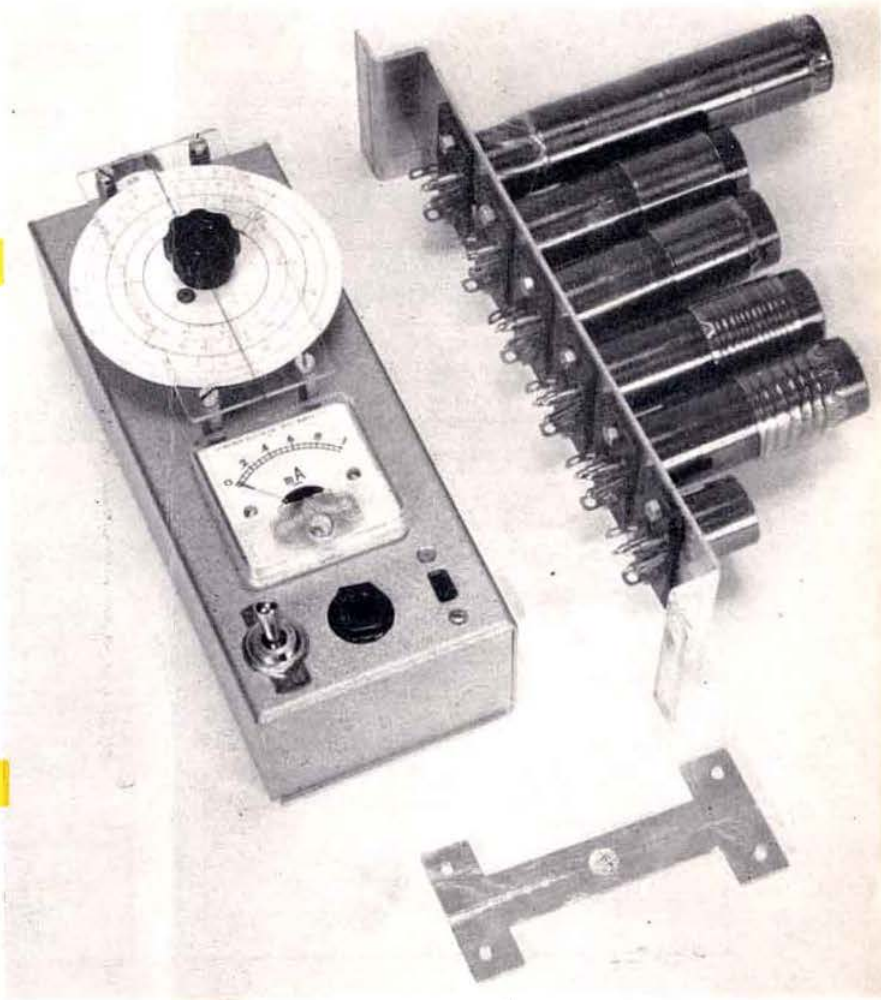
RSGB BULLETIN

APRIL 1966
VOL. 42. No. 4

G3HBW Transistor Dip Oscillator



JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

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(All British models are available in kit form or assembled. Deferred terms available U.K. over £10)

RG-1 Receiver

GC-1U Receiver

RA-1 Receiver

DX-100U Transmitter

"AMATEUR" BANDS RECEIVER, Model RA-1. Covers all "amateur" bands, 10-160 metres. Half-lattice crystal filter at 1·6 Mc/s I.F. Provision for fixed, portable or mobile uses. Switched USB and LSB for SSB.
Kit £39.6.6 Assembled £52.10.0

"AMATEUR" TRANSMITTER, Model DX-100U. Covers all the "amateur" bands from 160-10 metres, 150 watts DC input. Own power supply. **Kit £79.10.0 Assembled £104.15.0**

SSB ADAPTOR, Model SB-10U. **Kit £39.5.0 Assembled £54.18.0**

REFLECTED POWER METER. Model HM-11U Indicates Antenna/Tx match. **Kit £8.5.0 Assembled £10.10.0**

NOTE: All prices quoted are Mail Order prices.

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Model QPM-16 for 1·6 Mc/s I.F.
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AMERICAN CATALOGUE 1/- (Yes/No)
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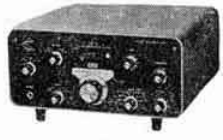
SB-400E



SB-300E

HO-10E

HW-12

FILTER-TYPE SSB TRANSCEIVER MODELS for 80, 40 or 20 metre bands. 200W P.E.P. input TX. 1μV sensitivity RX. Prealigned circuits P.C. Boards. Power reg: 800V D.C. at 250mA. 250V D.C. at 100mA. 125V D.C. at 5mA. 12V A.C. or D.C. at 375 A. Models HW-12 (80M), HW-22 (40M), HW-32 (20M), **£66.0.0 each Kit. Push/talk Mic. GH-12 £4.0.0.**
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A.C. VOLTAGE: 10V f.s.d. — 1,000V f.s.d. in 5 ranges.
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RESISTANCE: 0—2MΩ in 2 ranges, using 1.5V cell.
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Volume 42 No. 4

April 1966

4/- Monthly

RSGB BULLETIN

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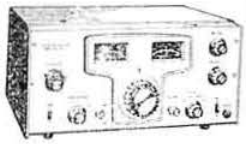
SUPERB LAFAYETTE AMATEUR EQUIPMENT

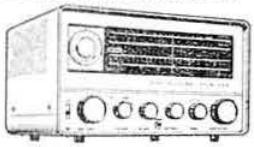


H.A. 350 10-80 METRE AMATEUR RECEIVER

A superb receiver. Dual conversion with mechanical filter. 12 valves, crystal controlled osc., product detector, 100 kc/s crystal calibrator, crystal B.F.O., A.N.L., 'S' meter. Rock like stability. Brand new and guaranteed. **75 GNS.** S.A.E. for full details.

HA. 230 DE-LUXE GENERAL COVERAGE RECEIVER

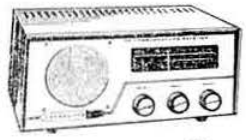
Wonderful value. 8 valves + rectifier. Coverage 550 kc/s-30 Mc/s. 1 R.F. and 2 I.F. stages, 'Q' multiplier, B.F.O., A.N.L., 'S' meter, electrical bandspread, aerial trimmer etc. Brand new and guaranteed. **£33** S.A.E. for full details. Also available in easy to assemble Semi-kit form at **25 GNS.**



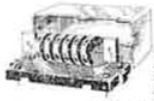
HA-63 GENERAL COVERAGE RECEIVER

7 valves + Rectifier. 4 Bands 550 kc/s-31 Mc/s. "S" Meter-BFO-ANL-Bandspread Tuning 200/250v. A.C. Brand new. **24 GNS.** carr. paid.

HA-55 AIRCRAFT RECEIVER.



108-136 Mc/s. High selectivity and sensitivity. Incorporates 2 RF stages including 6CW4 Nuvistor, 8 tubes for 11 tube performance, solid state power supply, adjustable squelch control, slide rule dial, built-in 4 in. speaker and front panel phone jack. 220/240V. AC. Supplied brand new and guaranteed. **£19.17.6.** Carr. 10/-.



PRECISION MECHANICAL FILTER

As used in HA. 350 Receiver. For superb selectivity. For 455 kc/s I.F. provides 60db attenuator at 2·5kc either side. Complete adjacent channel rejection **£9.19.6.** post paid.

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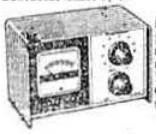
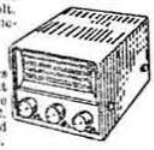
Compact true one hand operation. Frequency range 1·7-180 Mc/s 230V. A.C. operation. Supplied complete with all coils and instructions **£12.10.0.** Carr. 5/-.

TM-59'er "S" METER



Signal strength meter using VTVM principles. Calibrated in S units. Sensitivity and zero adjustments. For any superhet receiver with ACV. Requires 150/200 volt and 6 or 12 volt. Complete with valve and full instructions. **59/6.** Post and packing 2/6.

DE-LUXE V.F.O.



5 bands covering 80-10 metres. Employs high 'Q' series tuned Clapp Osc. High output 10-20 volts to drive any TX. Large slide rule dial. Dual impedance O/P. 230V. A.C. operation. Size 6½" × 5½" × 7½". Supplied complete with all instructions. **16 GNS.** Carr. 7/6.

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CODAR AMATEUR RADIO EQUIPMENT

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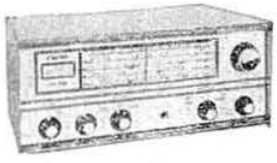

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7 valves. 550 kc/s-30 Mc/s.
Only **£19.10.0.**

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160 and 80 metres. 12 watts.
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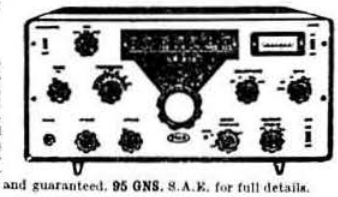
R.Q.10X Self powered	£8	8	0
A.T.5 Amateur TX.	£19	10	0
A.T.5 Mains P.S.U. ..	£8	0	0
A.T.5 12v. Trans. P.S.U.	£11	5	0

A.T.5 Remote control and Aerial Switching Unit	£2	7	6
C.C.40 Station Control Unit	£6	10	0

Postage Extra.

STAR SR.660 AMATEUR COMMUNICATION RECEIVER



New crystal controlled triple conversion de luxe 80-10 metre band receiver. Extremely high sensitivity, selectivity and stability. Special features include 3 I.F. stages, crystal controlled oscillator, 4 section L/C filter, "S" meter, BFO-ANL, 100 kc/s crystal calibrator, etc. Supplied brand new and guaranteed. **95 GNS.** S.A.E. for full details.

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5mA ..	..	22/6	
10mA ..	..	22/6	
20mA ..	..	22/6	
50mA ..	..	22/6	
100mA ..	..	22/6	
150mA ..	..	22/6	
200mA ..	..	22/6	
300mA ..	..	22/6	
500mA ..	..	22/6	
750mA ..	..	22/6	
1-0-1mA ..	..	22/6	
1A.DC ..	..	22/6	
2A.DC ..	..	22/6	
5A.DC ..	..	22/6	
"S" Meter ..	..	29/6	
50μA ..	..	32/6	
100μA ..	..	29/6	
200μA ..	..	27/6	
500μA ..	..	25/-	
50-0-50μA ..	..	29/6	
100-0-100μA ..	..	27/6	
500-0-500μA ..	..	29/6	
1mA ..	..	22/6	

3V.DC ..	..	22/6	
10V. DC ..	..	22/6	
20V. DC ..	..	22/6	
50V. DC ..	..	22/6	
100V. DC ..	..	22/6	
150V. DC ..	..	22/6	
300V. DC ..	..	22/6	
500V. DC ..	..	22/6	
15V. AC ..	..	22/6	
50V. AC ..	..	22/6	
150V. AC ..	..	22/6	
300V. AC ..	..	23/6	
500V. AC ..	..	22/6	
"S" Meter 1mA ..		29/6	

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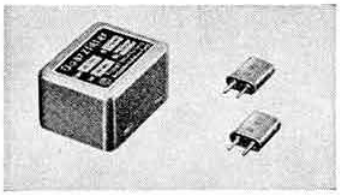

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Bandwidth (-6 db)	2.5 kc/s	2.4 kc/s
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Stop band attenuation	> 45 db	> 80 db
Dimensions	only 1.05" × 1.42" × 0.75"	
Centre frequency	9.0 Mc/s	

Delivery: immediate
Application notes supplied with each unit
Price (including 2 subminiature carrier crystals and sockets)
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XF-9A £15.15.0
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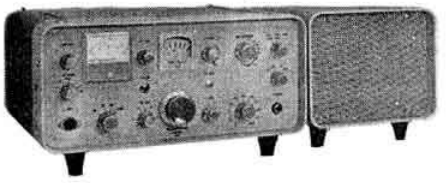
KW EQUIPMENT NOW AVAILABLE FROM STOCK



KW2000 transceiver £173, **P.S.U.** £32.
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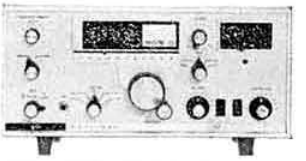

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Impedance: 50-75 ohms
VSWR: less than 1.2:1 over the range DC-100 Mc/s
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Current Comment

discusses topics of the day

Region I Conference

DELEGATES from the member societies of the IARU Region I Division will soon be assembling at Opatija on the Yugoslav Adriatic coast to deal with agendas that are, by the standards of previous conferences, of unusual length. Some agenda items will deal with matters of detail, others will be concerned with matters that are vital to the future of the Amateur Radio movement. It is hoped that, whatever matters will have been brought to the Conference by individual Societies, their delegates will be not only willing, but anxious, to deal primarily with the question that concerns us all and on a world wide basis—the maintenance of our existing frequency allocations.

Delegates will be well aware of the changes that have recently taken place in the world of telecommunications and these events are bound to have repercussions on Amateur Radio. Plans may now be in the hands of administrations who regard our activities not only with disinterest, but possibly with active disfavour. Attempts will undoubtedly be made to reduce our bands on the grounds that these frequencies are required for additional point-to-point stations, broadcasting, or other services. By this standard of expansion are not additional frequencies also required for amateur work? The world wide total of licensed amateur operators now exceeds the massive figure of more than 350,000. Surely an organization representing so many should command attention from those in whose hands their future largely lies.

How can this be achieved? First, by ensuring that there exists the fullest possible co-operation between each IARU Society and the Telecommunications Authority of the country concerned. Without detailing past history it can be said that the unfavourable attitude of certain administrations to Amateur Radio can only be attributed to absence of this vital co-operation. Secondly, by ensuring that the IARU has the power and the finance to enter into battle on behalf of the amateur wherever in the world such action might be necessary. Representation at ITU Conferences is one of the actions falling in this category, and is a matter that must not fail by default.

The Region I Division is strong and cohesive, and it is necessary that the Region II organization, recently formed, and the yet unborn Region III Division, should be at least as well organized. By drawing on the undoubted ability of those willing to guide each of the three Divisions it should not be difficult to form a world wide council of considerable strength which would be a great asset to the amateur movement.

Some two years ago RSGB formed a Working Group for the express purpose of preparing the ground for this and future conferences affecting Amateur Radio. The Society is anxious to co-operate with all those who aim to preserve the amateur movement, and we are looking forward to Opatija as a milestone on the road along which IARU must progress if our ideals are to be realized. There is abundant confidence that many other Member Societies have similar views, and we hope to continue fruitful co-operation on matters vital to amateurs everywhere.—R.F.S.

NEXT MONTH . . .

The Society's IGY Aurora Programme
Part I of a report by C. E. Newton, G2FKZ

The KW "Vespa" Transmitter
A review of this new s.s.b. transmitter

Technical Topics

Rules for the RSGB 21/28 Mc/s Telephony Contest 1966

and many other technical and topical features

. . . IN THE RSGB BULLETIN

A Transistorized Dip Oscillator

By A. L. MYNETT, B.Sc., G3HBW*

THE transistorized " grid dip " oscillator to be described was originally developed to satisfy the requirement for a small piece of equipment, suitable for a group constructional project for the Radio Society of Harrow, following the success of an earlier project in which a large number of simple 2m and 4m converters was built. The design of this " g.d.o." has now been fairly thoroughly tested as about 35 have been produced, all of them giving much the same performance.

Circuit

Basically, the arrangement comprises a multi-frequency range transistor oscillator, covering 0·85 to 150 Mc/s in seven ranges, using plug-in coils, a diode detector and a transistor d.c. amplifier operating a meter —see Fig. 1. The unit contains its own 9 volt battery, the " g.d.o." actually running from a 6·8 volt Zener-stabilized line, an arrangement which helps to reduce the effects of battery voltage variation. The total current consumption is 5 mA. A generous overlap is provided between the frequency ranges, L2, L3, L4 and L7 covering two amateur bands each and L5 three amateur bands (Table 1).

The writer has often been annoyed by the operation of various commercial g.d.o.'s, the meter indications of which vary widely over each tuning range and which also exhibit spurious dips and peaks. The former effect is usually due to large variations in feedback over the tuning range. The effect is also occasionally caused by the actual meter indication being " bridged out " to a certain extent to increase deflection sensitivity in a design in which the feed-back is much too large and oscillation consequently difficult to stop or reduce.

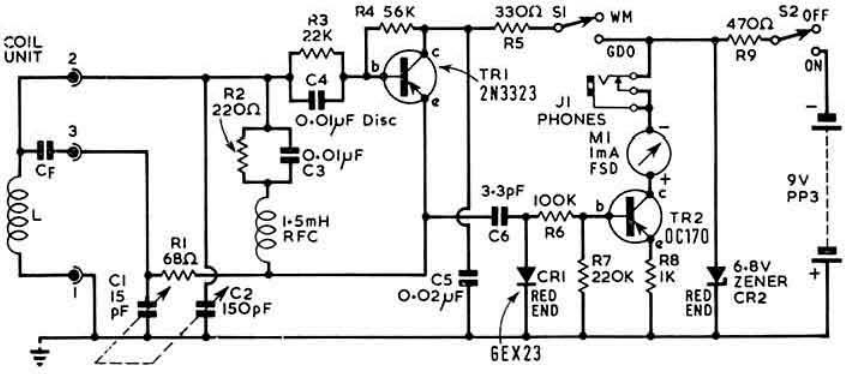


Fig. 1. The G3HBW dip oscillator covering 0.85—150 Mc/s. The r.f transistor TR1 is an inexpensive v.h.f. type manufactured by Motorola. S1 is provided to enable the dip oscillator to be used as a sensitive wavemeter.

Spurious dips and peaks are usually the results of subsidiary resonances associated with the oscillatory circuit, such as are produced by tapped coils with poor coupling factors between the two parts or possibly by the use of two capacitors in parallel in an attempt to achieve both h.f. and l.f. bypassing at some point in the circuit. This usually leads to shunt resonance of the two capacitors at a fairly high frequency where the larger of the two " looks " inductive. Excessively tight coupling of the active element, i.e. the transistor or valve, to the tuned circuit may also lead to this kind of trouble, due to large and violent phase shifts occurring.

It therefore seems necessary, for the purpose of g.d.o. design, to produce an oscillator circuit, not using tapped coils or requiring highly effective l.f. bypassing and in which the feedback may be arranged to be only just sufficient to maintain oscillation over the whole of each tuning range. Some degree of negative feedback would probably be desirable to assist in maintaining the latter condition and also to reduce the effect of gain variations between particular transistors. It might perhaps seem odd to employ negative feedback in an oscillator circuit which depends upon positive feedback for its operation! The justification for its use can be seen when it is realized that an oscillator circuit may be divided into two parts, the forward circuit and the reverse or feedback circuit. The former contains an active element contributing gain, whilst the latter is a tuned coupling filter, giving selectivity and attenuation. The loss in the second part is usually arranged to be just a little less than the gain in the first, so that the overall, or " loop," gain is just greater than unity. If the phase relationships are correct, the device will then oscillate.

The most variable part of the system is usually the active element and so, by applying negative feedback to it and bringing the loop gain up to around unity again by adjusting the loss in the return circuit, a very worthwhile improvement in operating stability may usually be obtained. The performance may also be made much more independent of transistor or valve characteristics. This policy has been adopted in the present design.

