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The SHORT WAVE Magazine

VOL. XXVII NOVEMBER, 1969 NUMBER 9

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E. & O. E.

FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE Magazine

EDITORIAL

Result *While it is hardly for us to criticise the recent Exhibition—we were not there, of intention, for reasons explained in this space in the July issue, and in September—readers will nevertheless expect some comment from us now that it is all over. A short illustrated feature appears elsewhere in this issue—but that does not tell the whole story.*

Concurrently with the Exhibition, we had arranged to keep our Office open till late every day. This was purely an experiment—but the result of it was that we had the pleasure of meeting a large number of readers at 55 Victoria Street and we were kept busy all the four days during the Exhibition. Almost without exception, discussion with those of our visitors who had already been to the Show elicited the opinion that it was " poor," " disappointing," " not worth the journey " or " the same as last year." Some opinions from the Trade point of view were: " Disastrous, a lot of talk but very few orders "—" We did well because the junk-boys were not in "—" Fortunately, we took much less stand space than last year "—" It was an opportunity to meet customers, but not a lot of business was done "—" You made the right decision, not to be here this year." There were also disparaging comments about the Hall itself, and the catering arrangements.

On the other hand, from our own observations it would be fair to say that any keen radio amateur who was a first-time-ever visitor would undoubtedly have found the Exhibition interesting and stimulating—simply because it was a new experience. But this is hardly good enough for the old hands, who hitherto have made the Exhibition a sort of annual pilgrimage.

What is to happen for the future is at the moment undecided—but apparently there is widespread support, on the part both of visitors who pay to come in and among trade exhibitors in the Amateur Radio field who pay to be there, for the ideas and opinions put forward here in the July issue.

So far as our own trading results were concerned, the experiment was entirely satisfactory, when compared with how we came out of the Exhibition last year and the year before.

We would like to thank all those readers who took the trouble to come round to see us, who between them made our experiment so successful. It was unfortunate that at times the pressure was such that it was not possible to talk to everybody—anyone who was with us on the Saturday (a day on which we are not normally open at the Office at all) will know why!

Austin Forsyth, G6FO.

TOP BAND MOBILE TRANSCEIVER

VALVE DESIGN FOR TRUE Tx/Rx OPERATION—CIRCUITRY, CONSTRUCTION AND ALIGNMENT —SUCCESSFUL RESULTS PROVED IN TWO YEARS' MOBILE WORKING

Part I

J. V. HOBAN (G3EGC)

AFTER operating for a number of years with separate home-built transmitter and receiver in the car, the author came to realise the need for the *simplicity* of control and operation of mobile equipment. The transceiver described (block diagram Fig. 1) is the outcome of thought and planning in pursuit of this simplicity. The 19 Set circuit was used as the basis of the design, which was planned around valves and components available in the shack. Top Band AM is still used by the majority of mobileers and so other bands and also SSB were not considered.

Circuit Description

Receiver Section—see Block diagram and Fig. 2. The Rx side is quite orthodox, employing six valves in a single-conversion circuit having an IF of 460 kc. *Electroniques* 160m. amateur-band coils are used, giving excellent bandspread across the whole of Top Band. The three-gang condenser is a surplus unit, thought to be ex-38 Set. Vanes were removed to make each section about 20 $\mu\mu$F. A similar three-gang, 7-20 $\mu\mu$F condenser is available from *Electroniques*. Four 460 kc transformers are used—two together in a top capacity-coupled arrangement to give extra selectivity. This works out very well in practice. HT for the receiver is switched *via* the send/receive relay, with the exception of the anode of the mixer V2, ECH42. The reason for this will be explained later.

Transmitter Section. The heart of this circuit is the mixer type VFO—*see* Fig. 2. The 19 Set circuit was closely studied, and copied. The triode section of V7, ECH42, runs at a fixed frequency of 460 kc from an *Electroniques* HSO-460 unit. A signal is taken from the receiver oscillator V2, and fed into the signal grid of V7. The mixing process produces at the anode a frequency which is the same as the received frequency. This is amplified by V8, 6AM6 which drives the QV04-7 PA. The following example will make the mixing process clearer: Assuming the receiver is tuned to 1900 kc, the receiver oscillator will be at 1900 + 460 kc = 2360 kc. If this frequency is now mixed in V7 with 460 kc, the output is the difference between them, *i.e.* 2360—460 = 1900 kc.

Modulator. A 12AX7 is arranged in a high gain audio pre-amp circuit which easily drives the EL84 modulator valve. The modulation transformer is a home-wound

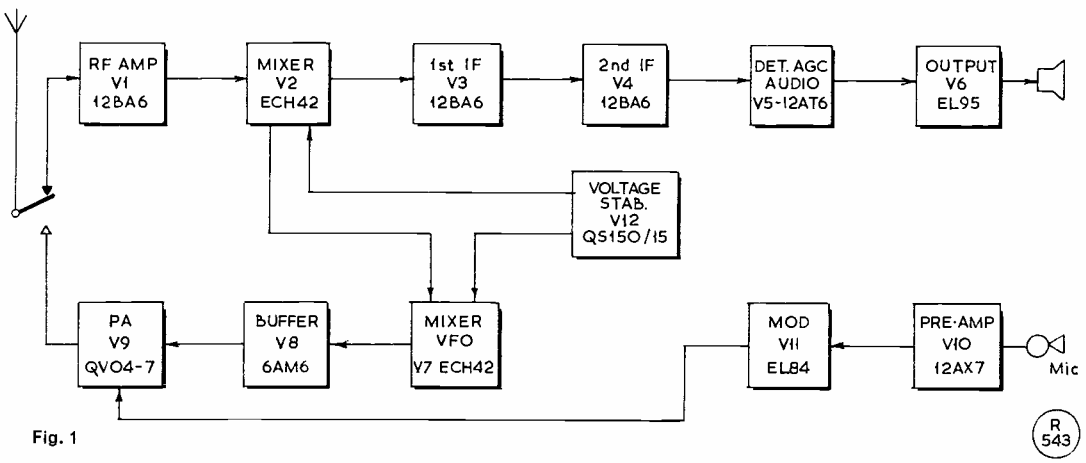


Fig. 1. Block diagram of the G3EGC Top Band Mobile Transceiver.

item which exactly matches the EL84 into the QV04-7, but any transformer with a ratio of approx. 1 : 1 would do. The author uses a small crystal insert mounted inside an old GPO breastset which hangs round the neck, leaving both hands free for the essential job of driving.

Power Supply. This is not described here in detail since it is assumed that individuals will have their own arrangements for this. It suffices to say that the author uses a home-built transistorised power supply made as a separate unit and mounted under the bonnet. This delivers approx. 230 volts with the car stationary and 270-280v. when doing 70 m.p.h. down the motorway. Connections between power supply and transceiver are made with multi-way screened cable.

Construction

The equipment is built into a *Philpott's* cabinet measuring 12in. long, 5½in. high and 6½in. deep. The chassis is 11in. x 6½in. x 1¾in. Layout will be determined by the size and shape of the components and Figs. 3, 4 and 5 will help readers to determine their own layouts. A lot has to be got into a small space and so the use of physically small components is essential. The loudspeaker takes up a lot of front panel space and so the receiver controls are placed to the right of this with the transmitter controls to the left. (See Part II) All external connections are at the rear, thus leaving the front panel clear of leads. IFT's are miniature types and those made by *Denco* are ideal. Coils L1, L2 and L3 should be mounted as near as possible under the associated three-gang condenser, to keep the leads short. All condensers used with the oscillator coil must be silver mica if maximum stability is to be achieved. HT for the receiver is applied through a 1K, 5w. wire-wound resistor. The power supply is less heavily loaded on " receive " with a consequential rise in voltage. The resistor prevents too high a voltage being applied to the receiver circuits. As stated earlier HT is kept on the anode of V2 continually and is not switched by the relay. This is because in the early developmental stages, it was found that if HT was removed from this valve during " transmit," it produced a shift of frequency in the receiver oscillator, thus causing a discrepancy between received and transmitted frequencies.

The receiver oscillator likewise is fed with an uninterrupted stabilised 150v. supply because it is required in both modes of operation.

Coils L5 and L6 are wound with 110 turns of 38g. enamalled wire on 0·3in. diam. Aladdin formers and fitted inside screening cans. Slugs are half-inch long. The PA coil L4 consists of 40 turns of 22g. enamelled wound on a 1¼in. diam. paxolin former. The PA tuning condenser, of 365 $\mu\mu$F here, is really too big but it was used because it is physically small and is currently available. C2 in the *pi*-tank is a fixed value and its determination is explained later.

The meter is an ex-19 Set 500 micro-amp. movement scaled 0-15v. and 0-600v. To measure the PA current it is shunted to read 60 mA full-scale. The shunt value can be fixed by trial-and-error and the author found that a value of 4 ohms was satisfactory. The other function of the meter is to measure RF output, and this is done though a small unit thought to be ex-19 Set. It is essentially a miniature RF transformer. A little of the outgoing RF is picked up and rectified by the W1 rectifier and the DC output is indicated by the meter. This facility has been found to be extremely useful eliminating, as it does, the need for any other form of

Table of Values

Fig. 2. Circuit of the G3EGC Transceiver—See pp.542-543

C1 = 365 $\mu\mu$F, var.
C2 = 850 $\mu\mu$F, *see text*
C3, C4, C5 = 7-20 $\mu\mu$F, 3-section, ganged
C6, C7, C8, C9, C11, C12, C29, C33, C38, C39, C41, C42, C44, C47, C48, C63, C64, C65 = ·01 μF
C13, C14, C27, C28, C35, C45, C49, C62 = 100 $\mu\mu$F
C15, C26 = 20 $\mu\mu$F
C16 = 430 $\mu\mu$F
C17, C20, C25 = ·047 μF
C18, C19, C21, C23, C24, C32, C37 = 0·1 μF
C22 = 0·2 μF
C30, C34, C55, C56 = 25 μF, elect.
C36 = 2 $\mu\mu$F
C40, C46 = 150 $\mu\mu$F
C31 = 1 μF, elect.
C43 = 5 $\mu\mu$F
C50, C51, C52, C53 = ·001 μF
C54 = 50 $\mu\mu$F
C57, C58 = 32 μF, elect.
C59, C60 = ·005 μF
C61 = 50 μF, elect.
R1 = 1 megohm
R2, R12, R15, R55 = 150 ohms
R3, R4, R13, R18, R28, R32, R38, R40 = 2,200 ohms
R5, R9 = 33,000 ohms
R6 = 4,000 ohms
R7, R50, R51 = 220,000 ohms
R8 = 470 ohms
R10 = 8,200 ohms
R11, R14, R20, R37 = 100,000 ohms
R16, R17, R31, R36 = 10,000 ohms
R19 = 47,000 ohms
R21, R22, R54, R56 = 470,000 ohms
R23, R48, R49 = 3,300 ohms
R24 = 270,000 ohms
R25 = 27,000 ohms
R26 = 500,000 ohms
R27 = 300 ohms
R29 = 1,000 ohms
R30 = 22,000 ohms (*see text*)
R33 = 22,000 ohms
R34, R42 = 220 ohms
R35 = 33,000 ohms
R39 = 120,000 ohms
R41, R45, R52, R53 = 20,000 ohms
R43 = 15,000 ohms
R44 = 33 ohms
R46 = 200 ohms
R47 = 2·2 megohms
R57 = 5,000 ohms
R58 = 65 ohms
R59 = 40 ohms
Rs = Meter shunt (*see text*)
VR1 = RF gain, 2·5K
VR2 = Audio gain, 500K
VR3 = Mod. gain, 1 megohm
M1 = 0-500 uA, f.s.d.
IFT1, IFT2, IFT3, IFT4 = *Denco* IFT 11/465, or similar
L1 = Rx Ae. coil, *Electroniques* SQ-LZ 1·8 mc
L2 = Rx mixer coil. *Electroniques* SQ-MX-1·8 mc
L3 = Rx osc. coil, *Electroniques* SQ-OS-1·8/46
L4, L5, L6 = *see text*
T1 = Audio o/p xformer, to match 10K to 3 ohms, approx. 30:1
T2 = Mod. xformer, about 1 : 1, *see text*
R3 = RF check, *see text*
RFC = V9 anode load, 2·5 mH
V1, V3, V4 = 12BA6
V2, V7 = ECH42
V5 = 12AT6
V6 = EL95
V8 = 6AM6
V9 = QV04-7
V10 = 12AX7
V11 = EL84
V12 = QS150/15

NOTES: All ·01 condensers are disc ceramic, except C29, C33 (paper). C59, C60 are 350v. paper. Mica types C50, C51, C52, C53, also C27, C28, C62. Following are silver mica: C2, C10, C13, C14, C15, C16, C35, C36, C40, C43, C45, C46, C49, C54. Resistors R16, R29, R57 are 5-watt, wire-wound; R27, R55, R58, R59 are 2-watt wire-wound; and R43, R45, R46 2-watt carbon. All other resistors rated ½-watt. Coil connections are: L1, white lead, Ae; brown, earth; green, grid; black, earth. L2, red lead, HT; blue, anode; green, grid; black, earth. L3, blue lead, anode; black, earth; green, grid; yellow, padder.

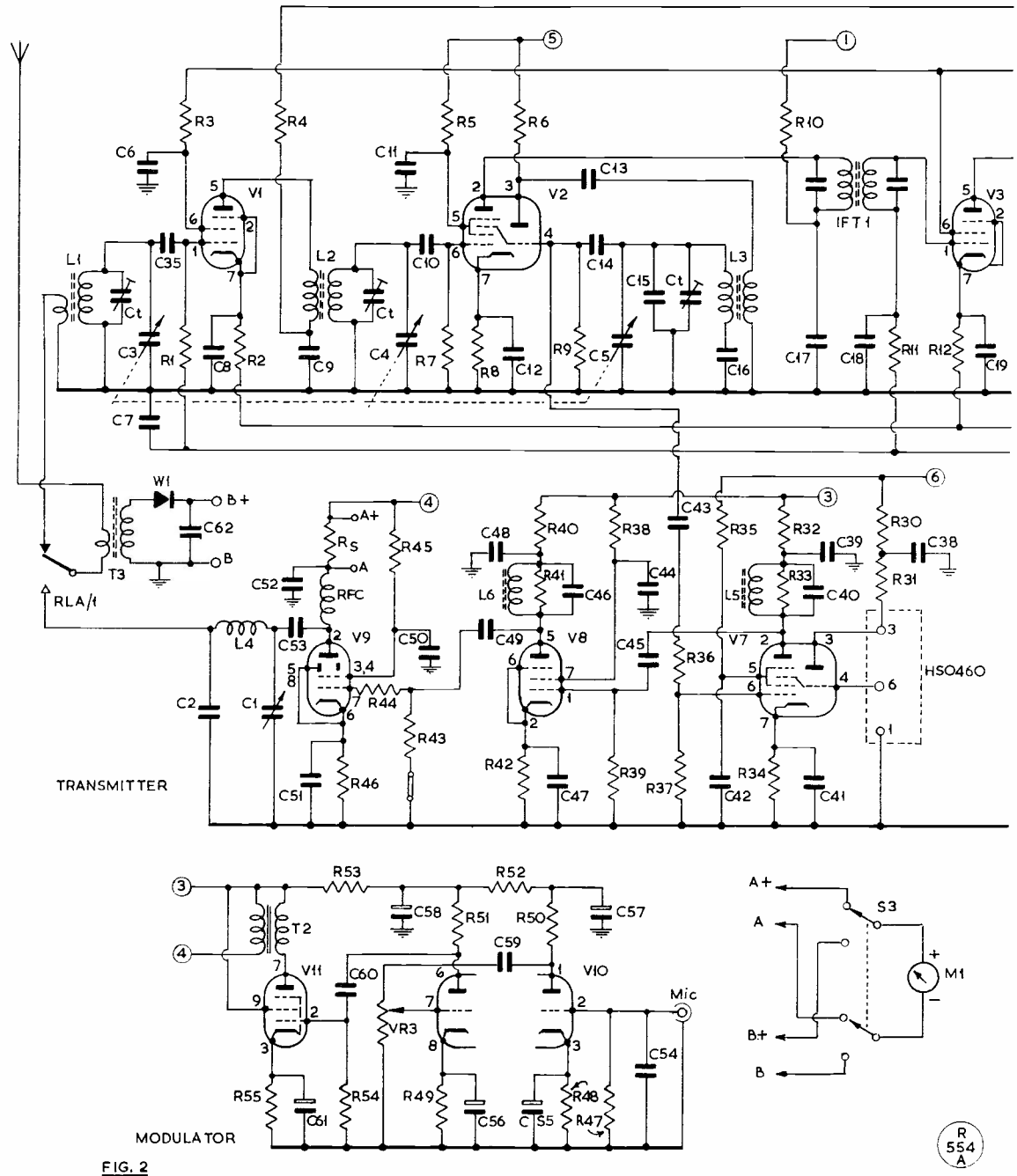


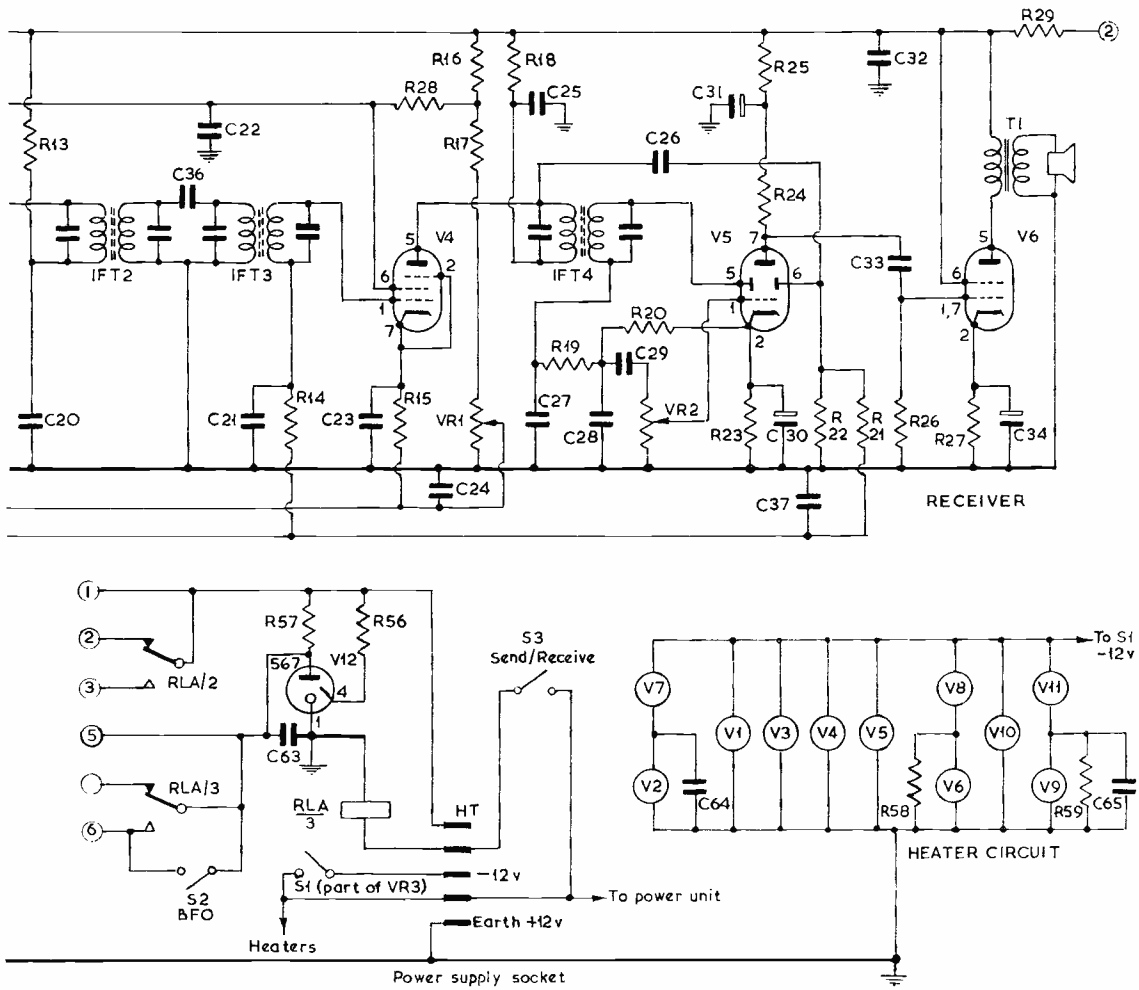
FIG. 2

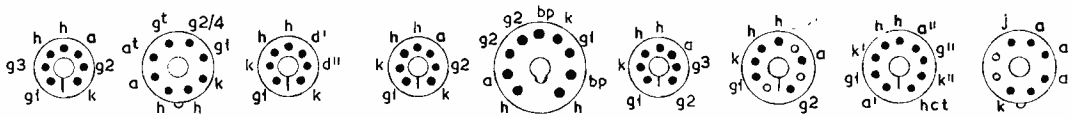
radiating and resonance indication.

The 32 μF condensers, C57 and C58 must not be reduced in value otherwise V10 will become unstable.

Being a single-ended valve the QV04-7 tends to "take off" and the 33-ohm grid stopper is essential.

The voltage stabiliser, QS 150/15 could be replaced by an OA2 with suitable alterations to the base connections. ***(To be continued)***



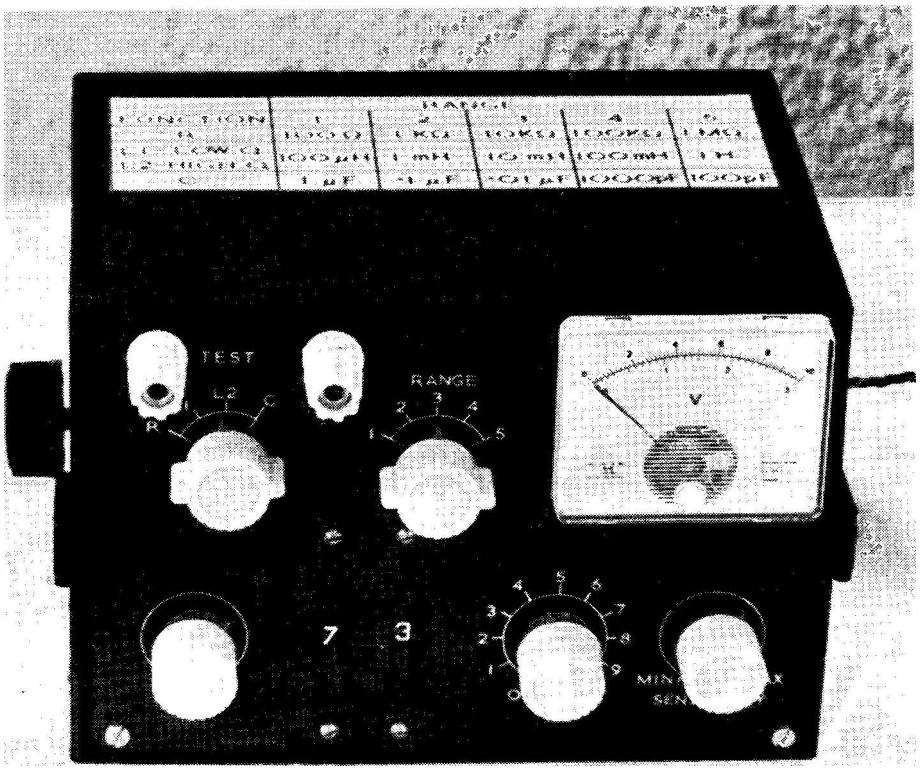


V1:V3:V4 12BA6 | V2:V7 ECH42 | V5 12AT6 | V6 EL95 | V9 QV04-7 | V8 6AM6 | V11 EL84 | V10 12AT7 | V12 QS150/15

R 554 B

Fig. 2. Circuit diagram complete of the G3EGC Mobile Transceiver—read from left of facing page.

(Table of Values on p.541)



AN AC BRIDGE FOR MEASUREMENT OF R, L AND C

USEFUL BENCH TEST-INSTRUMENT FOR RESISTANCE, INDUCTANCE, CAPACITY CHECKS TO A HIGH ORDER OF ACCURACY

D. J. RAVEN, M.Sc., Ph.D (G3TKR)

RECENT constructional projects undertaken by the writer, on filters and phase-shift networks, required the measurement of resistors, inductors and capacitors to an accuracy of 1 per cent or better. Fortunately, access was available to a Marconi Universal Bridge, but it soon became apparent that it would be much more convenient to have a test instrument of this accuracy readily to hand on the bench during experimental work.

Such an instrument, of simplified design to suit requirements, has been constructed at a fraction of the cost of a commercial instrument, and proves most valuable.

Besides checking and accurately measuring the values of resistors and capacitors, the values of inductors, from RF tuning coils upwards, can also be measured accurately, and this alone has taken much of the hit-or-miss out of the writer's constructional work. Tuned circuits can now be constructed with confidence, knowing that they will be right first time.

The Bridge Circuit

The bridge circuit used is shown in Fig. 1. For simplicity, the ranges of resistance, inductance and capacitance are restricted to 10 ohm to 1 megohm, 10 $\mu\mu$F to 1 μF and 10 μH to 1 Hy. respectively, as these are probably the ranges of values in which accurate measurements are most likely to be required. A table of ranges is shown, but other ranges could be accommo-

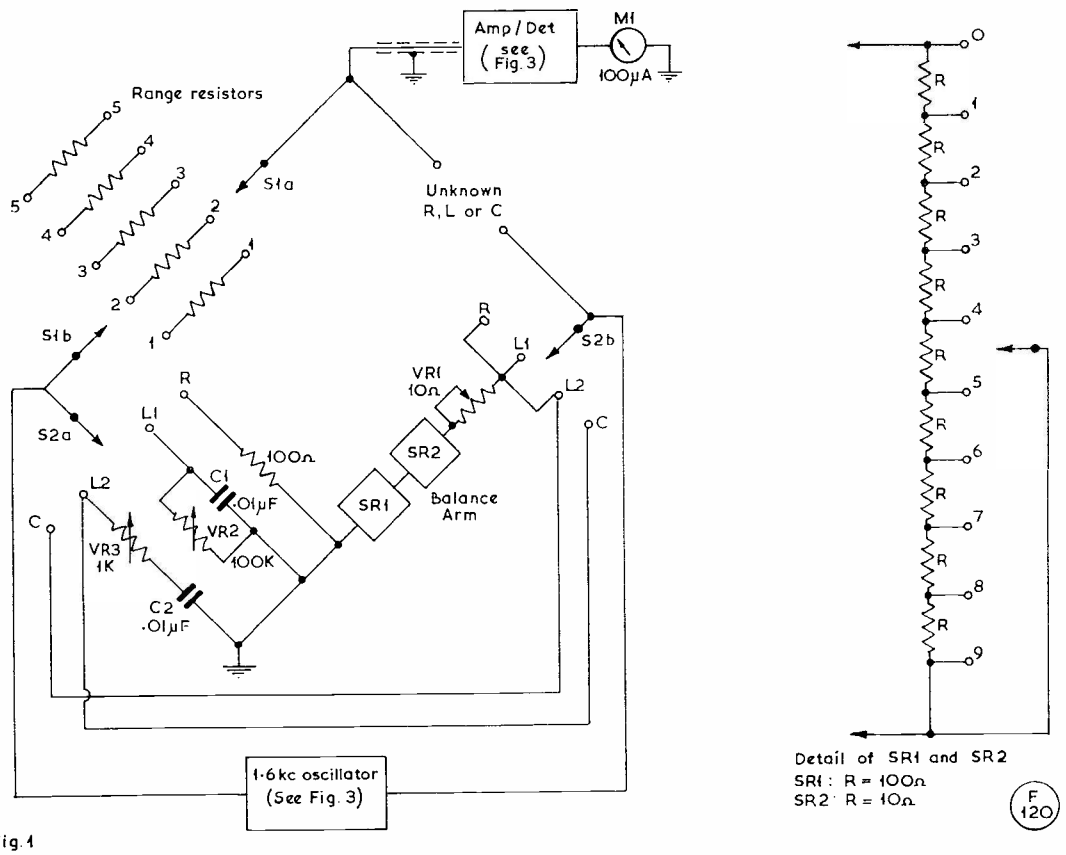


Fig. 1

Fig. 1. Diagram of the Bridge circuit—values as shown.

dated by using additional range resistors. The aforementioned minimum values of 10 ohm, 10 $\mu\mu$F and 10 μH are indicated to 3 significant figures (*i.e.*, using all 3 sections of the balance arm) but measurements down to 1 ohm, 1 $\mu\mu$F and 1 μH are measurable to 2 figures, with proportionately decreased accuracy. In fact, the instrument has proved useful for measuring inductances of less than 1 μH, utilising the fine balance control VR1 alone, the 300° scale of which indicates 0-1 μH on Range 1.

