF would produce any noticeable result (Sir Bernard Lovell had to use the 250ft. dish at Jodrell Bank to get a signal, on 162 mc, over to Moscow) it is always worth trying. Beyond that, *Echo II* can be of little interest in the amateur VHF context.

### TWO METRES

COUNTIES WORKED SINCE  
SEPTEMBER 1, 1963

Starting Figure, 14

From Home QTH only

Worked	Station
57	G3BA
55	G3LRP
54	G3GWL
52	G3NUE
49	G3CO
42	G3SAR, G4LU
40	G3HRH
38	G2AXI
37	G3LAS
36	G3PTM
34	G3DVQ, GM3LDU
33	G2BJY, G2CDX, G3PSL
32	G3AHB, G5JU
30	G3CKQ
29	G3CCA
28	G3PKT
26	G3GSO, GW3PWH
25	G3KQF
24	G3ONB
20	G3IOE
19	G2BDX, G3KPT, G8VN
18	G3EKP
16	G3HWR, G3OJY
14	G3OZF, G3SML, G5UM, G5ZT, GW3CBY

*This annual Counties Worked Table will run till August 31, 1964. All two-metre operators who work 14 or more Counties on the band are eligible for entry. QSL cards or other proofs are not required. After the first 14 worked, simply claim from time to time with counties as they accrue, giving callsign and date for the county worked. To keep the Table up-to-date, claims should be made at intervals of not more than two months.*

### The Tabular Matter

This month sees, on p.42, the reappearance of the "VHF Activity Report"—or, in other words, calls heard and worked. It is to be hoped that this feature as it expands will prove as useful and as interesting as it did in previous years. Indeed, already it gives valuable information—notice those EA's in the list from HE9RAP; at last we have some positive confirmation of Spanish activity. Some of his other Europeans are worth noting, too.

In Countries Worked, ON4FG at 22C is an interesting newcomer. The loose ones between the two at the top of that Table are GC, GD (not worked by ON4FG) and UA, YU (yet to be worked by G3LTF). As it should not be difficult for ON4FG to get GC, it looks as if he will be in the hot seat before long.

G3BA is still firmly in the lead in Annual Counties, and G3EHY keeps in front in the 4-metre All-Time. About 30 movements have been taken into the tables shown this month—and as soon as space looks like being available, the 2m, All-Time will appear again.

Finally, on the subject of the tabular matter, when sending in calls heard/worked lists for the Activity Report please make sure they conform strictly to the sample layout on p.690 of the February issue. And when making claims for the tables, remember to use separate slips, headed by call sign and the table for which the claim is being made. (It all helps your A.J.D. at about the most fraught period of the month.)

### Comment on The Band Plan

Ventilated in this space last month, the suggestion that we should drop the Band Plan and adopt single-channel working by VFO on two metres does not find general acceptance, if those who have commented on the topic represent a fair sample of current VHF opinion.

G3BLP (Woldingham, Sy.), an old two-metre hand, in a closely-reasoned letter, brings out a number of points: First, that only a small minority of the VFO's in

general use on two metres (mainly in connection with SSB) measure up to the required standards of stability and freedom from whiskers—in other words, though a VFO signal needs to be indistinguishable from CC, very few of them are, and this would be a particular difficulty in any area of high station density. Secondly, Johnnie points out that it is in just such a district that the segregation of the weak DX from strong locals is most necessary. (This was, of course, the main and, indeed, the fundamental idea of the Zone Plan when it was first devised.) Thirdly, that with well-adjusted transmitters giving clean signals, VFO operation within one's zone would be acceptable to avoid local QRM (a good, sharp beam helps with this, too). He discusses in some detail the difficulties caused by stations not so well adjusted—those who always over-modulate and, with no clipping or limiting, produce a signal about 100 kc wide at a distance of 30 miles. G3BLP goes on to say that it is very doubtful whether, under contest or EDX conditions, the pile-ups caused by the general use of VFO's would be worth it. (Anyone who has ever chased DX on the HF bands would probably agree that it wouldn't!) He boils this down by suggesting that under free-for-all conditions a station in the southern part of the country could never work GM through the density of the Midlands stations, and no northern station could ever get an F or an HB while southern G's were on the frequency. Well, Johnnie has made some good and strong points and it remains to be seen whether anyone can put forward any equally cogent arguments in the contrary sense.

G3IOE says, quite briefly, "I feel very strongly that the Zone Plan is more essential than ever for the comfort of everyone on two metres; I think that VFO operation within one's own zone is perfectly legitimate, but single-frequency working outside the Zone Plan will reduce two metres to the level of the rat-race on the HF bands, with all that that implies." Several other correspondents comment in the same vein.

If your A.J.D. were to be asked for his opinion it would be that we should stick to the Band Plan—stick to it, that is, under *all* operating conditions—but develop VFO operation (and VFO's) for single-frequency working in one's own zone. With that must go cleaner signals, sharper beams and receivers with much better front-end selectivity.

However, this need not be the end of it—it is the function of this feature to stimulate discussion and ventilate ideas. What we would like to have would be some more ideas.

### Scottish VHF Convention

This is now an annual event, which always draws a large attendance from North of the Border, with a certain amount of Sassenach support. The date is April 18; the place the Mill Hotel, Rutherglen, Glasgow; and the arrangements are in the hands of W. B. Miller, GM3PMB, 14 Clamps Wood, East Kilbride, Glasgow—who would be glad to have enquiries and reservations from VHF types in the North of England who cannot get to the London VHF Convention.

### Reports, Notes and News

In sending his claim for Countries, ON4FG (Bornem) says that he runs 150w. CW, with a



Robert Piat, F3XY, whose main interest on the two metres is working U.K. counties. As he is a long way to the south-east of Paris, his present total of 31C is no mean achievement. He is now on the look-out for EI, GI, GM and GW stations.

20-ele cross-fed long Yagi ; this has ten vertical and ten horizontal elements on the same boom, the radiators being fed 90° out of phase—quite an array. His converter is 6CW4-7587. Another interest in satellite tracking on 136-137 mc which, he remarks, is more difficult than one might think. ON4FG also hopes to be in on the *Oscar III* project in due course and he has worked much EDX by MS.

Having already mentioned HE9RAP, who is an SWL in Vaud, our next European correspondent is PAØVDZ (Woerden), whose Tx is a BC-625 running 32w., modulated by a pair of 6L6's, the beam being a 4/4 Yagi at 50ft.; his converter is a 3/6CW4 CC job into a BC-348Q. In hand is a Tx rebuild involving a QQV06-40. In the meantime, PAØVDZ goes into Countries at 11C.

**FOUR METRES**

**ALL-TIME COUNTIES WORKED LIST**

Starting Figure, 8  
From Home QTH Only

Worked	Station
40	G3EHY
37	G3IUD
36	G3PJK
35	G3OHH
34	EI2W
33	G5JU
30	G2OI, G3JHM/A
29	G3NUE
26	G3PMJ, G5FK
21	G3AYT
20	G3LZN
19	G3BNL
16	G3BJR, G3FDW, G3OWA
14	G3OKJ, G13HXV
12	G2AXI, G3LQR, G5DS
11	G3HWR, G3SNA
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.*

G3KQF (Borrowash, Derbys.) remarks, anent the appearance of the HB's recently, that he wished he'd had an LF-area xtal to which to change when the HB announced that he was searching 144-145 mc only!

New on the band is G3SUV (Colchester), who received his ticket on February 6 and by the 9th had worked a couple of Europeans, using only 3w. into an EF80; his beam is a 6/6 at 37ft. and the QTH is 200ft. a.s.l.—so he should do all right when he gets settled on the band. And another newcomer is G3SML (Earl Shilton, Leics.), who gets into the Annual with 14C.

G3GWL (Bletchley) reports a QSO with GW2HQ for Merioneth; located at Aberdovey, GW2HQ is using CW (good!) on 145-44 mc and is looking for contacts around 2030-2045 each evening.

From over in Basingstoke, G2AXI uses NBFM on two metres, with a QQV06-40A taking 100w. and has got to 38C in the Annual. For four metres, he has a 20w. PA, on CW/AM, with a transistorised modulator. In hand is a new Rx, and gear for 70 cm.

G3IOE (Newcastle) found conditions generally good during the period, a signal regularly heard from down South being G2JF, worked on CW during the recent

contest when, G3IOE says, he "had great fun, and wishing that that was the usual level of CW activity." He keeps the sked going with G3BA, and generally they can make it on phone.

G8VN (Leicester), the indoor-aerial king, has now worked a total of 257 different stations; is making good progress in the Tables; and says that local activity in the Midlands is still on the increase—he mentions G3AKP as back on the band, with G2DSF planning a come-back. G8VN was listening on four metres on February 9 (when conditions were good all round) and found more activity on that band than on two metres. He suggests that the /M's ought to try 70 mc, and that Rally organisers should lay on 4-metre talk-in to encourage them.

GW3CBBY (Swansea) claims for the Tables, and his list for the Annual shows eight GW's worked for various counties. G3LAS (Berkhamsted) is up to 37C in the Annual, and is another who enjoyed himself during the January CW contest; with 15w. input (and a terrific signal at A.J.D.'s) he worked 27 counties and heard two others; unusually from his location, GW's in South Wales were raised in spite of the barrier of the Chilterns—but G3LAS remarks that he doubts whether it would have been

**VHF ACTIVITY REPORT**

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

**TWO METRES**

GW3CBBY, 163 Rhyddings Tce., Brynmill, Swansea.  
 WORKED: G2AXI, 2BHW, 3CHW, 3KEU/A, 3KHU, 3MTG, 3OCB, 3XC, 5DW, 5LK, 5MA, 6TS, 6XM, GC2FZC, GW3DFF, 3HHO, 3LJP, 3MFY, 4CG, 5BI.  
 (During January 26 to February 16).  
 G2CDX, 37 Metcalfe Road, Cambridge.  
 HEARD: DJ4KM, F3XY, G2MR, 2MV, 3AOS, 3AYC, 3DYQ, 3GDA, 3GPL, 3IRQ, 3MTG, 3OHG/M, 3OHT, 3PMC, 3PZN, 3SML, 5TZ, 6LL, 6OU, 8SB, LX1SI, ON4UM, 4WW, 4TQ, OZ5HF, PAØAA, ØCOB, ØDOK, ØJBR.  
 WORKED: DL6EH, F2TU, G2FN, 2UX, 2AMX, 2AUD, 2FLR, 2FST, 2HOP, 3MP, 3AAB, 3AZU, 3BFE, 3CCA, 3EDX, 3FCY, 3FRY, 3GOZ, 3GSO, 3GWL, 3HGE, 3ION, 3KDG, 3KMP, 3KZU, 3LHQ, 3LZC, 3MRA, 3MVV, 3NUP, 3OCB, 3PFE, 3PKT, 3PNA, 3PNE, 3PYC, 3RJM, 3RND, 4QU, 5DF, 5HA, 6AG, 6CW, 6GN, HB9LN, OZ9OR, PAØEZ, ØFAS, ØJWV, ØMDG, ØPAL, ØPCR.  
 (January 1 to February 10).  
 HE9RAP, Boussons, Vaud, Switzerland.  
 HEARD: DJ1ZUA, 5IH, F1AY, 6MHA, EA2BJ, 3MS, F1AY, ICE, 1DY, 2GL, 2RQ, 2TU/M, 3IG/M, 3NB, 3XY, 8GL, 8VN, 9EA, G2GQ, 2JF, 3ENY, 3JRL, 3RMB, 3SAR, 3US, 5DF, 5MA, 5PW, 6ZP, HACP, 1NU, 1BMJ, ON4LQ, 4MT, 5DK, ØZ2BA, PAØACC, ØHVN, ØPDO, ØRJF.  
 (December 12, '63 to January 26, '64).