The oscillator circuit chosen is a grounded-collector Colpitts, with only part of the tuning capacitance tapped for connection to the emitter. If the 15pF variable capacitor (C1), shown ganged to the 150 pF variable (C2) in the circuit diagram, were in fact fixed, the coupling of the transistor input and output circuits to the tuned circuit would vary with rotation of the main 150 pF tuning capacitor, the effective positive feedback falling as the value of the tuning capacitance was increased. The combination of the stray capacitances in the circuit with the ganged 15 pF variable capacitor results in almost constant feedback being obtained over all ranges except the highest frequency one, where the feedback mechanism is somewhat different. The required value of the capacitance C_F varies with the frequency range in use and so the appropriate value of C_F is built into each coil range. Increasing the value of C_F reduces the feedback ratio.

The reactance of the 3·3 pF coupling capacitor (C6) and

*52 The Rutts, Bushey Heath, Watford, Herts.

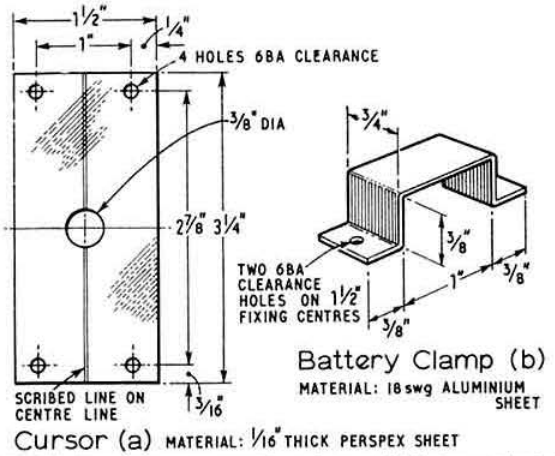


Fig. 2(a). The perspex cursor dimensions, and (b), the method of forming the battery clamp.

the essentially resistive impedance of the diode and its load, form a potentiometer which delivers a nearly constant d.c. to the base of TR2, except on the highest frequency range, where the meter reading is reduced to about one third of full scale deflection.

The coil is used as part of the d.c. return circuit for the oscillator transistor emitter current to avoid shunting the greater part of the tuned circuit with the 1·5 mH r.f. choke.

Provision is made to remove the d.c. supply from the oscillator transistor when required so that the " g.d.o." may be used as a sensitive wavemeter and also as monitor by employing the 'phones jack in the d.c. amplifier collector.

Construction

The transistorized " g.d.o." is built into a small 18 s.w.g. aluminium box, provided with a close-fitting, flanged lid, the box and lid being available ready made. The outside of the box and lid may be painted if desired. If this is to be done, grey, air-drying, hammer finish spray paint is recommended, preceded by one coat of aluminium paint as a primer.

The coils for each range plug into a socket on one end of the box. Ordinary three-pin battery plugs and sockets are used, the plug being glued, and then forced into a length of Paxolin tubing of suitable diameter on which the coil is wound.

The battery is mounted in a small clamp inside the lid and connected to the g.d.o. proper by means of flying leads. A normal toggle switch is used for the main on-off function and a small slide switch to select either G.D.O. or WAVEMETER operation. This was done so that there would be no confusion as to whether the instrument was switched off or not, which might have occurred if two similar switches had been used. However, any appropriate type of switch may, of course, be employed, the necessary adjustments being made when drilling the box. If a miniature slide switch of foreign manufacture is employed, it will probably be found necessary to tap its fixing holes 8 BA. Any type of insulated jack socket may be utilized, provided that it is of the shorting variety.

First, the Perspex dial cursor and aluminium battery clamp should be manufactured, according to Fig. 2(a) and (b) respectively. It is necessary to be very careful when cutting and drilling the $\frac{1}{16}$ in. thick Perspex sheet. A hand drill is to be preferred to a power-operated one to avoid the risk of splitting. The large centre hole should be opened out from a suitable smaller size with a repairman's reamer or a round file. A useful ancillary to be employed when marking the dial may be made from 18 s.w.g. aluminium sheet of the same dimensions as the Perspex cursor. Mark and drill the holes as in the cursor proper, using the latter as a marking-out template. Draw the centre line on the aluminium strip along its greater dimension and then mark out and drill four $\frac{1}{16}$ in. diameter holes along this centre line, at distances of $\frac{1}{16}$, $\frac{9}{16}$, $\frac{13}{16}$ and 1 in. from one end. Finally, cut carefully along the centre line, through the four holes and as far as the centre hole, with a fine hacksaw. A suitable thin blade for the

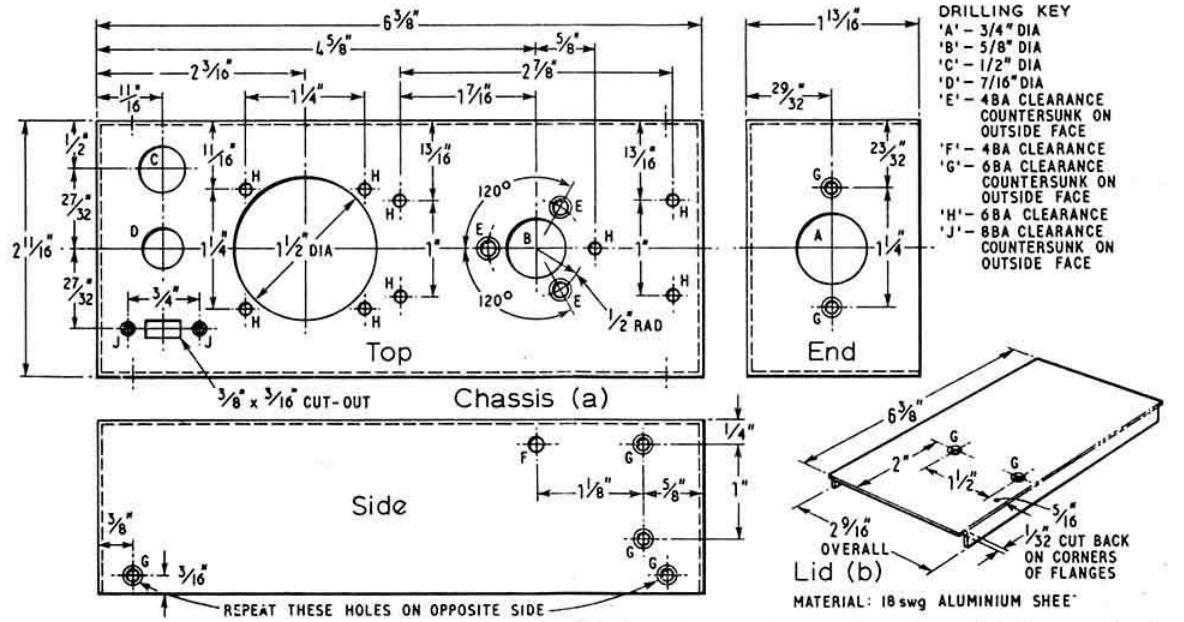


Fig. 3. Drilling details suitable for a standard 6¾ × 2¹⁵⁄₁₆ × 1¹⁵⁄₁₆ in. aluminium box. The cursor is spaced above the top of the box, over the slow motion drive which is also mounted on the exterior of the box.

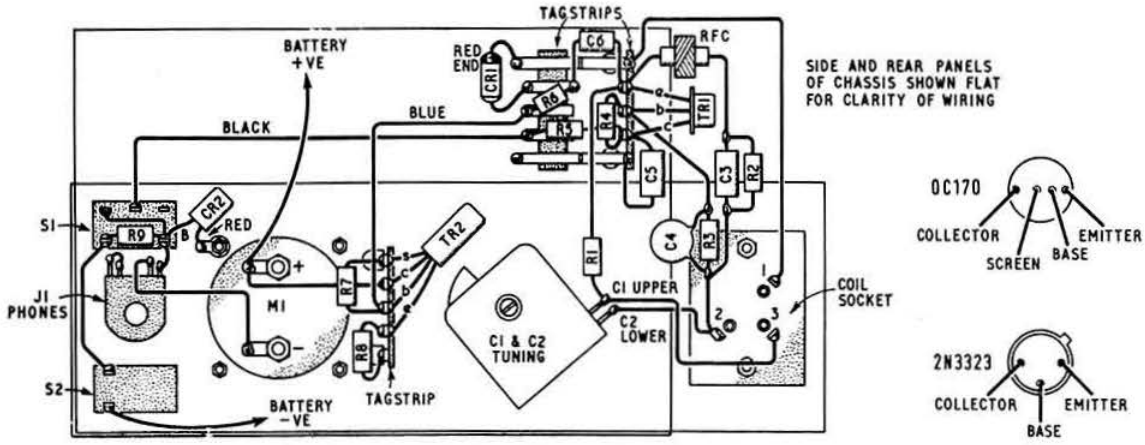


Fig. 4. Wiring diagram and component layout for the dip oscillator.

purpose may be made by grinding away the set of the teeth on a Junior Eclipse hacksaw blade, using a grindstone.

When making the battery clamp, perform the inner bends first and then the outer, finally marking and drilling the holes. The holes may now be drilled in the box and lid (see Fig. 3). The 1½ in. diameter hole for the meter may be cut with a Q-Max punch and die or by the use of an Abrafile. The four holes for fixing the lid should be marked out through the corresponding holes in the box and then drilled and tapped 6BA.

The shaft of the tuning capacitor is cut off so that only about $\frac{1}{16}$ in. of its length is left protruding. Both capacitor trimmers, if fitted, are then opened out to their fullest extent and the capacitor is mounted in the box by means of three 4BA countersunk head screws, *not more than ½ in. long*, using two 2BA full nuts on each as spacing washers and screwing tightly into the tapped holes in the capacitor end-plate. *If the screws used are too long, they are liable to damage the vanes of the capacitor beyond repair.* Before the capacitor is bolted home, insert a ⅜ in. long 6BA cheesehead screw into the lug fixing hole for the slow-motion drive, the head of the screw being inside the box. Next, the operating shaft of the slow-motion drive is cut off so that only about ½ in. of it remains, the drive is fitted over the capacitor shaft and the slotted lug is bolted to the box, using a single 6BA spacing washer and a 4BA nut as packing, between the lug and the box. The clamping screws may now be tightened on the capacitor shaft by manipulating a small screwdriver through the hole in the side of the box, which has been provided for the purpose.

A scale disc, 2⅜ in. in diameter is made from thin card or, better, from $\frac{1}{16}$ in. thick white plastic sheet, such as Ivorine, and a $\frac{5}{16}$ in. diameter hole is made in the centre, together with two 8BA clearance holes, ⅝ in. apart, so that the disc may be screwed to the drive flange, using two 8BA $\frac{3}{16}$ in. long, countersunk head screws. The two switches, the jack socket (using all packing washers on the inside of the box), the meter, the tagstrip in the centre of the box and the coil socket are then all mounted in the box. The two tagstrip-mounting screws are ¾ in. long and serve also to support the lower end of the perspex dial cursor, with two $\frac{13}{32}$ in. long pieces of $\frac{3}{16}$ in. o.d., 21 s.w.g. wall brass or aluminium tubing as packing pieces between the top of the box and the cursor. The other end of the cursor is supported in a similar way using two more 6BA screws, nuts and pieces of tubing. Ensure that the coil socket is bolted on the inside of the end wall and is put in the correct way round (see Fig. 4).

The two fixing lugs of *one* of the two remaining tagstrips are bent away from the strip through a right angle, so that its fixing feet are parallel to the tags themselves. The two tagstrips are then bolted together, by means of their fixing feet (to facilitate wiring) in the manner indicated in Fig. 4. The tagstrips are not yet actually bolted into the box. A touch of solder on the sides of the fixing feet holds the tagstrips together.

Finally, it will have perhaps been noticed that only one of the seven coil sockets has so far been used. The other six may conveniently be mounted on a suitable 18 s.w.g. aluminium strip to serve as storage for the six coils not actually in use.

Wiring

Wiring up the g.d.o. is a simple process. First, the double tagstrip arrangement should be partially completed as a unit, inserting R4, R5, R6, C5, C6 and CR1 but not TR1. Then bolt the tagstrips in position in the box, as shown in Fig. 4. Connect R1, R3, C4, R2, C3, RFC and also the interconnecting wires between the tuning capacitor, coil socket and tagstrips. The parallel pair, R2, C3, should be brought up vertically from coil socket connection 2, between connection 1 and the pin sockets of 2 and 3. The 2N3323 transistor, TR1, may then be soldered† into position. Next, attach R7, R8 and TR2 to the centre tagstrip and R9 and CR2 to the slide switch. Two unused poles of the d.p.d.t. slide switch are used as anchoring points for R9. Finally, complete the rest of the wiring, to the switches, jack socket, meter, tagstrips and battery connector, according to Fig. 4. Observe the polarity of the battery connections!

Coil Construction

The general arrangement of the various coils is shown in Fig. 5. For the five lowest frequency ranges, covering 0·85 to 34 Mc/s, the form of construction shown in Fig. 5 (a) is adopted. The v.h.f. coils, L6 and L7 are made self-supporting, as shown in Figs. 5 (d) and 5 (c) respectively. In all cases, the feedback capacitor (or capacitors) is mounted on the plug base, its wires being soldered into the pins.

First, cut one 4¼ in. length and four 2½ in. lengths of ⅛ in. o.d., ⅛ in. thick wall Paxolin tubing, filing the ends at right angles and smoothing them off. Take the longest tube and

† A heat shunt should be used to protect the transistor while soldering it into the circuit.

drill $\frac{1}{16}$ in. diameter holes $\frac{3}{16}$ in. and $3\frac{3}{8}$ in. from one end on a line along the length of the tube. Do the same with the four shorter lengths, drilling the holes $\frac{3}{16}$ in. and $1\frac{1}{4}$ in. from one end. Remove the burrs and sharp edges from these holes, both inside and out. Now cut off and file square two lengths of $\frac{3}{4}$ in. o.d., $\frac{1}{16}$ in. thick wall Paxolin tube, both $\frac{5}{8}$ in. long (the other size of tubing will do if this is not available). Take the seven aluminium plug-shrouds and, supporting them carefully with a pair of narrow-nosed pliers, cut off the constricted portion with a fine hacksaw, leaving a $\frac{3}{16}$ in. length of the $\frac{5}{8}$ in. o.d. aluminium tube portion with, of course, the four tabs still attached. Square off the end remote from the tabs and file a small chamfer on the outside at this end to provide a lead, when inserting into the Paxolin tubes. Put a smear of Durofix on the outside of the aluminium tubes and then force each of them into one of the five longer Paxolin tubes, at the end remote from the holes, so that a $\frac{1}{16}$ in. length of the aluminium tubes, together with the four tabs, are left protruding. When the glue is dry, the coils may be completed. The writer is, by the way, indebted to G3RAN for suggesting this way to make cheap and effective plug-in coils.

The three lowest-frequency coils are close-wound (Table 1). Winding the coils for Ranges 1 and 2 is perhaps made easier if a simple procedure is adopted. Start at the plug end, passing the 28 s.w.g. wire through the hole and then temporarily anchoring the free end with Sellotape, hold the plug end of the former in the left hand and wind on about ten turns at a time, with a small spacing. Then, keeping the tension on the wire with the right hand, use the index finger of the left hand to push the turns together. When the coil is completed, pass the free end of the wire through the hole and anchor it temporarily with Sellotape, as at the start. The beginning and end turns of the coil may be secured with adhesive Melinex tape if desired but ordinary Sellotape should not be used for a permanent job, as it is hygroscopic.

The coils for Ranges 4 and 5 should be spaced out after winding to fill the available winding space. Take both ends of the coil down through the plug end of the tube, cut off so that only about 1 in. is left protruding and then bare the whole of this length, sliding an inch or so of loose-fitting sleeving on to each lead. Take the feedback capacitor appropriate to the range (Table 1). If two or three are required, parallel them as shown in Fig. 5 (a). Then pass one capacitor lead into pin 3 of a plug base, cut off and solder in position, leaving the capacitor pointing away from the plug base, as shown. Bend the other capacitor lead over and push into pin 2, but do not solder. Then offer up the plug base to the coil, pushing the coil leads into the appropriate pins, cut off the leads and solder. Test the coil in the g.d.o. before folding over the tabs.

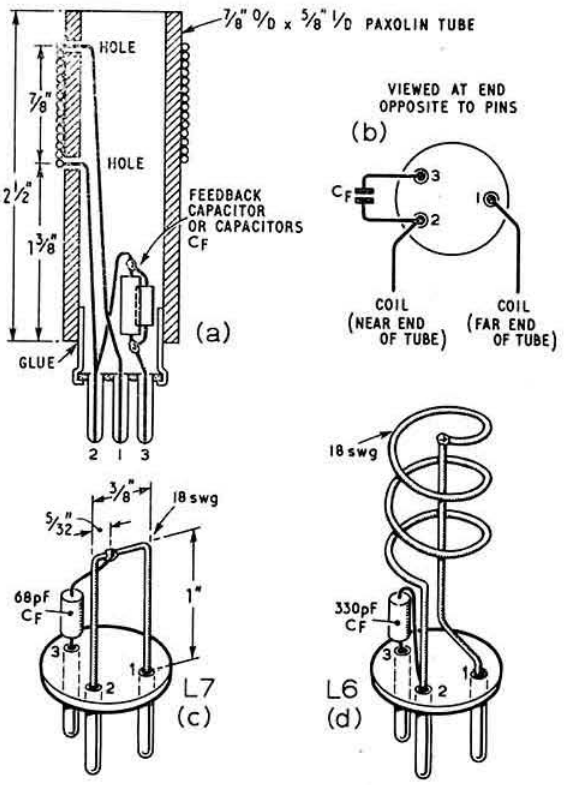


Fig. 5. The coil assemblies, the five lower ranges are wound on Paxolin tubes, while ranges 6 and 7 are airwound.

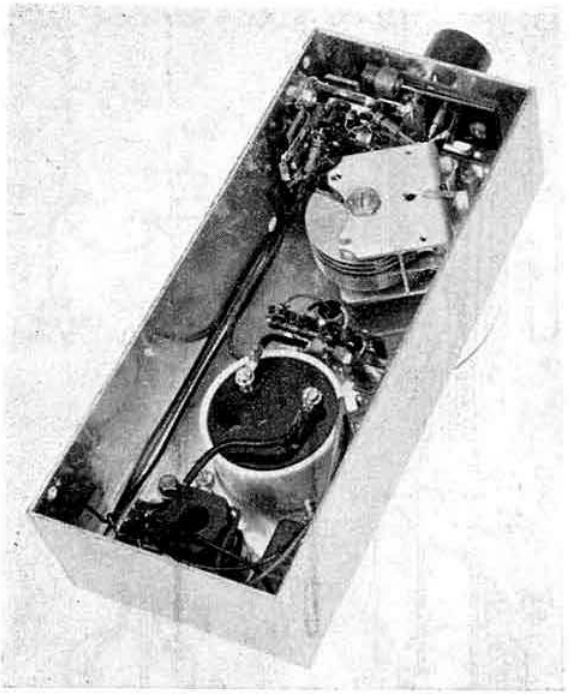
The coil for Range 6 is wound on a $\frac{3}{8}$ in. diameter drill or rod as a mandrel. The forms of construction of L6 and L7 are self-evident from Figs. 6 (d) and (c). The two short pieces of $\frac{3}{4}$ in. o.d. Paxolin tubing already prepared are used as protecting shrouds for these two v.h.f. coils.