For resistance measurements, the circuit is a conventional Wheatstone bridge, but because the bridge is energised by an AC supply, it is generally not suitable for measuring the resistance of wirewound iron-cored components such as transformer windings, LF chokes, etc., which have a high reactance. The addition of a DC supply and switching of the meter to put it directly across the bridge could be arranged if desired. However, for the ordinary wirewound resistor, the error is found to be negligible.

The unbalance-signal from the bridge is amplified, rectified and the resulting DC indicated by the meter M1. The decade switches SR1 and SR2 and the variable resistor VR1 are adjusted to obtain a zero or minimum reading of the meter. The settings of the two decade switches give the first two figures of the component value under test and VR1 provides still further resolution. A 10-division scale incorporated in the latter allows for easy reading of the third figure, which, without further subdivision, is sufficient to give a direct reading accuracy of 0·1-1%.

For the measurement of inductance, the capacitor C1 with VR2 in parallel, or C2 with VR3 in series, is incorporated to give a Maxwell or Hay AC bridge configuration respectively.

The variable resistor VR2 or VR3, as the case may be, is the phase balance control and produces a phase shift in this arm of the bridge to balance that produced by resistance or loss in the component under test.

It will be appreciated that to obtain a balance in an AC bridge circuit, the potentials across the bridge must not only be equal but also in phase. A pure inductance or capacitance will each produce opposite phase shifts of exactly 90°, but resistive components in either give rise to phase shifts which depart from this ideal condition. This is much more apparent in inductors than in capacitors because good quality capacitors have negligible losses.

[over

The basic Maxwell and Hay bridge circuits are shown in Fig. 2. For the Maxwell bridge with parallel phasing control, the balance equation is:—

$$L = R1.R2.C1$$

and the setting of the phasing control R3 is determined by the Q (or quality) factor of the coil under test. The Q-factor of the coil is given by:—

$$Q = 2\pi f.R3.C1$$

It is seen that the equation for L is independent of both frequency f and the value of R3, but for high values of Q, the value of R3 becomes impracticably high. For coils of high Q-factor, the Hay bridge arrangement is used. The balance equation is:—

$$L = \frac{R1.R2.C2}{1+(2\pi f.R4.C2)^2}$$

and

$$Q = \frac{1}{2\pi f.R4.C2}$$

It is seen that the balance equation is more complicated in that the evaluation of L is dependent on frequency and on the value of R4. However, for values of Q greater than 10, $2\pi f.R4.C2$ is much less than unity, and $L = R1.R2.C2$.

This approximation gives a similar equation to that for the Maxwell bridge. The error involved is less than 1 per cent for values of Q greater than 10, and so the value of R4 (VR3 in Fig. 1) is chosen to accommodate only coils of Q-factor greater than 10.

A bridge source of about 1·6 kc was chosen, so that $2\pi f$ is approximately 10,000, making for ease of calibration of the phasing controls in terms of Q-factors, if so desired. The exact frequency, for the above relationship to hold, is 1592 c.p.s. The nearest note to this, on a piano tuned to concert pitch, is the third G above middle C and is 1568 c.p.s. The 1K series phase balance control VR3 can be calibrated in Q-values from infinity to 10 (in order of increasing resistance, non-linear) according to the appropriate equation. The 100K parallel control VR2 can be calibrated in Q-values from 0 to 10 (in order of increasing resistance, linear).

Because RF coils show much lower Q-values when measured at audio frequencies, the majority of coils tested come within the low-Q range, the exceptions being coils wound on ferrite pot cores, such as Mullard type LA1, etc.

For the measurement of capacitance, the series phasing circuit alone is used because of the usually high Q-values of mica, ceramic and polyester capacitors. For higher loss capacitors, such as electrolytic types, a parallel phasing control would be more appropriate but has not been included. The two lower arms of the bridge are interchanged for the measurement of capacitance (Fig. 1) because phase shifts in the upper and lower arms are now similar. Fortunately, because of the inverse reactance-capacitance relationship, the digits of the decade balance switches still read correctly, but the ranges are in inverse order of magnitude (*see* Table of Ranges, p.548).

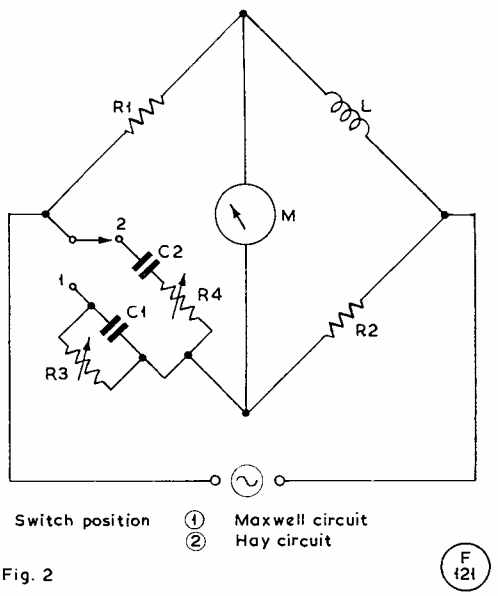


Fig. 2. Basic circuitry of the Hay and Maxwell AC bridges—see text.

Bridge Source Oscillator

The circuit is shown in Fig. 3, p.547. It makes use of an EF50 valve V1 (which still occurs in large numbers in the writer's junk box!). It operates as a phase-shift oscillator which gives a good sine-wave output. The values in the three-element phase shift network are the nearest preferred values for the frequency of 1·6 kc mentioned previously. The actual frequency is not too important, but can be adjusted over small limits by varying R3. (Fig. 3). The one tricky point is to ensure that the output from the transformer T1 is capacitively balanced to earth. The screening method used by the writer, to ensure this, seemed to be satisfactory, because reversing the connections between transformer and bridge did not alter the measured value of components under test.

Amplifier and Detector

Again EF50 valves, V2 and V3, are used, in two stages of AF amplification, to boost the output from the bridge. Low values of coupling capacitor are used in order to attenuate mains hum, which would give a standing signal and mask the *null* point. For the same reason, relatively low values of cathode bias decoupling capacitors are used to give a greater measure of negative feed-back at the lower mains frequency. The output from V3 is rectified by diode D1 and the resulting DC is indicated by the meter M1. A power supply is not described because requirements are straightforward and the unit can be operated from an auxiliary supply, as in the writer's case.

Construction

Layout is not critical, provided that the leads to the

bridge components are kept short and direct. The below-chassis circuitry of the oscillator section is screened from the amplifier to minimise stray pick-up. The output transformer with electrostatic shield calls for comment, and is made from a *Radiospares* midget output transformer after removing the original secondary winding. A sheet of copper foil is then wrapped round the insulated primary and a connection made from it to earth. The ends of the foil are insulated where they overlap in order to avoid forming a short-circuited turn. This is followed by several layers of cellulose tape and then the new secondary is added in two sections, each of 100 turns of 36g. enamelled copper wire, wound in opposite directions. The inner ends of each are connected together and the output is taken from the two outer ends, as shown in Fig. 4. This gives an output which is capacitively balanced to earth—*See* p.548.

The resistors used for the range and decade switches should be of high stability and of 1% tolerance or better, as of course the overall accuracy of the instrument depends on these. In the writer's case, they were selected from batches of *Radiospares* 2% tolerance metal-oxide resistors, most of which, as purchased, were found to be well within 1% tolerance and the ones selected were within about 0·1%. The range resistors are conveniently mounted across the range switch S1.

The capacitors C1 and C2 (Fig. 1) are 1% tolerance silver mica types, also selected if possible. If an additional pole is added to the function switch S2, one capacitor C2 can be made to serve both of the phasing circuits. This modification saves a close tolerance capacitor, but is not shown in the circuit diagram for the sake of simplicity.

The decade balance switches SR1 and SR2 are of the edge type (*Radiospares*) with positions numbered 0 to 9 for digital readout and incorporating a printed panel on which the nine resistors (100 ohm or 10 ohm respectively) are mounted. Alternatively, a rotary 10-position switch could be used.

The fine-balance control VR1 is a wirewound linear potentiometer. A wirewound component is quite suitable here because its reactance at the operating frequency is negligible compared with the resistance of the arm. Similarly a wirewound component is suitable for VR3. A scale divided into 10 equal parts and numbered 0 to 10 is used with the fine-balance control VR1.

Some of the layout used by the writer can be seen from the accompanying photographs. It was intended to gang the two phase balance controls together, but this idea was abandoned and so one of the controls had to be placed at the side of the unit because of lack of room on the front panel.

Operation

The component to be measured is connected across the test terminals, with the function switch at the appropriate setting and the sensitivity control at minimum. The sensitivity control is then turned up to give a reading on the meter and the range and decade switches adjusted

Table of Values

Fig 3. Circuit of Oscillator, Amplifier and Detector

C1, C2, C3, C7, C11, C12 = ·001 μF
C4, C8, C13 = 8 μF, 450v., elect.
C5 = 25 μF, 25v. elect.
C6, C9, C14 = 1 μF, 500v., elect.
C10, C15 = 1 μF, 25v., elect.
C16 = ·01 μF
R1, R2, R3 = 27,000 ohms, ½w.
R4, R5, R9, R14 = 10,000 ohms, ½w.
R6, R11, R16 = 470 ohms, ½w.
R7 = 2·2 megohms, ½w.
R8, R13 = 220,000 ohms, ½w.
R10, R15, R17 = 47,000 ohms, ½w.
R12 = 1 megohm, ½w.
VR1 = 500,000 ohms
D1 = Silicon diode, *Radiospares* 1SJ150, *Mullard* OA202
T1 = *See text*
V1, V2, V3 = EF50

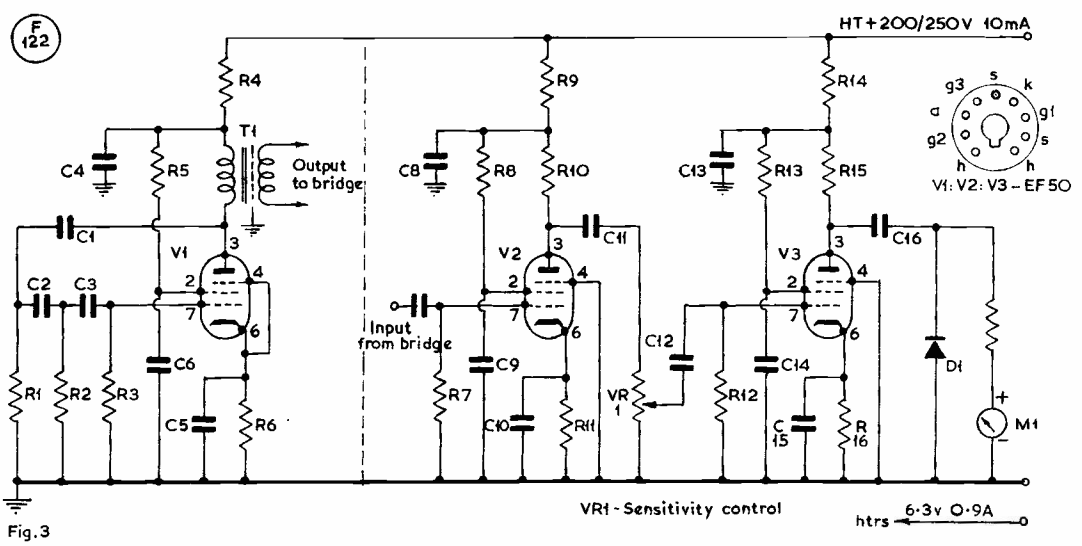
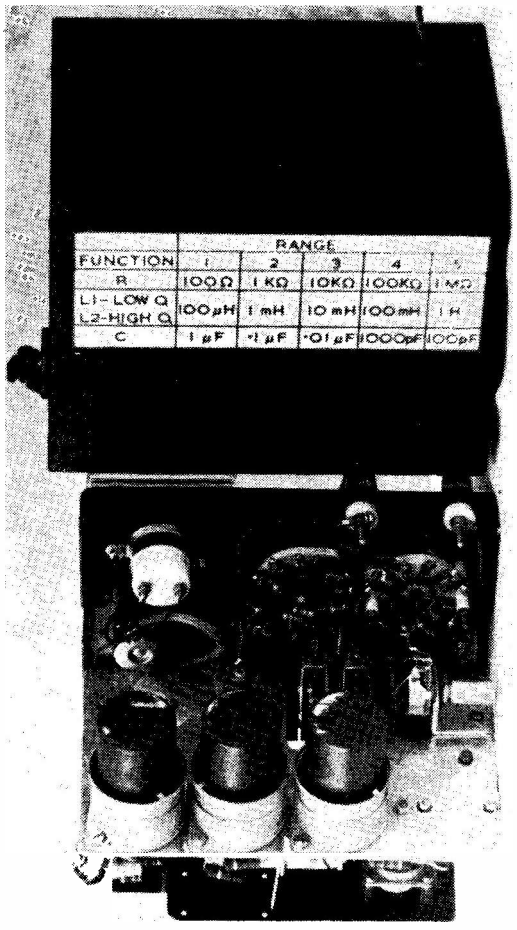


Fig. 3. Circuit of the Oscillator-Amplifier-Detector for the AC Bridge.



Showing the general construction of the AC Bridge, with the EF50's neatly mounted on a chassis which fits into the containing cabinet. Full details of the design and operation of the Bridge are given in the text.

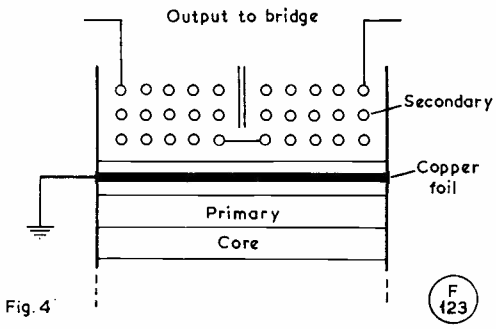


Fig. 4. The transformer modification for electrostatic shielding.

to reduce this reading to a minimum. As the bridge is gradually brought into balance, the sensitivity can be increased further. If L or C is being measured, the appropriate phase-balance control is simultaneously adjusted to produce a minimum reading. It is necessary to go back and forth a few times between the phasing and balance arm controls to obtain an optimum *null* point. It is usually possible to find a position of these controls which gives a practically zero reading at maximum sensitivity. The value of the component is then read off the decade switches and the fine balance control settings, in conjunction with the range in use. For example, if the balance arm reads 1-2-3 (123 ohm) on range 5, the value would be 123K, 123mH or 12·3 $\mu\mu$F for resistance, inductance or capacitance respectively.

When put through its paces, the results obtained for the various functions of the bridge agreed very closely ($\pm$ 0·1%) with those obtained using a commercial instrument. Perhaps this is not surprising, in view of the careful selection of bridge components, but is very reassuring. Using standard 1% tolerance components, which are usually well within their stated tolerance, an accuracy of 1% or better should be achieved.

RANGE TABLE

FUNCTION (S2a and S2b)	RANGE (S1a and S1b)				
	1	2	3	4	5
R	0-100ohm	0-1K-ohm	0-10K-ohm	0-100K-ohm	0-1M-ohm
L1 Low Q	0-100μH	0-1mH	0-10mH	0-100mH	0-1H
L2 High Q					
C	0-1μF	0-0·1μF	0-0·01μF	0-1000$\mu\mu$F	0-100$\mu\mu$F

TWO-METRE RECEIVER WITH TUNABLE FIRST OSCILLATOR

ELIMINATING FREQUENCY-MULTIPLIER STAGES —DOUBLE-CONVERSION, CRYSTAL-CONTROLLED SECOND OSCILLATOR— DESIGN FROM AERIAL INPUT TO AUDIO OUTPUT

C. J. DAVIS (G3VMU)

THE receiver described here is double-conversion with a tunable first oscillator giving a first IF in the region of 10·7 mc, the second IF being 455 mc. A crystal-controlled oscillator appears at the second conversion.

FET's are used in the VHF circuits, the remaining transistors being germanium except the first IF amplifier, regulator and crystal oscillator, which are silicon. A *negative* earth line is used; no trouble was encountered with the admixture of transistor types and their earthing requirements. A block diagram is shown in Fig. 1.

VHF Oscillator and Buffer

In both these positions FET's are used to provide simplicity of circuitry and high impedances. The oscillator is a Hartley, directly transferred from its valve equivalent with little change of values. It operates at 130 mc and is very stable. No special precautions were taken with the lay-out except to *Araldite*-down condensers and other movable parts to give maximum rigidity. The supply voltage is regulated at 6·8v. by a simple series regulator, this also feeding the BFO and detector stages. No noticeable pulling occurs doe to the demands on the main supply of the aduio output stage, which operates in Class-B.

The buffer, a source follower, does not provide complete isolation between the oscillator and mixer. During alignment the signal has to be followed by the VFO, but once this has been completed the VFO can be set and left. A small shift is still evident when changing from one aerial to another but this is of no real consequence.

The oscillator is built in an L-shaped piece of printed circuit board made by soldering two pieces together, with soldered-on copper angles for extra rigidity; this was then bolted to the main chassis board. The main tuning condenser is a wide spaced 15 $\mu\mu$F, one which has been cut down to one fixed and one moving plate. A 20 $\mu\mu$F capacitor in series reduces the frequency coverage so that two metres can be spread over the whole dial. By adjustment of this condenser the coverage can be set to whatever is required. With an ex-Govt. Muirhead dial—one of the best rotary types ever made—no trouble is found at all with tuning in a weak signal; a flexible coupler is used between the dial and tuning condenser to reduce movement to a minimum. All other condensers are silver mica with an air trimmer for bandsetting. These are *Araldite*-bound to a stand-off insulator which acts as the main support for the oscillator components where these are not soldered to the board. Injection is *via* a 1·5 $\mu\mu$F ceramic capacitor in the source of the buffer amplifier. The value quoted gives more than enough injection to the mixer, the drain current just rising when the oscillator is coupled to it.

On the bench with the oscillator open to the atmosphere only about 6 kc of drift can occur, due to draughts, etc., but it soon returns to normal.

RF Amplifier and Mixer

This is a standard grounded-source FET circuit with

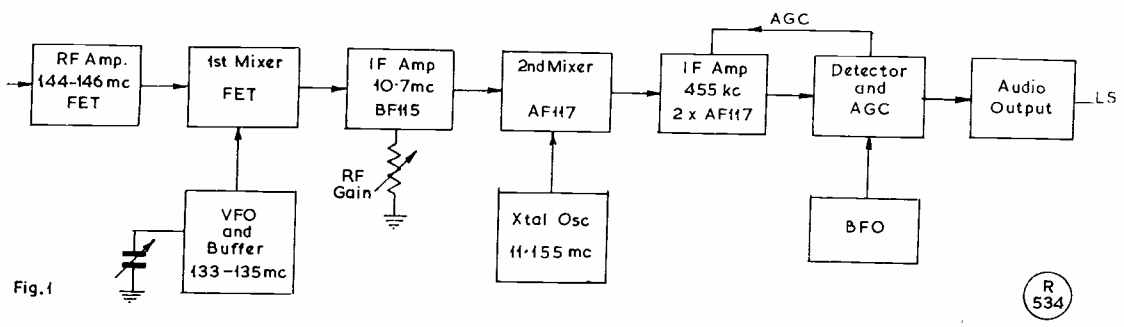


Fig. 1. Block diagram of the Two-Metre Receiver.

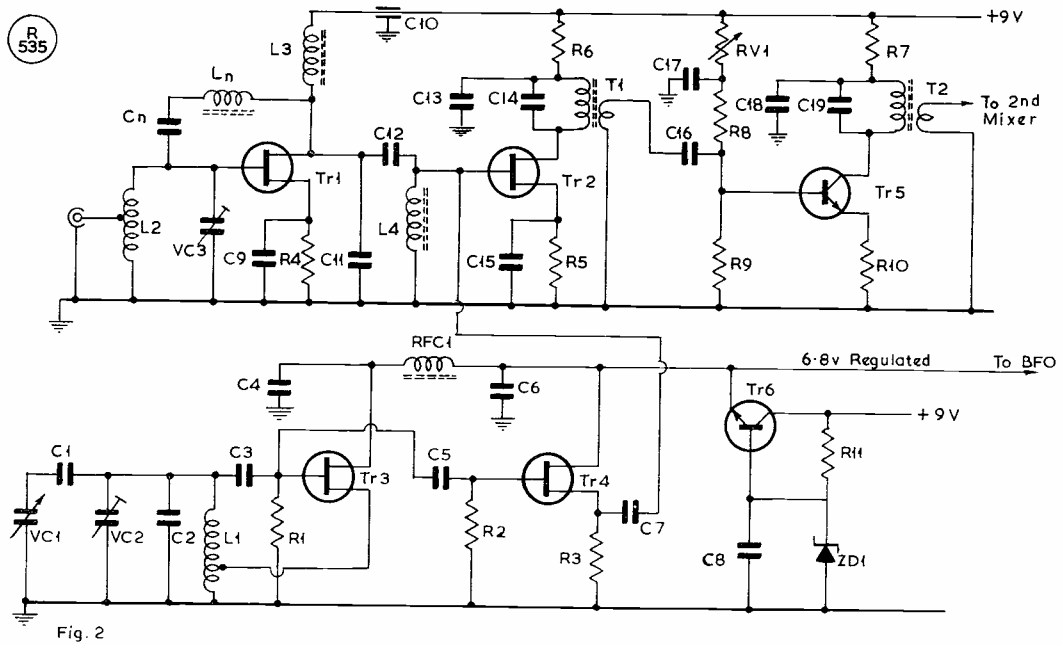


Fig. 2. RF Amplifier, First Mixer and IF Amplifier, Oscillator Buffer and Voltage Regulator.

neutralisation and provides plenty of gain. The source resistor should be varied for best gain and noise; if this is adjusted to let the FET pass 4 mA it should be about right. Gain and noise factor are dependent on drain current, as juggling with this resistance will soon show.

The mixer is also straightforward. The drain tuned circuit can be either home-wound of a commercial 10·7 mc transistor IF transformer. A home-wound one will give better selectivity, not being damped to provide a wide FM passband. This means that there is greater suppression of the inband image at (Signal frequency—twice IF) *i.e.*, approximately 900 kc from the wanted signal. If the mixer is found to be unstable a resistor of 10 to 75 ohms in the drain lead should stabilise it.

First IF Amplifier

This provides selectivity and gain at 10·7 mc. Gain of this stage is made variable but no AGC is applied to it. Sufficient control of the signal strength is available here without reducing the gain of the second IF amplifier, and no overload of the second mixer is evident even on strong local signals.

The screening cans are on the plain side of the board and as they are not earthed, they can be live to RF, as was found out after much trouble. The following action cured this, but if commercial coils are used there is no need to do this as they are soldered in: When all the holes have been drilled and the cans are being bolted into place, a solder tag should be placed between the board and the can over one of the fixing screws. When the screws are tightened this will give a good contact with the can, the tag is turned out side ways and a small

Table of Values

Fig. 2. RF, First Mixer, IF Amplifier, Oscillator Buffer and Voltage Regulator

Cn	= ·001 μF	R3	= 470 ohms
C1, C3	= 20 μμF, s/m	R4	= *see text*
C2	= 11 μμF, s/m	R5	= 1,000 ohms
C4, C9,		R6, R7	= 1,500 ohms
C15	= ·001 μF	R8	= 10,000 ohms
C5	= 2·2 μμF, s/m	R9	= 3,300 ohms
C6, C8,		R10	= 560 ohms
C13, C17,		R11	= 330 ohms
C18	= ·01 μF	Vr1	= 50K linear potentiometer
C7	= 1·5 μμF		
C10	= ·001 μF, feed-thru	ZD1	= 6·8v. zener
C11	= 4·7 μμF	RFC1	= 2 μH, or any small RF choke
C12	= 2·2 μμF		
C14, C19	= 33 μμF, s/m	Tr1,	
C16	= 220 μμF, s/m	Tr2,	
Vc1	= *see text*	Tr3,	
Vc2,		Tr4	= 2N3819 or 2N3823
Vc3	= 2-8 μμF, trimmer	Tr5	= BR-115
R1	= 47,000 ohms	T56	= BC-108
R2	= 1 megohm		

Notes: All resistors carbon rated ½-watt, and condensers ceramic except those marked s/m, which are silver mica.

TABLE OF COIL DATA

L1 — 4 turns 16g. tinned copper ¾in. i.d., ½in. long, tap quarter to half-turn from earthy end.

L2 — 4 turns 20g. tinned copper, 5/16th dia., ½in. long, aerial tap at one turn.

L3 — 4 turns 18g. tinned copper, ⅜in. long on ¼in. *Radiospares* former, with slug.

L4 — Six turns as L3.

Ln — 8 turns 22g. enam. close-wound on ¼in. former with slug.

T1, T2—32 turns 32g. enam., on ¼in. former with slug and can, with 4-turn link at centre.

drill run through the normal connecting hole and the board beneath. A piece of 18g. wire is then pushed through the hole and soldered to the tag and the board. No further trouble was encountered after this.

The circuitry of the front end is shown in Fig. 2. This could by itself be used as a converter ahead of a general-coverage receiver.

Second Mixer and Crystal Oscillator

The oscillator is built into a small can salvaged from a TV IF strip; this was done to minimise the possibility of harmonics appearing in the tunable range. Injection to the mixer is by condenser coupling from an overwind on the coil to the emitter of the mixer. The 10·7 mc signal is applied similarly to the base from the collector of the first IF amplifier. Instability was encountered when using the oscillator overwind as part of the emitter circuit, as is normally done. This mixer works very well and no further trouble was found.

Second IF Amplifier and AGC

The circuit used has appeared before in other receivers, and it does its job very well; the AVC performance is good and alignment simple. The unit actually used in the receiver was a commercial unit purchased some time ago for another project; this was modified to the circuit given in Fig. 3. The circuit shown has single-tuned IF transformers whereas the original board uses double tuned ones. R5 and R7 may need some adjustment to give the voltages quoted in the section on alignment—

Table of Values

Fig. 3. Second Mixer, IF Amplifier and Detector

C1, C3, C4, C5, C6, C7, C9, C11, C13, C17, C19, C21	= ·01 μF	R9	= 390,000 ohms
C2, C16,		R11, R14,	
C18	= 100 μμF, s/m	R19, R21	= 5,600 ohms
C8	= 390 μμF, s/m	R12	= 10,000 ohms
C10	= 1·0 μF, elect.	R13	= 8,200 ohms
C12	= 56 μμF, s/m	R16, R18,	
C14	= 120 μμF, s/m	R24	= 470 ohms
C15	= ·001 μF	R17	= 470,000 ohms
C20	= ·005 μF	R20	= 2,700 ohms
C23	= 33 μμF, s/m	R22, R26	= 39,000 ohms
C24	= 220 μμF, s/m	R23	= 830 ohms
R1	= 15,000 ohms	R25	= 3,900 ohms
R2	= 4,700 ohms	RFC1	= 2·5 mH choke
R3, R8,		SW1	= SPST, AM/CW
R10	= 1,000 ohms	X1	= 11·155 mc xtal
R4, R15	= 2,200 ohms	Tr1,	
R5, R7	= 150,000 ohms	Tr2,	
R6	= 680 ohms	Tr3	= AF117, or OC170
		Tr4	= OC71
		Tr5	= BC-108
		Tr6,	
		Tr7,	
		Tr8	= OC44

Notes: IFT's 1, 2, 3, 4, 5 all single-tuned 455 kc transistor transformers. All resistors carbon rated ½-watt, and condensers ceramic except those marked s/m, which are silver mica. L1 is 32 turns 32g. enam. on ¼in. former with can and core, 4-turn link for injection into mixer.