**FOUR METRES**

G3MWQ, 53 Hemming Street, Kidderminster, Worcs.  
 HEARD: G3EHY, 3ENY, 3JIJ, 3MYI, 3NUE, 3OHH, 5JU.  
 WORKED: G2OI, 3IUD, 3PJK.  
 (Sunday, February 9, only).  
 SWL R. Andrew, 7 Rutland Gate, London, S.W.7.  
 HEARD: G2AVC, 2FTB, 3JEQ, 3MEH, 3OJE, 3OLM, 3PHG, 3PRQ, 3SKD, 3VK/M.  
 (February 6-11, only).  
 SWL G. Shirville, 94 Cope Avenue, West Wickham, Kent.  
 HEARD: G2FTB, 3FD, 3IR, 3JKY, 3KKK, 3MEH, 3MI, 3OJE, 3OLM, 3PDK, 3SKD, 3NB, 6OX, 8SK.  
 (January 12, 1955-1645).

possible on phone. G3AHB (Slough) is regularly active (and he may like to know that G8VN tried for a QSO one evening) with the counties piling up steadily; G3AHB had the odd experience, on February 10, of hearing EI2W out of the blue for a few minutes with a strong signal on a dead band, and they managed a QSO—*Echo II*, perhaps?

GM3GZA (Campbeltown) is getting ready for both 2m. and 4m., mobile and fixed, and will give Argyll. He is in a good location, with mainly sea-paths

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
40	G2XV
36	G2CIW, G3JMA
35	G2CIW, 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	G2HDZ G3FAN, G5DS
13	EI2W, G2BDX, 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.

towards the south-west, and EI/GI as locals. The two-metre gear is 15w. Tx on CW and Phone, with a Green & Davis converter into an S.750, the aerial being an 8-ele Yagi. For 4m., the Rx is an RF-27 Unit into the 750, and the transmitter a Marconi H.16.J running 10 watts.

In sending in his calls-heard list, G2CDX (Cambridge) mentions that he has included a number of London stations which, though at about 50 miles, are not normally heard in his district.

Going back to G2CIW (Birmingham) and his work on 23 cm., Jack reports that on January 26 he made it again with G3FP, but attempts since have proved abortive—however, he has a local in G3KPT to help keep the 1290 mc band warm; the 3XC1005A tripler to 23 cm. has been cleaned up and is giving more urge, another improvement being a tuning probe fitted in the aerial dish; this is a DC rectifier device and gives a reading down at the operating position.

G3NPF (Rochford, Essex) is now at a new QTH, with better aerial facilities and clear take-off in most directions. The beams are a slot-fed 4/4 for 2m., and an 8/8 for 70 cm., both outdoors and at a reasonable height. His Tx runs 150w. to a pair of 4X150A's, modulated by TZ40's in Class-B; the converter is 6AF4A GG into an E88CC in cascode, with an ECC85 mixer, giving 7-9 mc tunable on the main Rx.

G3PKT (Rainham, Kent) reports two more counties for the Annual and a total of 341 different stations now worked; he is refitting his beam assembly using 2in. steel piping, which he hopes will prevent further collapse incidents.

G3EKP (Belthorn) reports "active on 4m.," freq. 70.21 mc. with 30w. into a 6146 and a 2-ele indoor beam—in less than an hour after getting on he had nine contacts; his other band is 70 cm., on which G3LJO/T is regularly worked. G3PMJ also reports on 4m. activity, with news from the Manchester area, and says that G6NB can always be heard up there on CW.

And that's about it for this

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

- 22 G3LTF (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP, 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 G6NB, ON4BZ, OK2WCC
- 16 G3BA, G3BLP, G3CO, G3GHO, G3KEQ, G5MA, G6RH, G6XM, PA0FB
- 15 G2CIW, G2XV, G3AYC, G3DKF, G3FZL, 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, G4LU, G6XX, G8VZ
- 12 EI2A, EI2W, F8MX, G2BJY, G2CDX, G3BNC, G3GFD, G3GHI, G3GWL, G3JAM, G3JLA, G3JXN, G3LAS, G3OBD, G3WW, G5CF, G5JU, G5ML, G8DR, GW2HIY
- 11 G2AJ, G2CZS, G3ABA, G3BDQ, G3BOC, G3GSO, G3IUD, G3JYP, G3JZN, G3KUH, G3LHA, G3OHD, G4RO, G4SA, G5UD, G6XA, GC2FZC, OK1VR, PA0VDZ
- 10 G2AHP, G2AXI, G2FQP, G3BK, G3DLU, G3GSE, G3JHM/A, G3KOF, G3LAR, G3LRP, G3LTN, G3MED, G3OSA, G3OXD/A, G3RMB, G5MR, G5TN, G8IC, GW3ATM, GW3MPY, GW5MQ
- 9 G2BHN, G2DHV, G2DVD, G2FCL, G3BOC, G3BYY, G3FIJ, G3FUR, G3OJY, G3PSL, G3PTM, G4LX, G5UM, G8GP, GC3EBK, G3ONF, GM3DIQ
- 8 G2DDD, G2XC, G3AEP, G3AGS, G3AHB, G3CCA, G3EKX, G3GBO, G3HCU, G3HWS, G3KHA, G3PKT, G3MPS, G3VM, G5BM, G5BY, G8SB, GM3JFG, GM3LDU

time—those not mentioned in the text who have reported have been taken into the tables, as appropriate.

The date for all your news and views, claims and comments, for the April issue must be **Friday, March 20**—and please don't be a day later, as we have to beat the Easter holiday to get the April issue out on time. The address, as always, is: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. With you again on April 3, all being well—and have a good holiday. 73 de A.J.D.

## AUTOMATIC CQ SENDING

### USING A TAPE RECORDER

THE idea of using a tape recorder to actuate a keying circuit for sending automatic CQ calls is not new—nevertheless, it is always interesting and, as so many AT-station operators now possess a tape recorder, this note explains how it can be used as an auto-CQ sender.

Basically, the required "CQ CQ CQ de G3ZYZ G3ZYX G3ZYX," recorded carefully on tape by keying an oscillator (audio, VFO or whatever) when played back can be made to drive an external keyer circuit incorporating a relay—which, of course, does the actual work by controlling on the normal keying circuit somewhere in the transmitter.

A suitable circuit for the keyer unit is shown in the diagram. The output side of the recorder goes into a step-up transformer, T, which can be an ordinary LT type connected "the other way round," with a bridge rectifier to produce the DC pulses through the relay RL. The relay contacts connect to the transmitter keying circuit, with a c/o switch to change over to the usual key when a QSO is effected.

Having made the recording by playing the keyed oscillator into the recorder microphone, at the slowest tape speed, a screened lead is run from the output (the "ext. spkr." jack as found on most recorders will do) and the gain is turned up until relay action is obtained. The procedure then is to adjust the gain, the value of C2, and the relay tensioning spring for accurate following.

Values for the circuit shown are: C1, 100  $\mu$ F; C2, 0.5 to 1.0  $\mu$ F, depending on keying speed (lower capacity for higher speed); D1-D4, rectifier diodes, 400 p.i.v.; R, 47 ohms; and RL, any relay with a coil of about 2.5K and operating current of a few mA.

Points to watch are the relay adjustment for normal sending speed and the avoidance of RF pick-up on the keyer-recorder connecting lead; funny

things can happen when RF gets into a tape recorder. As the latter has to produce audio power to actuate the relay, and it is not a good thing to have to run it with the audio gain right up to get enough drive for the keyer, it follows that a sensitive relay should be used. Indeed, the setting up of the device will probably call for a certain amount of experiment. But it's nice to hear the auto-CQ call going out—and, remember, its characteristic as a good Morse signal will depend upon how carefully and accurately the original recording was made.

(Article based on circuit and notes in a recent issue of the Wolverhampton A.R.S. Newsletter.—Editor.)

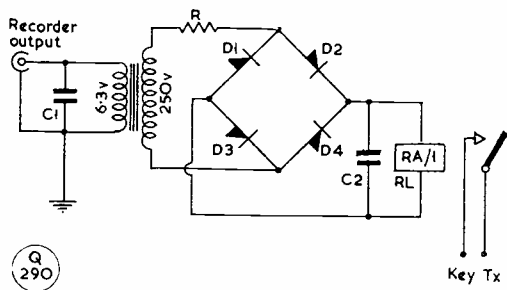
### AMATEURS IN RESERVE

The callsigns GM6RI, GM2HIK, G3GVV, G3LOV, and GW3PPS are owned by a group of licensed amateurs who form part of the 92nd Signal Regiment, Army Emergency Reserve. The holders of these calls, together with several SWL's, are members of the Regiment's Radio Club, which in turn is affiliated to the Royal Signals Amateur Radio Society.

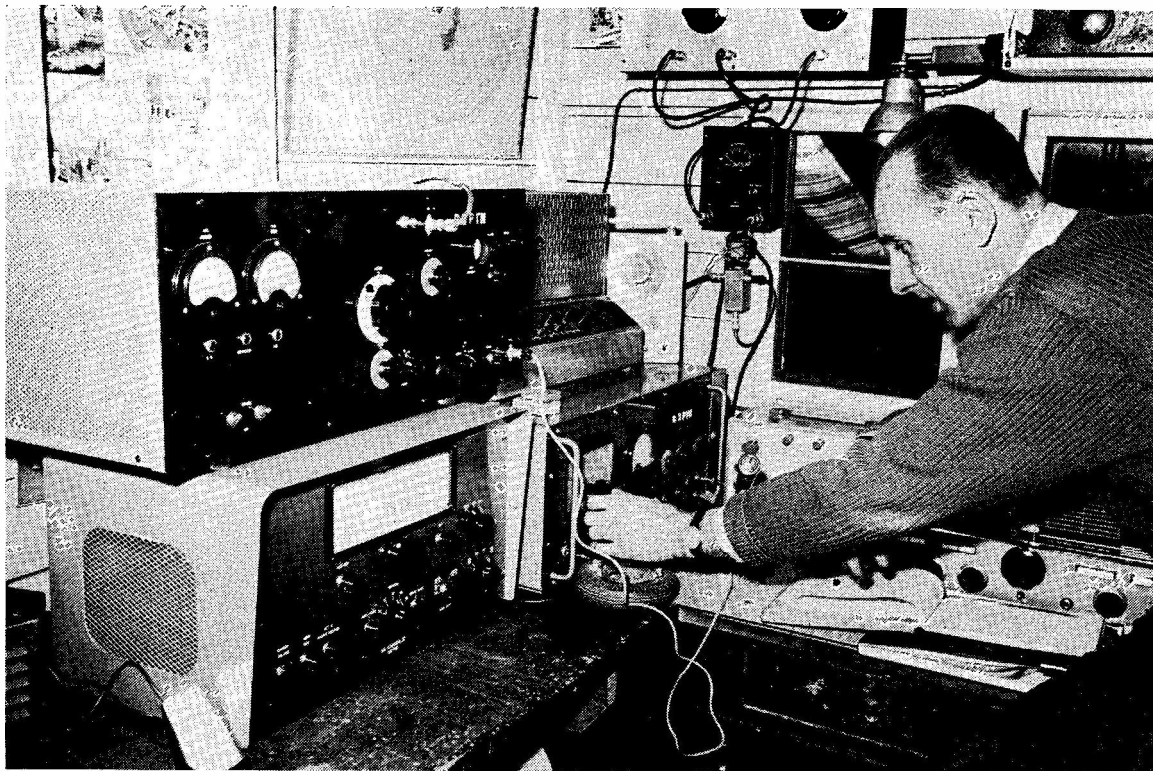
Last summer, whilst they were at their annual training, they organised a Top Band expedition, with stations in the rare GM counties of Angus and Kincardine. With large areas of land at their disposal, they were able to erect a 250-foot Marconi at the former QTH, with a half-wave dipole (70 feet high at the centre) at the latter. It is scarcely surprising that this enabled them to work most parts of the British Isles, together with several stations in OK and other European countries.