Testing and Calibration

The circuit connections should first be checked carefully. If all is well, plug in the Range 1 coil (0·85 to 2·0 Mc/s) and,

TABLE 1
Coil Winding Details

Coil No	Range Mc/s	No. of turns	S.W.G.	Former o.d.	Former Length	Winding Length	CF total
1	0·85 to 2·0	180	28	$\frac{3}{4}$ in.	$4\frac{1}{8}$ in.	$3\frac{1}{16}$ in. (close wound)	3 × 1,000pF
2	1·8 to 4·0	54	28	$\frac{5}{8}$ in.	$2\frac{1}{2}$ in.	$\frac{5}{8}$ in. (close wound)	2,200 + 820pF
3	3·4 to 8·0	27	22	$\frac{5}{8}$ in.	$2\frac{1}{2}$ in.	$\frac{5}{8}$ in.	2,200 + 680pF
4	6·7 to 16	13	22	$\frac{5}{8}$ in.	$2\frac{1}{2}$ in.	$\frac{5}{8}$ in.	3,300pF
5	13·5 to 34	6	22	$\frac{5}{8}$ in.	$2\frac{1}{2}$ in.	$\frac{5}{8}$ in.	2,200pF
6	33 to 85	3	18	wind on $\frac{3}{8}$ in. drill (see Fig. 5 (d)).	shroud $\frac{5}{8}$ in. long	coil $\frac{1}{2}$ in. long	330pF
7	50 to 150	1	18	(See Fig. 5 (c)).			68pF



The underside of the dip oscillator constructed by G3HBW.

with the function switch set to g.d.o. and the tuning capacitor at mid-scale, switch on. A meter reading of from 0·5 to 0·7 mA should result. If no meter reading is produced, try the next Range 2 coil. Should success still not be obtained, check the polarity of the detector diode CR1, whose red (positive) end should be connected to the chassis. Correct operation of the d.c. amplifier may be ascertained by momentarily bridging the collector and base connections on the TR2 tagstrip with a 470 K ohm resistor, which should give a reading of about 0·4mA on the meter. If this is successful, listen for the signal from the g.d.o. on a receiver. If nothing is heard, disconnect one end of CR1 and listen again, as a diode with very poor reverse characteristics may prevent oscillation. Using methods such as these, the fault should be localized.

When all the ranges have been made to oscillate, check the frequency coverage, which should not differ by more than a few per cent from the frequencies quoted in Table 1. Beware of image response and other spurii in the receiver, particularly if the g.d.o. signal is very strong. If the frequencies all seem too low, particularly at the h.f. ends, you have probably forgotten to unscrew the trimmers on the tuning capacitor! It will then usually be found easier to break the strip leads to the trimmers with a small pair of pliers, or unsolder them carefully.

The greatest meter deflection is usually obtained near the h.f. end of Range 3 or 4. This should be almost full scale. If the deflection is too large or too small, it may be adjusted by reducing or increasing, respectively, the value of R7.

It may, perhaps, be found that some coil ranges will not oscillate over the whole of the tuning capacitor travel; usually the h.f. ends are affected. If only one or two ranges are defective, the value of the built-in feedback capacitor should be reduced by about 5 or 10 per cent. However, if several ranges are unsatisfactory, a 2N3323 transistor of exceptionally low gain may have been used for TR1 and, in this case, it should either be changed or the value of the negative feedback resistor, R1, should be reduced to 56 ohms or even lower, until the trouble is cured.

Now, check all the coil Ranges 1 to 7 in the oscillator, tuning right round on each range. The indicated currents should be roughly the same as those given in Table 2 and should vary smoothly across each range, without spurious dips or peaks. It will be found possible on any particular range to use the self-resonance of the coil two ranges lower to check the g.d.o. action. Oscillation should be completely stopped at resonance, with only moderately close coupling between the coils. The meter deflection on Range 7 becomes rather small below about 60 Mc/s, but only the upper portion is required, in any case, as the Range 6 coil covers the frequencies below 85 Mc/s.

The g.d.o. is now ready for calibration. The dial-marking

TABLE 2
G.D.O. Meter Deflections and Frequency Calibration Points

Range	Meter Deflection L.F.	Meter Deflection H.F.	Calibration Points (Mc/s)														
1	0·50	0·70	·85	·90	·95	1·0	1·1	1·2	1·3	1·4	1·5	1·6	1·7	1·8	1·9	2·0	
2	0·65	0·80	1·8 3·4	1·9 3·6	2·0 3·8	2·1 4·0	2·2	2·3	2·4	2·5	2·6	2·7	2·8	2·9	3·0	3·2	
3	0·80	0·85	3·4 5·6	3·5 5·8	3·6 6·0	3·7 6·5	3·8 7·0	3·9 7·5	4·0 8·0	4·2	4·4	4·6	4·8	5·0	5·2	5·4	
4	0·85	0·90	6·75	7·0	7·5	8·0	8·5	9·0	9·5	10	11	12	13	14	15	16	
5	0·80	0·80	13·5 26	14·0 27	14·5 28	15·0 29	16 30	17	18	19	20	21	22	23	24	25	
6	0·40	0·65	33 47	34 48	35 49	36 50	37 55	38 60	39 65	40 70	41 75	42 80	43 85	44	45	46	
7	0·25	0·30	50 120	55 125	60 130	65 135	70 140	75 145	80 150	85	90	95	100	105	110	115	

(Frequencies underlined are actually marked on the dial)

template described earlier is a useful tool for the purpose, but a device made from 18 s.w.g. tinned copper wire, bent and soldered together in the form of an " H " so that it may be bolted to the stand-off pillars in place of the Perspex cursor is usually satisfactory. Four concentric circles are drawn on the dial, using differently coloured ball-point pens in the four holes of the template, or held against suitable slight kinks in the wire marking-guide. The radii of the four circles are, respectively, $\frac{5}{8}$, $\frac{13}{16}$, 1 and $1\frac{3}{16}$ in. The capacitor is then completely unmeshed and a line is drawn along the diameter of the disc.

The easiest method of calibration is to listen for the g.d.o. signal on a receiver, which will probably be available up to 30 Mc/s. Above this, a 2 or 4m receiver may be used and, by listening to harmonics of the g.d.o., the sub-multiple frequencies as well may be checked. A TV or f.m. receiver will provide further calibration points. Simple absorption wavemeters may be employed to check that spurious signals are not being received.

Both the upper and lower halves of the dial are calibrated, reversing the dial-marking template to suit. It is best to mark the Range 1 and 2 calibrations on the outside of the $\frac{5}{8}$ in. radius circle, Ranges 3 and 4 on the outside of the $\frac{13}{16}$ in. radius circle and so on up to Range 7, leaving one space on the outside circle as a " spare." Suitable calibration frequencies for the various ranges are given in Table 2. The frequencies underlined in the table are actually marked on the dial, the others being put on only as intermediate calibration points. An " H " pencil is probably the best writing instrument for this job.

COMPONENTS LIST

Qty.	Item	Supplier
1	18 s.w.g. aluminium chassis, $6\frac{3}{8}$ in. × $2\frac{1}{8}$ in. × $1\frac{1}{16}$ in., complete with flanged lid.	H. L. Smith, Edgware Road, London
1	Type " 00 " twin gang variable capacitor, front section 150pF, rear section 15pF.	Jackson Bros. (London) Ltd., Kingsway, Waddon, Surrey.
1	Type " F " Ball Drive, fitted $\frac{3}{4}$ in. flange.	Jackson Bros (London) Ltd., Kingsway, Waddon, Surrey.
3	5 way tagstrips.	
1	1mA f.s.d. meter, Shinohara MR38P, $1\frac{11}{16}$ in. square front.	G. W. Smith and Son (Radio) Ltd., Lisle Street, London.
7	3 pin battery plugs and sockets.	G. W. Smith and Son (Radio) Ltd., Lisle Street, London
1	S.P.S.T. toggle switch (Japanese).	Henry's, Edgware Road, London
1	D.P.D.T. miniature slide switch (Japanese).	Henry's, Edgware Road, London.
1	1·5mH miniature r.f. choke	Henry's, Edgware Road, London.
1	2 pin battery connector for PP3, with lead.	Henry's, Edgware Road, London.
1	PP3 9 volt battery.	
1	Igranic closed circuit jack socket, Type P.73.	
1	Knob, $\frac{3}{4}$ in. diameter, for $\frac{1}{4}$ in. spindle.	
1	2N3323 transistor (Motorola) (see text)	Celdis, Ltd., 4, Trafford Rd., Reading, Berks.
1	OC170 transistor.	See text.
1	GEX23 germanium diode.	See text.
1	OAZ204 Zener diode.	See text.

Small Components

Qty.			Qty.	
1	68 ohm resistor	all ½ W, 20 %	1	3·3pF ceramicon.
1	220		1	68pF ceramicon.
1	330		1	330pF ceramicon.
1	470		1	
1	1K		1	680pF
1	22K		1	820pF
1	56K		3	1000pF
1	100K		3	2200pF
1	220K		1	3300pF
			1	·01 μF disc ceramic.
			1	·01 μF paper, 150 V.
			1	·02 μF paper, 150 V.

all 5 % tolerance miniature, preferably polystyrene.

No. 2, 4, 6 and 8 BA nuts and bolts, as required.
Insulated connecting wire.

28 s.w.g. enam. copper wire
22 s.w.g. enam. copper wire
18 s.w.g. enam. copper wire
} for coil winding.

18 s.w.g. aluminium sheet.
$\frac{1}{16}$ in. thick perspex sheet.
$\frac{1}{16}$ in. thick ivorine sheet or white card (for dial).
$\frac{3}{8}$ in. o.d., $\frac{1}{8}$ in. wall Paxolin tube.
$\frac{3}{4}$ in. o.d., $\frac{1}{16}$ in. wall Paxolin tube.

Substitution of Components in the G.D.O.

Oscillator Transistor TR1. The Motorola 2N3323 was chosen as the active element for the oscillator because it was one of the cheapest devices (less than 8/-) that could be found, with a reasonable current gain and an average f_t above 300 Mc/s. This is required for effective operation on the top Range 7 (50 to 150 Mc/s). Other transistors that may be substituted with no reduction in performance or change of circuitry (apart from the transistor connections themselves, of course) include the AF102, AF118, AF139, AFZ12, 2N1742, GM0290, GM0378. These are, however, all rather more expensive than the 2N3323.

If the g.d.o. is required to work only up to 85 Mc/s (Range 6), the following transistors may be substituted for the 2N3323: AF114 series (AF114, 115, 116 and 117), AF124 series (AF124, 125, 126 and 127), AFZ11, OC170, OC171, XA141, XA142, XA143.

No changes in circuitry will be required but, on range 6, the meter indications will probably be reduced to one-half to two-thirds of the values quoted in Table 2.

D.C. Amplifier Transistor TR2. An r.f. transistor is used here:

(a) To obtain a reasonably large current gain at low currents;
(b) So that the collector leakage current is low.

The OC170 is quoted in the Components List, but others which may be directly substituted for it, without change in performance, include the AF114 series, AF124 series, OC44, OC171, GET880 series (GET880, 887, 888, 889, 890), GET881 series (GET881, 882, 885, 891, 892, 895), and, indeed, any small *p-n-p* r.f. transistor with a current gain of about 100 at 1 mA collector current and a permissible collector-emitter voltage of at least 15 V. Good samples of the OC45 should be satisfactory.

Detector Diode CR1. The diode specified for the detector is a GEX23 (miniature style envelope) or GEX54 (old style envelope), which are electrically interchangeable. However, the following will work satisfactorily: OA70, OA71.

Zener Diode CR2. The Zener diode is incorporated in the design to reduce the effects of battery voltage fluctuation, during life. Apart from the OAZ204 specified in the components list, any small 6·8 volt Zener diode will do and, in particular the BZY88 (C6V8), BZZ11, OAZ210, OAZ244 or SX68.

The Zener diode is however by no means essential to operation and it may be omitted without much reduction in performance. If this is done, R9 should be increased in value to 680 ohms.

Colour Television

A Brief Review of the Systems

By J. BISHOP, AMIEE *

ANY colour system which is intended for use as a public service must possess certain essential features. It must be stable, give faithful reproduction, be easy to operate and be compatible with existing monochrome transmissions. Compatibility means in practice that a standard monochrome receiver must be capable of receiving colour transmissions in monochrome and conversely that a colour receiver must be capable of receiving monochrome transmissions. Since existing channels are to be used, the bandwidth occupied by a colour transmission cannot exceed that of existing monochrome transmissions. The colour systems currently under consideration for a common standard possess the features mentioned above. The systems rely upon the same colorimetric theory of reproduction and differ only in the manner in which the colour information is transmitted.

From the video pick-up tubes in the television camera, a luminance or brightness signal is developed and is given by

$$E_Y = 0{\cdot}3E'_R + 0{\cdot}59E'_G + 0{\cdot}11E'_B$$

where E'_R, E'_G, E'_B are suitably corrected output voltages proportional to the amount of the red, green and blue primary colours in the original. These voltages may be considered as unity when the illuminant is at a maximum and is " illuminant C " which is the basic " white " of the system. The ratios 0·3, 0·59 and 0·11 are representative of the spectral sensitivities of the eye. The luminance signal is representative of the brightness of the scene and is radiated at full bandwidth; namely 5·5 Mc/s in the UK 625 line system. It is this signal which the standard monochrome receiver utilizes to reproduce the monochrome picture.

From the corrected tube output voltages, two signals are derived which are known as colour difference signals. These are $(E'_R - E'_Y)$ and $(E'_B - E'_Y)$. The values of these signals fall to zero when the " colour " at any instant is " illuminant C."

A characteristic of the human eye is that it becomes increasingly insensitive to colour as the detail becomes smaller until in the limit it perceives fine colour detail as monochrome. As a result of this characteristic, it is possible to transmit the colour difference signals with a much lower bandwidth than that of the luminance signal. The overall received colour picture appears sharp due to the high definition luminance signal being superimposed upon the low definition chrominance signal. From the $(E'_R - E'_Y)$ and $(E'_B - E'_Y)$ signals it is possible to derive the third colour difference signal $(E'_G - E'_Y)$, since

$$(E'_G - E'_Y) = -\frac{0{\cdot}3}{0{\cdot}59}(E'_R - E'_Y) - \frac{0{\cdot}11}{0{\cdot}59}(E'_B - E'_Y)$$

Having the luminance signal E_Y and the three colour difference signals available at the receiver, it is now a simple matter to derive the three original signals E'_R, E'_G and E'_B. This process is usually performed in the cathode ray tube, the E'_Y signal being fed to the cathodes and the colour difference signals to the respective control grids.

It is the manner in which the colour difference signals are encoded that forms the difference between the proposed systems. These differences will now be considered.

The NTSC System

This system has been operating in the USA and Japan for some years. At the time of writing, there are about four million colour receivers operating in the USA. The luminance signal is transmitted at full bandwidth and the colour difference signals undergo a linear transformation into what are known as I and Q signals. Space does not permit discussion of the reasons for this transformation but it is associated with achieving the best possible colour definition within the limits imposed by the need to contain the transmitted information within the spectrum of a standard channel. The two signals E'_I and E'_Q are quadrature modulated on a subcarrier. Balanced modulators are used so that the carrier itself is suppressed.

As quadrature modulation will probably be unfamiliar to most amateurs, the principle will be briefly described. By a process similar to the phasing system of s.s.b. generation, two carriers at the same frequency but 90° apart in phase, can be amplitude modulated with different signals, combined and transmitted as one. At the receiving end, they can be separately demodulated and the signals separated by two carrier insertion oscillators, provided that these are synchronized in frequency and phase with the original carriers.

The resultant of this quadrature modulation is a signal which varies in amplitude and phase depending on the values of E'_I and E'_Q. The frequency of the subcarrier is chosen to be high as it inevitably causes interference in the form of a beat pattern on the reproduced luminance signal due to band sharing. Careful choice of the subcarrier frequency in its relation to the line scan frequency helps to minimize this pattern. The subcarrier frequency cannot be too high as it is of course essential to allow for the upper sidebands of the modulating signals. In the 625 line system, the sub-carrier frequency is approximately 4·43 Mc/s.

At any instant, the phase and amplitude of the subcarrier signal are representative of the hue and saturation of the colour information being radiated, the amplitude falling to zero for neutral tones. The luminance signal and the colour subcarrier are then modulated on to the main vision carrier. At the receiver, the luminance signal is demodulated in the usual way and fed to the tube cathodes. The chrominance signal is extracted from the composite video signal usually by means of a simple high pass filter. After amplification, demodulation takes place in two synchronous detectors operating at the appropriate phases to recover the E_I and E_Q signals. The injected reference carriers to the demodulators are supplied by a unit known as a subcarrier regenerator. This consists of a phase-locked crystal oscillator deriving its reference from nine to ten cycles of subcarrier known as a colour burst which is radiated during the back porch period of every active line. The reference burst is of specified phase and is held within very close limits. The actual phase of the reference signals applied to the synchronous detectors may be altered, this giving rise to a change in colour of the reproduced picture. A control to perform this function is always fitted to NTSC receivers and is known as the HUE control. Should the phase of the subcarrier at any instant be unintentionally altered, errors in colour reproduction will occur. Phase errors can and do arise in transmission and probably the most disturbing form of phase distortion which cannot be corrected by adjustment of the HUE control is that known as differential phase distortion. In this form of distortion, the actual phase of the sub-carrier is dependent upon the amplitude of the luminance signal upon which it " rides." This form of distortion becomes objectionable when it exceeds about 10 degrees. It tends to be prevalent on long

* The Granary, Bell Lane, Eton Wick, Windsor, Berks.

land lines linking programme centres and transmitters and can also occur in transmitters and receivers though generally to a much smaller degree.

A further form of distortion in NTSC can arise due to poor frequency response of land lines, etc., resulting in attenuation of the upper chrominance sideband. This leads to quadrature distortion of the chrominance signal resulting in cross-talk between the colour signals. This upper sideband attenuation can be more severe on continental 625 line systems where the bandwidth of the luminance channel is only 5 Mc/s. Similar effects can occur under conditions of multipath reception which are common in mountainous countries such as Austria, Switzerland and Northern Italy, and are familiar to h.f. band operators as " phase distortion " due to unstable ionospheric reflection.

It was because of these weaknesses of the NTSC system that alternative methods of encoding the colour information were investigated.

SECAM

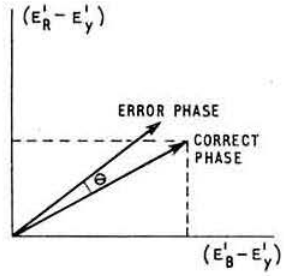
This system was invented by Henri de France of CFT for the express purpose of eliminating NTSC's main disadvantages—sensitivity to phase distortion and quadrature distortion. In this system, the transmitted colour information alternates between $(E'_R - E'_Y)$ and $(E'_B - E'_Y)$ on successive lines. Since one colour difference signal is being transmitted on any one line, frequency modulation may be used which is relatively insensitive to phase distortion. As both colour difference signals must be simultaneously available at the demodulators, a delay device of delay time equal to that of one line period is used to store the information transmitted on the previous line. This is perfectly reasonable since it has long been established that the information on two successive lines of a TV picture does not differ appreciably. In the receiver there is an electronic switch which connects the appropriate $(E'_R - E'_Y)$ or $(E'_B - E'_Y)$ discriminator to either the direct or delayed signal as the case may be. Accurate synchronization of the switch is achieved by transmitting an identification signal during the frame blanking period. Demodulation is provided by two wideband discriminators having a linear conversion characteristic of at least $\pm$ 800 kc/s at a centre frequency of 4·43 Mc/s. These discriminators must be extremely stable as any residual output when the subcarrier is undeviated (during neutral tones) will upset the white balance of the reproduced picture. It is to be noted that with this system, no subcarrier regenerator is required.