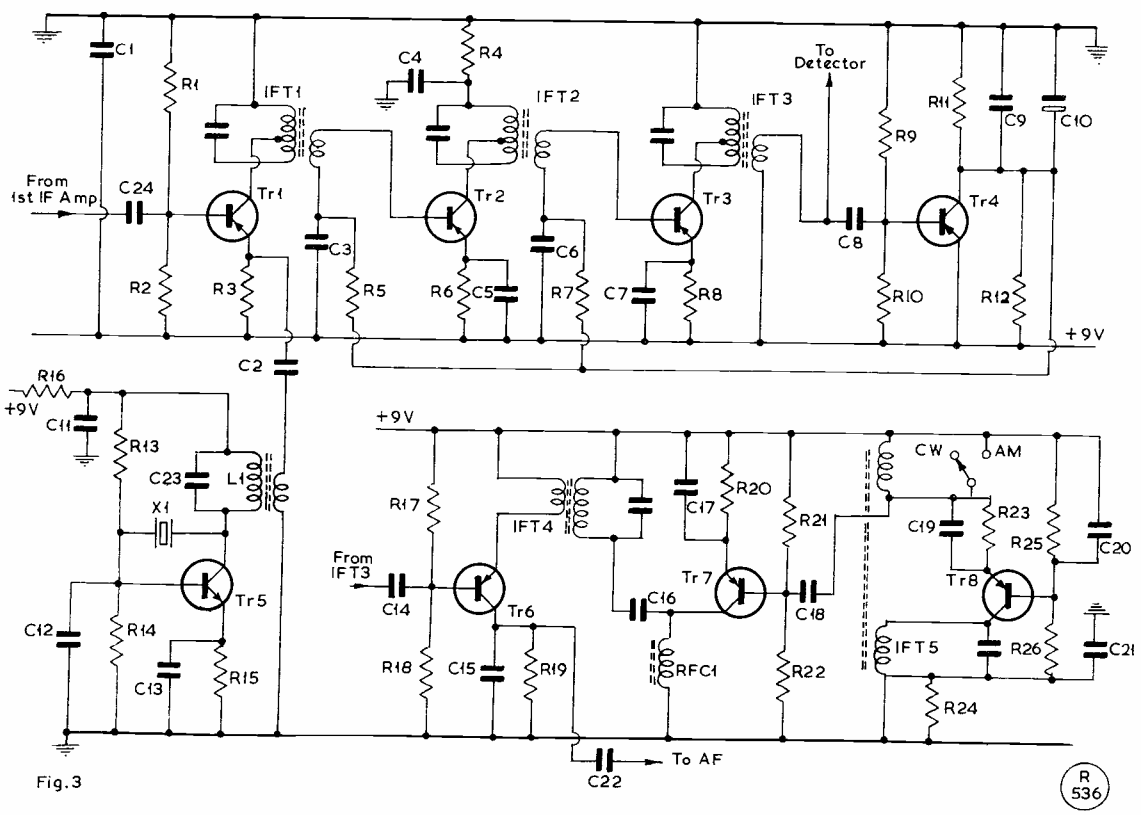


Fig. 3. Second Mixer, IF Amplifier and Detector Unit.

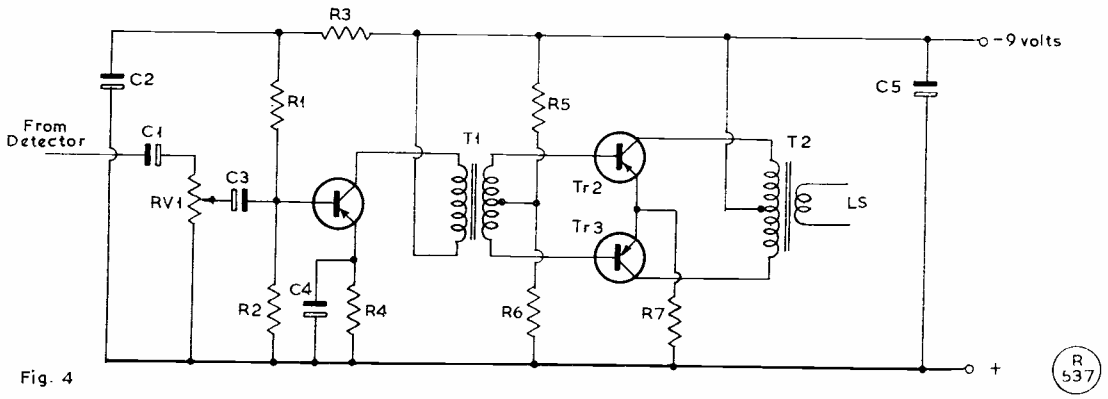


Fig. 4. Audio Output Stages for the Two-Metre Receiver.

other than this no further adjustments, apart from peaking the IF transformers, are needed.

Detector and Audio

The transistor detector provides plenty of output, there being more than enough to drive the amplifier to full audio. For CW reception the BFO signal is coupled into the emitter from the base winding of an ordinary 455 kc IF transformer, the BFO and amplifier giving more than enough injection. The BFO and amplifier are also part of the detector unit. (As yet no SSB signals have been heard so its use in that mode has not been checked.) The 144 mc harmonic from a 9 mc crystal gives a T9 note so the only limiting factor would appear to be the VHF oscillator. This whole unit is really more complicated than it need be, but a BFO is useful in setting up the receiver and for resolving beacons whose signals are a most reassuring sign of life when the band appears dead.

A pre-built audio output stage is used; this came with the IF strip but any similar small amplifier will do. A circuit suitable for it is included at Fig. 4, or a pre-built unit may be used.

Construction

The receiver main chassis is a piece of printed circuit board cut to fit inside an upside-down chassis; shielding is by pieces of material soldered to the base board. Corner brackets and angle bent from aluminium sheet hold this rigid. A front and back panel of 1/16-inch aluminium are bolted to the chassis. The bottom, much abused, was cut out and a new full size piece cut to provide a new base. A sheet of 22g. was bent round the outside to form a wrap-round cabinet, and all given a coat of hammer-finish paint.

The batteries and speaker are external and connected to the receiver by a strip connector block on the back plate. This was done to stop any vibration from the speaker causing frequency modulation of the VHF oscillator.

The detector and first conversion oscillator were made as units, which are mounted on the chassis with stand-offs. The audio and second IF strips should be

Table of Values

Fig. 4. Audio Output Stages for Receiver

C1, C3	= 8 μF, elect.	R7	= 4·7 ohms
C2, C5	= 100 μF, elect.	T1	= *Radiospares* T/T6
C4	= 25 μF, elect.	T2	= *Radiospares* T/T7
R1	= 47,000 ohms	LS	= 3-ohm impedance
R2	= 12,000 ohms	Tr1	= OC81D
R3, R4	= 680 ohms	Tr2, Tr3	= OC81
R5	= 2,200 ohms		
R6	= 39 ohms		

built in the same way, either on *Veroboard* or a printed circuit. Suitable commercial units could be used and modified to suit.

Having all the units as modules allows shuffling them about to get the best lay out. The RF, mixer and first IF stages are built straight on to the board, following normal practice.

Alignment

After checking for obvious faults the 9-volt supply is connected and the 6·8v. regulated line checked. The voltages at the emitters of the second IF transistors should be, first transistor 0·85 volts and second 1·3 volts above the IF amplifier positive line with the second conversion oscillator disabled. The crystal is then plugged in and the core adjusted for best starting when switching on; this can be checked by the rise in the emitter voltage of the mixer. A voltmeter should then be connected between the collector of the AVC transistor and the positive line. A signal at the crystal frequency *minus* the second IF is applied to the mixer base and the IF transformers tuned for a voltage minimum. The same signal is then applied to the drain of the first mixer and the 10·7 mc IF tuned for the minimum voltage, as above.

The signal generator is then moved to the aerial socket and set for 145 mc and the signal found by varying the oscillator. L2, L3 and L4 can then be tuned for maximum signal and the neutralising coil adjusted for the best stability and noise figure. All that remains to be done then is to set the oscillator to cover two metres. In this receiver it is covered by a 140° rotation of the tuning condenser. The BFO is then tuned to the centre of the passband and its amplifier transformer touched up for maximum voltage drop across the detector load resistor.

Results and Observations

The receiver performs very well indeed but it could do with a noise limiter. As yet, however, a suitable one has not been found, but experimentation continues. Sensitivity is good, aerial noise can be heard, and GB3VHF at 70 miles received on a very poor aerial (a four-element beam resting on a roof about six feet above ground level). The drift is small and the receiver becomes quite stable after 10 minutes.

All-in-all, this Rx is better than it was thought it would be, though more listening will no doubt uncover some snags—but as it stands the receiver does much more than was originally required of it.

The version by G3MJW—who also has a similar Rx—uses a VHF Hartley oscillator directly taken from its valve equivalent, as shown in the VHF/UHF receiver section of the *Radio Amateur Handbook*. The values shown for the Colpitts, in the same section, should give approximately the correct coverage. The BFO is crystal controlled, and a different IF circuit is used, though the block diagram is the same; SSB can be copied on this receiver, also Continental stations have been heard on it from the Midlands.

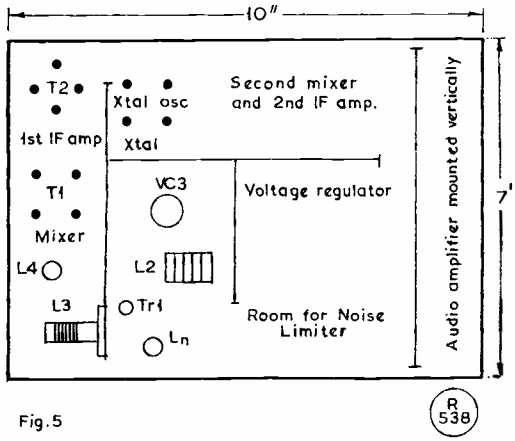


Fig. 5. Bottom View of Main Board—Oscillator and Detector are bolted to the top, above the Voltage Regulator and RF Amplifier sections.

CORRECTIONS AND AMENDMENTS

Reference his article "Discussing Phased Vertical Antennae" in our September issue, G3DDN points out that in Fig. 2 (p.419), the tops of Sw3A, Sw3B should be connected, likewise Sw3C, Sw3D—these interconnections are essential for the proper working of the system. Also, in Fig. 3 (p.420) Sw2 should be seen as a two-way switch only, without a centre position.

* * *

Again in the September issue, in the circuit diagram on p.422, G3EEZ says that there should be an ·001 μF by-pass condenser from the junction of R3, L1 to earth; "C18" on the lines L5, L6 should have been marked as C20—same applying to the reference in the second paragraph on p.424. Diode D1 is a GEX-66, and D2 must be a mixer type, such a 1N21C.

* * *

Regarding the item "Beginner Licensing in Eire," on p.420, September, we are informed that *all* EI amateur Licences are "Experimental Permits," and that new licensees are confined for one year to the use of CW only on the 20-40m. bands—what a sensible provision! After the expiration of this probationary period, they have to re-apply for full-bore operation on all bands. Calls as issued are not dated by the figure, but any single-letter suffix, *e.g.*, EI9F, pre-date those having two or three letter suffixes. And we can remember the time, 'way back in 1927, when Irish amateurs had callsigns like GW12B, in that case the Wireless Society of Ireland, now EIØRTS, for today's Irish Radio Transmitters Society.

NOMINATED FOR COUNCIL

We were interested to see that Eric Dowdeswell, G4AR, of Ashtead, Sy., until recently general manager of the RSGB, has been nominated for the council of the Society. The election takes place shortly, by ballot, on forms delivered to members. G4AR has had considerable experience in the fields of amateur and commercial radio, as well as of administration. A keen and active DX operator, CW and SSB, he was well known as ST2AR when chief radio officer with Sudan Airways in Khartoum, before retirement to the U.K., to take up his job with the RSGB—a position now held by Ron Vaughan, G3FRV. We commend the nomination of Eric Dowdeswell, G4AR, to readers who may be RSGB members.

TO WHOM IT MAY CONCERN

We are informed that the firm of Globe Scientific, Leeds, is in voluntary liquidation, with a deficiency at present estimated at about £15,000. Their affairs are in the hands of Mr. R. W. Hellyer, of Armitage & Co., chartered accountants, City House, Leeds 1—and it is to him that all claims and correspondence respecting Globe Scientific should be addressed, without delay.

On the same dolorous theme, it was only on October 13 that we received information that the affairs of Swanco Products, Ltd., Coventry, are now being handled by H. L. Barnes & Sons, chartered accountants, 22 Queens Road, Coventry, preparatory to a meeting of creditors, which has been called for November 4 and is to be held at the Accountants' offices. Any reader having a claim against Swanco should write immediately to H. L. Barnes, with full details.

HIGH-GAIN VHF/UHF AERIAL ARRAY

ERECTION, EXPERIENCES AND RESULTS

M. HEARSEY (G8ATK)

THE writer having spent three years in a mediocre VHF/UHF location in the middle of a saucer-shaped area, decided to move to a QTH which was 600 feet a.s.l., in the nearby town of Farnham. This was in fact the old home of G5NF, now GW5NF, from whence several records were made.

From contacts with G5NF in the past and early tests by the writer, it became apparent that from the NW around to NE the take-off was slightly obscured by rising ground and a heavily wooded area of high pine trees, so an aerial height of at least 40-50 feet was required to attempt clearance of the obstructions.

Factors Involved

All sorts of problems had to be considered, the most important being windage on a large array at the top of a hill. It became apparent that a rigid structure would be necessary. All the various suppliers products were scrutinised, and the *Heathkit* 32-feet galvanised tower was selected.

Next, what aerials should be used? At first two Parabeams for 70 cm, and another pair on two metres were considered, but it was felt that two 14-element 2m. Parabeams would present a serious windage problem; so a compromise was made—two at 70 cm and one for two metres. Following a telephone QSO with G3JHM it was decided that a monitor on ZB2VHF on 4m. would be extremely helpful, to indicate when sporadic-E conditions were prevelant, so a 3-element Yagi was added for four metres.

With a high-gain highly directional array, it became apparent that one would only be able to search the bands in the directions that the aerial was aimed, so a form of wide-angle aerial would be required. As it happened the author had a two-metre 4-element Yagi, and an 8-over-8 slot for 70 cm (which was shortened to 4-over-4).

The result of these thoughts is portrayed in the photograph herewith of the final array.

Two remaining problems were soon solved:

(1) How high could one protrude from the top of the tower without guying,

(2) How to turn the aerials when the rotator was mounted inside the tower.

Problem (1) solved itself by availability of 2in. tubing—a 21ft. length of dural which, with a 9ft. length of 1½in. steel, made it 18ft. protruding, to bring the upper array to 50ft. above ground.

Problem (2) was solved by removing the bottoms out of scaffolding feet, and mounting on $\frac{5}{16}$in. aluminium plates. The load-taking bearing was fabricated using a brass bush, turning on a SRBF plate, with a $\frac{1}{16}$in. p.t.f.e. washer between. The object of this disc was to take up any tolerance discrepancy and provide a self lubricating bearing. An AR22R rotator was purchased from *K.W. Electronics.*

Ge'ting It Up

All various parts began arriving and assembly started by laying the base for the tower; this was 5ft. square, 4ft. deep with, 18in. x 12in. feet on each corner for stability. The ragbolts were mounted in a simple jig. An inspection of the tower components yielded some sub-standard pieces. After discussion with *Heathkit* these were replaced.

At last construction of the tower started. It was easy enough to build on one's own, with the exception of joining the second set of verticals to the first. With the aid of G8BEJ, this was accomplished, but not without some difficulty, as extra holes had to be drilled.

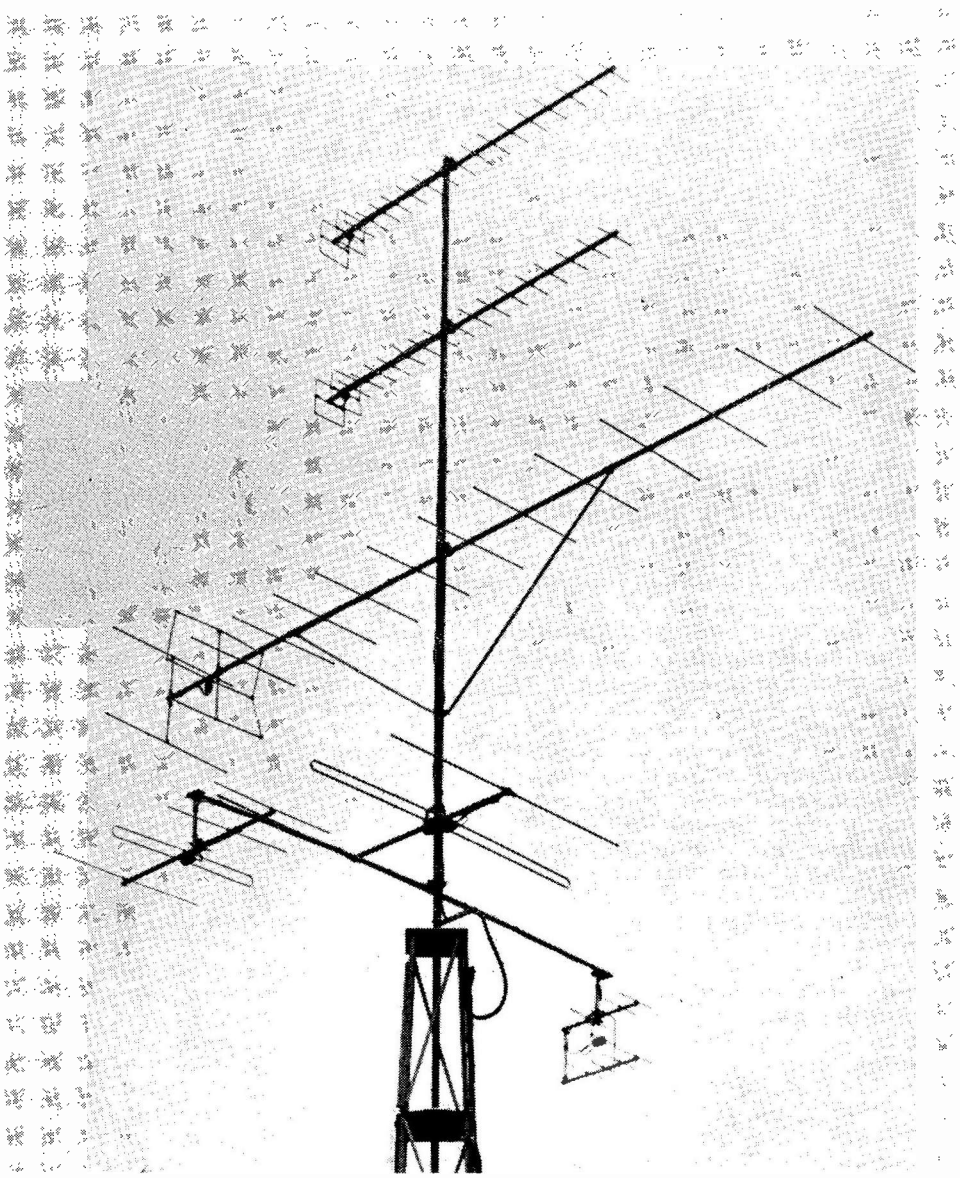
When the rotator was inserted the control box appeared to malfunction, jumping several divisions. A replacement was despatched immediately by *K.W. Electronics*, free of charge without question.

Following discussion with G8COB of *J-Beams*, the problem of watertight jointing on coaxial cables was overcome. An hitherto unknown service provided by *J-Beams* came to light, which was that phasing harnesses can be ordered with feeder attached, or alternatively if one's own feeder is despatched to the firm, it can be bonded to the harness for you.

The two 70 cm Parabeams were assembled on the 9ft. steel section on the ground and hoisted up to the top of the tower and inserted in the 2in. dural tube, the feeder was connected into the converter—but only weak signals could be detected. This was traced to a short-circuit joint in the phasing harness. However, to rectify meant taking the antennae down again. Whilst the harness was away with *J-Beams*, two identical lengths of cable were connected to the Parabeams, and the aerial re-erected. When the harness was returned it was fitted inside the tower where it could be reached, should a fault re-occur in the future.

The two-metre Parabeam is of course nearly 20 feet long and it was felt that assistance would be required to mount it—here G8BEJ and G8AXZ obliged. Having fitted it, no signals could be heard. Subsequent investigation revealed open-circuit coaxial feeder. Down it too came, and had new feeder connected. (*Moral:* Never use second-hand coaxial cable that has been used on a rotary system before.) The remainder of the aerials went up without a hitch.

For securing cables to the structure, insulating tape was tried and found to be useless, as it came off with weather; p.v.c. tape also came undone. The remedy in this case was to put a tie of lacing cord over the top.



The aerial assembly for VHF/UHF as described in the article by G8ATK (Farnham, Sy.). The two upper elements are a pair of J-Beam "Parabeams" for 70 centimetres. Below is a two-metre "Parabeam", and the Yagi assembly for monitoring ZB2VHF on four metres (see text) is beneath. The 32ft. tower is a standard Heathkit, and the AR22 rotator is mounted about 20ft. up in the tower, where it can easily be got at when necessary. The tubing above the tower is unguyed.

If subsequent work had to be carried out, Hellerman strapping and studs would be used.

In the future it is intended checking the gains, and it is hoped to publish the results. However, since May 1969 G8ATK has worked 400 different stations on two metres in 8 countries, and 40 counties, 150 of these stations being Continentals; on 70 cm 5 countries and 20 counties have been raised. The 4-metre ZB2VHF beacon has been discernible above the noise for quite long periods.

In conclusion, if the aerial could be raised another 20 feet, stations in the North would be more workable than at present, although fair success has been had in that direction.

• • • SWL • • •

SHORT WAVE LISTENER FEATURE

SOME INTERESTING TECHNICAL POINTS — NEWCOMERS TO THE FOLD — PASSES IN THE R.A.E. — DISCUSSING ANOTHER HEAVY MAIL — ABOUT QSL CARDS AND PICTURES — LATEST HPX PLACINGS

By Justin Cooper

THERE is no doubt whatever that the improvements in the technological state-of-the-art as far as communication is concerned have, and will increasingly, change the face of Amateur Radio as we know it. Already this situation is beginning to develop. In the days when your J.C. was a young reader of this piece—well, a bit younger!—the usual path into the SWL aspect of A.R. was the building of a simple TRF receiver, or accidental reception of AM amateur transmissions on the short-wave range of the domestic BC receiver. Of late years the almost complete adoption of SSB as the normal mode for telephony working has resulted not only in the TRF but the BC set becoming very rarely the sparking-point for interest. Similarly, receivers which a few years ago were highly-regarded by transmitting amateurs and aspired to by SWL's have more and more been replaced by the latest chromium wonder-worker. Concidentally, the trend has been to regard the present-day range of commercial equipments as black boxes securely labelled " do not touch " (for fear of invalidating the guarantee), to be put down tidily, and connected to an aerial and earth system of terrifying inefficiency, and used solely to listen to the S9 signals that appear from time to time from all parts of the world.

However, many operators of these SWL outfits wonder why, when the band appears to be dead, old Joe Blow down the way is busily knocking off strings of VK or JA stations at S9 which are just not audible to the listener, the said Joe Blow being known to use an old HRO or R.1155 as his main station receiver, and a transmitter that resembles a bit of a bird's nest.

How can it happen? Usually by carelessness or lack of application. An expensive receiver is no guarantee of an infinity of DX, even when new, if sufficient of the DX signal radiation is not presented to its input terminals —and in this context the single-valve receiver well made and operated need lack little in sensitivity in comparison with the more modern receiver. In the final analysis, the aerial is The Thing, plus the earth system, and the ATU which will ensure best transfer of signal from the aerial to the receiver. The " big boys " who are so often accused, quite wrongly, of using excessive power, are in fact those who have spent more time, thought, and energy, on the system *outside* the shack than on anything else, to ensure that the receiver gets the best possible chance to work, within its limitations—and the biggest limitation the receiver has is invariably the bit between the headphones!

Talking about that between the ears reminds us that experience is a great aid in winkling out the weaker ones from under the QRM, and it is very nice to note, among the new correspondents this time, several who have been at it for quite a long time.

* * *

R. Iball (*Worksop*), although this is his first letter to " SWL," has been at it since 'way back in 1936, first with an O-V-O, which could be used as converter, adaptor or straight receiver. Progress then was to a 1-V-1 running from batteries, with which both BC and amateur bands were monitored. After Hitler's War, Bob had to content himself with BC listening until 1951, when another one-valver enabled him to hear W/VE on Top Band; this was followed successively by R.1224, R.1155, and SX-28 receivers, until the present AR88D. And it is an interesting thought that when your J.C. was a budding SWL, marvelling at the distant stations some of the top-dogs used to report hearing, one of the names that can be recalled through the years is none other than that of Bob Iball of Worksop, in the early fifties!

Another old-timer is *M. Newsome* (*Sutton-on-the-Forest*) who has an answer to the plea of S. Palmer last time round for suggestions on a good, cheap-and-cheerful two-metre converter for use with an HRO. Malcolm uses a conversion of an old HRO coil-pack, which plugs into the receiver in the normal way, no modifications to the main body of the receiver being needed, and says that many other enthusiasts have been astounded to hear 144 mc signals coming so well out of an HRO.

Both an HRO and an RA-1 are used by *B. McCombe* (*Peterborough*) who combines Amateur Radio with many other interests, not least of which is his work as a general practitioner. However, Brian even turns the " night calls " into use, by taking a quick turn round the bands when he gets home from the inevitable baby-case!

Points of Technical Interest

Interference from TV sets was mentioned last time, and touched off a letter from G3LHR, who has spent quite a lot of time battling with it. Martin says the first thing to do is to disconnect the mains earth from the receiver, and to rely entirely on the *station* earth both for the aerial and for safety—which in itself means doing some work to get the station earth resistance down

to a low value. Any remaining traces of noise from the Lantern can usually be removed by ·001 μF mica capacitors wired between live and neutral in the mains plug, first in the shack, and then in each TV set in turn. (J.C. would add a rider that the rating of the capacitors should be not less than 1000 volts). By this means it should be possible to reduce the interference caused by line time-base harmonics down to negligible proportions.

Changing tack a little, frequency measurement would appear to be something that most SWL's do not consider very important, if the frequencies quoted on reports received by J.C. are anything to go by; and it is a view confirmed by the correspondence, which very rarely mentions *any* method of confirming frequency. There are various forms of wavemeter, the simplest one being nothing more than a tuned circuit roughly calibrated in bands, called the " absorption wavemeter " and used by transmitters for confirming that they are somewhere near the right band. Having done this, the next step is to use some sort of heterodyne wavemeter to tell exactly where in the band one has settled, the point being that the heterodyne device cannot tell you for certain *which* band you are in, but *can* tell you the exact spot once you have confirmed you are in the right parish. To make it easier to zero-beat the wavemeter with the received signal, visual display by way of the oscilloscope is possible. For oscillator frequency measurement, one can apply the signal to a receiver and beat it against the wavemeter, or, a possibility becoming more intriguing with the arrival of integrated circuit chips on the surplus market, actually to count the number of cycles in a given time. A 1 mc " rock " in a suitably designed oscillator can be made to generate a one-second " gate " by using, for example, seven J-K flip-flops. The gate so produced is used to " enable " a counting chain using another seven J-Ks, which can count up to ten million. Having done the count, there are various ways of displaying the answer, probably the simplest being to use lamps to put up each digit of the answer in binary form. Other methods, such as the use of digital indicating tubes, Nixies, or whatever, are nicer but need lots of transistors or valves to convert the output of the counting chain into a suitable form for driving them. However, it is nice to be able to give a chap a really *accurate* report on his frequency or perhaps more important, drift. Such a home-brew counter could be made to be accurate to a cycle or so at room temperature and knocked up in a weekend.

From The Letters

M. Fatherley (*Wokingham*) dabbled in radio as a lad during the early years of the war but did not have a great deal of success, so gave it all up until the bug bit again a couple of years ago. A home-brew Rx was used for a while, until the present B.40C receiver was acquired and courage is now being plucked up to delve into it and bring it up to date.

S. Lowe (*Exmouth*) wants to know the licensing conditions for G/MM stations. Broadly, they are crystal-controlled as to transmitting frequencies on the VHF and HF bands, and the transmitting licence is to an operator in a particular ship, it being necessary for the installation to be inspected before the rig is used, and again cleared before it can be set up on a different vessel.

Still talking around the HRO receiver, *M. Stokes* (*Wakefield*) has a 21 mc bandspread coil which flatly refuses to " give " although the receiver goes well on the other bands. Coils for this band are usually made by modifying other ranges, and it would not be at all a bad idea to start off by giving the pins on the coil-box a good clean, followed by a thorough check of the innards for broken or dry joints.