During the last fortnight of July 1964, they will again be operating on the amateur bands, this time with their own callsign GM3SIG. In addition to stations on LF and HF, they propose making a VHF expedition to Kincardine. This will be publicised during the early summer, in order that schedules can be arranged and adequate details given well in advance. It is intended that operating will be on the two-metre band, using both CW and phone.

In working hours, these amateurs and their colleagues operate QRO CW transmitters (working into rhombics and V-Beams), being responsible for the hand-keying and the maintenance of the equipment; and it should be added that all of this equipment is new! For the rest of the year, of course, they go about their normal civilian jobs, having no other commitments apart from a couple of weekends. The financial compensation they receive for giving a little of their time to the Army is more than generous—a minimum of £88 for a single man, whilst a married man gets at least £93. These rates of pay increase considerably with promotion and length of service, so that it would be quite possible to purchase that hitherto too-expensive Rx or Tx! Both GM6RI (Schoolhouse, Tannadice, by Forfar, Angus) and G3GVV (Farleigh, 65 Harlands Road, Haywards Heath, Sussex) have full details of the Regiment which they will be pleased to send to those who are interested; just let either of them have a postcard (or QSL card) with your name and address—they are as glad to hear from SWL's as from licensed amateurs.



Circuit for a keyer unit driven by the output from a tape recorder on which "CQ de G3ZYZ," or whatever, has been imposed by an audio oscillator. The voltage build-up for actuating the relay is obtained by using an LT transformer connected back-to-front. The bridge rectifier produces the DC pulses for the relay. In order to avoid having to use excessive audio gain on the recorder, the relay should be adjusted "light"; for high keying speeds, C2 may have to be reduced in value—see text.



## THE OTHER MAN'S STATION

**G3PTN**

**O**WNER and operator of G3PTN is Sigmund Chowanec, of 3 Toronto Place, Leeds 7, Yorkshire, who started in radio in 1935 and before Hitler's War held the callsigns SP1LK and SP1LW—for Sigmund is of Polish origin. During the war, he served as a radio technician with 2 Polish Corps in our 8th Army and was demobilised in England in 1947. Like many another of his gallant countrymen, he could not return to Poland; he became a naturalised British subject, took his R.A.E. and the Morse Test in 1961 and so, after 23 years away from Amateur Radio, found himself on the air again in February 1962, this time with a U.K. callsign.

The present layout consists of an AM rig running 120w., plate-screen modulated, with high-level clipping—this reduces even his 9+40 signal locally to a width of only about 10 kc, whereas without the clipping it could be anything up to 50 kc broad. For SSB he has a K.W. Exciter driving a TT21 linear to about 300w. p.e.p., and there is a separate Tx for Top Band. The receivers are a K.W.-77 and a

CR-100, and the aerial system consists of a Mosley TA-33Jr., inverted-V dipoles for 40 and 80 metres, and a loaded wire for 160m. Auxiliary items include an SWR meter, Z-match unit, L/C/R bridge and various test meters.

All the gear is housed in a shack built as an extension to the garage. Sigmund says it is "out of bounds to XYL, no dusting and such-like"! But he does provide an inter-com. so that she can at least call him in. They have a young son, also very interested in Amateur Radio, who uses the CR-100 and is working for his own ticket in due course.

Though as a service representative for Philips, radio for Sigmund in the amateur context is by way of being a busman's holiday, nevertheless he enjoys constructional work and DX operating on the amateur bands, especially 20 metres. The station scores having reached 145 countries worked and 110C confirmed on 14 mc Phone, DXCC is expected very shortly—he wonders if there are any other G3P's who have yet gained this award.

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*For anything radio you may want to buy, sell or exchange — use the Readers' Small Advertisement section in "Short Wave Magazine"*

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# NEW QTH'S

This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the 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.

**GM3PFY**, J. G. Watt, 101 Lanark Road West, Currie, Midlothian.

**G3REP/A**, R. E. Parkes, Parkview, Abbey Road, Malvern, Worcs. (Tel. Malvern 1579).

**G3SKM**, C. C. Mitchell, 4 Hurstbourne Close, Leigh Park, Havant, Hants.

**G3SME**, K. P. B. Wood, Windrush, Hail Weston, St. Neots, Hunts.

**G3SMW**, B. J. Spencer, Lagarom, Rectory Road, Tolleshunt Knights, Maldon, Essex.

**G3SNW**, F. W. Worthy, 9 Fieldsend Road, Cheam, Surrey.

**G3SOP**, P. W. Beaumont, 24 Wilmar Drive, Salendine Nook, Huddersfield, Yorkshire.

**G3SPO**, P. R. O'Neill, 79 Northern Road, Swindon, Wilts.

**G3SQE**, E. B. Longstaffe, 10 Station Street, Mansfield Woodhouse, Mansfield, Notts.

**G3SSF**, R. J. Storey, 64 Grosvenor Road, Caversham, Reading, Berks. (Tel. Reading 73731).

**G3SSY**, D. F. Jones, 187 Hook Road, Epsom, Surrey.

**G13STK**, P. R. Crome, Mount-hamilton, Cloughmills, Ballymena, Co. Antrim, N. Ireland.

**G3STN**, D. G. D. Wright, 77 Aigburth Road, Aigburth, Liverpool, 17. (Tel. Lark Lane 2943).

**G3STP**, P. S. La-Pierre, 38 Dartmouth Park Road, London, N.W.5. (Tel. GUL 9695).

**GM3STV**, A. L. Stevens, 97 Ravelston Road, Bearsden, Dunbartonshire. (Tel. BEA 4396).

**G3STW**, J. S. Watkins, 30 St. Michaels Road, Claines, Worcester. (Tel. Worcester 23877).

**G3STY**, W. H. Symonds, 37 Harvest Bank Road, West Wickham, Kent. (Tel. HURst-way 5640).

**G3SUG**, J. J. Jarvis, 50 Upper Churnside, Beeches Estate, Cirencester, Glos.

**G3SUQ**, W/Cdr. W. D. Reid, M. B. E., A.M.Brit.I.R.E., Officers' Mess, R.A.F. Steamer Point, Aden, B.F.P.O. 69.

**G3SVV**, Miss A. I. Goode, 15 Oaklands Avenue, Leicester.

**G3SWM**, W/Cdr. A. J. E. Forsyth, O.B.E., (G6FO), Old Mill House, Maids Moreton, Buckingham. (o/b/o "Short Wave Magazine.")

## CHANGE OF ADDRESS

**G2AUZ**, O. H. Owen, Church View, Trefonen, Oswestry, Salop.

**GM2BMJ**, T. D. Jardine, Malindela, Main Road, Locharbriggs, Dumfries.

**G3ABB**, C. L. Fenton, Freezy Water Post Office, 775 Hertford Road, Enfield, Middlesex (Tel. Waltham Cross 22991).

**G3DZS**, H. Fudge, 9 Moormead Drive, Ewell, Surrey.

**G3EMK**, T. E. Price, Caorle, Low Habberley, Kidderminster, Worcs. (Tel. Kidderminster 4518).

**G3GYR**, J. H. Woodward, 77 Sandbach Road, Rode Heath, Stoke-on-Trent, Staffs.

**G3HAE**, A. L. Eden, Meadowdene, Green Lane, Yarm-on-Tees, Co. Durham. (Tel. Eaglescliffe 2139).

**G3HCW**, A. E. Ashby, 22 Rossiter Drive, Knottingley, Yorkshire.

**GW3HEA**, J. U. Burke, Barcdy, Caernarvon Road, Criccieth, Caerns.

**G3IGW**, M. G. Whitaker, Rose-dene, Wood Lane, Hipperholme, Halifax, Yorkshire.

**G3JWI**, R. M. Page-Jones, 24 Carr Lane, Willerby, Hull, East Yorkshire.

**G3JXE**, R. S. Wilkinson, Janine, 55 Summergangs Drive, Thorn-gumbald, East Yorkshire.

**G3LUY**, E. W. Brett, 8 Alexander Road, London Colney, Herts.

**G3MZY**, J. D. Last, 3 Mortimer Drive, Cubley, Penistone, W. Yorkshire.

**G3NGI**, G. W. Davey, 20 Pennine Drive, Edith Weston, Oakham, Rutland.

**G3NJP**, M. T. Phillips, Shandon, Willesley Pound, Cranbrook, Kent.

**GW3NMZ**, G. N. Bath, c/o B.B.C. Transmitting Station, Woodstock, Clarboston Road, Pems.

**G3NPF**, A. C. Wadsworth, 130 Ashingdon Road, Rochford, Essex.

**G3NTU**, P. J. Davis, Education Division, Infantry Junior Leaders' Battalion, Wingate Lines, Park Hall Camp, Oswestry, Salop. (Tel. Oswestry 2321).

**G3OAH**, P. R. Whittlestone, c/o Flat 12, Chestnut Grove, Boston Spa, Yorkshire.

**G3OKX**, J. W. Roberts, 21 Addison Drive, Alfreton, Derbyshire.

**G3OVX**, H. W. Hammett, 9 Hollins House, Tufnell Park Estate, Tufnell Park Road, London, N.7.

**G3PKV**, H. R. Thornton, 43 Fordwich Road, Welwyn Garden City, Herts. (Tel. Welwyn Garden 23163).

**G3PSL**, G. N. Harvey, 36 Springfield Close, Burton-on-the-Wolds, Loughborough, Leics.

**GM3PWK**, J. B. W. Braithwaite (ex-G3PWK), 23 Clifton Road, Giffnock, Renfrewshire.

**G3RPL**, T. A. Neyland, 22 Pax Hill, Hillyfields, Bedford.

**G3TC**, B. C. Cooper, 182 Crimicar Lane, Upper Fulwood, Sheffield, 10.

**G6QB**, L. H. Thomas, M.B.E., 49 Winchelsea Lane, Hastings, Sussex. (Tel. Pett 3014).



# THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for April Issue: March 13)

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

ONCE more, it seems, we must address a few remarks to the scribes, publicity officers and secretaries who write in to us for this feature. The "rules," if one can call them that, are simple enough, but even so many reports received indicate that the senders do not really understand what is wanted.

For instance, this month *seven* reports have come in with no indication of the secretary's name and address—so we used the one on our files, hoping that there has been no change, except in one case of a new reporter for whom we have no secretary notified at all! In another instance, the secretary's name is given, but not his address. In yet another a club has reported after an absence of some years, but with no notification of secretary, so that we feel sure that the QTH given in the panel is incorrect. And in another case we are completely at a loss concerning the identity of the *club*, since no title whatever is mentioned, and the secretary's name is new to us.

The reason for wanting the *hon. secretary's* address (rather than that of the member deputed to send in reports) is, in the first place, so that it can appear in the Secretaries' Address Panel as the official QTH of the club, and secondly, to enable potential members locally to know to whom to write if they are thinking of joining—and in any club organisation, one of the main functions of the honorary secretary is to receive new members.

So — some simple requests, please. (1) When a scribe or publicity officer sends in the report, will he please state clearly on it the name of the club, and the secretary's name and address. (2) When a club publication is sent, with no covering letter, please see that the secretary's name and address appears somewhere thereon—and it would also be a help if a chit with the dates of forthcoming meetings were enclosed, since these sometimes do not appear in the text. (3) When future meetings *are* notified, please see that they come after the publication date for the issue concerned. For instance, if you send in your report for the April issue,

to reach us by March 13, there is little point in notifying meetings that occur between March 13 and the actual publication date, which is April 3.

Just watch these simple points, please—we will do the rest.

## CLUB ACTIVITIES

Sixty members and guests attended the annual dinner and social of **Barnsley**, and were addressed by G5IV, their new president, G2BH having been sadly lost to the club, suddenly, last year. This club, which celebrated its fiftieth anniversary in 1963, now has twenty licensed members and seventeen SWL's, and looks forward to another half-century of activity.