In practice, SECAM is more tolerant of phase distortion and upper frequency limitation than NTSC although criticisms have been levelled at it in respect of an inferior noise performance in fringe areas and the tendency for a flicker to appear on some sharp horizontal colour edges. Since the system is not phase sensitive, a HUE control is not required and this is considered an advantage by some people.

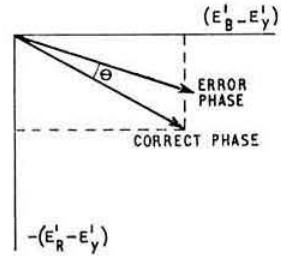
PAL

The PAL system was developed by Telefunken of West Germany. It is essentially a variant of the NTSC system and like SECAM is designed to overcome the weaker points of the system. Originally, the modulating signals of the colour subcarrier were the same as with NTSC; namely E_I and E_Q. Recently, however, the modulating signals have been changed to the colour difference signals $(E'_R - E'_Y)$ and $(E'_B - E'_Y)$. These signals are quadrature modulated on to the subcarrier in a similar manner to NTSC but with one important variation. This variation consists of switching the phase of the $(E'_R - E'_Y)$ signal by 180° on alternate lines at both the transmitter and the receiver. In this way, phase errors and undesired cross-talk components in any line are reversed in phase on the following line and hence are cancelled out over a two line period.

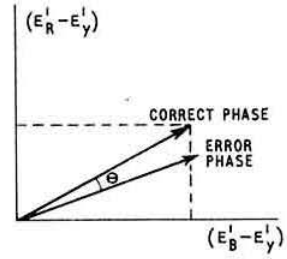
Consider the situation where the phase of the sub-carrier is advanced due to phase distortion, by an angle θ. The vector diagram for the subcarrier at some instant on a given line could be represented as follows:



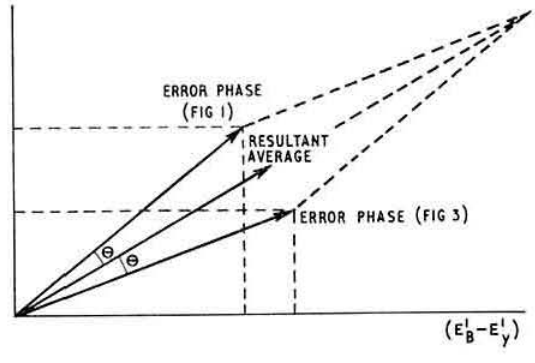
On the following line, the $(E'_R - E'_Y)$ phase is changed by 180°.



If now in the receiver, the phase of the $(E'_R - E'_Y)$ signal is switched by 180°, we have:



Averaging over two lines gives



Thus the resultant is of correct phase but slightly reduced in amplitude. This means in practice that the reproduced hue is correct at the expense of a slight reduction in saturation. This reduction in saturation is far less noticeable than the equivalent hue error in NTSC. Indeed, for a phase error of 30° (which is considerable and would be intolerable in NTSC) the reduction in saturation is some 14 per cent which is almost negligible for all practical purposes.

Two methods exist for the averaging of the colour information on two successive lines. The first of these makes use of the averaging abilities of the eye. In the receiver, the phase of the reference carrier to the $(E'_R - E'_Y)$ synchronous demodulator is switched by 180° on successive lines. If a phase error is present, two successive lines on the display tube will have hue errors in opposite directions. By way of an example, let us suppose that it is desired to transmit a hue of yellow. Owing to the presence of a phase error, one line would tend towards red and the other towards green. The eye will tend to average the two lines to produce the subjective impression of yellow. This method is known as SIMPLE PAL and gives good results up to phase errors of about 30°. For phase errors greater than this, a rather annoying horizontal " blind " pattern appears which has become known as " Hanover Bars." This effect is due to a change in brightness between two lines.

In DELAY LINE PAL or STANDARD PAL as it is now known, a storage device in the form of a delay line is used to average the signals over the two line period. This eliminates the " Hanover Bars " effect for large phase errors.

In simple PAL, it is probable that a control will be provided to adjust the phase of the reference carriers fed to the two synchronous detectors. Correct adjustment of the control will be for the minimum "Hanover Bar" effect. This setting will give correct colour reproduction. In delay line PAL, a customer control of this type will not be required, the hue of the picture being automatically correct. Synchronization of the line by line switch is achieved by swinging the phase of the reference " burst " by $\pm$ 45° about its normal axis on alternate lines. This produces an output at the phase detector in the subcarrier regenerator of the receiver which is used to synchronize a locked oscillator controlling the switch. This does not upset the carrier regenerator as its response is too sluggish.

The PAL system is very rugged and can accept large phase errors with very little deterioration in picture quality. It is in fact possible to get perfectly acceptable picture quality under single sideband transmission characteristics of the subcarrier. Conditions approaching this can be encountered on long land lines with a falling high frequency response. The only real disadvantages of PAL are the extra receiver complexity and cost and the fact that compatibility is slightly worse than NTSC. The extra cost is, however, a very small percentage of that of the whole receiver.

The Russian NIR System

Just before the Vienna Conference in April last year, the Russians decided to adopt the SECAM system for a public service. Recent information, however, suggests that they propose to modify the system. Definite information on the parameters is at the time of writing not available, but sufficient information exists to give a brief outline of the system. The only similarity that exists between the NIR system and the SECAM system is that the two signals carrying the colour information are transmitted sequentially line by line instead of simultaneously as is the case with NTSC and PAL. Frequency modulation of the subcarrier has been dropped in favour of phase and amplitude modulation. In the receiver, a delay line is employed in which one or other of the two signals may be stored whilst the other is being transmitted. Thus both signals are simultaneously available as the demodulators. In this respect, the system is similar to SECAM, an electronic switch being used to switch the appropriate signal into the delay line. No information exists at the moment of the method of synchronizing the switch. From the colour difference signals $(E'_R - E'_Y)$ and $(E'_B - E'_Y)$ a signal is formed which modulates the subcarrier to give

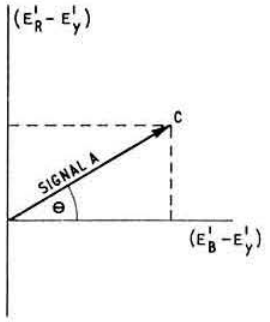
$$A = \sqrt{C}\cos(\omega t + \theta)$$

Where C is a function of the saturation given by

$$C = \sqrt{(E'_R - E'_Y)^2 + (E'_B - E'_Y)^2}$$

and θ is a function of the hue given by

$$\theta = \tan^{-1}\frac{(E'_R - E'_Y)}{(E'_B - E'_Y)}$$

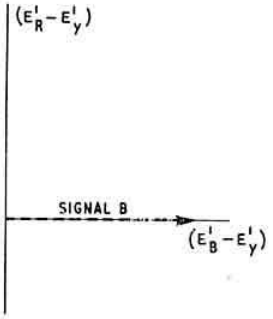


This signal is basically that of an NTSC signal with $\sqrt{C}$ as the saturation function instead of C.

The other signal modulates the subcarrier to give

$$B = \sqrt{C}\cos\omega t$$

This signal has the same saturation function as signal A but is of fixed phase, i.e., carries no hue information.

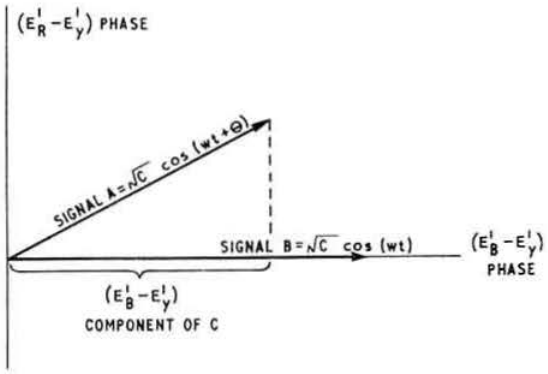


This phase is fixed in the $(E'_B - E'_Y)$ phase.

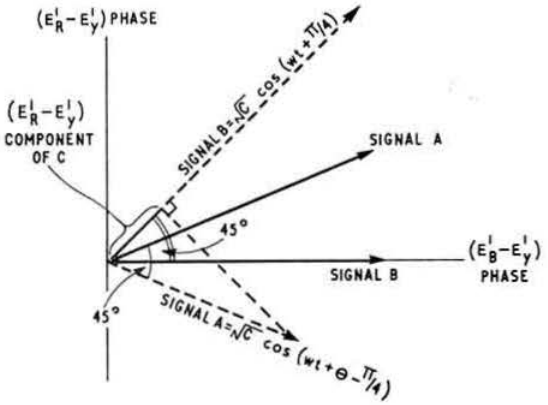
In the receiver, the signals are applied to a product detector and the A signal is demodulated against the B signal as a reference to produce the $(E'_B - E'_Y)$ component of C, i.e. $(\sqrt{C})^2$ which is of course the $(E'_B - E'_Y)$ colour difference signal.

The recent announcement by the Postmaster General that the BBC is to be authorized to start a public colour television service late in 1967 did not finally settle the question of which system is to be employed in the United Kingdom. Britain originally favoured the American NTSC system but it now seems highly probable that the final choice will be the German PAL.

This article describes these systems and the various alternatives.



If now the *A* signal is retarded in phase by a simple phase shifter by 45° and in a similar manner the *B* signal is advanced by 45°, the situation is such that the *A* signal demodulated against the *B* signal in a similar product detector produces the $(E'_R - E'_Y)$ component of *C*, i.e., the $(E'_R - E'_Y)$ colour difference signal.



The two colour difference signals having been obtained, it is a simple matter to derive the $(E'_G - E'_Y)$ colour difference signal as mentioned previously. This system is completely free from whole and differential phase distortion as both signals are equally affected. In other respects, however, provisional tests in this country have shown that the system performance is not up to the standard of PAL under transmission conditions that are other than ideal. Nevertheless, it is undoubtedly a system clever in conception.

The Situation in the UK

Originally, the UK was in favour of the NTSC system as the system was known, whereas the claims for PAL had yet to be substantiated. At the CCIR Vienna Conference of April 1965, a strong technical support for PAL emerged and the UK decided to examine this system in greater detail. At the same time, two improvements were made to the system. The first of these was a change in the subcarrier modulating parameters from E_I and E_Q to $(E'_R - E'_Y)$ and $(E'_B - E'_Y)$. The second improvement was the introduction of the " Swinging Burst " for switch synchronization in place of the original identification signal carried in the frame blanking period.

Further studies in this country showed that the modified system was completely acceptable and in fact showed a small but significant advantage over NTSC. The overall BREMA opinion was that the PAL system would result in easier manufacture, installation, maintenance and improved stability of colour receivers, thus giving a more reliable and consistent colour service. The Television Advisory Committee accordingly advised the Postmaster General that the PAL system should be adopted in the UK.

The majority of European countries also favour PAL and it is hoped that countries in favour of NTSC will also accept PAL in view of the UK decision. The position regarding SECAM countries is uncertain, particularly as the Russians have proposed a major modification of this system.

Interference Aspects of Colour Television

As far as interference from amateur transmitters is concerned, the situation is not likely to be very different from monochrome TV. Apart from wired television systems, it seems highly probable that colour transmissions will take place in Bands IV and V on existing channels.

The subcarrier frequency of 4·43 Mc/s is sufficiently remote from the usual amateur bands, and in any case the input to the chrominance amplifier is at a relatively high level. One point worth mentioning, however, is that an interfering carrier which is close to the r.f. subcarrier frequency can produce a fairly broad colour beat due to heterodyning action with the subcarrier. On a monochrome receiver, the effect would be a fine herringbone pattern which would probably be of less annoyance value. If the interfering carrier is greater than about 56db down on the main vision carrier, interference is not expected to be troublesome.

Television Society Fleming Memorial Lecture

This lecture will be delivered by Prof W. D. Wright of Imperial College, London, on 21 April. Non-members can obtain free tickets from the Secretary, The Television Society, 166 Shaftesbury Avenue, London, WC2.

International Audio Fair

Tickets for the International Audio Fair, to be held at the Hotel Russell, Russell Square, London WC1, from 14-17 April are now available free from the Editorial Office of *Wireless World*, Dorset House, Stamford Street, London, SE1. Requests should be accompanied by a stamped envelope.

WRITTEN LONG AGO

" At a recent meeting of the Radio Industries Club, Gren Holden, a Vice-President of the Sylvana-Electric Company of Pennsylvania, described the progress of television in the United States and quoted facts so startling as to leave members of his audience gasping for breath! From the low figure of 5400 receivers in 1946 the industry increased its production last year to 850,000. The target for 1949 is approximately *two million.*

" How does the British position compare with that of America? At the end of March 1949 there were 126,500 television licences in force compared with 120,100 a month earlier. At that rate of increase the quarter million mark may be well in sight by this time next year. By that time Midland amateurs will be faced with the TVI problem.

" In order to help members who are in trouble due to TVI the Society has published a new technical booklet ' Transmitter Interference. ' "

Current Comment
RSGB Bulletin, May 1949

(As at *30 November, 1965* the number of television licences in force had increased to *10,693,709.*)

J. C.

Adapting the Heathkit DX-40U for S.S.B.

Daystrom Ltd., Gloucester, have passed on some circuit modifications to enable owners of the Heathkit DX-40U a.m./c.w. transmitter to use it in conjunction with the SB-10U single sideband adapter. Although the information has been supplied by the manufacturers of this equipment, no kits of components are available, but these may be purchased from the usual retailers.

The changes basically consist of the addition of an outboard power supply for the sideband adapter, and slight re-arrangement of the circuitry of the transmitter p.a. to incorporate switching for operation in class AB with fixed bias. Fig. 1 provides details of the alternations of the transmitter circuitry, additional wiring being drawn in bold, and deleted wires marked "X." The two 0B2 stabilizers may be mounted either on the side of the shield bracket located on the underside of the chassis, or alternatively on a sub-assembly chassis that can be attached to the side of the shield bracket. The valves will be in a horizontal position and facing the left side of the chassis when viewed from the rear of the transmitter. The two co-axial sockets should be installed on the chassis rear drop, while the double pole, single throw toggle switch for switching from a.m. to s.s.b. is fitted to the front panel.

The power supply parts are standard, and should be easily obtainable from radio component stockists. Silicon rectifiers could be used in place of the 5V4 with advantage, but steps must be taken to reduce the increased output voltage owing to the superior efficiency of solid-state diodes.

There should be no difficulty in running full power on 80, 40, 20 and 15m, but the output on 10m will be somewhat reduced.

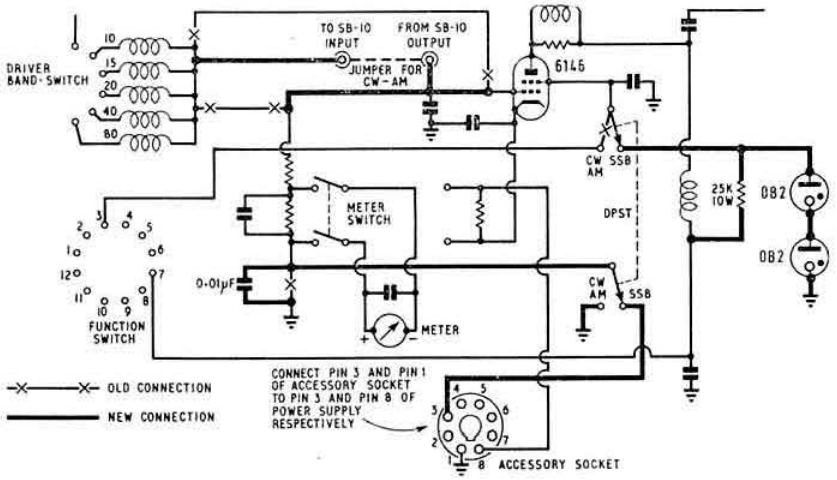


Fig. 1. Alterations to the wiring necessary for switching between class C and class ABI. Heavy lines represent new wiring, and an "X" indicates a connection to be broken.

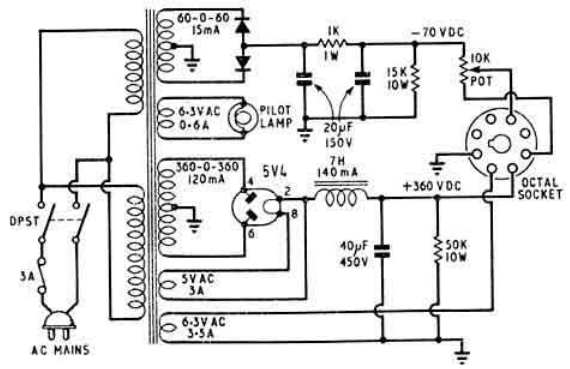


Fig. 2. An additional power supply required for the SB-10.

Wired Television

Members who are experiencing, or have experienced, interference difficulties associated with wired television systems are asked to write to the GPO Liaison and TVI Committee giving full details including the name of the relay company concerned and the distribution frequency. The Committee is interested in information both on systems which are susceptible to interference and on systems which cause interference by radiation in authorized amateur bands.

From "Semaphore to Satellite"

The Society holds a small stock of this volume published by the International Telecommunications Union in 1965 on the occasion of its centenary. *Semaphore to Satellite* traces the history of communication from the crude beginnings of semaphore in 1793 to the relay satellites of 1965. The first part delves into the period 1793 to 1932 describing the evolution of the telegraph and telephone; the second part covers the early life of radio communication from 1888 until 1947; and the third section describes the formation, purposes and work of the ITU. The book concludes with chapters on the present achievements and prospects for communication in the future. It runs to 344 pages, profusely illustrated with high definition photographs on high quality heavy paper, and is contained in an attractive, durable hard binding. Price £3 10s., post free, from RSGB Publications Dept.

Receipts

Receipts for subscriptions paid by cheque, bankers' order or postal order are not now issued unless specially requested.

Quickstarting with Transistors at V.H.F.

A basic approach to the design of simple solid-state converters for 145 Mc/s and 70 Mc/s

By JACK HUM, G5UM*

IT was the acquisition of four OC170 transistors, and the realization from a study of their characteristics that they had v.h.f. potentialities, which suggested the development of a simple solid-state converter for the 2m amateur band.