New Entries

J. Haig hails from *Hitchin*, and started listening in February with the domestic set, which later was replaced by a Trio receiver, Joystick, and various odd aerials which John had been putting up and taking down during the month prior to writing.

Although he has been a reader for several years, *C. S. Foster* (*Ferryhill*) had his first contact with Amateur Radio back in 1952, when a visiting Flight-Sergeant tuned in G3IOW on the mess radio set, and later took him on a visit to the G3IOW shack. SW/BC listening was the main interest for some years after that until a couple of years ago a CR-100 was picked up, and extensively altered, making a tremendous difference, and bringing the amateur bands to the fore. Incidentally, Sammy is wondering about tackle for use when he gets his ticket and wants to know whether the Heathkit DX-100U plus SB-10 combination can only put out ten watts of SSB RF. No, indeed, the SB-10 in itself gives ten watts of Sideband, which is then passed back into the DX-100 and used to drive a pair of 6146's in the PA.

Another new starter is *G. R. Ridgway* (*Upminster*) who has a PCR2 and a 52 Set, operated to a 110-foot were at about twenty feet. Graham does not have set listening times, but just fires up as the mood takes him, and sometimes this results in him getting on when some DX band is well and truly open.

W. H. Butcher (*Towcester*) passed R.A.E. way back in 1949, but never was able to pass the Morse, even though he did have three shots; now he is retired and is able to spend a lot of time listening on his R.1475 receiver to Twenty, although there are ideas brewing for a converter which will take into the two higher bands. The next letter in the clip comes from the same area, indeed, Butch and *P. Goff* are friends. Paul uses an old pig-sty as the shack, but reckons on doing a smart QSY into the bedroom before the cold winter weather renders his present quarters untenable; he runs a Pye 47C to a couple of sixty-foot wires as aerials.

A very brief note with his first entry introduces *N. Hoult* (*Loughborough*) as yet another HRO user, his list being made with an MX model, coupled to an end-fed quarter-wave for Top Band.

There are now no less than three members of the *Hyder* family in the HPX list—first the OM, then daughter Lynne, and now *Michael*, who has found the interests of HPX, and put in a takeover bid for the family AR88!

R. Shilvock (*Stourbridge*) comes in for a starting score of 267, gathered with a Trio 9R-59, fed from an ATU which looks at the output from a 60-foot end fed aerial; just in case the wire falls down there is a Joystick available as a stand-by.

[over

Department of Congratulations

As ever at this time of year, there are quite a few letters announcing either passes in the exams. or a nice new call. *J. E. Jenkinson* (*Oxford*) has taken out G8CVS; John took the R.A.E. at Oxford College of Technology, but did not follow any course, simply setting out to read up his subject carefully and make sure he was well grounded in examination technique.

* * *

Another one with a call, this time G3YRU, is *P. Wilby* (*Rothwell*) who is on 80-10 metres with a home-built CW rig running 60 watts to the PA.

Robert Ellis (*Llandaff*) has his R.A.E. and the Morse in the bag, and an Amateur Radio Certificate; the next step is to get the gear together for Top Band and take out a call.

Young *Tony Cobb* (*Hull*) spent most of his holidays waiting for the postman to bring in the slip, and now he has got it—a pass, incidentally—he feels, looking back, that all the traipsing to evening-classes and back through the winter weather was certainly worth while. Tony has now to pass the Morse, rake together the gear to get him going, and, last but by no means least, to find ways and means of putting a decent aerial up where little or no room exists.

M. Bass (*Nottingham*) has passed the R.A.E., but is taking a rather more leisured approach to things than most of the others in that he has targeted Morse and the call as "sometime in 1970." Meantime, he keeps his score going, with the help of a Trio 9R-59 recently introduced to the shack.

Last but not least, *C. Ekberg* (*Grimsby*) who, J.C. recalls, came back to radio at a time when the demands on his time were very heavy, and so has had to stick to a careful programme, even cutting out listening to a great extent, in order to do the necessary work involved in getting the R.A.E. and Morse passed. Now Charles is in for a ticket, and hopes, all being well, to be on by Christmas—and J.C. will be looking for a QSO, to fill a hole in his county score on Top Band!

John Struthers (*Hawick*) hopes to be operational on 144 mc ere long, having gained the call GM8CVN since last time round. John was so pleased at his new call that he decorated the signature on his letter with a neat drawing of a five-element two-metre beam array!

To all of these chaps, who have made their way, either partly or wholly, to the goal of a licence and a station go our congratulations on their industry and its success. Long may they enjoy the pleasures of Amateur Radio.

Turning now to the rest of the clip, we have quite an assortment of letters, so that once again we will have to select those with major points to be discussed. In the line of HPX queries, the 3Z wallahs have startled quite a few readers, notably *J. Marchant* (*Sharnbrook*), although a glance at the back sheet of the Prefix List would have settled the problem immediately.

Another one which worried quite a few people is mentioned in the letter from *R. Bence* (*Cardiff*) who was puzzled by hearing the C31CL station banging away on Twenty Sideband. The C31 prefix is the correct one for Andorra, and supersedes the PX1 previously used.

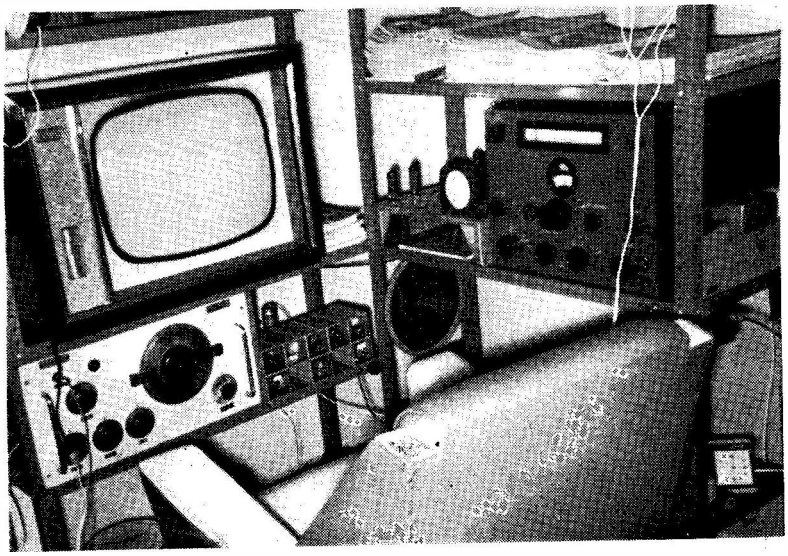
Quite a few points in the letter from *M. Williams* (*Sleaford*), who wants to know why the deadline for "SWL" is as early as it is, and why it does not appear every month. If he sat where your scribe sits right now,

HPX LADDER

(Starting January 1, 1960)

SWL	PREFIXES
PHONE ONLY	
S. Foster (Lincoln)	1072
A. W. Nielson (Glasgow)	948
J. Singleton (Hull)	919
B. Geary (Leicester)	860
D. Reynolds (Dudley)	765
R. Woods (Slough)	754
M. A. Lount (Leicester)	751
M. G. Toms (Ilford)	731
J. Fitzgerald (Gt. Missenden)	716
I. Poole (Leeds)	705
C. P. Davis (Leicester)	685
R. Allisett (Guernsey)	684
G. Dover (Nottingham)	668
W. Moncrieff (Hampton)	667
C. J. A. Morgan (Wallsend)	656
N. Henbrey (Northiam)	643
G. Braund (Taplow)	617
R. Bagwell (Frimley)	613
J. P. Scragg (Stockport)	612
L. Cunningham (Wath-on-Dearne)	586
G. Ayton (Sunderland)	574
L. Harwood (Wirral)	571
K. Plumridge (Southampton)	564
M. Pipes (Derby)	562
N. Whiting (Leeds)	560
H. M. Graham (Harefield)	546
A. Cobb (Hull)	536
R. Nicholls (Narborough)	534
D. Henbrey (Northiam)	521
D. Robinson (Birmingham, 26)	517
B. J. Gilbert (Tonbridge)	503
P. Brown (Isham)	499
T. W. Hyder (Southampton)	493
J. E. Jenkinson (Oxford)	490
C. Wynn (Birmingham, 22B)	485
N. Peacock (Tonbridge)	481
R. Carter (Blackburn)	480
M. T. Hyder (Hythe)	463
D. Palmer (Fareham)	460
P. N. Butterfield (Wakefield)	459
T. J. Bucknell (St. Albans)	454
P. Sharman (Hayes)	453
R. C. Waterman (E. Lothian)	449
M. J. Quintin (Wotton-u-Edge)	441
M. J. Wigg (Ferndean)	439
C. Price (Bolton)	439
D. Nobles (Isham)	436
K. B. Mendoef (Wellesbourne)	422
A. Parker (Chesham)	421
C. Shearing (St. Agnes)	420
M. Fisher (Bradford)	414
C. Freeman (Nottingham)	406
R. A. Treacher (Eltham)	405
R. Bence (Cardiff)	405
D. Whalley (Coraham)	404
S. Palmer (West Wickham)	398
J. W. Struthers (Hawick)	392
P. Schofield (Bolton)	392
A. Wood (Husthwaite)	389
R. Miller (London, S.W.15)	387
P. Levitt (Worksop)	386
R. W. Cook (Leicester)	379
J. Pullen (Barton-on-Humber)	373
S. Cole (Newport, Mon.)	373
R. Mortimer (Abingdon)	365
R. Thorneycroft (Shifnal)	365
S. Osborne (Derby)	364
K. Kyezor (Perivale)	362
D. F. Randles (Sale)	357
C. G. Pearson (Northfleet)	348
W. Rees (Newport, Mon.)	347
H. N. Plumridge (Southampton)	346
M. Williams (Sleaford)	343
W. T. Bowen (Dinas Powis)	342
N. Crampton (Romford)	337
K. Haywood (Manchester)	334
P. Smith (Chesterfield)	332
C. Burrows (Gidea Park)	328
M. Timms (Aylesbury)	328
S. Pitt (Hornchurch)	327
Rev. D. P. Brewster (Oxford)	324
M. Stokes (Wakefield)	319
C. Jones (Mold)	310
R. Horne (Castleford)	308
S. Jassel (Newcastle-on-Tyne)	305
D. J. Browning (Bishops Stortford)	302
A. Vest (Durham)	298
S. Culnane (Harrow)	295
K. F. Bone (Chard)	292
J. Brackenridge (Maybole)	290
J. R. Lloyd (Plymouth)	284
P. Gould (Tiptree)	282
S. W. Dean (High Wycombe)	277
D. Maunders (Settle)	277
R. Hilton (Ashbourne)	273
R. Shilvock (Lye)	267
R. Ellis (Llandaff)	267
C. Pearson (Northfleet)	267
J. Marchant (Sharnbrook)	263
E. P. Englehard (Macclesfield)	262
Mrs. S. Singleton (Hull)	262
N. P. Taylor (North Wembley)	261
D. J. Porter (Harrow)	255
M. Fatherley (Wokingham)	254
C. Garcia (Worthing)	250
Dr. B. McCombe (Peterborough)	244
S. Bushell (Sunbury)	241
K. Taylor (Sunderland)	237
D. Garrad (London, S.E.23)	236
C. Foster (Ferryhill)	233
J. W. Dunnett (Preston)	232
D. J. Harris (Bath)	231
P. Goff (Towcaster)	228
S. Lowe (Exmouth)	224
Lynne Hyder (Southampton)	224
G. K. Upton (Nottingham)	224
W. H. Butcher (Towcester)	215
A. Watson (Dartford)	214
N. Hoult (Loughborough)	214
R. Berkolds (Chatham)	212
G. R. Ridgway (Upminster)	204
J. Haig (Hitchin)	200
CW ONLY	
A. Vest (Durham)	535
C. Harrington (Maidenhead)	512
R. Hyde (RAF Locking)	439
B. A. Smith (Ruislip Manor)	417
G. Braithwaite (Belfast)	360
J. Dunnett (Preston)	356
M. A. Lount (Leicester)	343
R. A. Fowler (Marlow)	338
H. Wright (Pontefract)	314
P. Wilby (Rothwell)	215

(NOTE: *Listings include only recent claims. Failure to report for two consecutive issues of "SWL" will entail removal from the Table. Next list, January issue, for which the deadline will be November 7.*)



R. Berkolds has this outfit at 73 Barberry Avenue, Davis Estate, Chatham, Kent. the Rx on the right being a CR-100 (which he has been modifying recently) and below the TV set is an R.71, of which he would like to know more from anyone who knows anything about it.

with a wet towel round his aching head, he would surely know! Seriously, though, there is quite a lot of checking and researching to be done before the copy goes off to the Editor, who casts a distinctly beady eye over it before clearing it for press—and your conductor still has his daily bread to work for, let alone a little time for operating and domestic chores. Going on a little Maurice is quite interested in aerials and wants to know about the Joystick and what are the best ones to use if one has the choice. There is only one real answer to this—you pays your money and takes your pick! The Joystick, properly used, has certainly given extremely good results, but if one had all the space and funds to run the best possible aerial system it would not be far off the aerial farm at W6AM, where there are rhombics pointing in all the major directions, switched at the shack in order to select whichever one is needed at any time to give Don S9 from any part of the world.

Up in *Hull*, *J. Singleton* has popped out of silence again, with another entry for the Table. He seems to be working soundly along the lines of that old theory of Confucius which suggests that the more sunlight the aerials shut out the better the DX; in fact there is a quite astonishing collection decorating his garden, operation being contemplated on all bands up to Seventy-cems. XYL *Shelagh* also has an entry, and remarks that she now has her own receiver, an HRO-500. She had a trip to the maternity home up in Ferriby due during October, and reckons it would be a lovely site for an aerial farm.

P. N. Butterfield (*Wakefield*) had the bad luck to lose the copy of his last letter before deadline this time; which entailed a certain amount of mild cussing by old J.C. until the copy of the list held here could be dug up and things sorted out—but it all came out right in the end.

September 2 was quite a day for *A. J. Harmsworth* (*Lymington*) who fell neatly into a ten-metre opening, which gave him ZE1BS, G4RS, W3BMS, W1NSH, G3IAP, KG4AA, ET3RLL, G3UML and G5BR all around 1800 and 28·5 mc, give or take a little. Quite an unusual opening, with DX and also true short-skip conditions.

I. Poole (*Leeds*) hit the jackpot with his GCE results, eight in all, but has thus landed in the Sixth Form where it will be " nose to the grindstone " to the detriment of his SWL activities—but it will all be worth while in the end, and after all SWL is a hobby and not a means of livelihood.

A somewhat similar situation follows with *D. Whalley* (*Corsham*), who has finished the school examination grind, but is now occupied job-hunting. David has hopes of having a stab at R.A.E. sometime next year, before the examination techniques are completely forgotten. On a rather different tack, David recalls mention of the AC4RF book in this piece some time ago, and wonders if there are any more non-technical works which highlight Amateur Radio? Perhaps readers would care to offer suggestions; and J.C. would kick off by mentioning a yarn called *Race for Life* which is largely based on the theme of international communication by Amateur Radio. While it is none too accurate in depicting detail, it is nonetheless a good read for its own sake.

D. Randles (*Sale*) listens to the 80-metre DX Net quite often, but bewails the fact that the stations in it are often giving the DX reports of S6 or better when he just can't hear them—sounds like a good case for some *careful* working on the aerial system and coupler to get the very best out of it. David, on August 23, heard a genuine case of short skip on Twenty at the same time that W's were booming in; not so common—most of what is called " short-skip " is nothing more nor less than normal propagation at first-hop distance, which takes in a range of up to a couple of thousand miles or so, and so results in loud signals from all Europe. All the real DX is achieved by more than one hop, the number being a function of the aerial and the propagation conditions.

Talking of DX, *A. Wood* (*York*) rather amused J.C. with his comment that either conditions have been good

or there are a lot of JA pirates about! Good conditions it is, Alan, plus the numbers of JA's on the air, most of who seem to operate on the DX bands.

Headphones are the main topic with *C. Burrows* (*Gidea Park*) who has treated himself to a pair of lightweight padded ones, which are more comfortable than the old set. A good point this, as a comfortable pair of "cans" can make or mar one's pleasure in operating. For spectacle-wearers, there is a lot to be said for the stethoscope type, quite apart from the fact that one can change the insert in a moment for one of a different impedance.

Poor old J.C. has been scratching around in his files again, because someone forgot to sign their letter—this time it seems likely to have been *N. Peacock* (*Tonbridge*) who signed with just his Christian name. (It would help a lot if all correspondents would use block letters for name and address!)

A. Watson (*Dartford*) has, by the sound of things, been hearing rumours—anyway, he put inverted commas over your conductor's name in his letter and Table entry. Perhaps he thinks J.C. doesn't exist—must get the Editor to *prove* the J.C. identity, even if he does have to suffer it every couple of months when he gets the script!

B. K. Middleton (*Welton*) has recently become G8CRI, and comments thankfully on the quality of the R.A.E. course run by 9H1R at Paola Technical Institute, Malta. G8CRI was, in Malta, located, as far as aerials went, about ten feet from the 9H1BL skywires, which must have given the front of his receiver something to think about at times!

SWL support at stations Specially on the Air is a point raised by *S. W. Dean* (*High Wycombe*), who found that once the SWL types who were standing around looking interested realised he was himself "only an SWL" as he puts it, then they were much more keen to talk and to be roped in to the Club—which is, after all, the basic reason for most of these affairs.

Surprisingly, none of the letters, other than the Top Dog—*S. Foster* (*Lincoln*), and G3UML—noted the slip in deleting OF as a good prefix last time from the list of D. J. Reynolds of Dudley. Thanks, both, for correcting your conductor. On a different point, Stew mentions his gear, for the encouragement of the others—he has one of the original 9R-59 receivers from Trio, with which he is well pleased, and 75ft. of wire, fifteen feet high, NE-SW.

A pretty obvious pirate was S5PW, heard working K6FA by *B. J. Gilbert* (*Tonbridge*); it seems the K6 challenged the call, and got an evasive answer. In the absence of any definite information to the contrary, he could reasonably be considered to be a pirate.

D. J. Reynolds (*Dudley*) should by rights have been in the section devoted to R.A.E. passes, but as his note that the slip had come through was a p.s. at the end of the HPX list, it nearly got missed. David also did nimself proud in A-Levels, with three passes booked in. Congratulations!

QSL Cards

Because of the Wx *J. Brackenridge* (*Maybole*) has been somewhat inactive of late but has been doing "quite nicely thank-you" in the matter of QSL returns, both *via* the bureaux and direct. A point of interest here is the rather tasteful card Jim uses: J.C. would confess to be rather taken with it, and could bear to know its origin.

S. J. Osborne (*Derby*) also enclosed one of his cards, and wonders whether it would be policy to send most of his cards *via* bureaux or direct. In general, one would think, direct, but essentially, as the DX station is directing, which often means hanging around on the frequency until the information about QSL'ing can be copied, or scratching around the various DX columns and newssheets for it. And (obvious though it may seem) it is not much good putting U.K. stamps on an s.a.e. to a station the other end of the world—in which case use IRC's.

* * *

Once again, it becomes necessary to raise the point of photographs. *R. A. Treacher* (*Eltham*) sent quite a nice coloured one of his shack, but it was just not right for reproduction. What is required is a sharp—razor-sharp—print, contrasty black-and-white, glossy and glazed, with the view confined as far as possible to the matter in hand. Bob, to judge by his photograph, has quite a nice station, decorated with maps on the wall and a goodly array of QSL cards.

S-meters and their calibration have got *R. Mortimer* all hot under the collar. As he says, various countries and makers seem to use different standards. One has seen, for various receivers 3, 4, and 6 dB used as the calibration standard—but few amateurs really give reports on the meter—because most audible stations would be on the S1 mark—and a report of S1 might *not* result in a QSL card! No, all the S-meter is useful for is as a comparative device, when checking aerials or the differences in signal levels from stations in the same area. Given a quiet band and a noise-free background, it would be quite proper to report a station R5 and S2—and an RS-52 signal can be quite hefty on the audio side when the gain is turned up a bit!

Also Received

And there, once again, space seems to have run out on us. So we acknowledge chatty letters and entries for the Tabular Matter from the following: A. W. Nielson, *Glasgow;* P. Levitt, *Worksop;* J. Pullen, *Barton-on-Humber;* C. G. Pearson, *Northfleet;* I. Porter, *Harrow;* S. Culnane, *Harrow;* J. Dunnett, *Preston;* H. Wright, *Hemsworth;* C. Garcia, *Worthing;* R. A. Miller, *London, S.W.15;* P. Gould, *Tiptree;* M. Fisher, *Bradford;* R. Hyde, *RAF Locking;* C. J. A. Morgan, *Wallsend;* D. Garrad, *London, S.E.23;* R. Thorneycroft, *Shifnal;* D. Maunders, *Settle;* K. F. Bone, *Chard;* R. Bagwell, *Frimley;* L. Harwood, *Wirral;* M. J. Quintin, *Wotton-u-Edge;* R. Nicholls, *Narborough;* G. S. Braund, *Taplow;* C. Price, *Bolton;* and P. Sharman, *Bromley.*

Deadline

November 7 is the deadline for the next time—a little short this, but it can't be helped, with the inevitable Christmas mail delays snarling up the afterend of the production schedule for the January issue. Address 'em to "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM, to arrive in time, and J.C. will be waiting for them with open arms!

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

QUITE a month, both personally and by way of band conditions. Personally, because of a holiday predominantly non-radio, but with highlights in the way of visits to two amateurs, both well-known on the DX scene. To them both, and their XYL's, thanks go for making a normal holiday memorable, and incidentally showing the writer the truth of his own oft-repeated assertion that it is the aerial that counts!

However, all this meant that your scribe, in the nature of things missed out on quite a bit. Conditions were pretty good during the month, except for one period, and it is of some interest to note that this seemed to coincide with the arrival over Scandinavia of the fallout from a " dirty " bomb let off by the Chinese, if a report from Sweden datelined the previous day was anything to go by. How odd that the arrival of a cloud which resulted in a radiation fallout level rising by a factor of twenty should coincide with the sudden change in conditions from very good to awful, accompanied by noise on the HF bands of a rather unusual level. One wonders if others have noticed the effect in connection with other reported atomic explosions.

QSL Managers

Three letters on this point are especially deserving of mention, either pro- or anti.

G3MCN (Liverpool) mentions that his correspondence with an American magazine regarding missing cards brought a reply from the Colvins saying that all the cards for *their* expedition had been despatched *via* bureaux. If any G is missing a card he can re-apply to the Yasme Foundation, 5200 Panama Avenue, Richmond, California. In addition, Harry mentions the QSL manager who, in response to his *third* request and s.a.e., wrote back saying " G3MCN did not appear in the log "—a pity, because another letter from the *same* manager, reference the *same* contact, arrived by the *same* post—containing the QSL!

ZC4GM (R.A.F. Episkopi) regards any suggestion of foreign stamp-collecting by QSL managers " as at best uncharitable and at worst impudent," while 9H1BL (Malta, G.C.) who, like ZC4GM, also has a QSL manager of whose quality there can be no doubt, remarks on the advertisements he has seen in U.S. DX bulletins by QSL managers who are offering thousands of IRC's at cut prices; and 9H1BL goes as far as openly to admit to a belief that the whole business is wide open to " fiddling."

Turning back to the G3MCN letter, already mentioned, Harry has the most pointed comment of them all when he says that according to his records he lacks a verification from fifteen countries—and *all* are through QSL managers, with IRC's or s.a.e.!!

Ten Metres

Here we can make a start by taking a look at the list from G3XBY (Wombourne) who says his activities have been somewhat reduced by a holiday job, and then by joining in the GB2GD expedition, as a result of which he ended up with a short spell in bed! However, SSB accounted for A2CAQ, CE5FQ, CR6's, CR7's, CX6BBW, EA9ER

SIX-BAND DX TABLE
(All-Time Post War)

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc	1.8 mc
W6AM	348	131	140	347	116	54	7
G3DO	337	201	240	330	90	83	9
G2DC	336	171	308	328	116	113	20
G3NOF	316	182	218	299	34	40	2
G3LZQ	254	138	155	201	72	38	8
G3IAR	221	126	161	193	91	73	12
G3KMA	248	187	178	187	119	54	11
G3IGW	204	127	156	168	122	91	42
G3RJB	164	64	50	150	59	37	8
9H1BL	163	95	95	123	56	48	—
G3VPS	128	36	42	108	50	36	14
G3VDL	145	59	105	101	53	31	—
G3XBY	161	104	113	97	69	56	6
G3PQF	159	103	46	96	84	57	12
G3MDW	116	47	66	83	20	15	7
G3SED	136	31	26	66	43	40	39
G3WPO	101	35	20	63	49	29	21
G3WJS	66	—	8	55	41	45	14

Note: Placings this month are based on the " 14 mc " Column.

(Spanish Sahara), ET3USA, GC5AET, JA's, KG6AQY, KR6JT, LU8DKA, MP4B's, MP4TDA, OD5's, PY's, SV1DB, UD6KGF, UO5BGD, VP8KL, VQ8CV, VQ9EP, VS6DR, VU2DK, all W call areas other than 7, YV4UA, ZE's, ZS's, 4X4's, 5H3KJ, 5N2AAF, 5Z4LS, 7Q7AM, 9J2DT, 9Q5CP—which adds up to quite a crop for a station that claims to have been rather inactive!

9H1BL regards Ten as having been the star turn of the month, and made Sideband QSO's with HP1JC, 5N2AAF, CR6LE plus a couple of all-time new ones in VP2VI and VP28KL; CW was not neglected and from this mode came contacts with UM8KAK, VS6AF, VS9MB, VU2XX, 8R1J and 9L1HC, not to mention loads of JA, W, UAØ and ZS. Alan has only one complaint as far as 28 mc was concerned, which was the number of stations worked having operators by the name of Vlad!

Contrary to the general view, G2DC (Ringwood) did not find the bands generally much to shout about. Jack does not seem to get on the air so much as of yore, for one thing, and for another his favourite operating period—1630 to 1830z—has not been the best time for the DX. Nonetheless, although nothing in the way of new stuff has been worked, CW did yield KZ5KZ, PY2DEH, VK4LV and XW8CQ.

Better luck, in terms of increasing his band totals, has attended the efforts of G3DO (Four Oaks), who rang the bell with HKØBKX, and VP5AA to take him over 200 on ten metres.

The report from G3NOF (Yeovil) is quite one of the most optimistic in outlook Don has sent in—general state of Ten infinitely better than it has been of late, although somewhat erratic, which after all is not unexpected when the MUF is just over the frequency under consideration. One rather gathers the mornings to have been Don's favoured time, with SSB contacts to A2CAH, CR6LV, CR6LX, CR7FR, CR7IZ, DU1FH, EP2BQ, ET3REL, ET3USA, JA1DCY, JA2CLI, JA3GFO, K6's, KR6's, MP4BHR, OD5BA, OD5BZ, UJ8AAC, UL7AQA, VK2AAV, VK2BKM, VK6CT, VK9BB, VK9BS, VP5AA, VS6DR, VU2BEO, VU2DK, VUØOLK, W6's, XW8AL, ZS's, 4X4's, 5H3KJ, 5N2AAF, 5Z4LS, 7Q7RM, 9G1GD, 9J2DT, 9J2LK, and 9Y4AA.

QSL Matters

G2HKU (Sheppey) was somewhat startled to hear VP2ME on Montserrat saying that ARRL would not recognise him for DXCC status, and that therefore his QSL cards were of no value in that context—and he is an American!

From W1WY each month comes a hatful of information which helps to make this column useful, and this time, he has a couple of late flashes. One is that KV4FZ and 9Y4AA are both expected to be active and operational during both legs of the *CQ* WW DX Contest; the other one is of a contest station which will be appearing for the same event from Zone 17. UA9AN and operators from UA9KAI and UA9KAX will be on from the South Ural Mountains using a special call-sign 4J9DX. QSL cards for this one *via* Box 88, Moscow, or direct to 4J9DX, Polytechnical Institute, Chelyabinsk, USSR.

G3DO mentions HKØBKX as asking for his cards *via* WA6AHF, and VP5AA (Turks and Caicos Is.) through W1WQC. A long list appears at the end of G3NOF's letter, and mentions: *WA4MMO /KC6* to DOTM; *GD3PBD* to DOTM; *VU2BEO* to W3BWZ; *XW8AL* to F2WS; *9Y4AA (ex-ZD8Z)* to W6CUF; *VK9BB* through the VK Bureau; *TR8MC* to P.O. Box 3135, Libreville; *VP2VI* to P.O. Box 75, Tortola; *KC4USV* to K1NAP; *CEØAE* to Det 517, APO NR, N.Y. 09877; *YA1HD* to DJØDK; *XW8CS* to VE6AO; *YB1BM* to P.O. Box 288, Bandoeng —incidentally, the latter is YB1 QSL Bureau manager; and *C31AP* to Andorra City, Republic of Andorra.