**Dorking** will be at The Wheatsheaf on March 10 (8 p.m.) for an informal discussion on Aerials and Methods of Coupling. The following meeting, on March 24, will be a Junk Sale, at the Star and Garter.

The AGM of **Flintshire** was held on January 28, and the elected officers were GW3JQA (president), A. Antley (secretary) and GW3PCZ/T (treasurer). The club will meet on March 31 ("Animal,



When the Portsmouth and District Radio Society ran their weather-reporting exercise on a recent Sunday morning — described on p.48 — this was the control station, which took in reports from the locals on Top Band. G3DIT is the club's own callsign and in this picture G3ORR and G3SED are doing the operating, assisted by two SWL's as plotters. This enterprising effort was followed with great interest by the local press.

Vegetable or Mineral?") and on April 14 (Standardisation in Amateur Radio—Discussion). Both meetings at 8 p.m., preceded by slow Morse at 7.30, at the Clubroom, Railway Hotel, Prestatyn.

A new club to report to this feature is **Leyton**, gathering on Tuesdays (7.30) in the Leyton Senior Evening Institute for "a short lecture, Morse practice and a talk over a cup of tea." March 17 is the next meeting, and there will then be a talk on Constructional Work.

A very successful year was reported at the AGM of **Reading**, a week after their Dinner-Social, which was attended by 50 people. G5TP is chairman, G3EJA secretary and G3ASU treasurer. They would still, however, like to welcome into the club more of the licensed amateurs who have moved into the district. Their March meeting (on the 28th) will deal with Mobile Matters, and the following event, on April 25, will be devoted entirely to the SWL.

Another AGM is reported—from **Acton, Brentford & Chiswick**—where they elected G3IGM chairman, G6RC vice-chairman and G3GEH secretary, treasurer and press officer—busy man! The next meeting is on March 17 at the usual place—AEU Club, 66 High

Road, Chiswick.

**Clifton and Crystal Palace** play off the first round of their Quiz on March 21 (at Crystal Palace). The return match, at Clifton, will be on April 3. Clifton are all out to get the trophy back.

### Bright Idea

It is seldom that we are able to chronicle a completely new idea thought up by a club, but this credit does go to **Portsmouth** this month. They recently held a Special Activity Sunday, when their various licensed members, operating from their home stations, all worked other stations between 1000 and 1200 GMT and asked them for weather reports. These were eventually collected from 23 countries, and at midday all stations moved to Top Band and passed their reports in to the Control Station G3DIT, who recorded them on tape and later plotted them on maps. The result was offered to the local Press, who gave the event good coverage. Many members were kept busy over this, and all voted it an interesting day.

This kind of thing seems to open up unlimited possibilities—there is no reason why weather should

### Names and Addresses of Club Secretaries reporting in this issue :

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, W.3.  
 AINSDALE: N. Horrocks, G2CUZ, 34 Sandbrook Road, Ainsdale, Southport.  
 BARNET: F. Green, G3GMY, 48 Borough Way, Potters Bar.  
 BARNSELEY: A. J. Balmforth, G3RKQ, 13 Strafford Walk, Dodworth, Barnsley.  
 BRADFORD: E. G. Barker, G3OTO, 63 Woodcot Avenue, Baildon, Shipley.  
 BURNHAM-ON-SEA: D. W. Birt, G3GIW, 99 Stoddens Road, Burnham-on-Sea.  
 CAMBRIDGE: H. Lowe, G3PEI, 47 Hurst Park Avenue, Cambridge.  
 CIVIL SERVICE: G. Lloyd-Dalton, 2 Honister Heights, Purley.  
 CLIFTON: J. Rose, G3OGE, 63 Broomfield Road, Beckenham, Kent.  
 CORNISH: W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.  
 CRAWLEY: R. G. B. Baughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley.  
 CRAY VALLEY: S. W. Coursey, G3JJC, 49 Dulverton Road, London, S.E.9.  
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.  
 DORKING: J. Greenwell, G3AEZ, Eastfield, Henfold Hill, Beare Green, Dorking.  
 DURHAM CITY: E. Watson, G3SHE, 5 Park House Road, Neville's Cross, Durham City.  
 EAST KENT: D. N. T. Williams, G3MDO, Seletar, New House Lane, Canterbury.  
 FARNBOROUGH TECHNICAL COLLEGE: D. T. Strike, Farnborough Technical College, Farnborough, Hants.  
 FLINTSHIRE: A. Antley, Fairholme, Fairfield Avenue, Rhyl.  
 HOUNSLOW: R. T. Heywood, G3NH, 383 Whitton Drive, Isleworth.  
 LEYTON: R. W. Firmin, 9 Raglan Road, Walthamstow, London, E.17.  
 LIVERPOOL: H. James, G3MCN, 448 East Prescot Road, Liverpool 14.  
 LOTHIANS: L. R. Richardson, GM3AKM, 39 Silverknowes Grove, Edinburgh 4.  
 LOUGHTON: A. W. Sheppard, G3JBS, 11 Barfields, Loughton.  
 LUTON: D. J. Pinnock, G3HVA, 265 Chesford Road, Luton.  
 MANCHESTER: D. H. Poole, 215 Greengate, Middleton Junction, Manchester.  
 MEDWAY: P. J. Pickering, G3ORP, 101 Chatham Road, Maidstone.  
 MELTON MOWBRAY: D. W. Lilley, G3FDF, 23 Melton Road, Asfordby Hill, Melton Mowbray.  
 MIDLAND: C. J. Haycock, G3DJJ, 360 Portland Road, Birmingham 17.  
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax.  
 NORTH KENT: B. J. Reynolds, G3ONR, 49 Station Road, Crayford.  
 NORTH NOTTS: E. W. Badger, G3OZN, 20 Tennyson Drive, Worksop.  
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.  
 PLYMOUTH: R. Hooper, 2 Chestnut Road, Peverell, Plymouth.  
 PORTSMOUTH: H. Woodman, G3ORR, 71 Gladstone Street, Mile End, Portsmouth.  
 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, London, E.11.  
 SALISBURY: B. K. Middleton, 2 South View Villas, Station Road, Fordingbridge.  
 SCARBOROUGH: P. Briscoombe, G8KU, Roseacre, Irton, Scarborough.  
 SCOTLAND: A. Barnes, GM3LTB, 7 South Park Terrace, Glasgow.  
 SLADE: D. Wilson, 177 Dower Road, Four Oaks, Sutton Coldfield.  
 SOUTHGATE: K. Spicer, G3RPB, 22 Clifton Road, London, N.3.  
 SOUTH HANTS: G. J. Meikle, G3NIM, 34 Victoria Road, Netley Abbey.  
 SOUTH SHIELDS: D. Forster, G3KZZ, 41 Marlborough Street, South Shields.  
 SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.  
 STOCKPORT: R. R. Diamond, G3SFN, 102 Chatsworth Road, Hazel Grove, Cheshire.  
 STOKE-ON-TRENT: K. H. Parkes, G3EHM, 28 Grove Road, Heron Cross, Stoke-on-Trent.  
 STOURBRIDGE: R. A. G. Macintosh, 50 Field Lane, Oldswinford, Stourbridge.  
 STRATFORD-UPON-AVON: N. Smith, 54 Clopton Road, Stratford-upon-Avon, Warks.  
 SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.  
 SUTTON COLDFIELD: K. H. Varney, G3DMV, 149 Whitehouse Common Road, Sutton Coldfield.  
 SWINDON: I. S. Partridge, G3PRR, 104 Grange Drive, Stratton St. Margaret, Swindon.  
 WAMRAC: Rev. A. Shepherd, 121 Main Street, Asfordby, Melton Mowbray.  
 WIMBLEDON: E. N. Hurlle, G3RZN, 156 Monkleigh Road, Morden, Surrey.  
 WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington, Wirral.  
 WOLVERHAMPTON: J. Rickwood, G3JJR, 832 Stafford Road, Fordhouses, Wolverhampton.  
 WORCESTER: G. W. Tibbetts, G3NUE, 108 Old Hills, Callow End, Worcester.  
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.  
 YORK: W. H. Hodgson, 69 Sherwood Grove, Acomb, York.



Photograph taken on the occasion of the annual dinner of the Plymouth Radio Club, on February 8, when the total attendance of 61 included visitors from the Torbay Amateur Radio Society. Seen here, seated left to right, are: G3LMG, G3SCW, G3NOD, G5ZT, G3BLO, G3JYB, and 9M2DV. Standing are, again l. to r., G3PGJ, G3LWJ, G3LHJ, G3ABU, G3BRJ, G3ARE, G2DYM, G3HSC, G3RMZ, G3SN, G3HHV and G3SGV.

be the only subject treated in some similar fashion. It is undoubtedly a Bright Idea from Portsmouth, and we look forward to hearing of any modifications which other clubs may think up.

Liverpool will be holding their annual Dinner-Dance on March 7, at the Gateacre Country Club, 7.45 p.m. On March 10, at their regular meeting, they will be holding a *post mortem* on this event (which sounds a little gruesome). March 17 is booked for a Film Show, the 24th for a Junk Sale, and the 31st for a Two-Team Quiz, with G3PLX and G3KOR in the chairs.

WAMRAC (Circular Letter No. 39) announce the third Wamfest on May 30, comprising lunch, and afternoon get-together and tea; also the second Activity Week-End, May 22-24. Their U.K. Net is now on 3670 kc, Sundays at 1400, Tuesdays at 1900 and Saturdays at 0900—also on 1880 kc on Sundays at 2200.

Another good idea—an Open Evening to Discuss Beginners' Problems. This comes from (and happens at) Melton Mowbray on March 26, at their Hq. in the St. John Ambulance Hall, Asfordby Hill.

A visit to the Tape Recorder Centre, Halifax, is arranged for Northern Heights on March 18. On April 1 there is a Ragchew, and on the 15th their AGM. The March meeting for Barnet will take place on the 31st, and will be a lecture on Micro-Miniaturisation—8 p.m. at the Red Lion Hotel, High Street.

#### Contest for Cambridge?

The committee at Cambridge are thinking of organising a contest which would involve working all the active two-metre stations in the county (nearly twenty of them at present). This seems another promising and unusual idea which could be used elsewhere to stir up enthusiasm when it starts to wane. Meanwhile, Cambridge have a Junk Sale on March 6, an Informal Evening on the 13th and the AGM on the 20th. Headquarters are in Victoria Road, Cambridge.

Meetings held every Wednesday evening at Manchester are preceded by a Morse Practice session,

and an R.A.E. course is also being organised. A Film Show is arranged for March 11—Valves, Transistors and Modern Conductors. And a Quiz team is in process of being formed, with a view to challenging other local clubs. Finally, a club QSL design competition is being held.

The fourth Annual Dinner of North Notts brought out thirty-two members and guests. The president (G8ON) announced the engagement of two members, who then proceeded to win trophies in the raffle! This club, though small, is very active, and meets twice a week; furthermore, it has been responsible for doubling the number of local amateur licences within three years—which is one of the main objects of most well-run clubs.

South Shields (*Spectrum*, No. 81) meet on publication day, March 6, but no details are given. Their first Club Dinner, on January 11, attracted an attendance of forty-two members, friends and XYL's. An interesting event was a "Sounds Quiz" put on by two members. The club library is open on all meeting nights.

Considerable changes have been made in the forthcoming programme at Spen Valley. As amended, it looks like this: March 7, talk on Communications Satellites (3.15 p.m. at the Griffin Hotel); March 18, Silicon Semiconductors; April 9, visit to Leeds and Bradford Airport.