Until then the writer's practical experience of transistors was limited to the kind of tinkering which it seems the majority of people indulge in, the making up of simple audio pre-amplifiers and crystal oscillators for no better reason than a desire " to get one's feet wet " in the transistor business: " dabble " was in truth the operative word. Nothing for permanent incorporation in the station was undertaken. After all, the valves accumulated over the years seemed to serve most purposes reasonably well, and what is

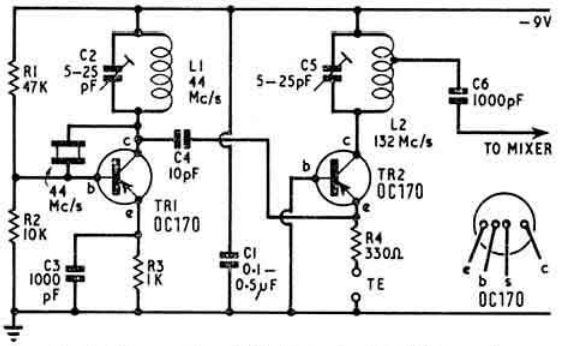


Fig. 1. The transistor " Quickstarter " oscillator unit.

more, posed none of those problems of unlearning which transistors threatened to do.

Two eventualities provoked a more active attitude on the writer's part towards putting transistors to work. One of them was the startling performance produced by a commercial design used by G2BLA on a couple of field day expeditions witnessed at first hand. The other was the ease with which the younger members of the local RSGB Group took " semi-conductoring " in their stride as a perfectly normal thing they had grown up with, exemplified by many practical, indeed beautiful, constructional exercises that eschewed valves completely.

In the writer's case there was no hope of " growing up with transistors as a perfectly normal thing " for the simple reason that it was too late. A simple calculation will disclose to any member that persons holding G5 call-signs are almost certain to be on the wrong side of 50.

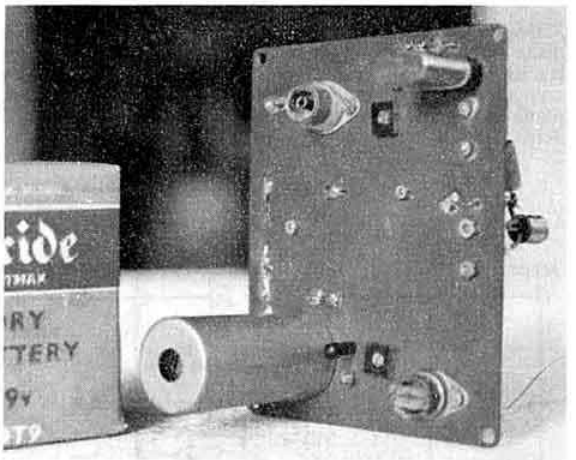
It was decided that *some* effort would need to be made to break into this brave new world, and a programme of brain picking was initiated—a main preoccupation in Amateur Radio incidentally, and one which has been going on ever since someone suggested that it would be a good plan to change over from spark to valves. What you don't know you seek from your better informed fellows.

Crystal Multiplier Unit

So the very first crystal oscillator and multiplier emerged, built on a tiny aluminium die-cast box which happened to be languishing in the spares cupboard. This was to be the starting point for a complete 2m converter. Gone, now, was the desire to make up little audio preamplifiers that had no real application to day-to-day operation on the air: it seemed much more important to build something which would meet the practical needs of home and portable use. And so the " All-Transistor Quickstarter Converter for Two " was born.

The oscillator chain is shown in Fig. 1. The first OC170 is an overtone oscillator using a crystal of whatever value will produce the required intermediate frequency. Because a 44 Mc/s crystal happened to be available it was used and three times the frequency taken out of the second OC170 (the multiplier). This gave 132 Mc/s to furnish a tuning range of 12 to 14 Mc/s on the main station receiver used as an i.f. strip.

To arrive at the popular mobile/portable tuning range of 4 to 6 Mc/s one of the 35 Mc/s crystals obtainable from BULLETIN advertisers† will multiply by four in the second OC170 to produce a local oscillator frequency of 140 Mc/s.



The transistor " Quickstarter " makes a very simple assembly on a piece of copper clad laminate. The 2-transistor oscillator section fills the right-hand half (crystal at the top) and the r.f. and mixer section the left-hand half (aerial input at the top, i.f. coil and output socket at the bottom). All earthed components are soldered on to the copper surface of the panel.

* " Wyldes," Burnham Green Lane, Bulls Green, Knebworth, Herts.

† Henrys Radio Ltd., 303 Edgware Road, London, W2.

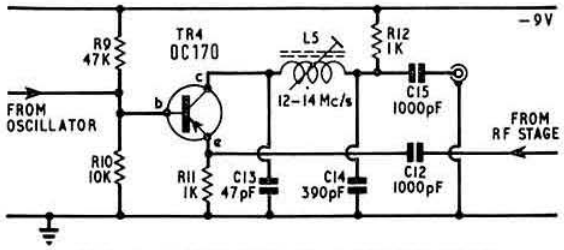


Fig. 2. The mixer section of the " Quickstarter."

Study of Fig. 1 discloses certain affinities with valve configuration if the base is regarded as grid, emitter as cathode and collector as anode. (Avoid the trap that because " base " looks like an anode in a valve it has any resemblance other than a pictorial one.) The crystal is connected between the equivalent of " grid " and " anode " as in the conventional thermionic circuitry, the inductor tuned to crystal frequency and the output passed via C4 to the emitter of the multiplier transistor.

Adjustment of C2 produces oscillation over a fairly wide arc of rotation, with a sudden cessation in the manner familiar from valve technique. This is indicated by a flow of current in the emitter resistor R4 to an order of 1 to 2 mA.

Next, rotation of C5, in effect the " anode " tuning capacitor of the multiplier, will produce small changes in the current passing through R4 as successive harmonics are picked out. There will be a marked movement of the meter needle as the second harmonic is selected, and a less pronounced one when the third harmonic is reached, demonstrating that transistors double better than they triple.

And this is all there is to it! A transistor oscillator-multiplier chain built in half an hour—so long as you don't break leads off one of the transistors by bending them too close to the body, or discover that the other transistor was unserviceable from the start (it was second-hand anyway), or killing its replacement because no heat shunt was used when soldering.

Learning the hard way meant that this oscillator unit took half a day instead of half an hour to build.

The Nine Component Mixer

Design of the mixer for the Transistor Quickstarter is disturbingly simple—disturbingly because things are not traditionally as easy as this on v.h.f. Yet with transistors they are. Only nine components (excluding the transistor) are required for this mixer, all of which can be tiny low-rated items.

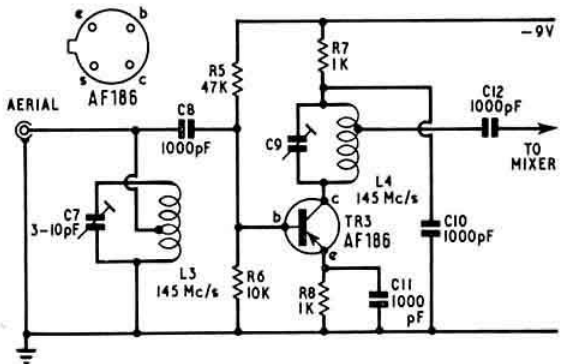


Fig. 3. The r.f. stage incorporated in the basic converter. An alternative preamplifier is shown in Fig. 5.

In from the left at Fig. 2 comes the 132 Mc/s local oscillator injection to be presented to the base connection of the OC170. In from the right comes the signal at 145 Mc/s fed to the emitter of the OC170. The difference frequency, 13 Mc/s, is accepted by the intermediate frequency transformer L5 and passed to the main station receiver through C15, which is no more than an isolating capacitor.

Two features of note at once present themselves. One: the apparent absence of a tuned circuit at signal frequency is explained when we move on to the r.f. stage (the output inductor of the r.f. amplifier is the input inductor for the mixer. It is L4).

Secondly, the pi-output network around the i.f. output inductor obviates the use of a separate link winding on the coil. The familiar pi-capacitors are C13 and C14. All that is needed is to preserve a ratio of about eight to one between them.

This arrangement gives convenient coverage of the whole 12 to 14 Mc/s (144 to 146 Mc/s) spectrum without the need to repeak the iron dust core of L5. The aerial input trimmer of the main station receiver i.f. strip will generally require some small adjustment to maintain maximum input over the whole of the 2m band.

After the mixer had been added to the oscillator section in the tiny diecast box already mentioned the thought suggested itself that the device might be persuaded to identify some 2m signals if the beam were connected to its input via C12. This proved to be the case, and the GB3VHF beacon dutifully came up at 12·5 Mc/s at an S9 level, accompanied by what seemed to be all the signals in the world riding through the completely untuned front-end of the OC170 mixer! It was evident that when some pre-selection had been added the Transistor Quickstarter promised to be a distinctly potent device.

The R.F. Stage

In the course of building this converter backwards (which is the invariable approach at G5UM) we came at length to trying out a newly acquired AF186, popular in u.h.f. television tuners. The circuit adopted is shown in Fig. 3.

Incoming 2m signals are accepted by L3, the top end of

Components List

R1, 5, 9	47K ohms.
R2, 6, 10	10K ohms.
R3, 7, 8, 11, 12	1K ohms.
R4	330 ohms.
C1	0·1μF to 0·5μF.
C2, 5	5-25pF trimmers.
C3, 6, 8, 10, 11, 12, 15	1000pF disc ceramics.
C4	10pF.
C7, 9	3-10pF trimmers.
C13	47pF.
C16	1-10pF trimmer.
C17	2pF.

L1, 26 s.w.g. enam., on ¼ in. diam. former.
2m: 15 turns for a 44 Mc/s crystal.
4m: 25 turns for a 16·25 Mc/s crystal.
L2, 18 s.w.g. enam., self-supporting, ¼ in. i.d.
2m: 6 turns for 132 Mc/s, tapped 1 turn from cold end.
4m: 11 turns for 65 Mc/s, tapped 1 turn from cold end.
L5, 30 s.w.g. s.c.c. or d.c.c., ¼ in. diam. former, with iron dust core.
4-6 Mc/s: 55 turns, close wound.
5·1-5·7 Mc/s: 50 turns, close wound.
12-14 Mc/s: 25 turns, close wound.
L4, 18 s.w.g. enam., self-supporting, ¼ in. i.d.
2m: 6 turns, tapped 1 turn from cold end.
4m: 14 turns, tapped 2 turns from cold end.
L3, 18 s.w.g. enam., self-supporting, ¼ in. i.d.
2m: 6 turns, tapped 1 turn from cold end.
4m: 10 turns, tapped 1 turn from cold end.

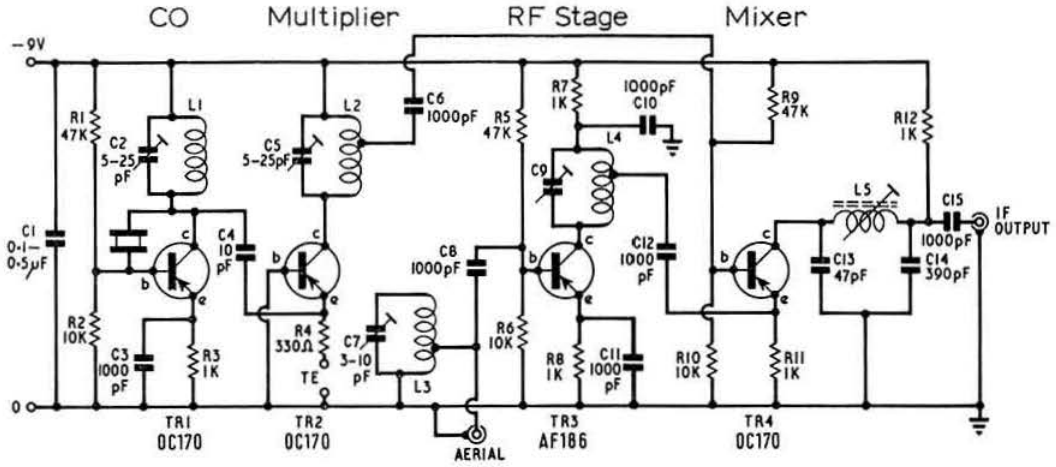


Fig. 4. The complete circuit of the 2m or 4m transistor " Quickstarter."

which is " hot " to r.f., in other words of reasonably high impedance. Because the transistor presents a fairly low impedance it must be tapped down the input coil.

The aerial input will almost certainly be low impedance, too—in the 80 ohm region, no doubt again requiring tapping well down the coil. For convenience both aerial input and transistor base can be put on the same tap, though it should be added that the experimenter prepared to forgo his quickstart to obtain a better noise factor from the converter by spending some hours altering the tapping points (if, that is, he possesses means of measuring whatever order of improvement is achieved) may find that the base tap needs to be a turn or two up from the aerial tap.

If desired the aerial may be presented to L3 through a conventional separate link coupled winding of one turn round the " cold " end.

The base is set at working potential by R5 and R6 exactly as in other stages. The emitter has a similar biasing arrangement to the crystal oscillator.

The output inductor of the AF186 amplifier is " hot " at the collector end and " cold " at the battery-feed end. The mixer stage which follows, of comparatively low input impedance, therefore needs to be tapped well down from the high impedance end of the coil.

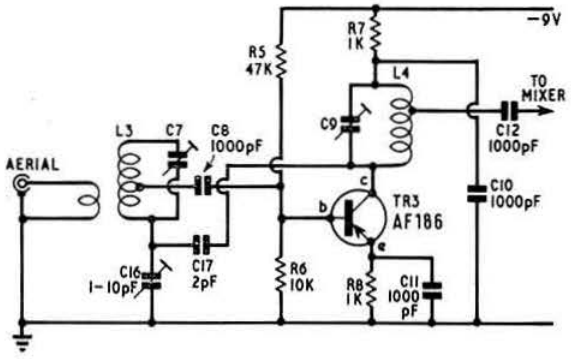


Fig. 5. This neutralized r.f. stage can give better performance than the basic circuit, and may be used as an alternative by constructors willing to tackle the more involved alignment procedure.

" In Toto "

What has been said represents a stage by stage analysis of a converter design. All the reader now requires is a synthesis of the three separate units. This is shown in Fig. 4.

For those who wish to neutralize the AF186 and are not bothered about the additional adjustments called for, Fig. 5 gives the necessary information.

For use on 12 volt supply: the design as described operates on 9 volts from a standard Ever Ready PP9 battery. It can, of course, conveniently operate from a 12 volt car battery with positive earth simply by inserting a dropper resistor in series. The converter consumes 6 mA, the voltage drop needed is 3 volts, and the value of dropper resistor therefore is 500 ohms.

Acknowledgement

To G8ACE, without whose guidance the " Transistor Quickstarter " might never have been developed.

QSL Bureau

The QSL Bureau sub-manager for the G5 three letter calls issued to foreign amateurs operating in this country is E. G. Allen, G3DRN, 65a Melbury Gardens, London, SW20.

All QSL Bureau sub-managers now hold stocks of printed address labels for the bureau, which members can request when they send in their envelopes.

RSGB QSL BUREAU

WILL BE CLOSED

3 MAY to 23 MAY, 1966

Both dates inclusive

No cards should be sent to G2MI during this period

Mobile Column

By E. ARNOLD MATTHEWS, G3FZW*

THE Society's first Mobile Rally of the 1966 season will be held at the Bedford factory of **Texas Instruments Ltd.**, on Sunday, 1 May. The Mobile Committee has arranged a programme of proven events and attractions for the meeting. There will be conducted tours round the factory as in past years (for anyone at all interested in the manufacture of semiconductors this feature alone makes the visit highly rewarding) and refreshments will be available. Talk-in stations GB3RS and GB2VHF will be operating on 160m, 80m, 4m and 2m from 10.30 until 14.00.

The **North Midlands Mobile Rally**, jointly organized by Midland ARS and Stoke-on-Trent ARS, will be held at Trentham Gardens on 24 April. The programme has the usual emphasis on family outing attractions, and Daystrom Ltd. will again be demonstrating hi-fi equipment in addition to their range of amateur equipment. A new attraction at this rally will be an RTTY demonstration. More substantial prizes will be offered in the raffle, the first prize in the OMs' section being an Eddystone EC10 receiver. Talk-in stations will be G3GBU/A on 160m, G3UD/A on 80m s.s.b., and G3MAR/A on 2m.

Thanet Radio Society is to hold its seventh Mobile Rally on Sunday, 8 May, by the Viking Ship at Cliffsend, Ramsgate. Talk-in stations will be G3DOE on 160m, G3JMB on 4m and G3BAC on 2m.

Mobile Safety

Most writers on this subject stress, very rightly, that the equipment should be properly safeguarded by fuses, and it is generally assumed that the vehicle's electrical system has been adequately fused by the manufacturer. This is not necessarily so. Many vehicles have two fuses, one which protects circuits taken from the ignition switch and one for the remainder.

It will generally be found, however, that the l.t. feed to the ignition system is taken from the battery side of the first-mentioned fuse and therefore the ignition circuits are devoid of protection. The reason for this is that when in motion, any short-circuit in the ignition-switch-controlled circuits will rupture the fuse but leave the ignition functioning normally. Obviously, any sudden interruption of the ignition could have disastrous consequences. Should a short-circuit develop in the ignition circuit, the voltage drop will cause misfiring and give a few seconds warning of trouble. With luck it is possible to diagnose the fault before the lead from the connection box to the coil burns itself out, the harness in which it runs, and the vehicle.

However, the ignition components are ruggedly designed and have more than adequate safety factors. But *can you say the same about the suppressor capacitors you fitted in that circuit?*

* 1 Shortbutts Lane, Lichfield, Staffs.

Special Events Station

Members of the North Notts Amateur Radio Society will be putting a station with the call-sign GB3RCW on the air during the annual Hobbies and Use of Leisure Exhibition from 14-19 April. All bands from 1·8 Mc/s to 144 Mc/s will be used, and it is also hoped to operate on u.h.f. The Worksop Rotary Club is organizing the exhibition, and the operators will therefore be looking for contacts with members of other branches in particular.

RSGB NATIONAL MOBILE RALLY

Texas Instruments Ltd., Manton Lane, Bedford

SUNDAY, MAY 1, 1966

* Raffle and Lucky Dip
* Special attractions for the ladies
* Trade exhibition
* DX competition

GB3RS will be in operation as a talk-in station on 160m and 80m s.s.b., and GB2VHF will be on 2m and 4m.

Adequate under-cover accommodation and car-parking facilities will be provided.

Further information will be announced on GB2RS.

Organized by the RSGB Mobile Committee

MOBILE RALLIES 1966

24 April.....North Midlands Mobile Rally
(See page 265)

1 May.....RSGB National Mobile Rally
Organized by the Radio Society of Great Britain

1 May.....Medway Mobile Rally
British Uralite Ltd., Higham, Rochester, Kent
NGR 70 3738, TQ 77
G2FJA/A ... 160m
G3TVH/A ... 4m
G3TXS/A ... 2m
} talk-in stations
Organized by the Medway Amateur Radio Transmitting Society

30 May.....Saltash and District ARC Mobile Rally
Calstock Playing Fields near Plymouth
Talk-in stations will be operating on 160, 80, 20, 4 and 2 metres. Attractions will include an Exhibition of Equipment, RTTY and TV.
Organized by the Saltash and District Amateur Radio Society

12 June.....RSGB National Mobile Rally
Organized by the Radio Society of Great Britain

26 June.....Longleat Mobile Rally
Organized by the Bristol RSGB Group

26 June.....Hunstanton Bucket and Spade Party
G3JEC's Brookes Refreshment Rooms, the car park, opposite the railway station.
G3ANM/P ... 160m talk-in station

10 July.....Hurn Airport Mobile Rally
Organized by Wessex Amateur Radio Group and BAC Radio Club

11 September.....RSGB National Mobile Rally
Organized by the Radio Society of Great Britain

Tackling the Radio Amateurs' Examination

THE Radio Amateurs' Examination, held twice annually, consists of a three-hour question paper with two compulsory questions on Licence Conditions and Interference in Part I and a choice of six technical questions in Part II. The detailed Syllabus—Radio Amateurs' Examination No. 55—may be obtained from the City and Guilds of London Institute, 76 Portland Place, London, W.1. This pamphlet has recently been revised and will be in force for the years 1966, 1967 and 1968. It includes a list of books recommended for study.