Top Band

As ever at this time of year, the mail has both a national and an international aspect, in terms of DX-chasing. Looking at the latter end first, we have a note from W1BB on the current series of Transatlantic and Transpacific tests. The former are down for November 30, December 14 and 28, January 11, February 1 and 15, from 0500 to 0730 GMT. Call "CQ DX Test" in alternate five-minute periods, the W/VE stations leading-off. Clocks should be set accurately, and the times adhered to closely unless actually in mid-QSO. Europeans on 1823-1830 kc, and possibly on 1851-1861 kc, which is a clear spot on the other side of the Pond. East Coast W's 1800-1820 kc, West Coast 1975-2000 kc.

The Transpacifics are a day *ahead* of those just mentioned, *i.e.*, November 29, December 13 and so on. W frequencies as already given, JA's 1907·5-1912·5 kc, ZL's around 1876 kc, and VK's 1803 kc approximately. Times 1330-1600z and, for the JA sunset tests 0730-1000z.

In January, we hear that 9H1BL and G3VPS will be joining forces to try to dish out some contacts from 9H1-land—all being well, the last week of January and the first of February.

Reading the RSEA *Newsletter*, there is a very good article by 5Z4LE which is clearly intended to stimulate DX activity on 160m. this winter, and suggests that skeds could well be set up—perhaps 5Z4LE would care to join the party, since there is no doubt that activity from East Africa would certainly find plenty of takers, if made known in advance.

G3RTU/4X4 is interested in Top Band, although the 4X4's are not licensed for it, and would welcome cross-band skeds—the address is Zvi Kahn, G3RTU/4X4, c/o Friedman, Rechov Avoda 23, Herzlia, Israel.

An interesting letter from K1PBW to G3VLX which comments on various things, one of which is that quite a few W9, WØ, and W5 stations are on, but probably not getting a QSO through the barrier of the East Coast—so they will be doubly appreciative of a *report* which lets them know they are getting over, even if not making a

Reporting the HF Bands

contact. Ernie also says that he, and probably other W's, will, in order to combat the "free-for-all" on their side, be calling with a frequency attached—"CQ DX 27," or "CQ DX 1827" for instance. It is strongly suggested that the European stations try to line up on the suggested frequency, in order to avoid an interfering station on the W side. As a matter of interest, K1PBW uses a Central Electronics 20A exciter to a pair of 813's at 100 watts input, feeding a 142-foot vertical directly through coax, against 100 radials, of which 70 are a full half-wave long. On the receiving side is an SX-101, with a Beverage aerial 2500 feet long and 6-10 feet off the ground. This is strictly used as a receiving aerial, in which service its directivity and low-noise characteristics give it the edge over most other types.

A quarter-wave at a maximum height of 45ft. was put up by G3UOF/A (Bristol) which produced spectacular results, contacts being registered with W1BB/1, W2EQS and VP9GJ, the latter incidentally being 588c—which should at least have the merit of making him clearly distinguishable from the "pirate" versions!

Just after last month's piece went down it was learned that KL7IR was active on 160m. on Wednesdays in September, and worked W3, KH6IJ and VK's. The JD1YAB expedition also had a stab at Top Band, QSO's resulting with KH6IJ and W7DL/7.

Over the past few days there have been various buzzes as regards the possibilities of 3V8 on Top Band, but at this writing no firm information is available—albeit the W lads would dearly love a crack at this one! Rather more firm is one that, by the time this reaches the bookstands, will, all being well, raise cheer in the souls of a good many DX'ers. Over the week-end of October 25-26, PJØDX will be on from Curaçao—this contest station will be operated by the W3MSK crew, and will be available 0300-0600z for contacts on Top Band. The point here is that they are a contest team, and will be dishing out the QSO's at a high rate-of-knots, so plenty of satisfied customers should ensue.

On a more domestic note a cheerful letter from G3CFV (Yeovil) remarks on the strength of K1PBW, and comparative strengths over there of some G's; it seems that G3OLI is most consistent, '3KRA however peaking higher to well over S9, with 'MYI, 'RPB, and G3CFV himself following in descending order—however he mentions that G3MYI has been having planning difficulty with his 91-foot vertical—let us hope John wins out. Back to the W's again, and here G3CFV mentions, for the benefit of the Phone wallahs, that K1PBW will be looking out specially for SSB contacts on Top Band during the *CQ* WW DX SSB contest.

OHØNI, at Mariehamn, Aland Is., runs a Drake TR-3 with Quads for 20 metres (two-element), 15 metres (3-ele) and 10 metres (4-ele). The callsign makes him popular with DX operators on the HF bands.

It is startling to find, as did G3XDY, that the HBØ stations on Top Band, both SSB and CW, did not find as many takers as they would have liked—possibly Liechtenstein was not realised as being a rare one, even if not so very far in distance. John, as also G3VLX, is putting up a top-loaded vertical, worked against ground radials; both stations find a 47-footer a convenient length, when made, possibly, of a common-enough surplus mast, and reckon it outperforms a horizontal at real DX.

G3HDQ (Alvechurch) has some pertinent comments to offer on the changes he has noted in things after a twelve-year spell. Most of all he sees the decline in CW activity, and the great ease with which SSB brings in the GDX—albeit Wilf is of the opinion, with which your conductor would agree, that it always was possible with AM, provided one had a really *stable* signal both ends and used the exalted-carrier technique in the receiver. But there, verily, is the rub; just how many AM signals on Top Band can be regarded as much good in this context? Not many, for most of them show FM, or pulling while the PA is being tuned up, drift, or poor neutralisation. Hence, the tyro with some boodle to spare buys himself a transceiver, and finds it difficult to use it to resolve AM—indeed your scribe himself heard the QSO which Wilf reported on, of the laddie who had a new call, and a KW-2000B, which he was plaintively saying he could not use to receive AM—as if the receiver could or should be blamed for the defects in the other chap's signal! Given a *stable* AM signal, most SSB operators would never notice the carrier, says Wilf, and

cites as proof the QSL from G3KFE which says " 2 x SSB," when he was using AM. *Touché*!

Now to G2HKU who mentions only PD3PN on SSB and PD3SNG on the key, as an interesting change in the pattern of prefixes to be heard on the band and something to make the ears prick up.

A nice letter comes in from G3LXD (Church Crookham) who makes a first entry in the Table, even though he, like the writer, is no believer in burning midnight oil. However, John says his main object is to get G3PQF rattled!

TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
Phone and CW		
G2NJ	98	98
G3HDQ	98	98
G3NPB	98	98
GM3OXX	98	98
G2HKU	96	96
G3WPO	94	94
G3SED	93	93
GI3WSS	89	92
G3VLX	80	96
G3XDY	77	91
G8HX	76	83
G3XTJ	63	88
G3XTL	62	78
G3WJS	60	86
G3XGD	42	55
G3FKE	41	65
G3LXD	32	65
Phone only		
G2NJ	98	98
G3TSL	94	97
G3SED	91	92
G3WPO	88	89
G3VGB	84	95
G3PQF	71	86
GI3WSS	38	58
G3XDY	37	66
G3NPB	17	62

(Failure to report for three months entails removal from the Table. Claims may be made at any time. Six months of " Nil " reports will also result in deletion.)

The Tabular Matter

Quite a large number of entries needed taking in this time, and equally a number to be purged. However, the purging process has made a sad mess of the First-Year Table, and it thus has to follow that unless some of the newer licensees are game to " have a bash " then obviously it will have to be dropped.

Comments

G2HKU recently had the pleasure of a visit from ON4CC and his XYL; those with long memories may care to recall winning three ARRL DX Contest on the trot in the late forties, and then becoming one of the pioneers of SSB by making a start in 1950, at a time when people were wondering if there would ever be a possibility of DXCC on SSB—hence the use of " SSB " QSL cards in modern practice.

Back now to G3HDQ, who wonders how the transceiver chaps fare without the facilities of split-frequency working, and then goes on to discuss the relative merits of transceiver *plus* auxiliary VFO, or transceiver *plus* separate outboard receiver and switching for it. Wilf goes the bundle on using a separate receiver rather than auxiliary VFO, his main argument being that you may well find that on switching from one to the other, some of the QRM will disappear, being due to cross-mod in the other receiving element. A Good Point this, particularly as G3HDQ is, obviously, fairly close to Droitwich and has a transceiver which uses the PA *pi*-tank as receiver input tuned circuit.

G3NMH (Swindon) asks readers to note that VP8KO is out of commission, owing to trouble with his gear—and hence, in that remote spot, is likely to be off for some time. In the interim, obviously, there were no VP8KO cards to be handled by G3NMH, as from October 8—and Hal is indeed not handling any, since he is up-to-date and there is no backlog to be picked up.

Fifteen and Twenty

These two are lumped together this time, and of course we have first to consider the note from specialist-in-Fifteen GM3JDR (Golspie) who used CW mainly. Don reports contacts in this mode with ZD9BM, ZE1DG, VQ9MK, LZ1ZO/AM (over Malta), CR6LV, WØJKV/MM (Panama) KL7AKE, PY6XQ, OK4CM/MM (at 5B4-land), VS6FK, 5Z4MG, UWØTB, ZS1A, M1B, UAØLH, UW9SG, HP1IE, ZS4AK, ZC4CB, VK2APK, OHØAM, LAØAD, IS1ZL, PJ2PS, YV1AD, GC5AET, PJ2CK, PY1BLO, PY5YC, ZS6BT, UH8CS, HL9UZ, TG4SR, VQ8CC, ZS5FC, TA2E, ZS5CD, VK6OV, ZS5WH, KH6AG, XW8BP, UI8A1, UI8KAB, PZ1CM, 4S7EC, YV7BL, OX3LP, sixty-seven JA's, all W call areas, and all VE call areas! SSB yielded ET3USA, UA9KAX, GD3TIU(!), UL7BF, ZL3KA, 3S, JA, and all W and VE call areas.

G2DC (Ringwood) offers CR6GO, CR6PP, CR6LX, EP2BQ, FG7XX, FL8RM, FL8RC, OA4NA, VUØVZ, XE1NQ and 7Q7AM, all worked on Fifteen, while Twenty gave the usual crop of signals from all continents but nothing of outstanding interest.

W6AM (Long Beach, California) dropped a welcome line which, sadly, just missed the deadline for last month. Don has mentioned his 5BDXCC totals, at 10/102, 15/131, 20/149, 40/82, 80/49 and also says that on August 30 he was surprised to raise BY5BB, who previously would *not* work W stations, during the All-Asian DX Contest. On a technical note, Don mentions that in order to enable him to change bands more quickly for 5BDXCC purposes he now has three VFO's—CW, SSB, or AM—which can be instantly switched to any one of his six finals; and any one of the latter can likewise be switched to any one of the 18 rhombic directions. There is a seventh final mounted, and part completed, with all the switches and relays available, which will one day become part of the system. Thus, if a station is game to QSY from, say 14 to 7 to 3·5 mc, Don can handle the band-changes that much faster. While many people will be green with envy at the thought of the W6AM aerial farm, it is only fair on the other hand to stop a moment and consider the formidable engineering problems of constructing such a set-up and making it work in the desired manner. No wonder W6AM is still, after all these years, sitting at the top of the DX tree!

Now to G3XBY, who used CW

on Fifteen to hook DL7NS/OHØ, G3JFF/MM (off Timor), UF6FN, UH8AE; and SSB for EF2BQ, ET3USA, FG7XX, JA's, LU8DKA, UL7BF, VP9MI, VS6AL, W6's, 4X4's, 5H3JL, and HC2GE. As for Twenty, it was all Sideband, and the crop included LU8DKA, PY8KC, TF2WLQ, TR8MC, VP8FL, VP8KD, VP9BK, VU2CT, and ZP5CE.

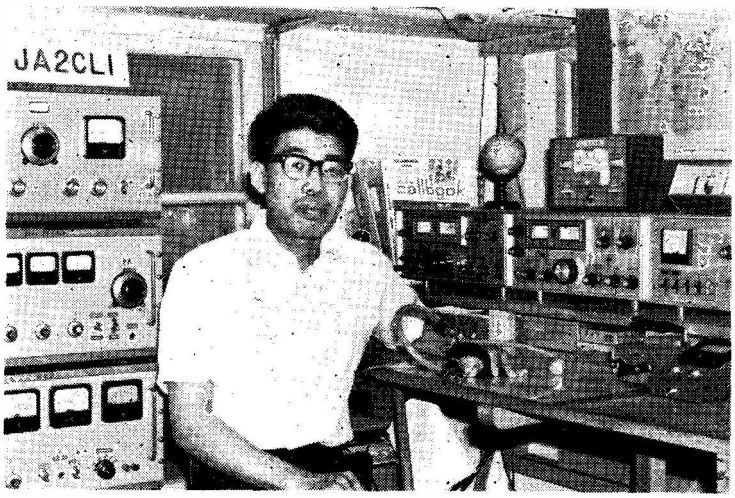
Fifteen for G3DO meant a new country for the band—and to make sure of it he did the job twice!—by way of JX4YM and JX8IL.

G3NOF worked his SSB to good effect on 14 mc to achieve QSO's with C31AP, CEØAE, FK8AH, JA's, KP4's, KV4FZ, VE6NH/VE7, VK's, VP2VI, VP8KD, VP8KO, VR2EK, VKØCK, VKØRM, VKØUK, ZL's, 4S7YL, 9V1LG and 9V1PA. The list is a little slimmer on 21 mc, with JA's, VK2AVT, VK2FA, VUØOLK, WA5TYY/KG6, 9Y4GT/KG6 (who gets around at bit—he is *ex*-G5AKG, YB1BM and 9V1PA).

At 9H1BL the hunt is on for Zone 27, which just *refuses* to allow itself to be booked into Alan's log, although it is not all that difficult normally. 9K2BF on Sideband, HL9UZ, KR8DU (who was running 10 watts to a dipole) and YN1AA were booked on Fifteen, with the first a new one for the band and the last an all-time new country. Twenty was not particularly rewarding, the SSB stuff hooking up with 5H3KJ, and CW doing the necessary with SU1IM, TG4SR, 5Z4LW and 9Y4AA (ex-ZD8Z) raised.

G3RTU/4X4 mentions the problems of getting on the air from the home-QTH and as a result has been doing his playing on the mobile rig. There are, he says, only three 4X4 mobiles, and he himself is the only G/4X4/M; he would welcome more U.K. contacts and is about on all three HF bands from the car.

The long silence of GW3UUZ (Llantwit Major) is explained in his latest letter, in that there has been considerable intrusion into his operating time by various other things—like work, for instance!—which have rather put a spanner in the system. However, Andy is still around, and in the next few months should be rather more in evidence than of late. CW is nowadays the favoured method of attack,



Station of JA2CLI, an outstanding DX operator on the 160-metre band. Running 120 watts into an inverted-Vee, with the apex at 105ft., he has worked VK5, KH6, W6, W7, VE7 and UAØ on Top Band. He has also heard W1BB/1 as the first-ever signal across the continental U.S. into Asia. Of course, what they have to battle with is not only the distance but also the QRM.

and on 21 mc the aerial in use is the forty-metre dipole. CW gave all W call areas, including WØEFJ in North Dakota on SSB, who asked GW3UUZ to keep his keying speed right down as he had not worked any CW since he had started on SSB years ago! AM was given one whirl, but a CQ yielded nothing but a deafening silence in return, *plus* one SWL report of 59 plus 20 in Greece and another of 55 in South Australia—well may Andy conclude that "there jist ain't no justice!" Other CW stuff on Fifteen included VK3OP and XE1OOL, both of whom were rendered difficult by the hordes of Europeans who insisted on calling GW3UUZ even though it was obvious he was in QSO. Down to Twenty, where the only area worked into was W/VE, albeit there were more than enough of these.

The usual morning session on Twenty enabled G2HKU to talk to ZL2KP, ZL3JQ, ZL3RS, ZL3SE, PY8JI, VK5MB, VK3BBA around 0700z, but one odd late-night turn of the switch to the same band tuned in VP9DC, who was raised at 2345z.

As a transition from discussion of the HF bands to that of the LF allocations, now seems to be the appropriate moment to comment that Mary Goldsbrough, G3WOP, is having her call pirated; it seems to have been mainly on Eighty and Twenty and cards are *still* landing in from the Bureau. As G3WOP only operates on 70 mc, and there but rarely, any "G3WOP" heard on the HF/LF bands is a definite phoney, and OM G3ERD would very much like to know all about it, with any useful information which could lead to catching the unchivalrous blighter.

Forty and Eighty

There seems to have been quite definitely an upswing in the number of reporters on these bands, particularly in the WAE affair; and no doubt there will be some more violent activity during the 7 mc Contest over the weekend November 8/9, 1800 to 1800z.

The SSB section of WAE was tackled for 5½ hours by Roger, G3KMA, who came out of it with CO2DC, HP1JC, HR1JAP, XE1J, VP1DW, VP2AA, VP9BK, KZ5II, 9Y4KR, YV1BI, YV4TI, YV4UA, HC2GG/1, ET3USA, CR6GO, UA9KAX, EP2BQ, ZL1AGO, ZL3GQ, plus 4X4 and a couple of PY's. The CW end yielded QSO's with UI8AI, UM8FM, UM8KAA, ET3USA, CT3/DJ5JK, 3V8AA and 6W8XX—all raised running the

KW-2000 to a dipole, used also for Fifteen in the inverted-V shape, the feed-point being up at sixty feet.

The summer weather out there rather took the shine off the enthusiasm of ZC4GM, together with the indifferent conditions, but as winter draws near Gordon will be back in the shack as much as ever. Prior to his letter this process had already begun, in fact, and the November rain will accelerate the shift of interest. The outdoor Joystick has been put to some good use in working G's and Northern Europe on 80 and 40, around 0100 to 0200z. Eighty is a band on which Gordon hopes to impress his signal regularly on Sunday mornings, with SSB around 3790 kc as often as he can do so.

Forty for G2NJ (Peterborough) has been mainly a question of working CW with the /MM's, YO4AJE having been raised on two successive days, the first time off Gibraltar and the second near Cape St. Vincent. Another was G3RSP /MM, off the coast of Muscat (MP4M) with a very fine signal—which answers a question that was asked recently of your conductor as to whether G3RSP was at home or not!

Forty in the morning and Eighty in the evening for G2HKU, the former band producing SSB QSO's with VK2AVA, VK3ZL, VK5EF, and VK7AZ, all around the 0700z mark, while 3·5 mc Sideband did the trick with 4U1ITU, JW7UH, LX1SK, OY1X, JX3XI (a new country for Ted), LX1BW and PAØADP, who was located near the German border and using 1 watt; all around the 2200z hour.

GW3UUZ is a devotee of Forty, and reports contacts with ZL3GQ, ZL4IE, a brace of VE3's and all W call areas. The September 24 session gave Andy three W6's on the run, followed by a 45-minute yarn with W7MB—and the cards *all* landed in his box on the morning of the 27th, which is pretty quick going. ZS4AC was also brought to book on the same morning for a new country. Not much 40-metre operation was indulged in by 9H1BL during the period we are looking at, although CW reports were exchanged with F9VN/FC, HC8AI, KP4AN, OY, PY, UI8, VK5NO and W6. There is a similarly short list for Eighty, with FØHI/FC/M and KV4FZ on SSB, plus UL7GW on the key as pick of the crop.

G3XBY found himself a holiday job, and so rather flinched from burning the midnight oil when a question of a 07.30 start next morning was at the other end—and who could blame him for that! However, some operation during the profitable night hours was undertaken, with the result that OH2BI/MM (CW) FØCH/FC, and 3V8AA (SSB) were landed on Eighty; and CW exchanges made with FØRS/FC, PY's including PY7AWD on Fernando de Noronha, TF2WLQ, UF6CQ, UH8AW, UL7BJ, ZS6CR, 6W8XX and YA2WHI, plus SSB with CO2DC, CR6GO, DU1FH, ET3USA, LG5LG, OHØAM, YV5DCO and 9H1BA on Forty.

At G2DC the impression was that both bands were pretty fair, particularly in the early morning 0600-0700z period, when a few VK/ZL stations can always be raised, albeit always the same few enthusiasts for the band; ZL3GQ is a keen as ever, and has a vertical for general DX work as well as a Vee-beam aimed on U.K., both of which are used in conjunction with Drake equipment. Thus, the bookings at G2DC came out to VK2EO and ZL3GQ on 7 mc *plus* ZL1CH, ZL1AH, ZL2PS, ZL3GQ and ZL4IE on Eighty.

G3TKN (Wallasey) makes a return to the piece after a longish absence and reports that he has been experimenting with 3·5 mc aerials—a vertical, 65 feet high, tuned as a ground-plane against the old Top Band earth-mat seemed to give a first hop of 800-1000 miles, producing CW QSO's with VP9GJ, W3BY, W3WJD, W2VJN, EA2BY, YU2ACD, UA9GW and a few more, whereas the previous aerial, an inverted-Vee with the apex at fifty feet, produced very little at a range of greater than 500 miles. So Vincent is quite definitely converted to the vertical, at least as far as Eighty is concerned.

Sad News

Fire is always a disastrous thing, and it has hit hard at W2QHH, who was victim of a very bad one on September 19, which wiped out 90% of his home, together with his entire radio station and about 200 awards. DX-ers everywhere will sympathise with Howy and hope that all will be sorted so that he can get back on the air again—though nothing can replace what was lost in the records of the station.

Sign-Off

A good month, as was indeed to have been expected. For next time, the deadline is **November 10**, to arrive first post, and addressed as always to "CDXN," SHORT WAVE MAGAZINE, BUCKINGHAM. Till then, *73 es DX de G3KFE.*

"INTRODUCTION TO LOGIC SWITCHING"

September Issue

Our contributor G3TDT now writes as follows: When the electronic keyer was first built it was much more complex than the version published in the September issue. Unfortunately two errors sneaked through in the process of writing up the simplified design. The first is a simple circuit error and can be corrected by removing Pin 6 to Pin 2 and Gates A.

The second and more serious error occurred in the operating description. In fact the keyer will produce a space before it settles in to normal working. This does not present any operating problem but it makes a hash of some of the sequence notes. At rest, the output of the various gates is as follows and from this it is a simple matter to trace the correct operating sequence:

A4	A11	A8	A1	B4	B11	B8	B1	C4	C11	D10	E5
0	1	1	0	0	0	1	1	0	1	0	1

Since the article was published *Radiospares* have discontinued their supply of tantalum capacitors (there is an international shortage of many components). However almost any paper or similar capacitors can be substituted, space permitting, but *not* electrolytic. When first switched on, the keyer may lock-on. This is because the JK's can take up random settings—but a single "dit" or "dah" will clear the keyer.

VHF BANDS

A. H. DORMER, G3DAH

ALTHOUGH from past records, one could have expected September and October to produce some good extended-tropo. propagation, and even an Aurora or two, conditions have been far from startling, apart from a couple of minor lifts.

The going was tougher than last year for VHF/NFD, with heavy QSB on all DX contacts—though the GW portables seemed to have been having a ball in spite of it all, with GW3BA in Montgomery, GW3NUE in Brecon and GW3TXR in Denbigh all scoring above the 200 mark. Conditions on 70 cm. were similar.

There was an opening to OZ over September 18/19, and F9FT was heard in contact with OK1VHN on September 23, but September 28 saw a peak in propagation with HB9 stations coming through, the most prominent being HB9ABH/P in DH66f near Berne, on the SSB channel.

Activity and conditions were generally poor again during the 70 cm. contest on October 5. Although the early morning produced some good DX, by midday reception was made difficult by very unstable paths for contacts at 100 miles or so, and the number of signals on the band had decreased considerably.

October 10-11 produced some of the best DX conditions, with EU on Two and 70 cm. at good strength. The opening was fairly widespread, since both GI and GM were also worked from Herne Bay. The Dundee two-metre beacon, DLØER and DLØPR were also audible in the South on the second day, and OE2OML on SSB was worked on both bands. By the 12th, propagation was virtually back to normal, although GM3NPO/P in Wigtown (on his way back to Leeds) was still a good SSB signal in the late evening, at times stronger than he was from Argyll.

Auroral warnings were issued during the last week in September, but apart from a weak and short-lived effect on four metres, did not greatly influence the VHF bands.

A feature of the extended tropo. openings was the pronounced ducting effects noticed on both Two and 70 cm. For instance, on Saturday morning, October 11, G3GZJ in Cornwall was heard working DJ/DL at around the 5/9 mark when they were barely audible in Herne Bay. By about 1100 hrs. they were pouring in to G3DIV near Eastbourne, and it was not until just before 1200 BST that similar reports could be given from the South-East. A plot of the German terminals showed them to be concentrated in and around the Cologne area, with nothing audible from the North of the country but a weakish signal from DLØPR. G3LQR reports similar ducting on 70 cm.

Operating Practices

The apparently arbitrary use of frequencies in the two-metre band for RAEN working is causing a fair amount of disquiet. Reports have been received of stations operating within their Zones being peremptorily ordered off a frequency "because it is reserved for RAEN." There is *no* special frequency allocated for this game. Groups make their own selections. The guidance offered is that on four metres, these nets should use the higher frequencies in the band, but nothing has been laid down for two metres. To prevent further bad feeling, it looks as if a bit of planning and co-ordination is required here.

Without wishing to appear didactic, it is perhaps not irrelevant to recall that operators with long experience on the VHF bands have a moral and communal obligation to assist the newcomer. This applies not only to technical assistance, but also to help in mastering operating techniques. There are times when the two-metre band sounds like the U.S. Citizens Band in full cry on a wet Sunday morning!

There is absolutely *no* justification for the gabbled callsign sent under the impression that it is "slick operating." All that happens is that the DX, who may be only just reading you, may get *his* call, but isn't sure of yours, and frequently no QSO results. A clear and distinct enunciation, with the use of phonetics is what is required.

A CQ call consisting of the tedious repetition of the symbol, and one's own callsign given once at the end, rarely brings results. The old maxim of three-plus-three, *i.e.*, the CQ, or the distant station's call, repeated three times and then the calling station's identification repeated three times, gives better results, particularly when QSB is bad. Long spells of cross-band operation without any callsign identification, is an offence, as is the radiation of an unmodulated carrier for long periods without identification and without regard for other possible users of the channel.

It is advisable to give location, beam heading and tuning intentions when initiating a CQ call, as this helps the distant operator to peak up a weak signal, gives him an indication of where to QSY (if that is his intention) and facilitates the decision on how long to call in return. How often one hears the announcement "tuning from the LF end," only to find a station on 144·1 mc calling back for an unnecessarily lengthy period.

Over-modulation is tantamount to gross indecency and the distorted signal at the far end, to say nothing of the distorted visages of nearby users of the frequency, decreases rather than increases the possibility of a good contact.

These all too frequent instances of rotten operating techniques are getting us a bad name which it should behove all of us to help to eradicate by judicious and timely advice. Helpful guidance will rarely be taken amiss.

While on the subject of operating techniques, the writer would like to pay tribute to the unknown soul(s) responsible for seeing that newcomers to the VHF bands in the

Edinburgh area are on the right lines. It was a real pleasure while on a GM holiday recently to have efficient and courteous QSO's with so many G8/3's. They were a fine example of what the band should sound like to all of us.

There seems to be a mistaken impression going around that CW may *only* be used at the LF ends of bands. This is not so—it may be used anywhere within band limits, although there are distinct advantages in a quick QSY to the lower frequencies when the DX is about. Care should be taken to avoid beacon frequencies. What is important is that under *no* circumstances should phone be used in the CW allocations—contest or no contest!

In the context of claims for our Annual Tables and VHFCC, it has been decided that DM may count as a separate prefix, and claims should be amended as required.

VHFCC Awards

Quite a bit to catch upon this time, so here goes!

Awards this month are to G8AUN, G8BKR, G3OHC, G8CEA, G3WQG and G8CJU for operations on two metres, and to G8AYN and G3MCS for work on 70 cm. To all —congratulations.