The programme for Wirral includes a lecture-

#### NOTICE TO ALL HONORARY SECRETARIES

Appearance in this space is free to those Clubs who care to make use of it for publicity and the reporting of their activities. Hon. secretaries are asked to ensure that their reports—addressed only "Club Secretary," Short Wave Magazine, 55 Victoria Street, London, S.W.1—reach us by the date given each month at the head of the feature. We can give no undertaking to write in late reports, received after the closing date. All reports must always include the name and address of the hon. secretary, for publication in the address panel.

demonstration on Test Gear (G2AMV and others); a talk on Receiver Servicing (March 18) and a lecture on VFO's, by G2FOS (April 1). The AM section of the Transmitter Construction Group have now finished the metalwork and are standing by with soldering irons; the sidebanders are a few lengths behind!

### Important Subject

About a year ago we first noticed the subject of First Aid and Treatment of Electric Shock in a club programme, and commented on their importance. Since then, we have been glad to note, the idea seems to have spread round most of the club circuit. **Stockport** now figure it in their syllabus, on April 22. On March 11 they are holding a Ladies' Evening—another excellent idea which ought to be noted by other clubs. And we also like their scheme whereby the junior members, in a group, are encouraged to talk to one of the senior members for fifteen minutes before each meeting, on some specified subject. Meetings are on alternate Wednesdays, 8 p.m. at The Blossoms Hotel, Bramhall Lane. (*Bulletin* No. 1 acknowledged.)

**Midland** (*Newsletter* No. 199) have a talk on Electrical Measuring Instruments, by Don Bates, on March 17—7.45 p.m. in the AFS Room at the Midland Institute, Paradise Street, Birmingham 1.

Just too late for the February issue came the news of the formation of a new club, in **Durham City**, where the inaugural meeting was attended by nearly thirty people. Mr. A. Smith was elected chairman, G3PDM vice-chairman, and G3SHE secretary; and they will meet on the first and third Thursdays at the Bridge Hotel. A detailed programme will soon be available.

A Junk Sale on March 10, and the AGM on March 24 are the events of the month at **Bradford**, who meet at 66 Little Horton Lane, Bradford 5, at 7.30 p.m. Recent events have included a Quiz Night, a visit to the National Switch Factory at Keighley, and joint meetings with Spen Valley and Halifax.

The Annual Constructional Contest at **Crawley** was won by G3CTP with his collapsible 30ft. mast and 14 mc beam; second was G3PHG with a 70 mc transmitter. On March 25 the subject will be Interference Suppression, by Mr. R. Beddis (GPO). March 6, publication day, is the occasion of the Annual Dinner, with G3FZL as guest of honour.

**Salisbury** held their AGM in January and elected G5YN chairman, Mr. B. K. Middleton secretary and G3PAV treasurer. **Stourbridge** (*Newsletter*, January) will be holding theirs on March 10, at the Library, Foley College of Further Education, Hagley Road.

Yet another AGM—at **Scarborough**, where they elected G3KS president, and G8KU secretary (the latter continuing his long term of office). They meet on Thursdays at 8 p.m.; March 12 will be a Film Show, the 19th a talk on Simple Formulae (for the R.A.E.); and the 26th a series of five-minute talks by all members, on any radio subject.

**Cray Valley** (*Newsletter*, February) get together on the first Thursday at Eltham Congregational Church Hall (8 p.m.). The March meeting has already gone, but G3JKY was to talk on the subject of

DF expeditions. The April event will be the AGM.

A welcome return to these columns is made by **Chester**, reporting successful meetings for the first part of this year. On March 10, GW3LDH will give a talk entitled "CQ DX 160"; on the 17th GW3KNZ will be the speaker, on the K.W.-77 receiver, and ATU's. A general discussion on Government Surplus will be held on March 24—all at the YMCA. (Secretary's name and address wanted, please.)

**Civil Service** continue their meetings at the Science Museum with a tape lecture on Problems of Space Travel on March 16, and the AGM on April 6. The latter will be in the ground floor Lecture Theatre, 6 p.m.

**Lothians** (*Lothians Radio Amateur*, January) record several successful meetings of late, but give no particulars of what is to come. From **South Hants** comes *QUA* (February), from which we gather that there is a Southampton Group meeting on March 14.

At **Southgate** (*Newsletter*, February) the next meeting will be on March 12, when it is hoped that G3NOX/T will be giving a talk on Amateur TV. This club is now starting the idea of a second meeting each month, for the benefit of novices and SWL's who want to discuss their problems, practise Morse and so on. March 26 is the date for the next of these occasions.

The Annual Dinner and Social at **Plymouth** was held on February 8, and the G5ZT Construction Trophy meeting will be on April 7 (no details of March events). Recent activities included a fortnight's display in the City Museum, which has already produced several new members. G3LMG is busy photographing members' shacks, preparatory to producing a lecture, with slides, on the subject.

**Wolverhampton** (*Newsletter*, February) will be seeing an Engineering Film (subject unspecified) on March 9; other meetings will be on the 16th and 23rd, but none on the 30th (Easter Monday). April 6 will be devoted to station visits.

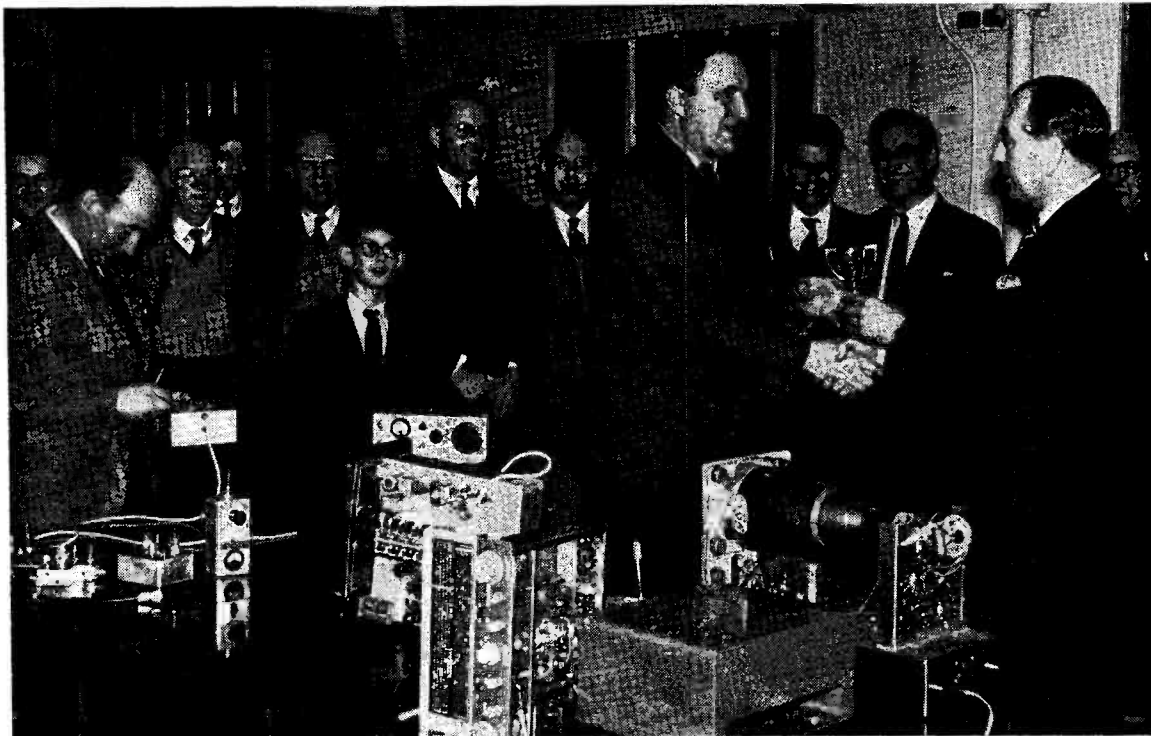
Regular Friday meetings are now the schedule at **Farnborough Technical College**, with a lecture on Microwaves on March 6. On the 18th they have arranged for a Hi-Fi Display in the College Hall at 7.30 p.m.—all visitors welcome. G3POW, the club station, is now being equipped, the mains having finally reached the shack!

**North Kent** (*Newsletter*, February) heard G3BHF on Properties of Electromagnetic Waves on February 13, and Mr. Dennis Licence, of Enthoven Solders, on the 27th. No details of forthcoming meetings.

Films on Electronics were shown in the college lecture hall at **Peterborough** at the February meeting. On March 6, G3HXR will talk on SSB Power Ratings, and on April 10 G2CVV will show slides on "Fifty Years of Amateur Radio." Room 13, Electronics Block, Peterborough Technical College, 7 p.m.

**Medway** (*MARTS Newsletter*) continue the struggle to raise the necessary funds to build their own headquarters. They held a Social Evening in January, and other ventures will include an Easter Raffle and a Mobile Rally and Hamfest.

*GM Magazine*, published by the **Radio Club of Scotland**, is a regular monthly effort which now runs



A section of the exhibits by members of the Newbury and District Amateur Radio Society for their annual constructional competition, which this year reached a very high standard. The apparatus included, on the strictly home-constructor side, a two-metre oscillator unit; a 23-centimetre trough-line converter and oscillator chain (by G2PCM); a test oscillator (G3IPR); a transistorised GDO (G2PCM); communications receiver (G3LLK) and a 160-metre mobile transmitter (G3MWB). Other items were a Heathkit Mohican Rx and their Oscilloscope. The winner was judged to be G3MWB, and here he is receiving the trophy from G5XV, at right in this photograph. On the extreme left is G2PCM, looking at the exhibit by G3IPR.

to some 36 pages. The current review of 1963 sums up a very successful year, with a meeting every Friday, and the number of licensed members steadily increasing. Despite the extremely active state of the club, the GM's consider that their activity *on the air* is disappointingly low, and suggest that transmitting members are not getting their money's worth from their licences! Some 26 members of RCS visited Lothians, in Edinburgh, at one of their recent meetings.

**Worcester** (Newsletter No. 5) have acquired a new headquarters, and are now clearing up in readiness for occupation. This is at Perdiswell Park, Droitwich Road, where they will be meeting on Saturdays at 7.30 p.m. for the time being. It is hoped to hold a constructional contest in the spring, probably in conjunction with a local exhibition.

#### Fully Licensed!

Surely not many clubs can claim that all their members hold licences, but this happy state has been achieved by **Ainsdale**, much to the relief of the technical and Morse tutors who have been "pounding into would-be G's for seven years"! Congratulations to them on the success of their labours. At the AGM they elected G2DQX chairman, G2CUZ secretary and G3FXI treasurer. They will meet on alternate Wednesdays at 77 Clifton Road, Southport (QTH

of G8QG/G3OIR, father and son). March 18, Tape Lecture on receivers; April 1, Open Night.

**Loughton** gather on alternate Fridays, 7.30 p.m. at Loughton Hall, Debden Community Centre, Rectory Lane. First meeting in March is on the 10th, when G3PEN gives a talk on TVI. GB3LOU will be operated as a special-activity station on May 23, and possibly later in the year.

**Preston** meet on the second and fourth Tuesdays at St. Paul's School, Pole Street, 7.30 p.m., and issue a cordial invitation to prospective members. For **Burnham-on-Sea** the date is the second Tuesday each month, 7.30 p.m. at the Crown Hotel, and at the March meeting G5DW—the well-known two-metre man—will be talking on "Getting Started on VHF." In addition, they run Morse classes every Sunday morning and a club night every Tuesday evening.

The fifth AGM was held at **Reigate** in January, and during February two parties from the club visited the BBC TV Centre. They also sent a panel of judges to the Crawley constructional contest. Next meeting is on March 21 at The Tower, Redhill, 7.30 p.m.

**Hounslow** ran a Brains Trust on February 24, and on March 9 G3MMQ will be talking on his own amateur-band receiver. March 23 is booked for a Film Show. All meetings at The Canteen, Mogden Works, Isleworth.