Some of the work of Part I is adequately covered in *How to become a Radio Amateur*, a pamphlet obtainable, with other relevant licensing information, free of charge, on application to the Radio Services Dept., GPO, London, E.C.1.

Every prospective candidate should obtain the above publications prior to or very early in his course of study.

Courses of Study

Many candidates study for the examination at a local Technical College or Evening Institute, but a large number prepare themselves privately either with or without the assistance of a correspondence course. Colleges and Institutions offering RAE courses are listed in the RSGB BULLETIN and other radio journals usually during July, August and September each year. Early application is advised, so that colleges are aware that there will be sufficient students to warrant the course being organized.

Newcomers to the Society may not be aware that the administration of the Examination upon the results of which radiating licences are issued by the GPO is the responsibility of an Advisory Committee which was set up in 1946 at the request of the RSGB. On the Advisory Committee are representatives of the GPO, the RSGB, the City and Guilds of London Institute and various other educational bodies and scientific institutions.

Besides the preparation and revision of the syllabus from time to time and the moderation of draft question papers, the Committee makes a careful study of examination results and the various trends exhibited by these results over the years.

During the last year or two, the Committee has paid special attention to apparent causes of failure in the examination and is of the opinion that many candidates, who have the necessary knowledge to pass, fail to do so through lack of examination experience and an inability to tackle the papers in a way that would secure the maximum scoring of marks.

It was decided at a recent meeting of the Advisory Committee that the Society should be asked to publish some notes which might help prospective candidates to overcome the above difficulties and so stand a better chance of success. This article has been prepared by three longstanding members of the Society, Mr W. A. Scarr, M.A., G2WS, Chairman of the Advisory Committee, Mr L. E. Newnham, B.Sc., G6NZ, Headmaster of a large boys' school, and Mr G. C. Oxley, AMIEE, G8MW, representative on the Advisory Committee of the Association of Teachers in Technical Institutions and himself an experienced instructor for the Radio Amateurs' Examination.

If it appears, after enquiry, that no course is proposed in your locality, it is suggested you contact the local radio club or RSGB Group if you have not already done so. Many clubs are affiliated to the Society and their addresses are listed in the RSGB *Call Book*. Clubs often run series of talks helpful to prospective amateurs. If, however, you can find enough prospective candidates for the RAE, then an approach to the Principal of the nearest College or Institute should be made. Normally 12 candidates will warrant a course being started, provided an instructor, preferably a teacher/amateur, and accommodation are available at the College. Courses, one or two evenings each week, usually start in September, so make this approach some months beforehand—you might even be able to find and suggest a suitable instructor as well, if the College hasn't one!

If no College course is available, don't give up. Many private students are successful every year. A correspondence course can be of immense help. Some College students, too, have found a correspondence course in addition to be a help. Whichever method of preparation is followed, the prospective candidate is strongly urged to contact his local club, where he is sure to find practical and willing help. If there appears to be no such club within reach, don't hesitate to contact amateurs in the area (again, see the *Call Book*). Most of them will be only too willing to show you their equipment and give useful help and advice to assist you in achieving your ambition. You may make many friends, too.

The actual examination is held at widely distributed Colleges and other Centres. A College may act as an Examination Centre although it may not have provided the actual course. The City and Guilds of London Institute will supply a list of Centre addresses in your area. Application to sit the examination should be made to the Centre with the required fees by the date specified—e.g., entries for May are usually required by mid-February. In addition to the examination fee, at present 30s., there is a small local fee (often 5s.) to the Centre. The RSGB also provides a Centre in Central London, available to all candidates, but with no local fee for RSGB members.

Specimen examination papers (No. 55), most useful for practice, may be obtained for 2s. from the City and Guilds of London Institute. All students are advised to test themselves by "dummy runs," working against time. Many adults find actual difficulty in writing "against the clock" and in getting their pens to write just what they mean them to. Guided practice is the answer. Remember that what is not written down "on the night" cannot possibly secure any marks.

Examination Requirements

The examination is divided into two parts. Candidates are expected to achieve a Pass in each of the Parts separately; failure in either Part entails failure in the examination as a whole.

The Examiner is looking for evidence of sound basic knowledge with a strong practical bias. Candidates should, therefore, make sure that they understand the functioning of components and the operation of simple circuits.

Six-figure logarithms are *not* needed when tackling the arithmetical calculations. If a value of 3·2 is used as the value for $^{10}/_{\pi}$, it will only give an error of about one half of one per cent. Students should make themselves as familiar as possible with measurements, and with adjustments to apparatus. They should be careful to avoid absurd answers or values (such as a tuning capacitor of value 50 μF), as these

may lead the Examiner to feel that the candidate doesn't know what he's talking about.

Above all, follow the instructions accurately and do not give information which is not requested.

In the Examination Room

Find out in good time where the examination room is, and try to arrive five minutes early equipped with a good pen and a ruler. The Examiner will not look favourably on blotchy ball-pen scribble. You are not being examined in English, but correct spelling will help you to communicate with him.

Read the paper through carefully, and then again, and put a tick against the questions which you decide to answer. Then decide on the order in which you will do them; you may be well advised to deal first with those requiring short answers, e.g., numerical questions.

Number your answers clearly. Whenever possible, make good diagrams to illustrate your answers. Draw these free-hand and leave plenty of room on the paper. When labelling components, be sure not to write across the lines of the diagrams or across components or between the plates of capacitors! (Prepare yourself by practising diagram drawing in accordance with British Standard No. 530—your local Technical College should have a copy.)

Rough notes and calculations can be done in the margin of your answer paper. Do not make them too "rough"; if you make a mistake which is not unreasonable, the Examiner may be able to see where you went wrong and you may be given some credit.

If you make a mistake, or even if you wish to delete a whole question, then one bold clear line through the work will suffice. Leave a good space at the end of each question —you may wish to add something later.

If it appears that you have half an hour for a question, keep this down to 25 minutes or so, to allow for reading and re-reading your answer. Try to cover as many points in your answer as is reasonable in the 25 minutes you have allowed. For instance, you may only be able to allow 10 minutes for part of a question dealing with the principles of super-heterodyne receivers!

When you have finished, read through your paper carefully and check all your calculations. Make sure that your answers make sense. You might have given a half-wave aerial as about 400m long—of course you have only made a mistake with the decimal point!

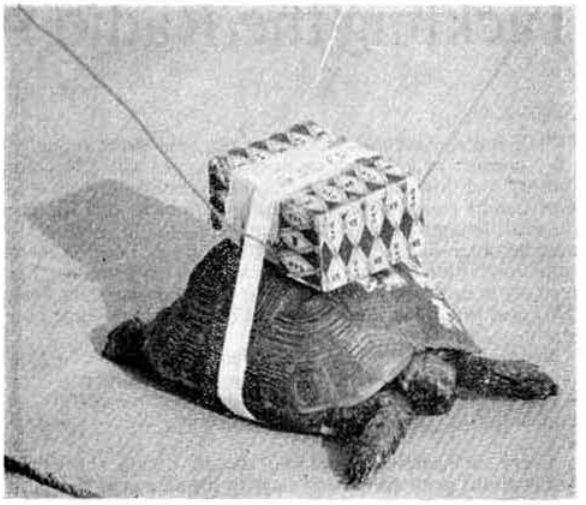
Conclusion

In attempting any examination, the mental attitude of the candidate is a factor of considerable importance. Do not on the one hand imagine that it so easy that you can hardly fail anyway, or on the other hand feel that the questions are bound to be just the ones you cannot possibly answer. There are no trick questions in this examination and the Examiner will be anxious to give you full credit for your answers. You are not competing against other candidates, but are trying to attain a certain standard. You may make a number of mistakes and still pass—full marks for all the questions are neither expected nor required. Remember that a great number of candidates of varying ages and from all walks of life succeed in passing this examination every year.

It is not the purpose of this article to discuss the Morse Test which may be taken at any time and is conducted by the GPO. Candidates may like to know, however, that records and tapes of slow Morse are available and that many Slow Morse Practice sessions are given "on the air" by experienced amateurs.

Radio clubs often arrange Morse practices and many individual amateurs are prepared to assist the newcomer to obtain proficiency.

Finally, if any prospective candidate for a licence is unable to understand any of the points set out in this article, the contributors will be happy to assist him further by personal correspondence.



Portrait of Fred Esher

A radio-located tortoise

By J. W. SWIFT, G3CTP

FRED ESHER—the surname indicates where he came from, and the Christian name refers to his resemblance (at least in intelligence) to a couple of other Freds known to the writer—is a tortoise.

In common with other members of his species, the problem is always where to find him; this is difficult enough in one's own flower beds, but positively exasperating when he roams under the fence into neighbours' gardens. To an amateur the problem is, of course, simplicity itself. All that Fred E. needed was a transistor, four or five components, a 1·5 volt penlight battery, and Hey Presto, 20 minutes later, he was equipped with a 100 microwatt beacon transmitter. But with this power and the non-resonant aerial employed in the prototype, ranges were none too great: 10 feet, sometimes more, on a miniature transistor receiver. However, the special virtue of this beacon, strapped to Fred's back with adhesive tape, only came to light at the conclusion of preliminary field trials; when equipped with the beacon Fred Esher couldn't pass under the garden fences anyway!

Junior ops., of course, took advantage of the electronic tortoise by hiding him in turn and sending the other op. (plus friends, who inevitably gather to ridicule all serious experimentation), off to find him with the search receiver. Of course, the junior ops. didn't really need the tortoise part of the apparatus at all for their purpose, and as the tortoise no longer needed the beacon—only the box to stop him going under fences—the Mk. 2 version will take these requirements into consideration.

The circuit of the transmitter is standard and available from current works of reference, so we will confine ourselves in this article to notes concerning the novel part of the apparatus: the box.

A small cardboard box, slightly larger than a matchbox, must be obtained and lacquered so as to be waterproof. The box height is adjusted according to the formula:

$h_t + h_b + h_v > h_f$

where h_t = height of tortoise, legs retracted

h_b = height of box

h_v = height from ground to underside of

(*Continued on page 249*)

THE HEATHKIT TWO'ER

Reviewed by R. C. HILLS, G3HRH

THE HW-30 2m transceiver is designed to provide a complete station facility for the 144-146 Mc/s amateur band in the simplest and cheapest form. The equipment is entirely self-contained in an attractive cabinet and comes complete with microphone and a.c. power lead. The circuitry employs a total of five valves and three diodes, and by selecting appropriate terminals on the power socket, can be operated from battery supplies as an alternative to the built-in a.c. mains power unit. The transmitter section is crystal controlled and delivers some 2-3 watts output. The audio section doubles as a modulator, or as the later stages of the receiver, the front end of which is a single r.f. stage followed by a super-regenerative detector. The HW-30 is basically designed for the US market, and the tuning range extends over 144-148 Mc/s with a slight overlap at each end to cover their Civil Air Patrol channels.

The block diagram of the transceiver is shown in Fig. 1, and the function of the various stages is evident from the diagram. The chassis and control layout are reasonably straightforward, although two design features are rather disappointing. The single FT243 crystal socket provided is located inside the cabinet and any change of frequency necessitates the removal of the chassis to obtain access to the crystal position. The connection from the wafer on the TR switch to the aerial socket on the rear chassis drop is a plain piece of stiff tinned copper wire some 4 in. long which must radiate a considerable amount of the available r.f. inside the cabinet, and is also a potential radiation source of energy from the super-regenerative detector stage.

The HW-30 is remarkably simple to operate. The only controls provided (and indeed necessary) are VOLUME, TUNING, and TR SWITCH. The latter has an alternative spring-loaded position for rapid changeover. The remainder of the front panel is occupied by the ample 3½ in. loudspeaker, and two neon lamps to indicate POWER and TRANSMIT. The main ON-OFF switch is located on the volume control. A preset regeneration control is provided on the rear drop of the chassis together with an American type " phono " jack for the aerial connection, an octal socket for power supplies, and a primary fuse. The changeover from a.c. to d.c. power supplies is achieved by suitable links inside the octal power plug; as supplied with the review model this was wired for 240V a.c. operation, but it is understood that the full kit includes an additional connector wired for battery operation.

The performance of the HW-30 is much as one might expect in terms of receiver sensitivity and transmitter range. The review equipment was tested under varying conditions, principally to establish the useful range and also to assess the degree of re-radiation likely to be experienced from the super-regenerative receiver's oscillating detector, which could form a potential hazard to other users of the spectrum both within *and outside* the limits of the tunable range of the receiver. The mode of operation of a receiver of this type is such that, when tuned to an incoming strong signal, a whole family of spurious signals, cross-modulated by the received signal, is re-radiated at intervals of the regeneration " squegging " frequency, extending away on both sides from the frequency of the received signal. Such spurious signals will be receivable on nearby receivers and will therefore form a serious interference hazard over a relatively wide range of frequencies. This is particularly important when commercial services operating adjacent to amateur bands have to be considered. The only effective way to reduce this type of " re-radiation " interference is by adequate screening of the offending receiver, and by isolation between the radiating detector and aerial using an r.f. amplifier stage. While the HW-30 must inevitably suffer from this disadvantage, by knowing the range to which the re-radiated signals are limited, it is possible to make some assessment of the conditions under which it may safely be used.

The Heathkit HW-30 (The Two'er) Transceiver.

For the first test, the HW-30 was operated indoors at a site some 3-4 miles away from a well-equipped fixed station using a 6-over-6 beam and a sensitive crystal-controlled receiver. The HW-30 was operated into a piece of wire 19 in. long (approximately a quarter of a wavelength) which was pushed into the aerial socket. Perfectly good communications were maintained at RS57 level, even when the HW-30

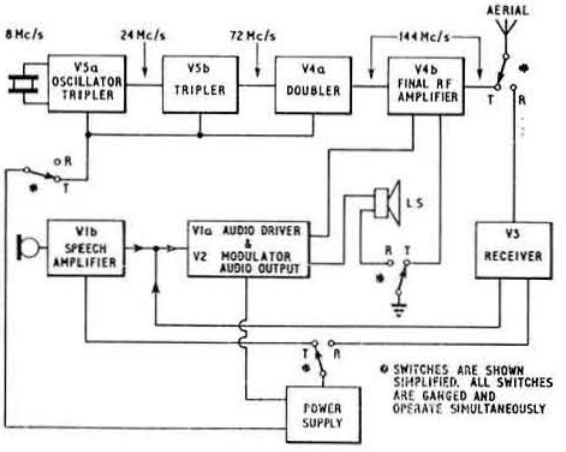


Fig. 1. A block diagram of the HW-30 2m transceiver.

was moved around in the room, and screened from the other station by metal objects. The modulation level was reported adequate, and by raising the voice or speaking too close to the microphone, limiting occured which degraded the readability.

In order to test the typical range of the HW-30, it was operated into a pair of crossed dipole aerials at some 20 ft. above ground at a good v.h.f. location. Under these conditions, signals could be received from all directions at good strength up to 10-15 miles, and one or two outstanding stations at greater distances. The range of the transmitter appeared to match the limitations of the receiver. When connected to a large Yagi aerial system some 35 ft. above ground at the same site the effective range went up significantly, and stations up to 50 miles could be received. However, under these conditions the inherent lack of selectivity of the simple receiver became a problem in resolving adjacent signals.

Finally, in order to check the re-radiation from the regenerative receiver, a strong local station was tuned in, using the crossed dipoles, and the band searched on another receiver located at a site approximately 100 yards away, and using an 8 element Yagi. At this range the interference over the band was definitely very objectionable. However, at the same time, no trace of interfering signals could be found at a site just over a mile away. At no time was any TVI experienced on Bands I or III on a receiver in the same house, even when the HW-30 was operated standing on top of the receiver. Neither could any spurious radiation be detected on a sensitive communications receiver coupled tightly to the HW-30 aerial socket, when no signal was tuned in on the HW-30.

Conclusions

The Heathkit HW-30 represents a simple and reliable means of getting on the 2m band with a single package. It is neatly arranged, and, with the usual comprehensive Heathkit Manual, should be very simple to construct.

The useful range depends very much on the aerial system employed, but for semi-emergency or casual point-to-point communication it is very suitable. It is recommended that it is *not* used where several 2m stations are in very close proximity or when the band is very active, i.e., during contests or E-DX openings, but for local nets it is quite satisfactory. An ideal application would be as a constant stand-by " talk link " between two co-operating stations.

The circuitry is basically satisfactory, but some benefit might accrue from mounting the crystal holder on the outside of the front panel, and by replacing the aerial socket with a Belling-Lee bulkhead coaxial socket Cat. No. L1421, wiring back to the transmit-receive switch with coaxial cable to reduce radiation.

TECHNICAL SPECIFICATION

Transmitter Section

Power input to final r.f. amplifier ..	Approximately 5 watts.
Frequency control ..	8 Mc/s to 8·11 Mc/s quartz crystal. Pin spacing 0·5 in. Pin diameter 0·093 in. FT-241 or FT-243 crystal holder.
Modulation.. ..	A.m. anode modulation, automatically limited to not more than 100 per cent.
Output impedance	50 or 72 ohms.

Receiver Section

Receiver type ..	Super-regenerative detector preceded by r.f. preamplifier stage.
Sensitivity	Usable with signals as low as 1 microvolt at the aerial terminals.
Speaker size ..	3½ in. circular.
Audio power output	Approximately 1 watt (undistorted).
Tuning range ..	143·0 Mc/s to 149·0 Mc/s.

Power Supply

Power rectifier ..	Two silicon diodes in full-wave voltage doubler circuit.
Power requirements	With built-in supply: 105-125 volts, 50/60 cycle a.c., 45 watts. With external supply: 6 volt operation—6 volts at 2·35 amps, 260 volts d.c. at 90 mA. 12 volt operation—12 volts at 1·2 amps, 260 volts d.c. at 90 mA.

Accessories

Microphone ..	Ceramic element, plastic case. Suitable for either hand or desk operation.
Connecting cables	Two supplied, one for 210-250 volt a.c. operation and one for 6 or 12 volt external d.c. power supply. Power circuits are automatically switched for internal or external power supply use when cable is plugged in.

General

Valve complement		
V5A	1—6BA8:	Oscillator/tripler (pentode section).
V5B		Tripler (triode section).
V4A	1—6BA8:	Doubler (triode section).
V4B		Final r.f. amplifier (pentode section).
V3	1—6BS8	Receiver preamplifier and detector.
V1A	1—12AX7	Speech amplifier and first audio.
V1B		Amplifier.
V2	1—6AQ5	Audio output and modulator.
Cabinet dimensions		8 in. high (including handle). 6 in. deep (including knobs). 9¾ in. wide (including licence holder).
Net weight		6½ lb. Shipping weight .. 10 lb.