From Norwich, Reg Chiddick, G8AUN, has made the Two-Metre Award. He runs a Pye base station with about 40 watts input and a 6CW4 converter. The aerial was a six-over-six, but a 9-ele job has now been erected. Although the QTH is at 100ft. a.s.l. the proximity of a main road is a menace. Fortunately, the noise limiter in the Trio Rx takes care of most of the QRN. A total of 242 stations was worked in fourteen months to get the 100 QSL cards—a very low return rate.

John Woodham, G8BKR, operates from a 190ft. a.s.l. site three miles NW of the City of Bristol. The take-off is restricted in most directions but is worst on an Easterly heading, as there the ground rises to 250ft. within ½ mile, with another ridge at 290ft. within 1½ miles. Stations in London, Kent, the Channel Islands and France have been heard, but no QSO has resulted as yet. The Tx runs 18 watts to a QQV03-10 modulated by a pair of EL84's. A Heathkit Two'er is also available. For reception, John has a JXK FET converter tuning 28-30 mc into a Hammarlund HQ-170A, with a Mohican as a stand-by. The antenna is an 8-element *J-Beam* at 31ft. Gear for 70 cm. transmitting and receiving is also available, using a QQV03-20A to an eight-over-eight, and reception on 23 cm. is catered for with a "K6AXN" converter and a six-over-six. A tripler to that band using a 2C39A is in hand. The necessary 100 QSL's were obtained in the main from the 160 contacts who were sent s.a.e's, which shows either a lack of courtesy or an inefficient postal system!

G3OHC, Graham Badger, is in Sutton Coldfield, and runs 10 watts to a QQV03-10 PA. Most contacts were made using a Nuvistor converter, but this was recently changed for 2N3819 FET type feeding an EC-10. The antenna was a four-over-four slot, but is now a ten-element Yagi, *both* installed indoors. It took QSL's for 391 contacts before the 100 cards required for the Award were received, and this in spite of the fact that many s.a.e's were sent. Graham also operates /A and /P on Two, and is on Four from his own QTH. He hopes to be on two metre SSB shortly.

When not busy flying Chipmunks, Richard Spencer, G8CEA, operates from Chobham in Surrey with a modified HW-17 and a 10-element long-Yagi at 35ft. from a QTH 150ft. a.s.l. He is also portable with a Honda 300E and a four-element beam on the luggage rack of a Mini, plus the HW-17. After getting 65 QSL cards in return for the 200 he sent out, he took to sending envelopes, when the return rate went up to 75%. He mentions particularly the promptness with which GC8AAZ/P and GW3NUE/P QSL in spite of the fact that they must both be smothered with demands. G8CEA was operating from Brittany recently with the call FØPV/P.

The Flackwell Heath, Bucks, site at 380ft. a.s.l. must have been an important factor in the gain of the Award by Dave Chalmers, G3WQG. His main transmitter is an Ameco TX62 with a measured 20 watts RF out, and the standby is a home-built job with a QQV03-10 in the final. For those contemplating using the Ameco equipment in TV Channel 9 areas, Dave recommends changing the multiplier stage from 48 mc to 72 mc, since 144 mc + 48 mc can give trouble. The receiver is a Nuvistor converter into the Ameco Rx. The eight-over-eight phased folded dipole on a home-built tower is used for VHF and this also supports the TA-33Jr used for the HF bands. The QSL return rate is about 50%. Best DX to date is with F9NL in the Pyrenees, achieved with the help of G3COJ, who is a near neighbour. Dave does a lot of listening, particularly to G2JF, and this helps in determination of optimum headings for the DX.

G8CJU is now G3YUA, Brian Pickers, of Markfield, near Leicester. The Tx runs 150 watts with series-gate modulation, a system which *can* be made to work very well, as was observed during a recent QSO with Brian. Reception is by G3BKQ FET converter into an AR88LF tuning 24-26 mc. (One cannot help wondering how many of these converters are now in use in the Leicester area—every other station working there seems to have one!) The aerial is a ten-element Skybeam, and the QTH is on the side of a 700ft. hill and is clear in most directions. Once again, the QSL rate is very poor—70% of cards were sent direct, but only 38% came in. Brian is also mobile on Two with 18 watts to a QQV03-10, a quarter wave whip and a BC-454/FET converter tuning 1·4 mc into the car radio. A solid state Tx for local working has an input of six watts, and has also been pressed into service in the car to keep the load on the electrics down. Plans are in hand to get two *J-Beam* Parabeams up on a new tower and use low loss 363 coax—which should have a certain effect!

Now to 70 cm: Roger Whitbread, G8AYN, joins the few who have achieved the VHFCC Award on both two metres and 70 cm. He operates from a QTH at 425ft. a.s.l. in New Addington, Surrey, which, in spite of the height, is screened in all directions except North-East. The Tx runs 25 watts input to a QQV03-20A and the Rx uses a transistor converter with two BF180 RF stages and a TIS88A mixer, tuning 12-14 mc into an AR88D. The antenna is an 18-element Parabeam. He is also active on 23 cm.

Finally, Bill Hawthorne, G3MCS. He operates from Lacey Green in Buckinghamshire—the QTH is 730ft. a.s.l. and must be one of the best in the South. The Tx is a 4CX250B modulated by push-pull 811's and this feeds the ten-element Yagi at 50ft. The Rx is an AF239 pre-amplifier into a valve converter, the first stage of which is an A.2521. Bill also operates on two metres, but is probably best known for the work he is doing on the higher frequency bands.

Although he gained his Award for two-metre work back in August this year, details of the gear in use at F1VP are only just to hand. Paul Reynes is in Chatellerault (Department 86) with a QQE03-12 Tx running 12 watts input and modulated by push-pull EL84's. The Rx is an Army surplus job Type RU93, and this is preceded by a transistor pre-amplifier and converter.

QRA Locator Maps

A new QRA Locator Map is now available from SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1, at 9s. including postage. As this system has been adopted throughout Region 1 as the standard position-finding aid, the Map is a "must" for all serious VHF operators. The revised version is based on the ON4IB original, but now includes the whole of Scotland and north to the Faroes, and large areas of Scandinavia. It measures approximately 2ft. 6in. by 3ft. 4in. A smaller version for desk use is to be produced later.

Four Metres

G3VPS advises that 9H1BL and 9H1AY can only *listen* on four metres as that band is not open to them while it is being used by other services on the Island. He, G3SJV and SWL Allin made a successful sortie to Hereford recently to put that county on the four-metre map. The QTH was Vagar Hill, about eight miles SE of Hay-on-Wye, at approximately 1,300ft. a.s.l., and although conditions were not very good, they managed to keep all the skeds which had been arranged. They were pleased to note the number of stations operating on CW, since due to screening, they were only able to contact stations in the North using that mode. The equipment con-

THREE-BAND ANNUAL VHF TABLE

January to December, 1969

Station	FOUR METRES Counties	FOUR METRES Countries	TWO METRES Counties	TWO METRES Countries	70 CENTIMETRES Counties	70 CENTIMETRES Countries	TOTAL pts.
G3DAH	22	3	65	15	16	4	125
G3COJ	15	2	59	11	20	6	113
G2JF	—	—	58	13	28	7	106
EI6AS	29	7	55	12	—	—	103
G8BMD	—	—	51	9	29	4	93
G3LAS	26	2	48	8	8	1	93
G8AUE	—	—	44	4	36	5	89
G3EKP	34	6	24	6	11	3	84
G3EHM	—	—	50	10	16	2	78
G8APZ	—	—	46	8	19	4	77
GI5ALP	14	6	41	10	—	—	71
G8BYV	—	—	26	9	21	7	63
G8AYN	—	—	32	6	19	6	63
GD2HDZ	—	—	47	7	4	2	60
G8ADP/A	—	—	36	5	16	3	69
G2AXI	15	2	32	5	4	1	50
G8CEZ	—	—	45	8	—	—	53
G8BJK	—	—	39	6	—	—	45
G8AUN	—	—	37	8	—	—	45
G8APJ	—	—	26	6	8	2	42
G3TDH	35	5	—	—	—	—	40
G3AHB	—	—	24	4	8	1	37
G8ASR	—	—	32	4	—	—	36
G8BDJ	—	—	23	6	4	2	35
G8BJC	—	—	28	5	—	—	33
G8BKR	—	—	16	2	10	2	30
G3KMI	12	1	14	3	—	—	30
GW8CGN	—	—	26	4	—	—	30
GW5NF	—	—	24	5	—	—	29
G8ARM	—	—	—	—	23	5	28
GC8AAZ/P	—	—	22	4	—	—	26

TWENTY-THREE CENTIMETRES

Station	Counties	Countries	Total	
G8AUE	13	2	15	(Also 1+1 on 13 cm.)
G8ARM	7	1	8	
G8ADP/A	3	2	5	
G8BAV	3	1	4	
G8AYN	1	1	2	

The THREE BAND ANNUAL TABLES show total claims to date from the year commencing January 1st, 1969. Claims should be sent as here-to-fore to:—VHF BANDS, SHORT WAVE MAGAZINE, BUCKINGHAM. Summaries by bands will be published at suitable intervals.

sisted of a 20-watt Tx with a TT15 in the final and a four-element beam at 24ft. The Nuvistor converter fed an AB46, the whole outfit being run from batteries with a dynamotor for the Tx. They report that Hereford is no longer on the " wanted " list, as G3WRA is now QRV on Four from there.

Don Hayter, G3JHM, or Worthing, Sussex, has completed his SSB Tx for Four. He mixes 21 mc from a Sommerkamp FL-200B with the 49 mc from the oscillator chain and drives a QQV06-40A to 130 watts p.e.p. and a very nice signal it is. He had ample opportunity during the last lift to try it out and got GI3TLT at 5 and 7/8 both ways among other choice GDX. Don would welcome skeds with GI and GM. So far he has 22 counties logged on this mode, and has found that GB3SU gives excellent indications of an opening. (GB3SX, when operational, should provide a like service for GI and GM operators). There might be a case for establishing a discrete SSB calling frequency on Four if the number of operators using sideband increases much further. The value of such a channel has already been amply demonstrated on two metres.

Two Metres

G3KMT (Rayleigh, Essex) is now putting out a fine SSB signal on two metres. The Tx power has been increased to about 250 watts p.e.p. to a blown QQV07-50. The antenna is fixed NW at the moment.

For those who worked HB9AMH/P on Two during the recent openings, his home call is DJ5VU and he was running 200 watts p.e.p. to a 44-element Yagi. The QTH was near Berne at 1,600 metres a.s.l.

At last, identification of the German beacon which has been operating just outside the lower limit of the two-metre band, and to which reference has been made previously in this Column. It is a VOR navigational aid, the frequency is 143·966 mc, power output 200 watts to an omni-directional antenna, transmission continuous tone-modulated carrier and the QRA Locator is DJ63j, which puts it about 65 km. SSW of Aachen.

QRV in Argyll and Wigtown while on holiday there, was GM3NPO/P. Fortunately, his operations coincided with a lift in conditions, and his SSB has been heard well over large areas of the country, including the South Coast. We could do with some more of this!

G3SZX, Corsham, Wilts, has gone to VK, but G8ATV is now putting in a good signal with 100 watts and a Parabeam from Chippenham, Wilts, so there is still some two-metre activity from that county.

G8BMI (Keighley, Yorks) suggests that it is a profitable exercise when the band seems dead, to try calling " CQ and tuning two metres and Top Band " as contacts seem to result from this. He and G3SMB were operating /P on the Moors for VHF/NFD, and it seems that a good time was had by all. Best DX called, but not worked, was GW3TXR/P.

Seventeen-year-old A. Newman is now QRV on Two from Milton, Portsmouth, and expects to have 70 cm. gear ready shortly. The call is G8CXC. G8AMG/M has now worked all the G prefixes while mobile.

The Farnborough and District Radio Society has completed its Club project of a two-metre transmitter and has many of them already on the air. The next project, now well in hand, is the modulator and PSU for the Tx.

GD2HDZ (Laxey, I.o.M.), still very much in demand on two metres, has made his advent on 70 cm., although results to date have been a little disappointing. Do not despair, Arthur, it is true for most of us, with conditions and activity at a very low ebb over most of the country. Once again " Use it or lose it!" Things have been a little brighter on Two though, contacts being with OZ6OL (for a first GD/OZ?) and with several PAØ. GI5ALP has also been heard but could not be raised at the time as he was involved in a four-way with a couple of PAØ and some character in Herne Bay. '2HDZ had 41 contacts during the contest on September 21, having risen at the crack of dawn and become sufficiently conscious by 0700 or thereabouts, and with nothing nearer than 100 km. the score should be reasonable. Incidentally, his QRG is 145·8 mc and he can be heard most nights. He enters a plea for observance of the Band Plans which this Column heartily endorses.

Operations on two Metres by G2JF during the last IARU Contest in September resulted in a score close to 86,500 points, about 2·5K down on the previous year, but this does not look good enough to carry off the Trophy again, as there was an extended-tropo. opening between Sweden and Southern Germany which resulted in a couple of the SM's claiming more than 100K points! However, Jim made 22 QSO's at over 500 km. the best being with OZ9EVA/P in FR42a at 937 km. Best GDX was with GD3VXP/P in XO77g at 505 km.

GI5ALP (Londonderry) is very pleased with his new array for Two, although it doesn't show a dramatic improvement over his old eight-over-eight slot. It has improved coverage generally, and plans for next Spring are to get another one and stack it horizontally for a total of 40 elements, which should help when band conditions are marginal. It will, of course, narrow the bandwidth to about 28° *vice* the present 43°, but that should not be too bothersome and Jack finds from his remote location, that a large horizontal bandwidth can be very useful.

Some RTTY news: G6CW (Nottingham) made the first RTTY contact with Eire when he worked EI5BH (Athlone) at 2225 hrs. on the night of October 10. Signals were RST-579 both ways and were the culmination of a series of listening tests over the previous couple of weeks. Nice going, both. The contact was followed by one between EI5BH and G8BNW, (Horncastle, Lincs.), a photograph of whom appeared in last month's " VHF Bands," It is to be hoped that the allocation of discrete channels in the two-metre band for RTTY will result in bringing closer together the rather wide-flung adherents to this form of communication.

70 Centimetres

Two outstanding DX contacts on 70 cm. have been made recently. Early on the morning of the 432 mc contest on October 5, G8ATK (Farnham, Surrey) made it with F9NL in the Pyrenees at 3/3 both ways. On September 28, G3LQR (Ipswich, Suffolk), contacted OE2OML with 5 and 8 both ways. The weather at the time was windy and overcast, and some ducting was

apparent. Simon also worked DL and HB9 on the same day.

GW8AWS, operating from Mold in Flintshire during the recent 70 cm. openings, has been working PAØ from there, and was heard in DL.

The Sutton Coldfield 70 cm. beacon should shortly be operational again with its official callsign GB3SC. Power will be at least 50 watts. The exact QRG has yet to be announce in view of the new Band Plan.

G8AYN (New Addington, Surrey) and G8ARM (London, S.E.3) are both on 70 cm. between 2200 and 2230 each evening looking for contacts. QRG is 432·76 mc and 433·04 mc respectively. German stations are being encouraged to come on 70 cm. every Friday evening between 2000 and 2200z to look for G contacts. Should we not do the same?

G3EHM (Stoke-on-Trent) reports that there is planned 70 cm. activity in his area on Monday and Friday evenings from 2130 clock onwards. Look for G3UBX, G3UQK and G3EHM—all beaming South at that time.

G3COJ (High Wycombe, Bucks.) has at last worked his own county on 70 cm. this year! Having a new baby around has its advantages, says Brian—when he woke at 0400 on the morning of the four-metre contest, Brian was able to get on the air and work a few more counties, as witness his increased score for the Annual Tables.

On The UHF's

23 cm. At G8AYN (New Addington, Surrey) the 23 cm. Parabeam of 22 elements is ready to go up to 40ft. with some new low-loss coax and this should give a useful improvement over the existing eight-over-eight at 34ft. A G8AEJ converter is under construction. G8ARM has built a triple trough to go with his converter in place of the radial cavity, and this is showing a slight improvement due to better antenna coupling. G8AUE (Shottle, Derby) was operating on the band during VHF/NFD, and had ten QSO's, the best DX being with G2RD/P and G3LTF/P at around 140 miles, both stations in Sussex and both S8. Other contacts over the 100-mile mark were GW3HAZ/P in Montgomery, G3NNG/P in Berkshire and G3WGC at Hertford, Herts. To top it all off '8AUE took a S9+ signal from G3BNL/P on 13 cm. with a converter which had never before seen an antenna—it was a quart oil can!!

Conditions during the contest on October 5 were apparently vastly indifferent. G8AEJ (Penge, London) who is pretty experienced on the band now, reports that he made only five contacts, even though at infrequent intervals this band was better than 70 cm., which doesn't say much for the lower frequency propagation!

Conditions around mid-October have been interesting. G2RD had a fine two-way from the South coast with G8AKE in Leicester, although the northern station was not audible in the London area. G8AEJ (London) worked PAØ, DC9 and ON4, while the lift was on, but OE2OML could not be contacted. Most of the EU's were talking about their success with the Austrian station, but few G's seem to have made it with him on either Two or 70 cm.

13 cm. Latest on the 13 cm. tests between G3EEZ and G3BNL/P: On August 3, a test was set up on the 100-mile path between Clee Hill and a QTH eight miles South of Aylesbury, and 5 and 9+ signals were exchanged in spite of the torrential rain at the time. A move to Long Mynd, just 15 miles to the west of Clee, lost the signals entirely. On September 14/15 a 183-mile path between Glaisdale Moor, Yorks., and Dunstable was tried, but conditions were so poor that little more could be done than to resort to A1 on two metres and exchange reports about the frightful weather.

9 cm. G3EEZ/P and G3BNL/P can claim a new British record for this band with their QSO of 50 miles over a path from Painswick to Enville. Signals were 5/9+ at the former site and 5/5 at the latter. G3EEZ was using pulse gear for which special permission had been obtained from the GPO, and G3BNL had a klystron in a dish feed. Similar equipment was tried from G3EEZ but no signal was readable, which shows the advantage of pulse operation on these frequencies. G3BNL is now in the process of building a pulse cavity for further tests. This new record on 3,400 mc is possibly the first pulse transmission between amateurs on this frequency. Antennae were a three-foot dish with waveguide feed at G3EEZ, and a 4ft. and 30-inch dish at G3BNL. A fine achievement, and congratulations to both these pioneers.

General

G3VOJ (Maldon, Essex) met two keen VHF operators while on holiday in Austria recently. The first was OE7IB who lives in the Tyrol, and is the manager of the airport radio control section there. He was particularly pleased with a QSL card which he had received from an SWL in Dundee to confirm reception of his signals from the Patscherkofel mountain whence he was operating /P with five watts to a vertical. The site is nearly 7,000ft. a.s.l! The second was OE7GB, who operates from Innsbruck and who occasionally works /P from the Zugspitze, whence he has raised SM, so a U.K. contact could well be possible from there.

Another unexpected encounter was that between G6RH, who was quietly minding his own business with a cool drink in a café in Corsica, and GM3NJ, whom he found to his surprise was at the same table and similarly contemplative.

G8ALM reports the formation of a new Club in London. This is the North East London VHF Group and the address is:—The Shack, Wanstead Community Centre, The Green, Wanstead, London E11. They are already QRV on two metres and will soon be on 70 cm. also, with AM and TV. Active members are: G3SVQ/G6ABV, G8CIX, G3WKV, G8APJ and G8ALM himself. The Group meets every Friday at 7.30 p.m. and further details may be obtained from G8ALM, *QTHR.*

Congratulations to G8BBB on his win in the last SSB contest on 144 mc. The next two-metre SSB event is scheduled for November 3, and the time has been extended to three hours from 1900 to 2200 GMT. For the first time the contest is also open to Club and /P stations.

Deadline

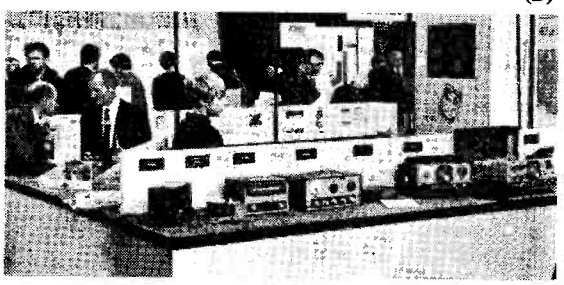
Deadline for the next issue is **November 8** and the address for news, claims and comments is " VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now, and *73 de G3DAH.*

FROM THE EXHIBITION

The pictures on these two pages were taken by our Staff Photographer during the afternoon of October 1, the opening day of the Radio Engineering & Communications Exhibition at the Horticultural New Hall, London, S.W.1. Keying on this page is as follows: (A) Lowe Electronics, with Bandit Bill well to the fore (white shirt, inside left at his stand), very busy at this year's Exhibition; he offered a wide variety of small items as well his regularly advertised equipment. (B) Radio Shack, Ltd., has an extensive display of new, second-hand and attractive equipment. (C) The Heathkit (Daystrom, Ltd.) stand at the Exhibition, their speciality being the well-known range of kit equipments for all radio-electronics requirements, including some excellent test gear.

(B)

(A)

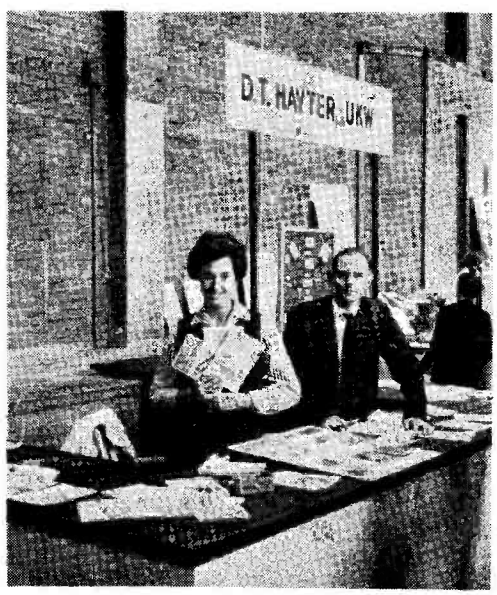


(C)

General view of the Exhibition Hall during the afternoon of October 1st, the opening day, with Trio (right) and K.W. stands in the foreground. This year's Show cannot be said to have attracted quite the attention and support that some of these Exhibitions have enjoyed in the past.

A view of the Trio Stand at the recent Exhibition, with a fine display of the latest equipment under the by now well-known marque. Items like the Trio TS-510 attracted particular attention—and well it might, having regard to the operating advantages it gives. The Trio range is beginning to achieve a degree of supremacy in the radio amateur context.

(D)



(E)

(Above) Rowley Shears, G8KW, principal of K.W. Electronics, Ltd., presiding at his Stand during the Exhibition. His two main items—the new K.W. Atlanta and the KW-2000B—attracted much admiring attention. They represent the best obtainable in the way of amateur-band equipment produced for the U.K. and overseas markets. (D), upper right, the J-Beam stand showed a selection from this firm's wide range of products in the field of antennae—at centre foreground is Vic Hartopp, G8COB, one of their directors. (E) Don Hayter, G3JHM, had a small stand at the Exhibition, representing his interest in the German UKW-Berichte organisation.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for December issue: November 7)

(Please address all reports for this feature to "Club Secretary," SHORT WAVE MAGAZINE, **Buckingham.)**

THIS issue should be in the hands of readers about a week or so before the dates set for the annual MCC Contest on Top Band—see pp.511-513 of last month's SHORT WAVE MAGAZINE for all the details. The Supplementary List of Indentification Codes (meaning Clubs that have signified their wish to enter since the October issue came out) will be found on p.577. Competitors should consult this, as well as the main list on pp.512-513, October, when making their contacts.

It looks as if we may well have a record entry—and a good entry always makes for more good sport all round. Remember that accurate time-keeping is essential, and that any out-of-time QSO's logged by the invigilators will be heavily penalised. It will not pay to try "slipping in a crafty one"! As in previous years, we would again ask—and perhaps again in vain—for more spreading out. There is no need for quite the congestion that usually prevails. And, as usual, we would be glad to have check-logs from anyone who cares to take an interest in the Contest.

One final point: It is essential that we have all entry logs by the due date, **Friday, November 21,** or earlier if possible, because there is little enough time for adjudication between that date and getting the January issue cleared for press. The work of checking the logs, etc., starts immediately, over the weekend November 22-23, meaning that entries received during the week after cannot be taken in—every year, we have a few late ones, though actually we give competitors more time to get their entries in than we allow ourselves to do the adjudication.

We look forward to a keen, clean (notes!) and well-fought Contest.

* * *

Now to the reports, and first about new Clubs: Formed on September 23, **North Leeds** remark that initial discussions went with a swing, and the Hq. fixed up as the Oakwood Hotel, Leeds, 8, with meetings down in November for 4th and 18th. Already there have been discussions about an R.A.E. course, and slow Morse; no doubt ere long a programme will be firmed up and the result will be yet another active group to add to our already long-as-your-arm file.

Is there anyone in the **Bolton** area interested in the formation of an Amateur Radio club? D. Catterall is hon. sec. of the Bolton School ARS, but wants either to get in touch with and possibly join any Bolton Club which may already exist, or, alternatively, if there is none, is prepared to take the initiative if there is enough interest in the area. Incidentally, this is by no means the first time that one of the younger chaps has been instrumental in forming a good group—one recalls G3VWC and the efficient way in which he got things cooked up for that initial meeting, followed by a very successful year in the onerous office of hon. sec. Returning to Bolton, if there is any interest, contact David at the address shown in our Panel, p.576.

Casting an eye down the rest of the North of England and Scotland clip, we come first upon **Spen Valley,** who are "at home" to visitors and prospective members every Thursday evening at The Grammar School, Heckmondwike, the start being timed for 7.30. Sadly, we have all the gen on the October activities, but not the November programme, albeit there is normally something of interest organised each week.

Fulford are arranging their talks at the last moment, though the R.A.E. and Morse course is pressing on as previously detailed. Find them on any Tuesday at the Scout Council Hut, 31 St. George Street, York.

November 19 is the next date shown for **Northern Heights,** when G3ADQ will be giving the lecture, his subject being SSB. Looking back a little, your conductor was amused at the reference to the recent Surplus Sale; the hon. sec., somewhat ruefully, one suspects, claims the auctioneer, G8CB, could easily sell snow to an Eskimo! The lads have their meeting-place at the Sportsman Inn, Ogden, near Halifax.

Wirral DX Association are in session on our publication day, October 31, at G3AKW, when G3UFO/MM will show some slides of the "far-away places with strange-sounding names" of the old song, which he has visited on his travels around the world. November 28 sees them at G3UFO, when a tape-and-slide talk on Aerials will be given. The report also mentions that they are especially grateful for the trouble taken by G3YFZ for them in going round the Decca Navigator station at Neston.

GM is represented this time by **Lothians** who have a Junk Sale down for the 13th and a Visitors' Night on the 27th; the programme for the latter meeting includes a couple of films, one of which deals with the making of specialised electronic valves, and the other, in cartoon form, the effect, for better or worse, of TV on people!

At the AGM of the **South Shields** crowd all the main officers of the club were re-elected for a further year. The routine of meetings is every Friday evening *except* the fourth in each month, and the place is the Trinity

House Social Centre, 134 Laygate, South Shields. Of particular interest, we note that on November 14, the son of the Club president, David Clarke, will be talking about DX Television.

Bradford next, where they have moved into new Hq. at 10 Southbrook Terrace, Great Horton Road, Bradford, 7 which is the office of the Bradford Liberal Federation. November 4 is a Junk Sale, November 11 is set for a return to the old Hq. at Bradford Technical College to see the Mullard Lecture and Film Show, and for the 18th the card is still open.

At **Derby (Nunsfield House)** November starts off with the AGM on the 7th. November 14 at Hq. sees G8BFC talking about Radiography, while the 21st is an Open Evening. A show of films rounds the month off nicely on the 28th. As the name of the group implies, " home " is in Room 8 of the Nunsfield House Community Association, which lies in Boulton Lane, Alvaston, Derby.

Also in **Derby** is the group called Derby and District, who have a total of 221 fully paid members, and a programme to keep them all. The Junk Sale, on November 5 is always a popular event, while D/F, which comes up for discussion in theory and practice on the 12th, is also a very popular activity in this part of the world. An Open Evening is November 19, followed by a visit to the Railway Technical Centre Research Department, which ought to be of great interest.