**Slade** will hear G3JZF's talk on Radio Funda-

mentals (Part 9) on March 6, and on the 20th they will be visited by G5JU of Stratton & Co.

Greatly increased attendances are reported from Luton, with the acquisition of their new headquarters in Crescent Road. March 10—talk by a club member; 17th—Bring-and-Buy Sale; 24th—Contest, with a prize for the best home-constructed gear.

**Sutton Coldfield** hold their annual Junk Sale on March 12, and on the 26th their chairman will be talking on The Transistor as an Oscillator. Two club nights will shortly be devoted to the construction of short-range D/F receivers—one per member. These will be used in the summer for D/F hunts in the local park, the transmitter being hidden in a specified area which must not be entered. The idea is to establish its exact position solely by bearings taken from outside the perimeter, using large-scale maps to plot it accurately. A good idea, and one worth following up, we should say.

Recent meetings at **Yeovil** included a demonstration of the BC-221, by G3BEC; talks on Valves and on Forward-Scatter UHF, both by G3OMH; and one on Oscilloscopes, by C. Atkins. At their AGM they elected G3BEC chairman, G3NOF secretary and F. Parkhurst treasurer. Future meetings will cover TVI, a series of talks for beginners, and visits to nearby radio stations.

Members of **Roding Boys' Society** visited the Science Museum on February 8, and each one did a little research into a subject which interested him. As a result, they had a minor symposium at their meeting on February 11, with members and several visitors giving short talks on the subjects they had studied. Surely there is the germ of an excellent idea here for other clubs, particularly in the London area.

**York** held their AGM on January 30 and elected G3GDA chairman, and Mr. W. H. Hodgson secretary/treasurer. The club has now acquired a Panda Cub and an AR-77, and meets at 61 Mickle-gate, York.

**Surrey (SRCC Monthly News, February)** will be hearing a Mullard talk on UHF/VHF Front-Ends on March 10 (7.30 p.m. at the Blacksmiths Arms, South End). They have managed to acquire, appropriately, the call G3SRC, which will doubtless be heard on the bands to good effect from now on.

#### NEW PRESIDENT, R.S.G.B.

The new President of the Radio Society of Great Britain, in succession to Norman Caws (G3BVG), is Geoffrey Stone (G3FZL). To mark his retirement after many years as General Secretary of the R.S.G.B., John Clarricoats (G6CL) has been made its first honorary member.

#### SPECIALLY ON THE AIR

On Saturday, March 14, G3SEM/A will be operating from the Town Hall, Great Yarmouth, Norfolk, in support of a local occasion. To be installed by members of the Great Yarmouth and District Radio Society, assisted by the local Scout group, the 28-80-160m. bands will be worked, on

Activity at **Swindon** will include a contribution to the Adult Education Exhibition, in the Town Hall, April 8-11; plans are afoot to operate a station on the HF bands, and to exhibit members' gear. On March 13 the club will be visiting the local telephone exchange at 7 p.m.

Down in Cornwall, they had a record attendance of 45 members, plus 6 visitors, for the February meeting of **Cornish**—they report not only well-attended meetings, but also a continuing increase in membership. *The Cornish Link*, the club magazine, now comes out in a printed cover, with improved presentation.

On the subject of club periodicals, **Stoke-on-Trent** mention that, having acquired a duplicating machine, they will shortly be able to issue a regular news-letter. Between now and the end of May the lectures—at the Cottage Inn, Stoke, Thursdays at 8.0 p.m.—will include Optics, Industrial Electronics and Colour Photography, while visits will take in the local Telephone Exchange and the Lichfield TV Transmitting Station. And on April 19 the club will also be hosts and organisers, with M.A.R.S., for the big Mobile Rally at Trentham Gardens.

**Wimbledon** report as a "new club." Formed last August by six hopeful enthusiasts, they now have 42 members and meet on the second Friday each month at the Community Centre, 28 St. George's Road, Wimbledon, S.W.19. Their entrant for the December R.A.E. duly obtained his pass-slip, so a first success has been registered in that context. The meeting on March 14 will be devoted to junk-sale proceedings.

At **Stratford-Upon-Avon** they are heavily involved in the Shakespeare Quatercentenary celebrations, in connection with which a station is to be put on the air; at the moment of writing they are still short of equipment, and finance has been proving a bit of a problem. Next meetings, at Flat 1, Birds Commercial Motors, are on March 6 (Power Packs); March 13 (Morse Practice); March 20 (SSB), and on April 10/17 they return to the subject of the Celebration.

**East Kent** continue to hold regular meetings and the committee is considering the formation of a junior section for young members. Talks and demonstrations now arranged are: March 10, Transistor SSB Tx, by G3RWB; March 17, The Deltahet, by G3FKW.

phone. A special card will confirm all contacts, and the QSL address is: G3SEM, 10 Avenue Road, Gorleston, Great Yarmouth, Norfolk.

As in previous years, we shall be glad to publish details of all such special-occasion activities. Please give date, location, callsign, bands to be worked and modes, event supported, and QSL address.

#### HEATHKIT ENTERPRISE

An exhibition of the full range of Heathkit equipment will be held during April 2-5, 11.0 a.m. to 9.0 p.m. daily, at the Grand Hotel, Southampton Row, London, W.C.1. Admission is free, and the occasion is concurrent with the annual Audio Festival at the nearby Hotel Russell. In addition to all their Amateur Radio equipment available in kit form,

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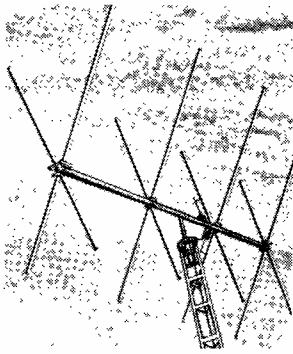


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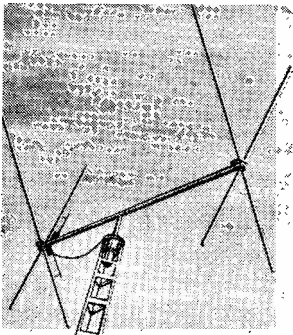
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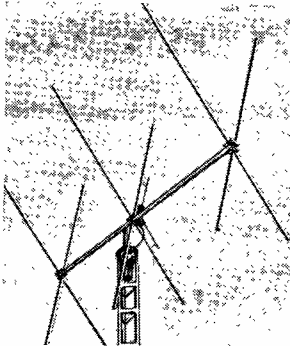
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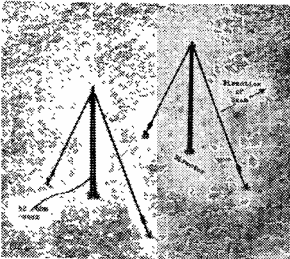
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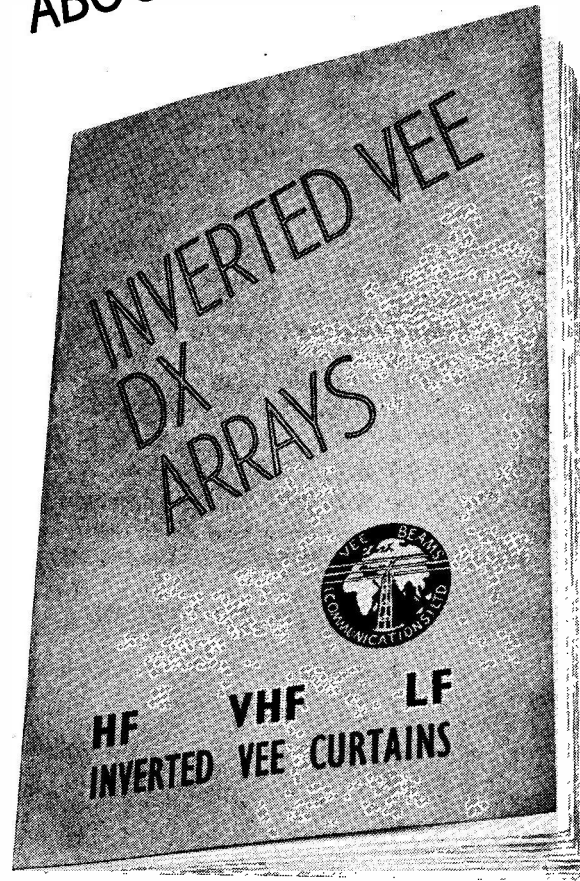
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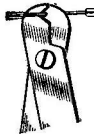
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**WANTED:** CR-100, scrap condition, price, particulars.—Kent, Winterton, Carlton Avenue, Hornsea, Yorks.

**SALE:** Creed manufactured Wheatstone number 11T tape printer. Perfect working order, offers?—Box No. 2960, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**FOR SALE:** Heavy HV power pack, FW rectifier, built in rack panel, £5 10s. Petrol generator set, 12/18v. 80 watt DC output, £10; also new Jap telescope, 30-40 mm, £4 10s. Guitar, £4. Will deliver 50 miles. **WANTED:** 8 mm. zoom lens, D-mount.—G3PIQ, 8 Bourne Avenue, Hayes, Middlesex.

**HRO-5R**, octal valves, power pack, coils (some bandspread) s.a.e. please for details.—Box No. 2961, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** Hallicrafters SX-140, amateur bands only, 80-10 metre, xtal cal., FB AM/CW/SSB, complete with manual, £27.—H. Grant, 11 Milton Avenue, Wellingborough, Northants.

**FOR SALE:** KW-76 receiver, brand new, mains or mobile, less power supplies, half price, £20.—Box No. 2962, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**RCA AR88LF**, first-class condition, re-aligned, cabinet resprayed, £35. K.W. "Vanguard," 10-80m., manufacturers' wiring, condition, appearance and performance excellent, LPF, £40.—Box No. 2963, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**FOR SALE:** Eddystone 940 receiver, 550 kc to 30 mc, with matching speaker, headset and manual, little used, as new, £75. HRO-MX receiver with set of nine coils, PSU, manual, AR88 speaker with matching transformer, new condition, £18. Creed 7B teleprinter, page printer, 240-volt 50-cycle motor, very good order, £30. Audio converter, complete with 299 AN relay, £5. 80 + 80 volt supply unit, £5. Apply—D. G. Cox, Tythings, Bluntington, Chaddesley Corbett, Worcs.

**75A4:** Good condition, first reasonable offer, must sell.—EI7D, 21 Strand Road, Baldoyle, Dublin, Eire.

**FOR SALE:** 800-watt alternator, 230 volt self excited, complete with 4-stroke Villiers petrol/paraffin engine, regulator, meter, etc. New 1963, £35 or offers?—B. Stuchbury, 40 Curborough Road, Lichfield, Staffs.

**ACCOMMODATION WANTED.** Licensed amateur requires lodgings in Hayes, Middlesex, or vicinity, with opportunity to construct equipment and if possible operate.—Box No. 2964, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**KW-500** Linear, as new, £50. TA-33J, used but OK and complete, £11; both carriage extra. **WANT:** Ham-M rotor, also 51-J4 receiver or 75S-3.—Robinson, Brown's Farm, Holbrook, Nr. Ipswich. (Tel. Holbrook 407.)

## SMALL ADVERTISEMENTS, READERS—continued

**A** R88LF, product det., Q-multiplier; Panda Cub, grid drive meter; first £40 cash. UM3 Woden, £2. No offers.—Bradley, 121 Worrin Road, Shenfield, Essex. (Tel. Brentwood 5183.)

**W**ANTED: SB-10U Sideband adaptor, state price.—Mahan, 28 Bayview Road, Stranraer, Scotland.

**W**ANTED: RTTY power unit FRS.1.2X (A.P. 66863) also CR monitor CRM-1 and AFC unit FRS.4.1. Must be in good condition.—Box No. 2965, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**W**ANTED: SWL requires HRO coils for 80 and 20m. bands. State price.—Box No. 2966, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**E**DDYSTONE 358X, ten coil sets covering 40 kc to 31 mc, completely rebuilt: EF183, 2/ECH81, 2/EF89, ECL80, EZ80, EABC80, product detector, noise limiter, S-meter, crystal filter, power pack, £16 o.n.o.? Wilcox-Gay VFO, £4 o.n.o.? Buyer arranges collection.—J. Gooday, 23 Torquay Road, Chelmsford, Essex.