Manufacturer

Heath Company, Benton Lane, Michigan, USA.
UK Agents: Daystrom Ltd, Gloucester.

Price £26. 5s.

QRV QRT

A ruling by Ministry of Defence (Air) has deprived the long-established Royal Air Force Amateur Radio Society of its official journal *QRV*—at least for the time being. It appears, according to the Editor of News Letter No. 17, that " some person (lady) unknown has decided that the society can afford to have the magazine printed privately and that advertisements should cover the additional outlay." RAFARS members are assured that something will soon be arranged and that *QRV* will reappear.

" The Parabeam and How it Works "

An article by Vic Hartopp, Chief Development Engineer, J-Beam Aerials Ltd. describing the Parabeam has been published in a recent issue of *Electrical and Electronic Trader*. Designed to cater for television broadcasting on u.h.f. (470-574 Mc/s) the Parabeam is basically a long Yagi using a skeleton slot as radiator and another as reflector. The Parabeam is now being offered commercially.

THE MONTH ON THE AIR

By JOHN ALLAWAY G3FKM

SINCE writing the comments concerning QSL cards in last month's *MOTA* your scribe has been giving further thought to the matter. It seems that QSL managers have recently been coming under fire, but to the writer it seems that the majority of these gentlemen do a first class job; anyone contacting a DX station whose QSLs are managed by W2CTN for example, will know that a QSL will arrive without fail. However, during the past few months G3FKM has been particularly anxious to obtain confirmations for certain contacts, and has therefore, in a number of cases, mentioned this fact over the air while in QSO. In some cases, in spite of promises, and although addressed envelopes and return postage at air-mail rates have been sent, no QSL has arrived. The possibility of the DX station being out of cards has been ruled out by the inclusion of an addressed blank card, completion of which would require minimum time and effort. It would seem that it is time for all amateurs to say that they *do not intend* to QSL, if that is the case, rather than dishonestly retain that which is not theirs.

To those awaiting cards a word of consolation—G3HDA has just received a QSL from a Portuguese station for a contact *14 years* ago.

News from Overseas

In a QSO with G3UDL, **ZD9BE** said that he is now on 14 Mc/s practically every evening, between 18.00 and 19.15 GMT. He is now using a.m. as well as c.w., and G3UDL says that he was an excellent signal on 1 March. His home call is GW3SWG, and he is especially anxious to contact his old friends in Wales.

Andrew, G3LZZ, is now in Trinidad for a year at the University of the West Indies, and has managed to obtain the call **9Y4LZ**. At the time of writing he was rockbound on 7040, 7050, 7060, and 7130 kc/s, and multiples thereof, and he is able to run 90 watts of c.w. or 75 watts of a.m. phone. It is hoped that a full sized 3 element beam will be in use soon on 21 Mc/s, and this should put a good signal into the UK. Operating hours are a little uncertain, but 11.00 on 14 Mc/s and afternoons on 21 Mc/s seem to be likely times. QSLs should be sent to the home QTH (See *QTH Corner*).

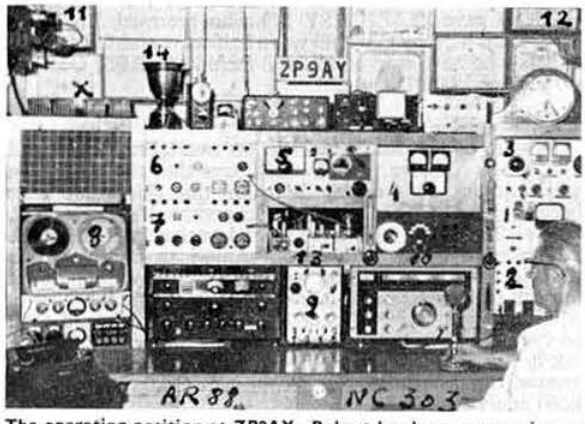
5N2AAF once again sends news of his experiences on the bands, and news of the present amateur population of Nigeria. On 28 Mc/s Mike says that he has been hearing Ws at odd times, usually around 16.00, but no Gs have been heard for some months. The 21 Mc/s band has been rather good, with propagation to Asia, and also to the VE6/7, W7 areas. On 14 Mc/s it seems that the Gs peak around 08.30, and also between 16.00 and 18.00, and 20.00 and 21.00. European and South American QRM is a serious problem! Turning to the l.f. bands, 7 Mc/s is apparently as difficult in Africa as it is here in Europe, with Radio Peking getting stronger every day; 3·5 Mc/s is quite good at times with the Gs not too easy to find amongst the DL and SM QRM. Mike has been hearing the West Coast Ws well at 06.30, which is broad daylight with him! The general level of activity in Nigeria is very low, and the only stations known to be active at present are 5N2AAJ, 5N2AAS, 5N2FEL and, of course, 5N2AAF. Other calls which have been issued include 5N2's AAD, AAE, AAG, AAH, AAK, AAM, and AAN. It is believed that AAO/P/Q and R have been issued but no one seems to know to whom. Finally, Mike has a number of QSLs for ex-5N2HJA and ex-5N2JEB; if anyone knows the whereabouts of either of these gentlemen would he please contact G3FKM?

One of the people benefiting from the new reciprocal licensing arrangements between the USA and the UK is G3MHV. He is now operating as **G3MHV/W6** from Berkeley, California, and has been loaned a 1 kW transmitter and a 6 element tri-band beam by W6HVN, of the Amrad Supply Co. in San Francisco. Terry will ultimately have his own equipment on the air, and says that it will probably be something a little less exotic! Contacts with G stations are particularly welcome.

We have been advised by 9G1ED/G3BQH that with effect from Saturday, 5 March, 1966, all Ghana amateurs have been instructed not to make any transmissions and to hand in their licences to the proper authority. Of course they hope that this will be a temporary measure only, but are reluctant to offer any speculation as to its probable duration. We can only hope that circumstances will soon change for the better and that the letter which was addressed to the General Officer Commanding will do a little to help in getting their activities put on the map again.

Top Band News

Although there have been occasional good DX openings on this band, on the whole conditions have been a little disappointing. News of activity as heard from Jamaica is provided by **6Y5FH**, who has sent along a list of European signals heard, which includes G3RPB, G3PQA, and G3TLY. The loudest of these is G3RPB, who has been called a number of times, but it is presumed that the W QRM in the 1805/1810 kc/s sector where 6Y5FH called was too much for his signal to penetrate. In future it is proposed to call Europe in the vicinity of 1820 kc/s, in order to escape from this hazard. Operating hours are 02.30 to 05.30 every



The operating position at ZP9AY. Robert has been very active on 160m, and has already contacted the US on that band, which is no mean feat from Paraguay.

* 10 Knightlow Road, Birmingham 17.

It now seems to be inescapable fact that Chuck Swain, K7LMU, and Ted Thorpe, ZL2AWJ, have been " lost at sea " somewhere between Samoa and Wallis Island, in the South Pacific. After leaving Wallis Island on 27 February, together with three other passengers on the 38 ft. ketch " Marinero ", they ran into the full force of a hurricane. The area was subjected to winds of 100 m.p.h. and waves of up to 75 ft. in height. It is known that a Korean fishing boat of some 100 tons displacement was completely destroyed by the force of the storm, and all but two of its crew of 22 lost. In spite of an intensive search by the US and New Zealand Air Forces, and US Coastguard, no trace of the " Marinero " has been found.

In the absence of miracles we must therefore accept the fact that these two fine amateurs have lost their lives, in the course of a journey which they would never have undertaken but for their intense interest in Amateur Radio. They enjoyed giving all of us the pleasure of contacts with many rare places, Ted having assisted Chuck during their operation from Niue and Wallis Island. Chuck was well known for his previous tours to South East Asia, when he succeeded in getting permission to put Cambodia, Vietnam, and other places on the Amateur Radio map.

The hobby can ill afford to lose these two young men, whose ability to deal with adversity was so well known. Ted leaves a wife, and two young daughters; Chuck was single, but has a widowed mother. We know that they will both be sadly missed across the world, and our thoughts and sympathy are with their families, and with all others who were also privileged to call them friends.

Sunday morning, transmitting frequency as just mentioned, and listening between 1820 and 1825 kc/s for replies.

Further news from **VO1FB** suggests that the weekend following the *CQ Contest* would have been much better as far as conditions were concerned. This was the second European "First Timer's" night, and between 23.42 and 07.22 Joe raised 25 European stations, 17 of which were first ever contacts on 160. The absence of strong signals from the regulars made copy of the weaker signals much easier, and seems to indicate that the special mornings for newcomers should be a regular feature each winter. Conditions during the *RSGB 1·8 Mc/s Test* were also good, but not up to last year's standard, the first contact not being made until 23.47 when GM3KMR was raised. It seems that **ZD7IP** and **ZD7RH** are putting excellent signals out towards the US with their 95 ft. high aerial; they share the equipment and work alternately. The transmitting frequency would appear to be 1822 kc/s. Joe also reports that Peter, 6Y5XG, had contacted EI9J, G6BQ, and G3RPB on 26 February.

After having spent about six hours working Europeans during the weekend of the 5-6 February, Mike, **5N2AAF** took down his inverted Vee and will not be back on 160 until next October. He says that the rainy season is just about to begin, and the attendant static makes life too difficult. The position with regard to future operation on the band in Nigeria is a little obscure, as no mention is made of 160m on the new licences, so it seems that Mike will need special permission before opening up again.

During the morning of 18 March **G3UQD** (Hayes, Middlesex) worked ZL3RB (Canterbury, New Zealand). G3UQD gave ZL3RB RST 579 who returned RST 349. The aerials used by G3UQD was a half-wave end-fed at 70 ft. Others who have worked ZL3RB include G3RFS, G3RPB, G3SED and G3PU.

DXpeditions

In spite of the disaster which has overtaken Chuck and Ted, a news release from W4ECI says that the expedition will continue. Don and he both feel that this would have been the wish of the others. Don has operated from FK8AU, and VR2EW, and during the second weekend of the ARRL Phone contest was active from American Samoa. It is thought that the expedition will get under way again about the end of March, and it is intended that Manihiki, Nauru, Minerva Reef, Maria Teresa Reef, and Heard Island shall be visited. The order in which these will come is not known, but it *is* certain that Heard Island will be the last. Vigilance around the usual operating frequencies (14,045 and 14,105 kc/s) may be advisable.

Iris and Lloyd Colvin have abandoned their Pacific meanderings, at least for the present, and are now back in the US. Their last port of call was Tarawa in the Gilbert and Ellice Islands, where they used the call VR1Z. It is now understood that they will be travelling Eastwards towards Europe and Africa during the coming summer. The reason for their change of plans is not known.

A poll carried out recently by the Northern and Southern Californian DX Clubs voted PY0, St Peter and Paul Rocks, to be the most wanted DX country. No doubt the new Desroches and Farquhar Island groups would now be in the top bracket also. By the time this is published it is quite possible that Desroches will be a little less rare, as Harvey, VQ9HB, is preparing to visit there in the very near future. Unfortunately he has some mechanical trouble with his boat, and his departure is therefore somewhat delayed. Later in the season, when the typhoons are less frequent he will visit Farquhar.

Latest news for the DXpedition of the Month is that mailing of the first group of FL8AA cards has now been completed. The 4W2AA cards are expected from the printers early in March, and mailing of the cards for ZD8AR's 1965 *CQ* Contest activity is about to begin.

Awards

The Yugoslav Amateur Radio Society announces two awards, the **Jubilee Award of SRJ** and the **W-YU-R-VHF Award.** The former is being issued to commemorate the 20th anniversary of the society, and is being given on the basis of numbers of Yugoslavian stations contacted during 1966. Stations in Europe need 20 QSOs, in Africa, Asia and North America five QSOs, and in South America and Oceania three QSOs. Stations may have been contacted on any band or mode but each station may only have been contacted once for the purpose of the award. A list of claimed contacts with the log data is accepted, if certified by two other licensed amateurs, and should be sent together with five IRCs to: SRJ Award Manager, Box 48, Beograd, Yugoslavia. The v.h.f. certificate is to be given to stations who have worked two YU districts; in the case of stations in countries bordering Yugoslavia this needs to be three districts. QSOs since February 1950 on v.h.f. count. Reports must not be lower than R3 and T8. Applicants should send the QSL cards, a list of the appropriate log entries, a signed statement that the station was operated within the limits of the licence, and five IRCs to the address given above. This award is available to SWLs also.

The NRRL will in future accept lists of QSLs confirmed by a national radio society in place of the actual QSL cards, from those who apply for their **Worked All LA** certificate. The requirements for this sheepskin remain as before—confirmed contacts must have been made with 20 Norwegian

stations, at least six of which must be North of the Arctic Circle. LJ/LF stations do not count. Svalbard and Jan Mayen stations signing LA/P do count. Applicants should send the certified list plus 10 IRCs to: NRRL PO Box 898, Oslo sentrum, Oslo 1, Norway.

It is announced that the "**Alphabet Award**", issued by the Lakewood Amateur Radio Club of Dallas, is no longer available.

County chasers still requiring **Radnorshire** as a county for that magical "worked all 98", will be pleased to know that the county will be "on the air" from Good Friday, 8 April, to Wednesday, 13 April. The call-signs to look for are GW3PWU/P, GW3UAX/P and possibly also GW3PGM/P. As a general rule phone will be used during daylight, and c.w. during the evenings (until about 11 p.m.). Anybody feeling like dropping in to see them will be welcome; they will be located about 2 miles south of New Radnor Village, and will talk in any mobile stations. All QSOs will be confirmed by QSL.

Owing to known delays with certain QSLs, Geoff Watts wishes it to be known that this year there will be a further one month's grace in which to get those outstanding QSLs for your entry for the **1965 Islands-on-the-Air Contest Award.** Amateurs and SWLs the world over may enter. Send a list of QSLs held confirming QSOs with different islands, together with their IOTA Directory reference number, and multiply the total by the number of continents worked. *Do not send QSLs*, but just this list and total. Entries must be postmarked no later than 30 April, 1966 (send air mail if possible) and addressed to Geoff Watts, 62 Belmore Road, Norwich, NOR 72T, England. Winners will be asked to forward their QSLs for checking, and copies of the 18-page Directory of Islands may be obtained from Geoff Watts, price 2/- or four IRCs, or by air mail; Europe six IRCs, USA eight IRCs, and Far East/Pacific nine IRCs.

Contests

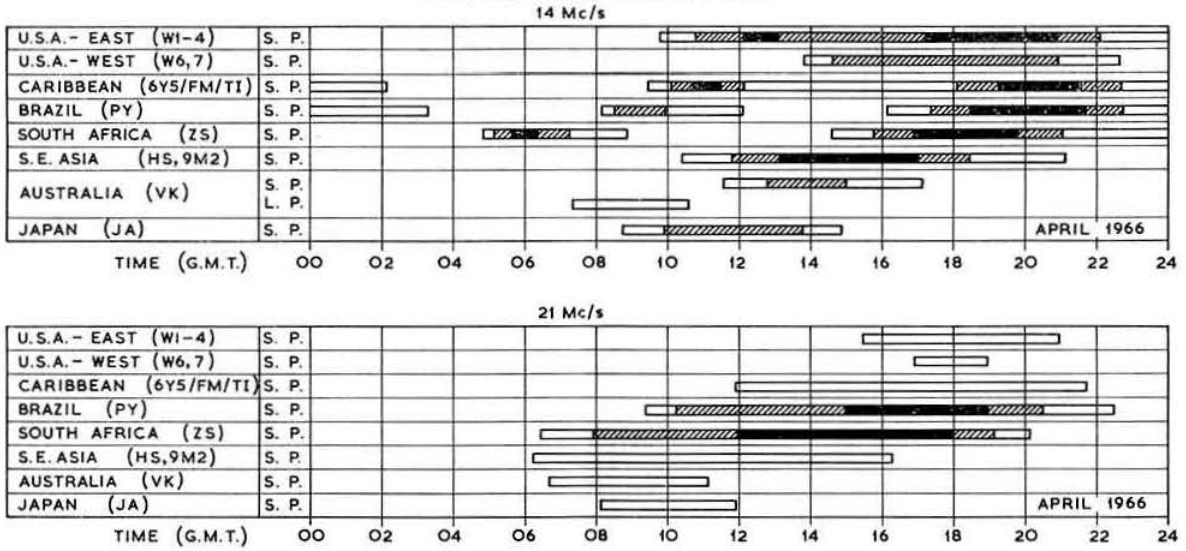
The results of the **1965 *CQ* Magazine WW S.S.B. Contest** were received just too late for last month's *MOTA*, but are as follows:

All Band Single Operator		*Multi-operator Single Transmitter*	
DL3LL	692,208 points	I1RB	854,832 points
OD5BZ	409,960 points	M1ZG	736,890 points
9M4LP	404,920 points	YV5AKP	618,184 points
K2HLB	322,784 points	GB3RAF	574,959 points

Leading UK stations (single operator) were:

G4CP	All band	293,880 points
G8KS	,,	133,650 points
GI3CDF	3·5 Mc/s	24,900 points (World highest)

Propagation Predictions



There are several indications that solar activity will shortly increase more quickly than was the case during 1965. In this phase of the sunspot cycle one is never quite sure just how quickly the increase will take place and so the propagation forecasts will be less accurate in the next year or two. The DX possibilities on 28 Mc/s will still be of little practical value. On this band on days with F2 m.u.f.'s above average there will be opportunities for contacts with Africa (12.00-18.00 GMT) and South America (15.00-19.00 GMT). On 21 Mc/s, only Africa and South America will be workable with certainty. Not until May will 28 and 21 Mc/s show any improvement, when contacts over 500 to 1100 miles should be possible via sporadic-E reflection. 14 Mc/s will experience better propagation conditions compared with the winter months. The nights are becoming longer and so the band will remain open longer than in previous months, giving most hams the opportunity to work DX on 14 Mc/s in the evening. On days free of disturbances the band should remain open until midnight and sometimes even longer, especially in the latter half of the month. Opportunities for working DX on 14 Mc/s via the long path will still be very few. On days with F2 m.u.f.'s noticeably above average contacts will be possible with Hawaii between 16.00 and 21.30 GMT. In contrast to 14 Mc/s the longer nights will lead to a worsening of DX conditions on 7 Mc/s. Likewise the increase in atmospheric noise with the approach of summer will lead to a worsening of the DX situation. Basically DX contacts are only possible on 7 Mc/s when the greater part of the transmission path lies in darkness, which means that this band is only open for DX in the period from shortly before sunset until shortly after sunrise. There will be a certain improvement in traffic with South America and South Africa compared with the winter months. Traffic with the USA will be only occasionally interrupted due to too low an m.u.f. in the latter half of the night, especially in the first half of the month. On 3·5 Mc/s DX contacts are basically possible when the whole of the transmission path lies in darkness, and this condition is more severe on 3·5 than on 7 Mc/s. The shorter nights and the increase in atmospheric noise will result in this band opening much less frequently for DX than in the winter months. Interruptions to local traffic outside the ground wave area will still occur here and there on 3·5 Mc/s due to the dead zone, though less frequently than during the winter.

The provisional sunspot number for February 1966 was 23·5 with the period of greatest activity lying between the 18th and 28th of the month. The predicted smoothed sunspot numbers for June, July and August are 33, 35 and 37 respectively.