Wales, the West and North-West

Bangor—GI, not GW!—lead off, with a mention of their very successful show at the Civic Week, in Holywood, Co. Down, as a result of what sounds like good teamwork, with both SWL and licensed members combining to show the public what it is all about, to make sure the report in the local paper made sense—a good point, this—and to demonstrate the practicability of world-wide QSO's. As for the next meeting, it looks like Friday, November 7 to us, at the Silverstream Unionist Hall, where visitors are welcome indeed. However, it would be as well to check with the GI3OLJ—see Panel—just to make sure.

Back on the mainland, **Chippenham** have Bill Lowe's " western bandit," G3CHW, on the rostrum on November 25; Vic is to demonstrate the " goodies " and to follow up with a talk on the pitfalls to be avoided when loading-up SSB transmitters.

A change, both of venue and of meeting date, is announced by the **Rhyl** chaps, who from November onwards will be foregathering on the second Tuesday in each month at the Mona Hotel, Market Street, Rhyl. This gives November 11, and it is understood there is a film show on the cards.

Cornwall is a big county, hence the **Cornish** group have not only their " main meeting " which is at the SWEB, Pool, Camborne, on November 6 with a potted talk on the Show for those who did not get up this year and the main talk, on a three-band semi-conductor transceiver costing twenty pounds; in addition they have a Newquay section which uses Treviglas School as Hq. and is in session on November 12 and 26.

It sounds rather as if the **Saltash** crowd are in for trouble in November! After the serious business of the AGM, for which there is a move to the Wheatsheaf Inn on November 14, there follows a recital of " The Life and Times of G9BO " which is to be introduced by G2DFH, back at Burraton Toc H Hall, Warraton Road, where incidentally, the lads get together on alternate Fridays.

Not far away is **Plymouth,** where Hq. is at Virgina House, Bretonside, on the first and third Tuesday in every month. November 4 is a Brains Trust, and the other date of especial importance during the month is the 15th, when the annual dinner will be taken; tickets 22s. 6d. and the " do " at the Davie Hall, North Hill, Plymouth, almost opposite the Blind Institute.

Wessex next, where the unusual arrangement of dates shows the first Friday and the Monday falling seventeen days later as the ones to be reserved each month. These chaps make a special point that they are always glad to see visitors, whether licensed or SWL, at the Cricketers Arms Hotel, Windham Road, Bournemouth.

Membership is still steadily rising, reports the hon. sec. of **Exeter,** who also mentions that the meetings have been shifted to the YMCA, St. Davids Hill, on the first Tuesday in every month, the subject for the current month being Video Tape-recording.

The scribe at **Yeovil** has missed writing for some months now, but reappears this time saying the members have threatened to lynch him if he doesn't write! Only snag—although he tells us that November 5 is set aside for a talk on his experiences with Frequency Modulation by G8BVV, he forgot to tell us *where*—so it becomes necessary to enquire from the hon. sec. at the address in the Panel, p.576.

Over at **Reading,** the " Victory " in Meadway Precinct is the place to look for this Club; November 4 is down for a guest speaker who will talk about Military Radio, and, it is hoped, have some working exhibits. On a little to November 18, when the Junk Sale starts the ball rolling, followed by a lecture by G3XOW on the Techniques of Home Construction, illustrated by reference to his " G2DAF " transmitter which will be brought along, and possibly put on the air as well.

National and International

Here the top of the pile is with **WAMRAC,** who by the time this is in print will have held their first conference, at Unstone Grange, Derbyshire, to discuss the future of their organisation through the Seventies. The group is truly international, with members, both of the Methodist and other persuasions, in many countries throughout the world.

The **Royal Navy** A.R.S. is certainly a booming group, the more so since the decision to permit associate membership to members of foreign navies—23 new members booked in by one committee meeting! This *must* be something of a record! The issue of the *News Sheet*

MCC—November 8-9

See pp.511-513, October, for rules and all relevant details. Supplementary Identification List in this issue. Check clocks and watches on GMT before the start, at 1700z each day. Have a good time—and let's have those logs in as early as possible.

currently to hand is memorable, for your conductor at least, by virtue of the very good description of the raising of the Ullswater steamship after 67 years, by a team led by G3HQU who couples his abilities as an amateur with skills in diving, and withal has an extremely able pen.

Mobile operators are catered for by **A.R.M.S.,** through its *Mobile News* and MCA award, the latter being a version of DXCC in which all the contacts have to be made from the /M rig; as to what the /M rig is capable of in the way of DX'ing, we notice F3DJ/M at the top of the list with 202 countries confirmed!

RAIBC, of course, looks after the interests of the blind and invalid members of our hobby, both the fully licensed and the complete newcomers. Contacts are maintained by way of the nets, *Radial* which this month has an amusing blast at amateurs by an XYL, and personal contacts of one sort and another.

On to **Civil Service,** who have a most palatial Hq. at the Civil Service Sports Centre, Monck Street, S.W.1, where they get together on the first and third Tuesdays of each month. This month, they mention temporary aerial problems at Hq. which is not helping them in keeping the skeds with " country " members. However, the AGM has resulted in quite a reshuffle, a change in the hon. sec., a change in the style of the *Newsletter*, and a change in emphasis in the programme—to get away with such a mammoth change, bearing in mind the ability of the old committee, is an indication of the basic stability of the club.

Nice to hear again of the **Radio Society of East Africa,** by way of their newsletter *QTC* which this time contains an interesting suggestion for keeping away intruders to the shack, Part II of an " East African Call Book," and some sketches to show how to make a mast of between forty and sixty feet. Quite a good effort, in any language.

The Midlands

This is an area somewhat difficult to define, and if anyone should disagree with your conductor's definition,

Names and Addresses of Club Secretaries reporting in this issue :

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.
A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, CR2-1EZ.
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BASINGSTOKE: P. Sterry, G3CBU, Ashley, Orchard Road, Salisbury Gardens, Basingstoke, Hants.
BOLTON: D. Catterall, 626 Chorley Old Road, Bolton.
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CIVIL SERVICE: J. Luxton, 8 Twyford Crescent, West Acton, London, W.3.
CORNISH: J. Farrar, G3UCQ, Elm Cottage, Ventonleague, Hayle, Cornwall.
COVENTRY: C. Jaynes, 20 Belgrave Road, Wyken, Coventry.
CRAY VALLEY: D. Buckley, G3VLX, 234 Halfway Street, Sidcup, Kent. (*01-850 6945.*)
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (*21931*), DE3-7GE.
DERBY (Nunsfield House): N. J. Gregory, G3LCV, 21 Back Lane, Chellaston (*3516*), Derby.
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EAST WORCS.: R. J. Mutton, G3EVT, Summerhayes, Mill Lane, Alcester (*2041*).
ECHELFORD: M. Clift, G3UNV, 45 Fordbridge Road, Ashford (*59628*), Middx.
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FAREHAM: J. A. Rampton, G3VFI, 23 Oxford Close, Fareham.
FARNBOROUGH: B. Woodfield, G3REL, 538 Rosemary Lane, Blackwater, Camberley, Surrey.
FULFORD: G. W. Kelley, G5KC, 9 Cornwall Drive, York YO1-4LG.
GRAFTON: T. Coleman, 14 Norman Court, London, N.4.
GREENFORD, F. C. Reid, G3VMD, 34 Carlton Avenue, Greenford, Middx.
HARROW: R. H. Medcraft, G3JVM, 134 Dulverton Road, Rsuislip Manor, Ruislip, Middx. HA4-9AG.
LICHFIELD: W. K. Ginder, G3NAS, 222 Whetstone Lane, Aldridge (*53718*), Staffs.
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MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead (*20107*), Berks.
MELTON MOWBRAY: R. Winters, G3NVK, 32 Redwood Avenue, Melton Mowbray (*3369*), Leics.
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NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (*44329*).
NORTH KENT: A. Watt, G3WZJ, 67 Glenhurst Avenue, Bexley.
NORTH LEEDS: G. Brown, 2 Fearnville Close, Dib Lane Leeds 8.
PLYMOUTH: J. H. Peters, G3YDU, Treetops, 43 Holtwood Road, Plymouth (*77878*).
PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey, CR4-6DB.
RADIO SOCIETY OF EAST AFRICA: Hon. Sec., P.O. Box 5681, Nairobi, Kenya.
R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs.
READING: G. R. J. Addis, G3TEB, 13 Keats Close, Woodley, Reading, Berks.
RHYL: T. Hewitt, GW3YFD, 15 Knights Green, Flint, CH6-5DE.
ROYAL NAVY: C/RS K. Randall, G3RFH, HMS *Mercury*, Leydene, Petersfield, Hants.
SALOP: W. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Copthorne, Shrewsbury.
SALTASH: J. A. Ennis, G3XWA, 19 Coombe Road, Saltash, Cornwall.
SHEFFORD: C. W. Stedman, G3XWS, 10 Wychwood Avenue, Luton, Beds.
SILVERTHORN: D. Standley, G3XSA, 212 Westward Road, Chingford, London, E.4.
SOLIHULL: J. Lester, G3VXV, 173 Damson Lane, Solihull, Warwickshire. (*021-705 3060.*)
SOUTH BIRMINGHAM: E. A. Burke, 236 Beaumont Road, Bournville, Birmingham, 30.
SOUTHDOWN: L. E. Tagliaferro, 9 Tugwell Road, Hampden Park, Eastbourne (*54244*), Sussex.
SOUTH SHIELDS: D. Forster, G3KZZ, 41 Marlborough Street, South Shields.
SPEN VALLEY: N. Pride, G8BSC, 100 Raikes Lane, Birstall, Nr. Leeds. (*Batley 3925.*)
STRATFORD-ON-AVON: J. R. Cutter, G3XFV, 84 Sharmans Cross Road, Solihull, Warks.
SURREY: R. Morrison, G3KGA, 33 Sefton Road, Croydon, Surrey CRO-7HS. (*01-654 5982.*)
VERULAM: W. C. Dennis, G3NCK, 129 Colney Heath Lane, St. Albans, Herts.
WAMRAC: Rev. A. Shepherd, G3NGF, 52 Thanet Street, Clay Cross (*2184*), Chesterfield, Derbyshire.
WESSEX: A. G. Emery, G8AVE, 7 Brunel Drive, Preston (*3177*), Weymouth, Dorset.
WIRRAL (DX Association): J. A. Share, G3OKA, Trelawney, 21 Curlender Close, Bidston, Birkenhead, Cheshire, L41-7BN.
WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton.
YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove Yeovil, Somerset.

or if we have put any group in the " wrong slot," blame his lack of geography at school!

Not much doubt as to which clip to put **Midland** into! They are to be found at the Midland Institute in Margaret Street on the third Tuesday in each month. In addition they have a special " do " at the Savoy on November 21, with tickets at 25 shillings.

Quite a while since last we heard from **Stratford-on-Avon,** who mention that they have a Direction-Finding Contest laid on for November 2, with all comers welcome to compete. RSGB standard rules apply, the contest will be within the limits of Ordnance Survey Sheet 131, and the start will be at Oversley Green, NGR 093571. First transmissions at 1320 clock time. If anyone intends to enter please contact G3RPJ—*QTHR*. For details of the other activities of this group, get in touch with G3XFV.

South Birmingham have recently had an AGM, and a new secretary takes over the reins of office—*see* Panel. We gather that at the same time certain minor changes were made in their rules and slight alterations to the routine, so the hon. sec. should be consulted for all the " gen " although we can say that the venue is, as for some years past, at the Scouts Hut in Pershore Road, Birmingham 29.

Now to **Salop,** who are nicely holed up in the Signals Hut of Shrewsbury School. November 6 is set aside for an MCC dummy run, so as to ensure the Club continues each year to improve its position—good!—while Wellers are coming along to talk about Soldering Equipment on November 13. The Club call will be aired on the 20th, and on the 27th, G3FHL will talk about Selectivity, and some unusual types of transmission.

Wolverhampton have a place at Neachells Cottage, Stockwell Road, Tettenhall, Wolverhampton where there is something each week. Thus, November 3 sees G3NUE expounding RAEN, and on the 10th there is to be a Natternite; November 17 for Mr. Charles Pittaway to talk about Model Aircraft Control Equipment, and on the 24th a committee meeting.

The first meeting of their second year of existence takes place for **Solihull** on November 18, so the secretary pleads " please bring your friends and your money! "

At **Coventry** they are to have a " University Challenge " type Quiz on November 7, while on the 14th and 28th the Club station will be on the air. As for November 21, this is set aside for a Junk Sale, otherwise described as " New Homes for White Elephants " —a new twist on an old and ever-popular theme.

Redditch is the home-town of the **East Worcs.** crowd, who will be in session on November 13 at the Old People's Centre, Park Road, Redditch. For their enjoyment there is a tape-and-slide talk on ARRL Hq.

November for **Melton Mowbray** means a lecture on Construction Techniques by H. Miles, at St. John Ambulance Hall, Holwell Works, Asfordby Road, Melton Mowbray, plus possibly a Saturday visit to Old Dalby REME Workshops sometime during the month, details of which may be obtained from G3NVK, as in Panel opposite.

The first Monday and the third Tuesday every month see the **Lichfield** gang getting together at the Swan Hotel in Bird Street; the former meeting—November 3—is of considerable interest in that the firm of Amateur Electronics, G3FIK, will be coming along to demonstrate some of the gear they sell.

IDENTIFICATION CODES FOR CLUBS IN " MCC "

Supplementary List

A02	Acton, Brentford & Chiswick	*K04*	Kirkcaldy, Fife
A09	Addiscombe, Sy.	*L12*	Limerick, Eire
B23	Bishop Rawstorne School, Lancs.	*L13*	Leyland Hundred, Lancs.
B24	Basingstoke	*M17*	Maesteg Contest, Glam.
C26	Chorley	*N16*	North-West Durham
C27	Crawley " B "	*P11*	Purley " B "
C28	Crawley " C "	*P12*	Purley " C "
C29	Crawley " D "	*R11*	Royal Navy A.R.S., HMS *Mercury*
C30	Culham, Berks.	*S43*	Spey Valley, Banffshire
C31	Cheltenham Grammar School	*S44*	Standard, Harlow
D10	Digby R.A.F.	*U01*	Univ. College, Cardiff
E09	East Barnet A.R.C.C.	*V03*	Verulam " B "
F07	Finchley	*W12*	Wheatsheaf A.R.S. Grimsby
H14	Henley Grammar School	*Y03*	7777 Contest Group, Glam.
K03	Kings Norton, Birmingham		

N.B.—This list includes all additional requests for identifications received up to October 14. Any asked for subsequently will have been allotted but cannot now be published before the Contest, November 8-9. These " unlisted identifications " will be in the same sequence as the published lists. See also pp.512-513, October issue.

London and the South

Cheshunt missed the deadline last time, but luckily had the November information in the same letter. The 7th it is, for a tape lecture entitled " Radio Aurora " at the Methodist Church Hall, opposite Theobalds Station, Cheshunt.

At **Acton Brentford and Chiswick,** memories of the sunshire will be recalled on November 18, when the lads are going to show an assortment of their holiday slides. They assemble at 66 High Road, Chiswick.

The hon. secretary of **Cray Valley** wonders where the copy for October went—a pity, because your scribe always thought that here was at least *one* reader! As for this month, the dates are November 6 and 20, with the first meeting as usual given over to a lecture, this time by C. A. Jones of Mullard on Integrated Circuits. The other date is an informal; both are down for the Congregational Church Hall, Court Road, Eltham, London, S.E.9.

Surrey are in the clip but out of phase with us, so all we can say is that the venue is the " Swan and Sugarloaf " in South Croydon, that for details one should contact the hon. sec.—*see* Panel—and that the programme of recent months has been well worth the trouble of a visit.

At **Echelford** the *Newsletter* printer seems to be having a spot of bother with his machine—a pity, as this one has always been very good in content over the years. However, it is just possible to make out that the 10th of November is yet to be finalised, and on November 27, G3MFB is to discuss RAEN; both are at " The Hall," St. Martins Court, Kingston Crescent, Ashford.

Now to **Basingstoke,** where the AGM has been got over; November 1 sees a talk on Basic Radio for the Beginner, and on the 15th one on Frequency Measurement. All their meeting are held at Chineham House, Popley Way, Basingstoke.

Fareham are unusual in that they get together on Sundays, at Portchester Community Centre. During the summer much has been done to improve the shack and the gear, by dispensing with a formal programme. However, they are back at it again, with G2QK reminiscing about the Good Old Days on November 2, and W1BB on tape for November 23. Other sessions are informal affairs.

Now to **Norwich,** where the November 3 date is organised by G2DX and entitled " Please Explain This." An informal on the 10th is followed by Business on the 17th, and finally a talk by Mr. Hanks on the Racal RA-17L receiver.

Chiltern have a new secretary, who advises that they are still in existence, and still getting together at the British Legion in St. Marys Street, High Wycombe. By the time this is out, a programme should have been fixed up, so for details we refer you to G3IQF at the address in the Panel.

It was specially pleasant to hear from the hon. sec. of **Harrow** again, since it was known he had been " horizontally polarised " but now he is well on the mend, and advises that the lads can look forward to a talk on November 7, although the subject is not yet firm. On November 14 and 28 they will be " Practical " and the intervening session will have a talk on El-bugs by G3SCO.

The **North Kent** chaps—and lasses—are at home on November 13, when the G8/3's are to discuss Latest Developments, and November 27, for a Natter Session.

If you want to find the **Farnborough** group, look for the Railway Enthusiasts' Club, 310 Farnborough Road—and recall it is almost opposite the Railway Station. They have booked the second and the fourth Tuesdays, the former for a Junk Sale and the latter the all-important AGM.

Southdown are pleased to be able to mention that they have obtained a talk and demonstration by K.W. Electronics at the Victoria Hotel, Latimer Road, Eastbourne, for November 3.

November 19 is the date for **Verulam** members to remember, when G3HRH will discuss the development of the UHF TV Network. As for December, which is AGM time, this is an advance warning that they have the booking for December 10, since the Council want to use their Chamber on Verulam's normal night.

At **Dorking** the form is an informal at the Wheatsheaf and the lecture at the Surrey Yeoman. November 11 is the session at the former spot, while on the 25th they have four interesting films, one technical and the others for the families and friends attending.

A wise man is the secretary of **Mid-Herts**—he marks your conductor's copy of the newsletter to indicate where the meeting details can be found. Good Idea! The place to find is Welwyn Civic Centre on November 13, to listen to G6OPB/T explaining the intricacies of ATV.

Purley are exactly 20 years old on November 25, after surviving quite a few ups and downs. They have a place at the Railwaymen's Hall, the first Friday in the small hall and the third Friday in the large one—but *never* a get-together on the fifth Friday, even though

Some members of the Kings Lynn (YMCA) Radio Club, which meets every Wednesday evening at the YMCA Building, off Columbia Way. Though a comparatively small group, they have often been able to help by putting on a station at local functions in aid of charity. The chairman is G8BQT, second from left, front row, and there are eight other callsigns in this picture.

Photograph courtesy " Lynn News."

The Leeds Radio Society was recently reactivated, and members seen here include G3AYK, G4AD, G3TEE, G2HLL and G3YFI.

someone invariably turns up! The former meeting is a Natter, and the later date is reserved for a possible carry-over of the Junk Sale from the previous month.

Talking of long-lived groups makes one think of **Grafton;** and oddly enough they are next on the pile, to advise that they are still at Montem School, Hornsey Road, Holloway, N.7, every Friday evening.

The dates for **Maidenhead** are November 3 and 17; the latter informal, as ever, and the former given over to G3VCT to show and talk about his homebrewed transistorised receiver for the amateur bands. Both are at the Victory Hall, Cox Green, Maidenhead.

It is quite a startling thought that the high academic standards in the area served by **Silverthorn** means that promising youngsters are whipped off to the Universities before they can be " blooded " in office and relieve the old hands. However, that is the way of it, and things still go with a swing at Friday Hill House, Simmons Lane, Chingford.

Talking of long-lasting clubs, **Shefford** have a 21st annual dinner in prospect for the 29th as well as the usual weekly sessions at the Church Hall, Ampthill Road, Shefford on Thursdays. One of the secrets of their continuing success is that, being as it were out in the boondocks, they still manage to have something to offer each week. November 6 is a film show, while on the 13th Dr. Williams will answer his own question " What is a Watt?" As for the 20th, club members' questions will be answered, while the month is rounded off by G8AKT talking about VHF, to bring them to the Dinner already mentioned.

On to **Greenford,** who have Hq. at the Community Centre in Oldfield Lane, where they are booked for alternate Fridays. This gives them November 14 and 28, and they emphasise their desire to meet and welcome any new blood to the club.

Conclusion

And there it is for another month. Best of luck in MCC, and don't forget the deadline is **November 7,** with your news for *December*, addressed, " Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM. As for the MCC logs, these should be in, to the same address, by first post on *November 21.*

MCC—November 8-9

See pp.511-513, October, for rules and all relevant details. Supplementary Identification List in this issue. Check clocks and watches on GMT before the start, at 1700z each day. Have a good time—and let's have those logs in as early as possible.

FIRST-CLASS CW OPERATOR'S CLUB —ANNUAL DINNER

This was held on the evening of October 4, at the Lord's Cricket Ground Banqueting Suite, and was again a great success, the attendance being some 135 members of F.O.C. and their friends, including 14 members holding overseas callsigns, who had made the journey specially to be there. GB2FOC on the air for most of the day, working F.O.C. members round the world. The speakers at the Dinner included G2QB, G8VG (the hon. secretary, who made all the arrangements and for some years now has worked hard for the Club), G3FXB (selected president for the ensuing year), G3JAF, G2YS and W4ZM. Messages were read from G6FO (who holds membership No. 1 and, so far as is known, is the most senior member still active from pre-war days) also from some other members unable to be present.

THE OTHER MAN'S STATION

ZL2BCJ

THE photograph shows the station of Leslie Lewis, ZL2BCJ, 50 Chalmers Road, Gisborne, New Zealand. Interest in Amateur Radio started before Hitler's War, when medium and short-wave DX broadcast and amateur stations were hunted for on a domestic receiver. After the war a Hallicrafters S.40A was procured and interest was renewed in SWL activity, both BC and short wave DX. Then there was a lull till 1964, when a technician licence was taken out as ZL2TCT. The full licence was granted after passing the Morse Test in 1965, and ZL2BCJ came on the air with a A.R.E.C. 2C1, graduating to a Geleso VFO, with parallel 807's in the PA, and 807 Class-B modulators, still with the S.40A as a receiver, and a long wire antenna. The present-day station is as in the picture.

The shack is a room in the garage, away from the house, size being 12ft. x 10ft. with floor to ceiling window on the North side, carpet on the floor, concealed lighting, panelled walls with pinex planks to the ceiling. The equipment includes an Eddystone 640 receiver, on top of which is Drake-2B Rx, a phase recorder, Rustrak recorder and speaker. These four items are used in experiments to measure the electrons in the ionosphere, a brief description being as follows:

Outside is a box approximately 4ft. x 3ft. x 2ft., mounted at an elevation of 45°, aimed at the communications satellite *Syncom 3*, which is in a geostationary orbit at 180° long. over the equator. Inside the box is an electric motor driving a 5-element Yagi array at one revolution a second, also a nuvistor converter employing a crystal oven to keep the IF stable. The Drake-2B receiver employs triple conversion with a tunable first IF from 3·5 to 4 mc, a crystal of 10·5 being used for first conversion, giving a range from 6·4 to 7·0 mc; there are two further conversions to 455 kc and 50 kc, producing a bandwidth adjustable down to 500 c/s, the value required for recording *Syncom 3*. Rotation of the aerial causes the satellite signal to drop out twice each second when the aerial becomes perpendicular to the incoming polarisation. With the AVC off this 2 c/s modulation is fed into the signal channel of a narrow band 2 c/s amplifier in the phase recorder box. This amplifier reduces the effective band width to about 0·05 c/s. A 2 c/s reference signal obtained from two magnets fixed to the rotating aerial is fed into the other channel. After filtering and squaring, the relative phase of these two signals is recorded, giving a measure of the *angle* at which the satellite signal is *polarised*. This angle varies with the number of electrons in the ionosphere between the receiver and the satellite. Frequency of the satellite is 136·980 mc with a 2-watt telemetry signal.

An interesting and unusual amateur layout.

NEW QTH's

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

DL2AH, J. T. Worrall (*G3XBA*), 1 Div. HQ & Sig. Regt., B.F.P.O. 32.

DL5ZZ, C. A. Dodd (*G3XMZ*), J.S.B., B.F.P.O.40.

EI8BZ, J. Klinkenbergh, Proby Square, Blackrock, Co. Dublin.

G3OWH, Amateur Radio and Electronics Club, R.A.F. Station, Lyneham, Chippenham, Wilts. (*reissue*).

G3YER, D. Lowe, 32 Glebelands, Newton Poppleford, Sidmouth, Devon.

G3YMB, J. R. Wheeler, 50 Essex Road, Gipsy Lane, Leicester.

G3YMD, South - East Kent (*Y.M.C.A.*) Radio Club, Leyburne Road, Dover, Kent.

G3YMP, P. A. Lovell, 42 Southwell Road, Deal, Kent.

G3YNC, C. J. Adams, Electrical Dept., Harringay Stadium, Green Lanes, London, N.4.

G3YNU, I. J. Stevenson, 21 Somner Close, Canterbury, Kent.

G3YNW, C. J. Booker, Leeuwkop, Whitehouse Road, Woodcote, Reading, Berks. RG8 0RX.

G3YOG, C. H. Crook, 19 Hatters Lane, Berwick-on-Tweed, Northumberland.

G3YPW, P. M. Willingham, 239 The Hides, Harlow, Essex.

G3YQB, D. A. Rankin, 6 Woodfield, Lacey Green, Aylesbury, Bucks.

GW3YQM, D. W. Thomas, 4 Green Park, Pentlepoir, Saundersfoot, Pembs.

G3YQN, R. M. Trott, 169 Browning Road, Milehouse, Plymouth, Devon. (*Tel. Plymouth 51270.*)

G3YQQ, J. A. Bibby, 167 The Green, Eccleston, Chorley, Lancs. (*Tel. Eccleston 213.*)

G3YQR, S. J. Whiteman, 3 Stanley Cottages, Woodside Close, Kearsney, Dover, Kent.

G3YQT, B. A. R. Phillips, 18 Ibbett Close, Kempston, Beds. (*Tel. Kempston 2619.*)

G3YQX, E. Howard, 2 The Greenway, Collett's Green, Powick, Worcester.

GM3YRK, M. A. Comrie, 57 Dumgoyne Drive, Bearsden, Glasgow.

G3YRP, I. C. Dudley, 31 Belle Vue Road, Ashbourne, Derbyshire.

G3YRR, C. Ekberg, 109 Abbey Road, Grimsby, Lincs. (*Tel. Grimsby 4718 or 57533.*)

G3YRU, P. R. Wilby, 137 Wood Lane, Rothwell, Leeds, Yorkshire. (*Tel. Rothwell 3218.*)

G3YRW, J. A. Van Walwyk, 321 Parkside Avenue, Barnehurst, Bexleyheath, Kent.

G3YSB, D. R. Hood, 7 Mountbatten Close, Hastings, Sussex.

G3YSI, P. A. Tipping, 16 Portal Crescent, Mirfield, Yorkshire.

G3YTI, S. J. Cooper, 24 Cambridge Street, Darwen, Lancs.

G6YH, J. K. Haynes, Simor House, Clare Hill, Esher, Surrey.

G8CRI, B. K. Middleton, 7 James Court, Welton, Lincs.

G8CUO, D. W. Rowan, 13 Fleming Drive, Newark, Notts.

GM8CUS, G. J. A. Smith, 80 Deanburn Park, Linlithgow, West Lothian.

G8CVA, B. A. Castle, 159 Elmers End Road, Beckenham, Kent.

G8CVC, A. H. Carter, 29 Hill Morton Road, Four Oaks, Sutton Coldfield, Warks. (*Tel. 021-308 4564.*)

G8CVO, J. Martin, 14 Upper Mead, Cox Green, Bromley Cross, Bolton, Lancs.

G8CVR, F. A. Fear, 185 Longwood Road, Aldridge, Walsall, Staffs. (*Tel. Aldridge 52706.*)

G8CVS, J. E. Jenkinson, 26 Blenheim Drive, Oxford OX2 8DG.

G8CVX, C. M. Waldron, 22 Windermere Road, Patchway, Bristol BS12 5PW. (*Tel. Bristol 691582.*)

G8CVZ, D. I. Spooner, 39 Brambley Crescent, Folkestone, Kent. (*Tel. Folkestone 76523.*)

G8CWB, J. W. T. Oxley, 37 Buckminster Gardens, Grantham, Lincs.