**T**O LET: Isolated Welsh mountain holiday cottage with electricity, sleep 5, ideal /A QTH, no TVI troubles.—Box No. 2967, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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**W**ANTED: Purchase or hire workshop manual, Panda Explorer. Will buy "Vanguard" or "Viceroy," reasonable Rx; scope, wavemeter and Mosley beam.—Box No. 2968, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**W**ANTED: Eddystone 840C in good condition, reasonable price.—Skelton, The Glen, Slaley, Hexham, Northumberland.

**D**X-100U modified for AM/SSB, £60. SB-10U, £30. Geloso amateur band converter, £12. S.640 receiver, £18. BC-453, 190-550 kc, intact up to second detector, £2 10s. K.W. multiband dipole, 97 ft., unused, brand new, £6.—Lamb, 217 Balby Road, Balby, Doncaster, Yorkshire.

**N**CX-3 Transceiver (new), £125. Geloso GR-222 table top transmitter, 75 watts, AM/CW 160-10 metres, £45. Harvey-Wells (U.S.A.) miniature transmitter, fixed or mobile use, 90 watts, AM/CW 80-10 metres, £45. Power supply, £15. AR88D, good condition, £30.—G3AME, Grange House, Reigate Hill, Reigate, Surrey. (Reigate 46007.)

**S**ALE: HRO-MX, 10 coils with boxes, PSU, manual, set spare valves, GC but needs realignment, 200 countries confirmed, nearest £18.—Stephenson, 17 Park View, Wandle Road, Morden, Surrey.

**O**FFERS invited for late model AR88D in exceptional condition, resprayed case and front panel, S-meter, IF gain control. Also Hallicrafters S.27 in excellent condition, with loudspeaker output. Also 19 Set in good condition, with PU, calibrator, phones, etc., and rough set for spares. Will sell as lot or split. Yorkshire.—Box No. 2970, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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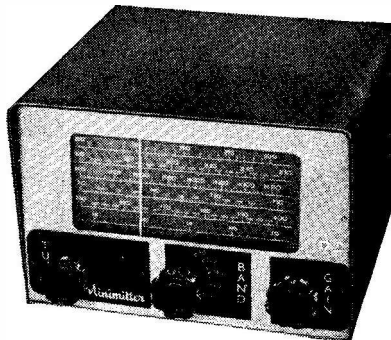
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**WANTED:** Grampian DP4H mike. **FOR SALE:** BC-221, as new, with stab. power supply, £12 10s. BC-453, £4 10s. Westclox Wallclock, 22s.—Box No. 2871, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED:** DX-100U or any other make of TVI proof Tx with built-in power, modulation, VFO and power supply; state price.—Box No. 2972, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WONDERFUL Opportunity:** Eddystone 888A with loudspeaker and mounting blocks, perfect, £65. Labgear LG300, slight fault, 10 metres, £28. Labgear matching modulator/power unit, brand new, £48. H.P. if necessary. Buyer collects.—Box No. 2974, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**DX-40U**, £19. Home-built VFO, £1. Buyer collects, or will deliver 25 miles.—G3KWH, 124 Parkway, Welwyn Garden City, Herts.

**LG.300 HB P/Pack and Mod. UM3**, small rack, spare 813, 5R4-5763. Offers around £50. Buyer collects, or carriage extra.—GM3NIO, 10 Bundiehouse Drive, Liberton, Edinburgh, 9.

**FOR SALE:** AR88D, £20 o.n.o.?—Willis, 19 Pattison Road, Plumstead, London, S.E.18.

**CLEARING SHACK**, Radio and TV valves, transformers, meters, manuals, xtals, relays, 'scope, wobulator, bridge, megger, Command Tx's, s.a.e. list.—G3IDW, Orchard Cottage, Hook, Swindon.

**FOR SALE:** Eddystone 888, matching S-meter, £60. DX-40U plus 5 xtals, £20; both good condition; £75 the pair.—R. Dalton, G3PWS, 9 Frenshaw Grove, Great Barr, Birmingham, 22a. Prefer buyer collect.

**EDDYSTONE 740.** BC-453's. TR.1986's. Power packs; much other gear cheap; s.a.e. lists. Callers welcome.—G3ERB, 56 Kings Lane, Bebbington, Cheshire.

**K.W.** Geloso Converter for sale, £17.—Cozens, Joans Cottage, Frilford, Abingdon, Berks.

**FOR SALE:** Heathkit RA-1 with matching speaker and calibrator, £39. Manuals: CR-91, SX-100A, KE93, 75-S1, 32-S1, BC-221M, SP600J.—Stagg, 2 Jackson Close, Easthampstead, Nr. Bracknell, Berks.

**BRAND NEW** factory aligned DX-100U; RA-1 plus xtal calibrator, £128. No offers.—Barnes, 7 Rectory Close, Oldswinford, Stourbridge, Worcs.

**WANTED:** Teleprinter type 7B or 3X in good working order. Collected 100 miles.—G3MEW, 17 Testcombe Road, Gosport, Hants. (Tel. Gosport 81697.)

**WANTED** to buy or borrow against deposit, manual for Eddystone S.640 receiver.—Brown, 11 Poole Road, West Ewell, Surrey.

SMALL ADVERTISEMENTS, READERS—continued

**H**RO-MX table model, mint condition, unmodified, H5 bandspread coils including 21 mc, plus four general coverage, PSU and manual, £20. Can be delivered.—Hayes, 31 Beverley Crescent, Northampton. (Tel. 33944.)

**S**ALE: R.107, excellent, £10; or straight exchange for Hallicrafters S36, similar condition. **WANTED:** Hire or buy AR88D manual.—(Phone Romford 47577.)

**S**X-62 Hallicrafters receiver, 550 kc-109 mc, also Hallicrafters UHF receiver. Western Electric Converter (AR88 gearbox, manual, crystal, trimming tools. SWR/Wattmeter, 35s., U.S.A. Navy receiver, £6 10s., all brand new).—Wright, 4A Nepal Avenue, Atherton, Manchester. (Tel. 991.)

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**W**ANTED: "Vanguard" in good condition, preferably Mk. II, price and details to—G3KNA, 5 Manor Street, Hartshead Moor, Cleckheaton, Yorks.

**R**A-1 Heathkit receiver, brand new, just completed, excellent all bands receiver, £40.—G3HCU, Timbers Ridge, Peaslake, Nr. Guildford, Surrey.

**S**ALE: AVO RC Bridge, £9 10s. Linear amplifier, S12-watt (brand new), £9 10s. Taylor Sig. Gen. 65B, manual, £8 10s. Meters: 0-1 mA, 0-100 mA (2), 0-500 mA, 30-0-30 volts, 0.8 amp. RF, £1 10s. lot. Valves: 6SJ7 (6), 6SG7 (3), 6SK7 (2), 6H6 (3), 6J5, 12SK7 (3), 12K8, 12A6, 12SJ7, £1 10s. lot. Tweeter speaker 4 in. diam. (new), 10s. 6d. Heavy-duty transformer. Admiralty pattern, 230 AC i/p, output 620-550-375-0-375-550-620v. at 200 mA respectively, 5v. 3 amp twice, £1 15s. (new); another, Sb 200-250 volts i/p, 525-0-525v. 150 mA, 6.3v. 1.5 amp, 55v. 50 mA, £1. Heavy duty choke (no details), £1. Ravon Multimeter, 0-1000 volts test AC/DC 0-500 mA (500v. needs attention), resistance and capacity tests, new batteries, £5 10s. Seen by appointment and collect. **WANTED:** 25 c/s tuning fork drive amplifier Type 114. Also circuit or manual for B.44 Mk. II Tx/Rx.—Harvey, 39 Curlien Road, Oakdale, Poole, Dorset.

**D**X-100U, professionally built, £60. AR88D, £45; both FB condition; going SSB. New and boxed BC-453, Q5'er, £4 10s.; and Triband by Panda, £9. Woden 2.5v. 10A xformer, £3. Woden 750-0-750v. 250 mA, £4; Woden 250 mA choke, £2. BC-522 Tx and Rx, valved and unmoded., 35s. Marconi TF-390F3 Sig. Gen. 1.6 2.4: 18/100 mc; and Marconi 144 Sig. Gen. 85 kc-25 mc, £20 the pair. —Poole, Siena, St. Catherine Close, Hook Heath, Woking.

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EA12.	Amateur Bands, Double Conversion ...		£185	0	0

Carriage extra

WANTED: C.R.100 AND OTHER MANUALS

H.P. — PART EXCHANGE — WANTED GOOD RECEIVERS

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## SMALL ADVERTISEMENTS, READERS—continued

**SALE:** Hammarlund HQ-170 (silicon rect.). Mosley TA-33 3-ele beam. Minimitter FB5 stacked array, 5-band high gain aerial. Olympic T-100 transmitter, 160-10 metres, with Z-match. Radiovision Pre-selector, AC, 80-10 metres. Gelson N.4/102/N VFO unit, with dial. UM4 mod. transformer. High-voltage mains transformers, chokes, condensers, short-wave equipment, valves, etc.—Ellis, G3SN, 12 Hillside Road, Saltash, Cornwall.

**SCANDINAVIAN AMATEURS** are constantly requiring the following (working or not): AR88D, CR-100 (especially CR-100/8 mod.), HRO5T, BC-342, BC-348, BRT-400, PCR-3; second-hand Eddystone, Hammarlund and Collins receivers, etc. Cash payment and immediate collection from your shack within 200 miles London.—B. J. Ayres, 21 Grange Road, Chessington, Surrey. (Lower Hook 2000.)

**FOR SALE:** Heathkit Mohican, as new, little used, with manual, £28.—Box No. 2975, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SURPLUS** Conversion Manual No. 2, 15s. Rx/Tx sections removed 4m. R/T, 30s. RP.47B VHF Rx, less p/pack, 30s. 100 kc xtal, 7s. 6d. Carriage Paid.—Box No. 2976, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** Eddystone 680X, grey model with speaker and built-in xtal calibrator, mint condition, £76. Will take in part exchange Heathkit Mohican or RA-1. Philips transistorised car radio, £6.—G3NQG, 1 Gib Lane, Houghton, Nr. Preston, Lancs.

**75A-1**, mint condition, all Collins mods., speaker, auto transformer, £90. SX-17, mint, speaker, one owner from new, £20.—G6XY, 22 Southbank Road, Kenilworth, (Tel. 52679), Works.

**CR-100/8**, new, bill shown, £30. AR88, like new, £40 o.n.o.?—Morris, 34 Birch Avenue, Romiley, Stockport, Ches.

**SALE:** Hallicrafters SX-110 modern general-coverage receiver, 540 kc-32 mc, amateur bands full scale of dial, S-meter, crystal filter, noise limiter, etc., £45 or nearest offer. Also Q'Fiver modified with PSU, £5.—G. Court, 21B Brondesbury Villas, Kilburn, London, N.W.6. (Evenings.)

**WANTED:** C-Core mains transformer and matching 20 Hy choke as per original G3BDQ Rx. Both items must be in excellent condition.—Details and prices to Michael Whelan, 44 Synge Street, South Circular Road, Dublin, 8, Eire.