G8CWS, E. Thorpe-Holmes, 180 Thoresby Road, Acomb, York YO2 3EP.

G8CWU, J. Cragg-Sapsford, 78 Babbacombe Road, Styvechale, Coventry, Warks. CV3 5PA. (*Tel. Coventry 69684.*)

G8CXC, A. Newman, 93 Salterns Avenue, Milton, Portsmouth, Hants. PO4 8QJ.

G8CXD, M. J. Atherton, 7 Wood Ride, Petts Wood, Kent BR5 1PZ.

G8CXH, VHF Group, University of Bristol Amateur Radio Society, Students Union, Queens Road, Bristol, 8.

G8CXI, D. Phillips, 14 Hall Place Crescent, Bexley, Kent.

G8CXJ, R. O. Phillips, 14 Hall Place Crescent, Bexley, Kent.

G8CYQ, A. Hulme, Station House, Speke Road, Liverpool L25 0NN. (*Tel. 051-486 1081.*)

G8CYU, P. York-Jones, 44 Lyttelton Road, Droitwich, Worcs.

CHANGE OF ADDRESS

G2DMR, J. Korndorffer, 17 Poulton Avenue, Carshalton, Surrey.

G3HAB, D. J. Black (*5A4TR*), 59 Westcote Road, Streatham, London, S.W.16.

G3JFF, M. J. Matthews, C/RS, Staff, F.O.2, F.E.S., B.F.P.O. Ships, London.

G3LKJ, B. E. Symons, 54 Quinta Road, Babbacombe, Torquay, Devon. (*Tel. Torquay 39727.*)

G3PST, P. J. Finch, M.Sc., 17 Dolcrofts Road, Rookley, Isle of Wight.

G3XBQ, A. P. Wesely, Frimley, Woodbury Road, Hawkhurst, Kent. (*Tel. Hawkhurst 2151.*)

G3XET, V. J. Riley, 2 Cartmell Drive, Belle Vue South, Carlisle, Cumberland.

G8BBA, E. Bailey, c/o 42 Elms Road, Stapenhill, Burton - on - Trent, Staffs.

G8BLI, M. L. Hollebon, 53 Tankerville Road, Streatham, London, S.W.16.

G8BRF, A. Hirst, 44 Newlands Avenue, Cheadle Hulme, Cheadle, Cheshire SK8 6ND.

SMALL ADVERTISEMENTS

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SELLING: New Air System bases and chimneys for 4CX250B, at 50s. each. New p.t.f.e. bases for QQV06-40A, 5s. each.—Box No. 4838, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: By Young SWL just starting this wonderful hobby, a CR-100 in good condition, and performing well.—Ryan, 18 North Drive, Ruislip, Middlesex.

FOR SALE: Eddystone EC-10 Rx, latest model, with mains PSU, price £42.—Robinson, 55 York Road, Woking, Surrey.

SELLING: National HRO receiver with speaker, headphones, PSU and transit case; front end converted to B7G types; coverage 10-20-40-80m. bandspread, plus general coverage coil packs; price £18.—Rundall, 44 Stanhope Gardens, London, S.W.7. (Tel. 01-373 6467.)

FOR SALE: R.C.A. AR88D Rx, in excellent condition, with speaker, spare valves and handbook, £40. Heathkit RA-1, fitted CL-1 100 kc calibrator, with manual, £30. QPM-16 Q-multiplier, with handbook, £5. Phone transmitter, 50 watts, very neat job, matches AR88D, £20. CW transmitter, 150 watts, PA stage as DX-100U, £20. Modulator, suitable for 150 watts, 2/TZ40's, £8. Geloso converter, fitted RF gain, mute and socket for CL-1 100kc calibrator input, £12. Minimitter converter, 10 to 80m., 12v. input or mains, £8. Owner of this lot going SSB.—Holt, G3XQT, 77 Kent Road, Woods Estate, Wednesbury, South Staffordshire.

SELLING: Star SR-200B SSB receiver, coverage 10 to 160m., three months old, price £28. Codar A.T.5 Tx, 80/160m., £8. Joystick system, comprising aerial and Type 4RF tuner, £6 complete. All items in FB condition.—Ring Evers, Leeds 637173 (Yorkshire), after 7.0 p.m.

FOR SALE: Yaesu Musen FL-100B transmitter, £85. FR-100B receiver, £80. Japanese bug key, new, 60s. Keyer paddle, 40s.—Barry, G3RJS/MM, 47 Gerald Road, Wollaston, Stourbridge, Worcs.

SMALL ADVERTISEMENTS, READERS—*continued*

GENUINE QRT Sale! All Equipment in excellent condition and some new. Heathkit SB-301 Receiver with CW filter, price £125; SB-610 'scope monitor, £38 (both used only four months). Heathkit V7A-U valve voltmeter with RF probe, new, £14. "G2DAF" Mk. II transmitter with PSU and LPF, all first-quality components, e.g., Eddystone dial, Turner meter, QCC crystals, in steel case, £60. Mosley TA-32 Antenna, never erected, £14. Heathkit 10-12U 5in. 'scope, £28. K.W. dummy load, 75-ohm, £4. Also some other items.—Monkhouse, 9 Beech Road, Chandlersford (2584), Eastleigh, Hants.

FOR SALE: All in mint condition: Trio 9R-59DE, with crystal calibrator and voltage regulator, £28. Grundig C100L recorder, with GDM-304 microphone and six cassettes, mains or battery operated, £32. Grundig C100 Cassette Recorder, with GDM-312 microphone, £26. Sanyo Transworld receiver, 530 kc to 28·5 mc, £14. (Scotland).—Box No. 4841, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Oscilloscopes: Cossor 1045K, price £15; and E.M.I. QD/101, £10.—Boughton, G8CVU, 51 Hempstead Street, Ashford, Kent. (Tel. 21904.)

SELLING: Joystick VFA and Mk. III Ae. Tuner, £6. Nombrex Model 27 RF signal generator, £7. Also copies "Short Wave Magazine," March '67 to July '69; and "Practical Wireless," November '63 to August '69—offers? (Herts).—Box No. 4842, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Plug-in coils for National One-Ten receiver; also gen on Admiralty 8c/75C transmitter. All letters answered.—Eccles (913TIJ), Silverhill, Moneymore, Co. Derry, Northern Ireland.

FOR SALE: Complete RACAL Receiving Station, comprising RA-17 receiver in black-crackle table cabinet, RA-66 single-sideband adaptor unit, and RA-137 LF adaptor. Frequency coverage 10 kc to 30 mc. All in excellent condition, with handbook, price £200, buyer to collect.—Spencer, G3DXK, 71 Liss Road, Southsea, Hants. (Tel. Portsmouth 34271.)

SALE: Sommerkamp FR-100B Rx, £90. FL-200B Tx, £95. Both in mint condition. Prefer buyer(s) to collect but could arrange delivery locally.—Jennings, G3SOE, 37 Springhill Lane, Penn, Wolverhampton, Staffs.

SELLING: VHF transistorised converter, with battery, £4. MW/LW transistor portable, £7. Complete Avometer with its case, £8. Gyroscope motor, 18s. 6d. VHF Rx, coverage 100-180 mc, with PSU and speaker, £20. Wide-range Marconi valve voltmeter, £15. All carriage extra, s.a.e. with enquiries. Manuals: For R.208 and VHF Calibrator Type 18, 20s.; Rebecca TS-31, 40s.; VHF Calibrator Type 120, 30s. Circuits: R.31 (BC-1000) Rx. 5s.; Rebecca Tester Type 102, 20s. Postage and packing extra.—Hayward, Sunnyfields, Lighthouse Road, St. Margaret's Bay, Nr. Dover, Kent.

OFFERING: R.C.A. AR88LF. Vitavox speaker Type 610. Mosley two-element beam, TA-33Jr. Cossor double-beam 'scope, Type 339, with handbook. Solartron stabilised PSU, 240v. AC in, output 250-300v. 100 mA DC, 6.3v. 1 amp, 6.3v. 2 amp, 6.3v. 4 amp. All in very good condition. Offers invited. Box No. 4852, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: K.W. Vanguard AM/CW Tx, coverage 10 to 160m. Also Heathkit SB-10U SSB Adaptor. Both items in immaculate condition and complete with all circuitry. Price for the two units, £50. Write, or call after 6.30 p.m.—Hopkins, 103 Shadow Moss Road, Woodhouse Park, Manchester 22, 6JR.

SALE: R.206 receiver, in perfect condition, coverage 550 kc to 30 mc, has variable selectivity with AGC, BFO, ANL and AF filter, including PSU, price £20 or near offer.—Ring Wilders, Chelmsford 71754.

FOR SALE: In new condition, Trio 9R-59DE receiver, with matching speaker, cost £46 17s. 6d., bargain at £36, carriage paid.—Jones, 3 Bircham View, Austin Crescent, Eggbuckland, Plymouth (76552), Devon.

WANTED: Collins, brand-new or in mint condition, equipments Type 312B-5 VFO-console; portable PSU PM-2; Speaker 312B3; TD-1 dipole antenna; new Astatic D.104 crystal microphone. Details and prices, pse.—Box No. 4851, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERING: KW-201 Rx, with calibration manual, absolutely as new, only few hours' use, accept nearest offer to £90.—Haines, 12 Cemetery Road, Laceby, Grimsby, Lincs.

WANTED: Electroniques valve-type amateur band front end unit Type QP-166, to complete G3HTA Rx.—Bourne, 111 Woodhouse Lane, Bishop Auckland, Co. Durham.

SELLING UP: G2MA-type Linear, with AC/PSU, 450w. p.e.p., coverage 10 to 80m., with spare 813, £20. Valves: 2/TT21 at 30s.; 3/5B254M (miniature 807), at 20s.; 6146, 30s.; 2/2E29 at 15s. Z-match ATU, for 10 to 80m., including dummy load, meter, etc., £8. Monimatch reflected-power meter, 60s. 80-ohm 100w. carbon resistor, 20s. Numerous B7G and B9A valves at 3s. each. Buyers to collect.—Champion, 11 Eden Way, Warlingham (near Croydon), Surrey. (Tel: Upper Warlingham 2493).

FOR SALE: TCS-12 Rx, with PSU, speaker and spare set of valves, price £8 or offer.—Ring Eaton, 061-928 0025 (Cheshire).

GOING ABROAD: So have for sale Complete Station, consisting of Trio SSB Transceiver TS-500, with power supply and speaker unit, PS-500 AC/PSU, remote VFO-5, all in as-new condition after only three hours work on the air. Price £195.—Brain, 6A Whaddon Road, Newton Longville, Nr. Bletchley, Bucks.

FOR SALE: In new condition, Trio Transceiver, latest exhibition model TS-510, with companion PSU, price £185, carriage paid.—Jones, G5ZT, 3 Bircham View, Austin Crescent, Eggbuckland, Plymouth (76552), Devon.

SALE. Heathkit RA-1 receiver, with crystal calibrator, and in immaculate condition, price £32 10s. —Kronquist, Trees, Rogate Road, Hill Brow, Liss, Hants.

NO OFFERS: A K.W. Vespa Mk. II, hardly used and an excellent performer, also a HA-350 Rx. covering 10 to 160 metres, the two together comprising an FB station for SSB operation, price £150.—Derrick, 218 Winchester Way, Bolton (20768). Lancs.

DISPOSING: Receivers—Heathkit RA-1, with calibrator and speaker, £27; Codar T.28, £13; R.1475 with PSU, £10. Also transmitter DX-40U, with VF-1U VFO, £20. And an Oscilloscope Type 13A, complete, £20.—Eggleton, G3TXG, 13 Beacon Heath, Exeter (67963), Devon.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: TV Vidicon cameras ready to feed into 70-cm, transmitter and commercial monitors, complete with all relative time-bases, PSU's, etc., for amateur TV station operation.—Jones, G6ABC/T (G5ZT), 3 Bircham View, Austin Crescent, Eggbuckland, Plymouth (76552), Devon.

WANTED: Mains PSU for 19 Set Rx/Tx. Price and details first, please.—Heslop, 4 Willow Close, Brandon, Co. Durham.

DECEMBER Issue "Short Wave Magazine" due out November 28. Single-copy orders, 4s. (or 4s. 3d. "first-class") post paid, to reach us by Wednesday 26th, for despatch on Thursday 27th. These copies are sent flat in an envelope.—Orders, with remittance, to: Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Collins 32S-1 Exciter, 516F-2 PSU, 75S3-B receiver, and 30L-1 Linear Amplifier. All in immaculate condition, ex-QTH and with manuals. Price all-in £525.—Wilson, GI3CWY, QTHR, or ring Whitehead 3260 (Co. Antrim, Northern Ireland).

TOP quality polypropylene non-rot rope. Diameters: ¼in., 13 lbs. breaking strain; 5/16in., +1890 lbs. B/S; and ⅜in. dia., 3100 lbs. B/S. Send s.a.e. for sample.—Powell, GW3HUM, 21 Tanybryn Estate, Valley, Anglesey.

WANTED: Pye Radiotelephones Type AM10B, AB10D and AM25T, also small quantity QQV03-10 valves.—Austen, 28 Valebridge Road, Burgess Hill (3409), Sussex.

SALE: Receivers: R.450/FRR.28, 540 kc to 54 mc; Hallicrafters 540 kc to 109 mc, 27 to 145 mc, 38 mc to 1000 mc, BC-348, £12 10s. R.1155, £5. Bendix, 30s. Receiver-Indicator, £5. R.C.A. 160-metre Tx, size 6½ x 6½ x 9in., £8 10s. BC-221, £10. Multimeter, 35s. HRO coil pack, 20s., crystal 20s., dial 30s., PSU 50s. New Teleprinter, R.C.A. crystal multiplier, 70s. Marconi ATU, 25s. Valvetester and other items; send s.a.e. for list. Carriage extra.—Wright 249 Sandy Lane, Hindley, Wigan (55948), Lancs.

EXCHANGE: R.1475 Rx, coverage 2·0 to 20 mc, with original 12v./250v. PSU, working but modifications need finishing FOR an R.1155 with D/F section complete, and "B" dial drive—or offer for the R.1475? Could deliver to 25 miles.—Vinson, 22 Springcopse Road, Reigate, Surrey.

SALE: Receiver for VHF, 97 to 145 mc, AM, 9v. battery, size 7 x 4 x 4in., suitable for fixed/mobile operation, price £7 carriage paid.—Box No. 4843, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Codar CR-70A receiver, in good condition, price £14 10s.—Cannon, 34 Queen Anne's Grove, Enfield, Middlesex. (Tel. 01-360 3516.)

WANTED: A good Drake-4B receiver. Details, price and all particulars.—Stead, 2 Cliff Road Gardens, Leeds LS6-2EY, Yorkshire.

WANTED: By an SWL, a Lafayette HA-52A receiver. Please quote price, with age and full details; all letters will be answered.—Box No. 4844, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: CR-300 receiver, regen. RF, with PSU and Q-multiplier, price £12.—Philpott, Russel House, Rye, Sussex.

SELLING: CR-100 Rx in good condition, price £14. Also an R.209 receiver (12v. version), with matching headphones, at £10. Prefer buyers collect, but could deliver up to 100 miles or so by arrangement.—Wallis, 10 Middlewood Road, Lanchester (477), Durham.

SMALL ADVERTISEMENTS, READERS—*continued*

EXCHANGE or SELL: An Eddystone 840C, at £36 (plus carriage), or would Exchange for a B.40, B.41 or EC-10 with appropriate cash adjustment.—Sangster, 13 Danestone Terrace, Bridge-of-Don, Aberdeen, Scotland.

SALE: Heathkit RA-1 receiver, with speaker, £27. T.W. two-metre receiver, including speaker, £18. Codar PR-30X preselector, 40s. Heathkit QP-1·6, 60s. Joystick aerial with tuner, 30s. Two-metre 5-ele Yagi, 20s. Also resistors, capacitors and other parts. —Holbrough, 6 Bay Tree Close, Kingsmead Road, Loudwater, Bucks. (Tel. High Wycombe 29547.)

SALE or EXCHANGE: An R.C.A. AR88D receiver in good condition, at £40, or Exchange for Eddystone EB-35, EB-36 or similar portable.—Poulsen, 21 Whitton Place, Newcastle-upon-Type 7 (or ring Newcastle 661827).

SELLING: Heathkit HW-12A 80-metre transceiver, with PSU, price £55. Garex two-metre converter, new, IF 23·7 to 25·7 mc, £7. Lafayette KT-340 communications receiver, £17. All equipment in mint condition and professionally constructed.—Andreae, 2 Bushwood Drive, Dorridge, Solihull, Warwickshire. (Tel. Knowle 4225.)

EQUIPMENT of The Late G5SX: R.C.A. AR88D receiver, price £35 or near offer. National HRO Rx, with PSU, general coverage coils and four bandspread coil packs, £20. BCC-69D for 4 metres, with PSU and leads, 60s. Small oscilloscope, £6 or offer. Ex-Govt. VHF Tx, QQV03-10 in final, 40s. Can be viewed in Ealing, London.—Box No. 4845, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: B2 transmitter/receiver, as a complete outfit, or Tx section with its PSU.—Tee, G8UA, 33 Red Lees Road, Cliviger, Burnley, Lancs.

SALE: Sommerkamp FR-100B receiver, perfect and in absolutely mint condition, with its manual and in original packing, genuine bargain at £85, plus carriage. (South Wales).—Box No. 4846, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: G-Line KW-2000, with both AC and DC PSU's. Price £135.—Ballance, G3KNB, QTHR.

FOR SALE: FT-150, with microphone, new and boxed, price £180. Also Hustler mobile Ae., with base, spring, coverage 10-15-20-80m., £20.—Surman, Dunsfold Aerodrome, Godalming, Surrey.

SALE: Swan 500C, with AC/PSU, in mint condition and used few hours only, price £230.—Kimpton, G3YHX, 261 Broadway North, Walsall (27719), Staffs.

WANTED: Collins 516F-2 PSU. Offers, pse.—Foulkes, G3UFZ, 21 Pishiobury Drive, Sawbridgeworth (3088), Herts.

FOR SALE: Joystick aerial, 25s. Copies "Short Wave Magazine," 36 in all, 1966-'67-'68, price 20s. Home-built preselector, coverage 1·7 to 30 mc in three switched ranges, using Denco coils, with EF183 RF, EF80 cathode follower, price 35s. Carriage extra all items.—Critchley, G3UTK, 63 Rachael Gardens, Park Hill, Wednesbury, Staffs.

WANTED: Labgear Quad, with or without spreaders. Also a 60ft. crank up free-standing tower. — Persson, G5AMH, 122 Gunnersbury Lane, London, W.3.

SALE: BC-221 Frequency Meter, with its charts and headset, price £15. Also a BC-453, Q'Fiver, 30s., and a G2DAF-type Linear, £10.—Bowen, G3GCO, 31 The Crescent, Donnington, Telford, Shropshire.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: Eddystone 940 communications receiver, with speaker, headphones and stands, all in excellent condition, price £87 10s., or near offer. Prefer buyer collects, London area.—Box No. 4853, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Frequency meter, absorption type or otherwise, to cover 144 mc and above. Reasonable price paid.—Hood, Heath Cottage, Nutley, Uckfield, Sussex.

SELLING: Peto-Scott Commercial TV Studio monitors, 17in. video, ideal for the A/TV station, bargain at £10.—Jones, G6ABC/T, 3 Bircham View, Eggbuckland, Plymouth (76552), Devon.

FOR SALE: BC-348Q Rx modified with 85 kc IF strip, new ⅛in. panel, S-meter, symmetrical control layout, complete but requires some attention, 60s. Also Geloso converter, coverage 10 to 80m., 4·6 mc IF, stabilised PSU, complete, also needs attention, 60s. (If sold separately BC-348Q will require PSU.) WANTED: Copy "Short Wave Magazine," June '62, original price offered.—Box No. 4854, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

AVAILABLE: Some back-number issues of "Short Wave Magazine." Six assorted numbers between 1960 and 1968, 8s. 6d. inclusive post/packing. (Shelf-space wanted!).—Publication Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: R.206 Mk. II receiver, with PSU and converter for long-wave reception, price including manual, £15.—Ring Billington, 01-656 9882, after 7.0 p.m.

EXCHANGE or Sell: Hallicrafters Sky-Champion receiver, for good tape recorder. Offers and enquiries.—Blackburn, 32 Park Hill, Carshalton, Surrey. (Tel. 01-647 5783.)

REQUIRED: A Q-multiplier. Rx covering most of 200-600 kc, such as Nova-Tech, Bendix or W-H-Y? Tx for CW only. Converter for 10-15m. ATU's for Top Band and HF bands. (Lancashire).—Box No. 4849, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Minimitter beam for 10-15-20m., together with Minimitter remote control and traversing unit, price £12. Also Minimitter "Mercury" Tx, CW/AM/FM, 150 watts, in excellent condition, £18. (Surrey).—Box No. 4847, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Small commercial Yacht transmitter/receiver for 12-volt supply; must be in good condition and G.P.O. approved type. Also a good TCS receiver.—Box No. 4848, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE: FL-DX500, new in February, for FT-100, or sell at £110, or near offer.—Morris, G4HU, QTHR, or ring 061-430 3858.

EXCHANGES, or Sell: Square solid-brass box cavity for 70-cm push-pull 4X250B's, holders, £15. Also a National HRO-MX with PSU and all coil packs, £15.—Foster, G2JF, Wye College, near Ashford, Kent.

FOR SALE: K.W. Vespa Mk. II with AC/PSU, 8 months old and as new, £110. Heathkit RA-1 receiver, with crystal calibrator and matching speaker, in first-class condition, £30. Mosley RV-4 antenna, £10. New de luxe Joystick, 80s. Offers considered, carriage extra.—Donne, G3YBK, QTHR, or ring Exeter 78710.

WANTED: Labgear LG.300 Tx in good condition. SELL or EXCHANGE: Codar A.T.5 Tx, £14; C.52 Tx, with manual, £8; TCS-6 Tx and manual, £5; Minimitter, coverage 10 to 80m., £10. — Jackson, G3SIE, 8 Longmeadow Road, Orchard Hills, Walsall, Staffs.

SMALL ADVERTISEMENTS, READERS—*continued*

SELLING: BRT-400E receiver. Crystal-controlled converter, two metres and 70 cm, 11 valves. WANTED: 5ft. or 6ft. enclosed rack with rear door. —Ring 01-599 9149, after 7.0 p.m.

FOR SALE: Well-known make of UHF Tx/Rx base station equipment, easily converted to 70 centimetres, complete with PSU, £25. Roband stabilised PSU, plus/minus 300v. DC at 2 amps., in as-new condition, £15. Also a Solartron PSU, stabilised, 250/300v. DC at 200 mA, 6·3v. at 9 amps., £8. Can deliver in the North-West area.—Box No. 4850, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Creed Teleprinter 75 Five-Wire. Offers? —Mellor, G3TVO, QTHR, or ring Shoreham-by-Sea 4107.

WANTED: Panadaptor for 455 kc IF. Sell: RTTY CFS-T.U., complete in transit cases, with plugs, PSU and documentation, price £12. Addie, G8LT, Spring Hill, Wappenham, Towcester, NN12-8ST.

SELLING: Eddystone EC-10 receiver, in excellent condition, with manual and headphones, price £38.—Bradley, 6 Linden Grove, Folkestone Street, Beverley Road, Hull, Yorkshire.

WANTED: Dud HRO, in any condition, also coil packs, similar. SELLING: G.E.C. "Overseas 10" Rx, coverage 10 to 2000 metres, with RF, 2/IF's and 10w. output, for 230v. mains, with headphones and speaker. £13.—Smith, G8ATY, 1 Rhymer Close, Long Street, Hanslope, Wolverton, Bucks.

FOR SALE: "G2DAF" type Rx, with mechanical filter, £45. Tx for 80/160m., 10 watts, with modulator and PSU, £7 10s. Tx for 15-40-160m., mixer type, with 2E26 PA and relay control, £12. W.1191, mains PSU, no charts, 60s. HRO, five coil packs, rough condition, £6. All or-offer and carriage extra. Would consider Transceiver. — Grant, GM3UKG, Easter Bogs, Buckie, Banffshire, AB5-2EL, Scotland.

WANTED: Pair of Heathkit HW-12 Transceivers, with AC/DC PSU's, speakers and microphones. Would purchase units individually if necessary.—Secretary, R.A.F. Amateur Radio Society, Royal Air Force Station, Locking, Weston-super-Mare, Somerset.

WANTED: Command Receiver, 1·5 to 3·0 mc model. Also Tx for 160 metres. Details and price, please. (Eire).—Box No. 4840, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: K.W. Vanguard Mk. II, AM/CW Tx, in mint condition and perfect working order, price £35 or near offer.—Holt, G3PTS. Dovehouse Farm, Dovehouse Lane, Solihull, Warwickshire. (After 4 Nov.).

POSTED To You for £5: Joystick de luxe with Type 3A tuner, hardly used.—Rickerd, 6 Penfold Drive, Great Billing, Northants.

OFFERING: National HRO, with five coil packs, fully stabilised PSU and speaker. Also a six-band converter, with other extras.—Snow, 14 Truro Walk, Romford, Essex.

WANTED: For a two-metre Tx, a good HC-6U crystal between 12·1250 and 12·1625 mc. Please state your price.—Struthers, GM8CVN, Ravello, 17 Wilton Hill, Hawick, Roxburghshire, Scotland.

WANTED: Genuine R.C.A. S-meter and trimming tools for an AR88D. Price and details.—Richardson, 2 Edna Road, Maidstone, Kent.

SMALL ADVERTISEMENTS, READERS—*continued*

SELLING: Heathkit RA-1 amateur-band receiver, covering 10 to 160 metres, in excellent condition, asking £30 or near offer.—Winter, G3XCW, 48 Ann Road, Wythall (6036), near Birmingham.

SALE: National HRO receiver, nine coil packs, original PSU, speaker, new capacitors, manual and spare valves, £25.—Sharman, 39 Kechill Gardens, Hayes, Bromley, Kent. (Tel. 01-462 2083.)

SELLING—Transformers, standard primaries: 650-0-650v. 250 mA, 100v. bias, 6v., 5v., heavy core, 30s.; Woden de luxe MT.15 500-0-500v. 150 mA, 6v., 5v., 40s.; UMØ modulation type, 15-watt, 30s. SCR-522 mod. transformer, 7s. 6d.; auto-transformer, 230v./110v., 500 watts, heavy, 30s. Collect big stuff, please, but will deliver to 30 miles.—Ingram, 5 Springhill Cottages, Snowshill, Broadway, Worcs.

STUDENT SWL Selling: Eddystone 840A, latest model, communications receiver covering 480 kc to 30 mc (10 to 600 metres), including shipping and distress bands, complete with manual, S-meter, aerial trimmer, and isolation transformer, in excellent condition, £23 10s. or near offer. Brec mains and battery receiver, coverage 13 to 125 metres, with battery and mains PSU, ideal for beginner, needs slight attention, 65s. Bush receiver Type AC.II, for long, medium and short-wave reception, new model, hardly used and in excellent condition, £6 10s. or near offer. Also many copies "Short Wave Magazine."—Ring Shams, 01-556 0312, after 6.30 p.m., or weekends.

METERS: Ranges 0-50 mA, 0-350 mA, 10s. 6d. New moving-coil microphones and headsets, 12s. 6d. New AFV 38 Sets, in original packing, with PSU, aerial and base, spares, etc., also handbook, £6 10s. Other items available, send s.a.e.—Vaughan, 65 London Road, Benfleet, Essex, SS7-5TG.

MUST SELL: HRO-500 in excellent condition, offers or exchanges. Also unused electronic key, preselector, Swan-500 little used, and Swan external Vox unit, new. Also a few other bits-'n-pieces. Prices?—let's talk.—Ring Romford 61191, evenings only (QTH: 114 Lodge Lane, North Romford, Essex).

LARGE Supply of 8 mc crystals, HC-6U, brand new and sealed, many on same frequency (for nets, etc.), send s.a.e. for list.—Pickers, G3YUA, 8 Croftway, Markfield, Leicestershire.

SALE: Drake L-4B linear amplifier (current price £415), used few months only and in as-new condition, £350.—Walker, G3AZT, Woodcote, Tubney, near Abingdon, Berks.

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