**SALE:** Eddystone 750, unmodified, excellent condition, set of valves, £35.—Box No. 2977, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**TRANSFORMERS**, 500-0-500v. 200 mA, 450-0-450v. 160 mA, 315-0-315v. 120 mA, all with heaters, 10s. each. Unused valves, EF86, EL84, etc., 2s. Headphones, 2s. 45 ft. telescopic aerial, £3. 500v. p/pack, £1. Ten relays, 5s. 50 condensers, 5s. Eddystone 659 receiver, £12. 150w. T.T. 80-10m. Tx, with Variac control, £20. Postage extra.—Box No. 2978, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**LG.300** Transmitter (new May 1963) with companion PSU and Modulator, £85. Minimitter three-band mobile transmitter, £10 10s. AR88D receiver, pvc wiring, (cost £85), brand new, £50. Cossor Oscilloscope Model 339A, £10 10s.—G3HID, Armadale, Burnham-on-Sea, Somerset. (Tel. 2511.)

SMALL ADVERTISEMENTS, READERS—*continued*

**ARTICLES FOR SALE:** Moving QTH. RCA crystal calibrated frequency meter, £5 (6s.). UM3 mod. xformer, 60s. (5s. 9d.). Crystal calibrator, 1000/100 and 10 kc, with PSU, 60s. (5s. 9d.). 813, 20s. (1s. 6d.). Signal generator, 40s. (4s.). 80-ohm 50-watt dummy loads, 5s. (1s. 3d.). New electric spray gun, 40s. (2s. 9d.). Wideband coupler, 40s. (2s. 3d.). Set 85 kc IF xformers and BFO coil, 15s. (1s. 3d.). Chokes, 440v. mains xformer, Absorption wavemeter, block condensers, microphone, etc., s.a.e. for details.—Borland, 6 Burnside Way, Largs, Ayrshire.

**EDDYSTONE 750**, complete with S-meter and matching headphones and L/speaker, all in little-used condition, £40 or nearest offer.—Cuttell, Ullenwood Court, Cheltenham Spa, Glos.

**OSCILLOSCOPE**, Tequipment S.32-10X, compensated probe, leads, manual, £48 o.n.o.? Deliver reasonable distance. West, 37 Franklin Avenue, Tadley, Basingstoke, Hants.

**VICEROY Mk. II SSB Tx**, exceptional condition, unmarked, £95. Hammarlund HQ-170 Rx, perfect, £90. TW Nuvisor 2-metre converter, £5. Jason wobulator, £7. Testgear Sig. Gen. 100 kc-200 mc, £3. Buyer collects.—Bonner, 29 Hillcrest Road, Orpington, Kent.

**BC-348** for sale, internal PSU, RF and AF gain, £15. Also HRO, new S-meter, PSU, loudspeaker, coils 160m. to 20m., bandspread on 20m., £15.—G3RKQ, 13 Strafford Walk, Dodworth, Barnsley, Yorkshire.

**EDDYSTONE 840C** receiver in new condition, £45 o.n.o.? Caby A.10 with complete set spare charts, multipliers, range switch and case, £4. Two multi-selectors 50v.-250 ohm, 3P, 12W, £2 10s. o.n.o.? —Box No. 2979, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**CQ Constructors**. Large box components, 95 per cent new, no junk. Boxed valves, transformers, resistors, condensers, everything value over £5, s.a.e. list, sell 55s. Exchange 19 Set or w.h.y.?, offers?—Akehurst, Stevens Cottage, Ipplepen, Devon.

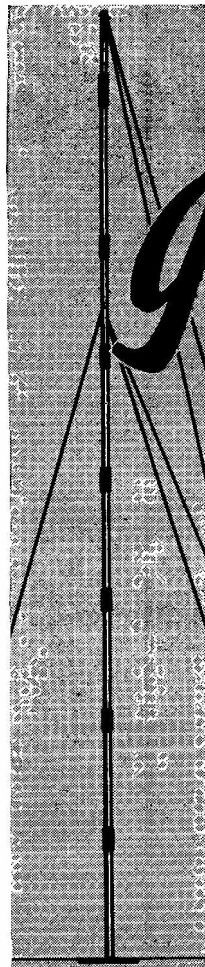
**MINIPHASE SB7M SSB-AM-CW** transmitter 3.5-30.0 mc, 180 watts, USB-LSB, Vox Anti-Trip, 100 per cent AM modulation, unused, complete with all leads, in makers' carton. A real bargain at £50.—Phone GLAdstone 9436 after 7 p.m.

**SELL 2-metre Tx**, 80w.; two chassis, 1-RF/mod, 2 power, branded components, £20. Spare valves. Buyer tests.—G3JDN, 14 Rushetts Road, Reigate, Surrey.

**MINIMITTER TR-7** mobile receiver, with home-made whip aerial, £7. Also new vibrator supply unit No. 9, £1.—G3ELJ, 28 Welfen Lane, Newark, Notts.

**G3KFE QRT; Rx CR-100**, £17 10s. Tx Panda Cub, £30. Minimitter MC8 Converter, £12. G.E.C. xtal calibrator, £4. Marconi DC VTVM, £4. Muirhead 10K ohm Decade Box, £4. 200 plus *Bulletin* and *Short Wave Magazine*, 1935-1963, £3. Would haggle.—G3KFE, 30 Dovedale, Bandley Hill, Stevenage, Herts. (STE 710, Ext. 121, daytime.)

**1962 Hallicrafters S.120** Receiver, electrical bandspread, BFO, slide-rule tuning etc., as new, bargain, £20. Eddystone 750, good condition, £35. WANTED: Heathkit Mohican, also 888A.—Habesh, 19 High Street, Rhyl, N. Wales.



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## SMALL ADVERTISEMENTS, READERS—continued

**WANTED:** CR-100, must be in good working condition. Details to—David Head, 4 St. Audries Road, Worcester. (Tel. Worcester 21849.)

**SALE:** HRO-M, nine coils, PSU, speaker, good condition, £10. Also Eagle RX-60, 550 kc to 30 mc, BFO, ANL, full bandspread, S-meter, £15 o.n.o.? Few weeks old. Buyer collects.—Seear, 60 Holywell Road, Watford, Herts.

**L**G.300 Transmitter for sale, with matching power supplies and modulator. Best offer over £50.—G3ESR, 10 Sturton Road, Saxilby, Lincoln. (Saxilby 294.)

**D**RAKE-2B Receiver, Q-multiplier, speaker, crystal calibrator; maker's modification for Top-Band, fitted four extra crystals for complete 28 mc-30 mc coverage (ideal as tunable IF 2-metre). Little used, perfect order, mint appearance, £105 o.n.o.?—G2HCV, 34 Grasmere Avenue, London, W.3.

**SALE:** HQ-180, mint, £110 o.n.o.? SB-10U new, £25. Vortexion recorder WVA, excellent, £50 o.n.o.—Box No. 2980, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**V**ALVES, guaranteed and tested: EB91, EF39, 2s. EF806X4, 6CM6, 12AT7, 1625, 2s. 6d. 5U4, 5Z4, 6X5, 12AU7, 3s. EL91, 807, 3s. 6d. 6V6, 4s. QV04/7, 6L6, VT75 (KT66), 6Q7, 5s.—S. Reeve, 284A Barking Road, London, E.6.

**C**R-100, bad condition, repairable, £5. P58 receiver, 280-680 mc, £5. R.1619A receiver, 1250-5000 mc, £3. 100 assorted relays, suit organ builder, £2. All carriage extra.—Woodhouse, Trenoweth, Porthpean, St. Austell, Cornwall.

**P**ANDA EXPLORER 150w. Tx, FB, £47 10s. o.n.o.? Or exchange Geloso or SSB Tx or w.h.y.? Also K.W. "Valiant," mains PSU, excellent, £30.—G3SCD, QTHR or phone Louth 2327.

**M**ARRIED TV engineer, amateur enthusiast, with own house and transport, seeks spare-time work to finance hobby.—Box No. 2981, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**W**ANTED: Hammarlund HQ-170 or HQ-180 receiver, full details please, age, price, condition, working or faulty, to—R. J. Newey, 23 Lea-House Road, Oldbury, Birmingham.

**C**R-100, S-meter, spares, manual, £17. K.W. Geloso converter, £16; or £30 the two. Deliver reasonable distance.—Pallant, Wheatley, Martins End Lane, Gt. Missenden, Bucks.

**W**ANTED: Geloso 4/104 VFO, 4/112 pi-tank, Woden UM1 or 2, Pr 5881's, STV280/80 or similar, 12AX7, 12AU7. State price.—A. W. MacDonald, 57 Laugharne Road, St. John's, Worcester. (Tel. 25805 after 6 p.m.)

**W**ANTED: Loran receiver R-9B/APN-4, preferably unmodified. Also any information on Loran indicator 1D-6B/APN-4. Your price.—Wright, Kirkdale House, Kirkdale Road, Leytonstone, London, E.11.

**S**ALE: Eddystone 840A, Collins TCS receiver, Q-Fiver, wavemeter Class-D. P.W. sig. gen., speaker, valves, etc. Offers and enquiries requested.—R. Crabtree, 180 Halifax Road, Nelson, Lancs.

**W**ANTED: Geloso VFO dial, pi-tank K.W. "Vanguard," or 160 Z-Match, 400v. PSU. SCR-522 mod. transformer. (Lancs.)—Box No. 2982, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.



SMALL ADVERTISEMENTS, READERS—continued

**S**ALE: Table Top Tx, 80-10 metres, 75-watt CW, 60-watt AM, fully plate-and-screen modulated. Excellent condition, £30.—Frew, 9 Hollybank Place, Sneyd Lane, Bloxwich, Walsall, Staffs.

**A**MATEUR-BUILT 150w. Tx 20/15/10 metres, 813 PA, plate-and-screen mod., also NBFM, built-in VFO, stab. HT, Power Unit 1500v.-750v.-400v., £18.—Box No. 2983, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**O**FFERS for set of Crystals by Brookes for G2DAF Rx. WANTED: Power Transformer by Parmeko, 620-500-375-0-375-550-620v. State price to—P. Kamiski, 162 High Street, Forres, Morayshire.

**F**OR SALE: Eddystone 358X receiver with PSU, 40 kc-31 mc, covered by nine coils. Only three with set: 150-300 kc, 600-1250 kc, 9-22 mc; v.g.c., £5. R.208 receiver, v.g.c., £7.—Phone ADD 3905 (C. Cumming).

**W**ANTED: Vanguard 160/10, or Tiger TR60 Transmitter. 160/80 Mobile Transmitter with 12v. transistor power supply. Details with price to—GW5BI, 25 Partridge Road, Roath, Cardiff.

**E**XCHANGE: Complete 35 mm. photography gear consisting Carl Zeiss 35 mm. camera with 2.8 Tessar lens, fitted Leica viewfinder and Kodalux exposure meter; Agfa flashgun, Aldis 303 magazine projector, collapsible screen, developing tank and full accessories. All in mint condition and hardly used, valued £85. Exchange for best offer first-class communications Rx, or commercially built TVI-proof Tx. Cash adjustment either way.—McGowan, Old Manse Farm, Boyndie, Banff. (Tel. Whitehills 207.)

**W**ANTED: Teleprinter Teletype Model 15 or Model 14 tape printer with keyboard. Also wanted Creed Auto-Tx 6S or similar. W.H.Y.?—Box No. 2984, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**E**XCHANGE: 4X150A for 4X150G, 4CX250K or two QQV06-40A.—G3LGR, Stud Farm, Dedham, Colchester 1, Essex.

**H**RO eight coils, PSU faulty, S-meter, case in secondary condition, £12, carriage extra.—G. Ashcroft, 4 Milton Place, Springwell, Gateshead 9, Co. Durham.

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**SUPER AERAXIAL, 70/80 ohm** coax, 300 watt very low loss, 1/8 per yard. P. & P. 2/-.

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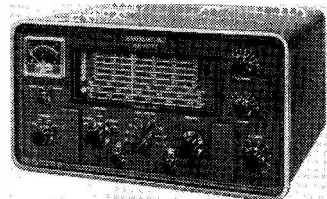
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