The recent Hamfest at Caracas was attended by many very well known DX-ers. This photograph shows W4BPD, Gus, YV5AGD, Tony, and W9WNV, Don.

GM3NQB	,,	7,015 points
GW3NWV	,,	2,204 points
G3NLY	7 Mc/s	9,702 points (World highest)
G5HZ	,,	6,405 points
G3PCG	14 Mc/s	231,288 points
G3IEN	,,	166,430 points
G2ABB	,,	105,963 points
G3OOB	,,	48,026 points
G2QT	,,	47,130 points
GM3JDR	,,	39,403 points

Congratulations to the winners, especially to GI3CDF and G3NLY who both came top of the world entries on 3·5 and 7 Mc/s respectively.

This year's ***CQ* WW DX SSB Contest** will be on 16/17 April. Rules are as last year. Entry forms may be obtained from G3FKM by sending a large s.a.e.

Results are also to hand of the **1965 OZ-CCA Contest** (C.W. Section). The leading UK participants were: G3EYN, 61,445 points, G3NSY, 22,152 points, and G3JFY, 16,848 points. OK3KAG appears to be the overall winner with 153,696 points. In the Phone section there were apparently no British entries, and the winner was I1LCF with 5,385 points.

This year's OZ-CCA Contest will be c.w. only, and will take place between 12.00 GMT on 30 April and 24.00 on 1 May, on all bands 3·5 to 28 Mc/s. Contest exchanges consist of six figure numbers—RST plus serial number of QSO, starting at 001. Each QSO counts 1 point for correctly received report, and 2 more for correctly received QSO number. QSOs with OX—OY—OZ stations count double. Every country worked counts as a multiplier, as will all W/VE/PY/LU/VK and ZL call areas. Final score is total QSO points multiplied by the total of countries worked on all bands. Entries must be mailed before 15 June, and must contain a signed declaration that all rules and regulations have been observed, and that EDR's decision will be accepted. The mailing address is: EDR Contest Committee, PO Box 335, Aalborg, Denmark.

The 3rd **VU/4S7 Contest** will be held on 8-9 October (Telephony), and 15-16 October (C.W.), from 05.00 Saturday to 06.00 Sunday (GMT). Rules are as for the previous contests, and logs and accompanying summary sheets should be sent to ARSI Contest Committee, PO Box 534, New Delhi 1, India, postmarked not later than 15 November 1966.

The **YL International SSB'ers Inc. Annual QSO party** will take place between 23.00 on 20 May, and 06.00 on 23 May. This event will be open to all amateurs, not just members of this excellent organization, and contacts are permissible on all modes and bands. In order to qualify for an award it is necessary to operate for at least six hours during each 24 hour period of the party. QSO exchanges should include QSO number, report, state or province, name and SSB'ers number (if any). Points are gained by non-members as follows: QSO with own country 0 points, with SSB'er member in own country 2 points, with SSB'er member outside own country 4 points, and with non-member in another country 3 points. Multipliers consist of total prefixes, plus countries, US/VE states and provinces and continents. It is strongly advised that interested amateurs contact WA6MWG, Pete Billon, 4040 Via Opata, Palos Verdes Estates, California, 90274, for full details and entry sheets. There are a number of points of importance for which there is not space to detail in full in *MOTA*. Your scribe would like to take this opportunity to congratulate the YL International SSB'ers on their suggestion that contest activity should be largely confined to 20 kilocycles around suggested frequencies on each mode/band. This is a policy which commends itself to the organizers of all contests, particularly those in which the number of participants is not likely to be as large as in the ARRL and *CQ* contests.

Those who are interested in contests (either for or against) will be interested to know that in the United States, FCC has just dismissed an application for a rule *prohibiting* contests! The applicant also sought to ban the playing back of recorded amateur signals, *and* operating awards.

QRP News

It seems that this section is gradually attracting a little support, but has not, however, brought quite the deluge hoped for by G3URX who thought that there would be letters from indignant brasspounders saying what *they* had done! He makes a point which is shared by the writer, that there are a lot of people who work a great deal of DX but keep the news to themselves and never send in a report. Perhaps it should be pointed out that those who wish to remain anonymous in *MOTA* shall do so, if only they will mention the fact when sending in their logs. John is putting up a vertical in place of his very low dipole soon, and this, of course, will make an enormous difference.

G3SML tried turning down the wick on 21 Mc/s to 25 watts input on s.s.b. He still managed to raise XE2WH, MP4TBO, and a number of Ws. One American station co-operated in the experiment by reducing his 1 kW to 150 watts—this resulted in about 1 "S" point drop in his signal.

Another new QRP supporter is G3TMB, who runs 25

Bill Wilkinson, BRS20317, a leading s.w.l. on the l.f. bands, and a regular winner of BERU. He uses an AR88 receiver, a 44 ft. vertical and a 66 ft. dipole.

watts to a half size G5RV aerial. The list of DX is impressive, all the US call areas having been worked on 14 Mc/s, the rarer African areas and the US on 21 Mc/s, and on 28 Mc/s a.m. he makes the grade to Africa when the band is open. He never calls CQ except on a dead band—what a sound idea!

Band Reports

With the approaching equinoctial period there has been the expected improvement in conditions on most of the h.f. bands. Equally predictably, 1·8 Mc/s has not been as exciting as during the mid-winter months although a considerable amount of DX has been reported on it. Eighty metres has been producing some very good DX openings, with signals quite strong, but on the s.s.b. portion of the band chaos has reigned occasionally when some of the less experienced operators have tried to take care of the situation! With regard to 40 all that can be said is that it would be an excellent band if only amateurs were allowed to use it. According to the IARC Newsletter the German Post Office has been carrying out some research on frequency pirates, and has found that even if the interlopers had signals only 9 kc/s wide they would entirely fill the 40m band. One cannot expect civilized behaviour from some of the countries of origin of the pirates, but surely we can expect Greece (7006, 7040), Iran (7064) and Saudi Arabia (7085) to behave responsibly.

Twenty metres has again been the main course of DX, and the lighter mornings are just beginning to produce openings to the Western USA, and to the Pacific. Fifteen comes to life occasionally, particularly during contests, which shows that its full potentiality is not being realized. Ten is very poor, but as one correspondent says " Where are the s.s.b. operators on ten metres, do they not work short skip, or have they been driven off by the grandads who cannot or will not resolve s.s.b? "

Once again, many thanks to all who have sent in reports and news items, including the following: G2BOZ, G3AAE, G3DO, G3HCT, G3HDA, G3JVJ, G3KSH, G3NMH, G3SML, G3UOL, G4MJ, G8JM, GW3AX, BRS20317, BRS26676, BRS26928, A4038, A4124, A4242, A4489, A4641, and A4955.

1·8 Mc/s C.W.: HI8XAL (06.30), ON5KW (?) (22.41), VE2UQ (02.15), VE3BWY (06.45), W1BB (23.00), W1HGT (06.50), WA1CAG (02.05), W2FYT (06.30), W3MSK (23.20), W4WHK (06.50), W8HGW (06.26), W9PNE (06.30), ZB2AM (06.45), ZD7IP/ZD7RH (04.00-05.15), 3A2AP (02.52), 6Y5XG (07.30), 9H1AE (22.15), 9V1LP (23.00).

3·5 Mc/s C.W.: CM2BL (07.53), CN8CY (00.00), CO2BO (02.30), CR6AI (23.38), EA8EN (21.10), FG7XX (23.20), HI3PC (23.36), HI8XAL (23.40), HK3RQ (03.48-07.57), HP1IE (07.00), KZ5FX (02.20), LA8FG/P (Jan Mayen—20.58), LJ2T (21.10), OX3LP (23.50), PY5XQ (23.28), TA2AM (23.45), UW9WI (19.00), VK2AP (20.25), VK3APJ (20.10), VP2VI (05.45), VP5AR (08.15), W6ITA (07.55), K6BPR (07.06), ZC4AD (" Achmed "—phoney? 21.48), ZD7IP (23.30), ZD8AR (23.30), ZL4BO (07.00), ZS5QU (03.08), 6Y5BB (07.54), 7G1A (00.00).

3·5 Mc/s S.S.B.: (All 20.00 to 22.00 unless otherwise stated) CN8AW, G3BID/CN/Mobile, F9RY/FC, I0FGM, IS1FSE (07.00), LA8FG/P, OH0NJ (00.01), OY7ML (22.00), VE8BB (07.00), VK2NN (07.50), VO1FB/1B/OG/HX/CM, VS9KRV (21.00-23.00), W5MYM (New Meixco, 07.00), W8YBZ (06.50), K0ZCS (07.15), YS1FSE (08.00), YV5AFH (02.20), ZL2AJ, ZL2BCG (07.15), ZL3FT (07.30), ZL4OD (07.21), ZL4LZ (07.43), ZS1BB/MM (07.32), 4X4AS (21.34), 7X2AH (21.17).

7 Mc/s C.W.: CP5EZ (00.53), EP3AM (03.00), FG7XO (05.42), HI4ARM (24.00), HK0AI (09.50), KR6MM (16.30), KZ5JF (23.45), OD5RO (23.25), VE8NO (07.43), VK2EO (07.43), VK3ARV (07.55), VK0MI Macquarie Island (08.07-08.38), VP2VI (02.02), VP5AR (09.40), VP7NQ (23.04), W6FSJ/LN/PZ/ULS/RW (L.P. 15.00-16.00), ZD7IP (01.52), ZD8AR (01.31), ZL3AB (09.15), 6O6BW (00.45), 9G1FQ (01.22), 9K2AD (15.46), 9V1LP (15.45).

7 Mc/s S.S.B.: (All 20.00 to 22.00 unless otherwise stated) ET3AC, JA2BAY, LA8FG/P, MP4TBO (21.16), OX3JV, OY6FRA, PY4ND, PY7LAK (20.40), TF3EA, UH8AE, VK2AHT (08.10), VK2KM, VK2KMB, VK3ATN (20.55), VP2AA, VP2AL, VP6KL (21.29), VS9KRV (21.45-00.15), W3MSK (00.30), XW8BM, YV5ACP, ZS1JA/XR, ZS5GU/QU, ZS6BBZ, 7X2AH, 9H1AB, 9Y4LQ, 9Y4VT.

14 Mc/s C.W.: CE2AP (22.15), CP3CD (21.50), CR4BB (16.00), CT3AQ (18.25), FB8WW (19.15), FY7YE (12.20), JA0AZE (08.19), KH6GAJ (19.08), KL7EFT (19.25), LU2DAW (20.35), OX3UD (17.00), UW0IF (08.15), VK9BJ/P (11.25), VP8HO (21.09), VQ8BJ (18.00), VS9MP (18.45), XW8BM (15.30), YU0ITU (16.15), ZD9BE (19.10), 7G1A (17.00), 9Q5RD (19.30).

14 Mc/s A.M.: EA6BC (13.19), EA6BG (09.20), TN8CZ (18.05), VK0MI (07.30-08.30), VP8HZ (21.45), VS9ATH (16.05), ZC4TX (20.40).

14 Mc/s S.S.B.: CR6EC (17.14), ET3AC (16.54), ET3WH (18.57), FM7WQ (22.38), FK8AU (W9WNV-08.20), FK8BG (08.55), FR7ZD (18.09), FW8RC (08.20), HC1PB (22.17), HI3XEG (18.28), HK0AI (21.50), HR2AK (18.26), KC6FM (08.35), W1VQG/KG6 (10.12), KG6IF (08.16), KG6IG (08.17), KG6SB (08.55), KH6AX (17.40), WA4GF/KM6 (08.40), KS4CA (18.30-22.00), KH6BCB/KS4 (13.56), KV4ES (19.55), KW6EK (08.07), KX6BQ (08.10), KX6JI (11.00), LA4FG/P (Spitzbergen, 12.30), OA5AO (01.46), OX5AC (12.55), TG8FA (18.47), TI8LM (18.30), TU2AF

QTH Corner

ET3WH	via W7TDK, 11900 S. W. Douglas, Portland 25, Oregon.
FK8BG	Box 97, Noumea, New Caledonia.
HS1AK	via HS1S, Charles Sykes, OSD/ARPA RDFU, APO San Francisco 96346.
I0FGM	Franco Armenghi, via C. Sigonio, 2 Bologna, Italy.
KG6IG	via W3KTY, David F. Jones, 1016 W. Penn St, Butler, Pa. USA.
KS4CA	via WA9OVE, Thomas E. Bull, 4340 Sunrise Road, Indianapolis, Indiana.
KH4BCB/KS4	Jim Takaki, Box 1148, Miami, Fla, 33148.
KV4ES	Box 982, Christiansted, Virgin Islands.
KW6EJ	via W2CTM.
KW6EK	via W7WLL, 9216 S.W. Fir Grove Lane, Portland 25, Oregon.
KX6DT	Box 191, APO San Francisco, California, 96555.
LX2UN	via D.O.T.M.
TU2BC	BP 1908, Abidjan, Ivory Coast.
VK9DJ	G. E. Pocley, Era Saw Mills, Private Mail Bag, Port Moresby, Papua.
VK9GN	73 Ukarumpa, TNG.
VK0MI	via WIA PO Box 41, Box Hills, E11, Victoria, Australia.
VP2AA	via VE3ACD, M. J. Wolfson, 305 Rosemary Road, Toronto 10, Ont. Canada.
VP2DAG	via W2YTH, Thomas W. Winternitz, Yardley Rd, Mendham, NJ.
VP2VI	As above.
VQ9HB/D	via G8KS, 31 St. Leonards Road, Eastbourne, Sussex.
VS9KRV	via G2MI.
ZB2AT	John J. Rose, 3/75 Red Sands Road, Gibraltar.
ZD8WZ	From 1 Feb. to W4HKJ, 990 S.W. 63rd Av., Miami, Fla., 33144.
ZL4CH	via ZL2GX, 152 Lytton Road, Gisborne, New Zealand.
ZF1XX	VE2BK, Colin Dumbrille, 116 Oak Ridge Drive, Baie.
9Y4LZ	via G3LZZ, A. M. Ponfret, 1 Scarborough Road, Shipley, Yorks.

QSL Managers

DOTM	W2GHK, PO Box 7388, Newark, NJ, 07107.
W2CTN	156 Ketcham Avenue, Amityville, NY. 11701.

* * *

RSGB QSL Bureau: G2MI, Bromley, Kent.

(18.45), TU2BA (08.00), UA1KED (F. Josef Land 08.00-16.00), VE6ABP (18.49), VK8KK (07.53), VK9BW (10.55), VK9CB (Norfolk Island 12.30), VK9DJ (Papua. 08.35-13.00), VK9KJ (09.43), VK0KM (Mawson, 12.30), VP1PV (12.50), VP2DAG (17.55), VP2SD (22.00), VP8AH (22.00), VP8CW (20.00), VQ9TC (18.44), VR1Z (08.20), VS6BE (09.33), VS9KRV (Kamaran Island 13.11), XE1JP (14.43), K1YPE/XV5 (12.45), YK1AA (15.24), YN1SL (18.49), ZD7RH (08.15), ZD8PI (08.10), ZF1BP (20.30), ZF1XX (12.45), ZL4CH (Campbell Island 08.00-09.30), 5H3JR (20.05), 5N2AAF (15.37), 6O1AU/5R8 (16.56), 9J2AM (17.09), 9M2GF (15.40), 9M6NQ (08.58), 9M8RS (15.05), 9U5BB (19.28), 9X5CE (16.00).

21 Mc/s C.W.: FL8MC (12.40), FL8RA (10.45), HP1IE (15.30), JA1KGT, 3KWZ, 5XX, 6DVR etc. (07.50-08.10), KR8CS (08.50), KV4CI (11.25), MP4BFK (13.00), OD5LX (13.54), UA9UI (11.00), VQ8AW (12.45), Ws all districts (15 to 18.00), XW8AZ (11.35), ZS6JK (11.52), 7G1A (15.30), 9J2WR (10.27), 9K2AD (12.45), 9V1MY (09.15).

21 Mc/s A.M.: CR6HG (16.45), CR7ER (16.30), CT3AM (13.10), EA8DR (10.26), FL8AO (08.50), MP4BBA (11.35), PY7VA (16.45), TN8BK (12.10), VU2CQ (10.58), ZE1BP (16.15), ZS1BV (11.05), 5N2FEL (08.40), 5X5JK (11.24), 6W8CZ (16.50), 9G1FL (12.52), 9Q5JW (17.20).

21 Mc/s S.S.B.: G3BID/CN/Mobile (13.03), CR6AC (12.00), CR7BL (13.50), ET3WH (10.05), FS7RT (14.15), G3SBP/KV4 (19.00), HC1EJ (20.10), MP4TBO (11.20), PJ2BE (18.40), UA0KWA (Zone 19, 08.25), UF6UB (12.54), VK2EV, NN (10.00), VK6SM (09.21), VP3AA (13.45), VP3HAG (15.50), VS9AHE (11.03), VS9KRV (11.20- 13.00), YV5AAS (13.45), ZD5R (09.45), ZD7RH (11.00), ZD8AR (16.00), ZE1AA (15.35), ZL3VV (09.15), 4U1SU, 9M2FX (08.35), 9M8RS (09.00), 9N1MM, 9Q5YL, 9X5VF (10.25).

28 Mc/s A.M.: CR7CZ (15.12), ZE1JJ, ZE2JA, 7Q7LC (15.13), 9J2RO (15.21).

28 Mc/s S.S.B.: SV1BV (11.10), ZE4JE (10.53), ZS2AF (10.50), ZS4OI (10.22). G3NMH has a sked with VK2NN on this band, but so far they have heard each other, but no QSO has resulted.

DX Briefs

It is rumoured that Smitty, 6O1AU, is hoping to operate from Iraq as **YI2AU**, possibly in August or September.

CR7GF is now said to have a licence for operation from VQ9, Aldabra. There is a chance that this trip may take place in late March or early April, and Glorioso and Comoro Island activity may follow. The proposed visit to Juan de Nova is likely to be left until later in the year as time is limited during the first trip.

1966 Countries Table

	1·8 Mc/s	3·5 Mc/s	7 Mc/s	14 Mc/s	21 Mc/s	28 Mc/s	Total
G8JM	5	—	—	115	23	—	143
5N2AAF	9	14	16	87	46	11	183
G3NMH	—	—	—	64	26	3	93
G3KSH	7	3	10	19	9	—	48
G3JVJ	15	9	16	6	2	—	48
G3MWZ	17		12		—	—	29
A4489	20	53	58	125	15	—	271
A3942	12	24	26	72	19	—	153
BRS25605	8	32	29	51	10	1	131

According to various reports **Curam Island,** off the coast of South Africa, is soon to be visited by ZS1RV. This island is alleged to have its own administration so could possibly be of interest to DXCC hunters.

HC8JG is reported on 14,122 kc/s at midnight, from the Galapagos Islands.

Those requiring a contact with Macquarie Island should look around 14,150 at 07.30 GMT for **VK0MI**. Colin has been quite active recently, and has contacted a number of UK stations on c.w. and phone. At present he only has a.m., but he is building s.s.b. gear, and he has an aerial four wavelengths long on 14 Mc/s, which has also enabled him to put a good signal into Europe on 7 Mc/s.

Harold, ZD8HL, will be leaving Ascension Island soon for South Africa. Apart from possibly joining CR7GF on the expedition mentioned above, he is hoping to get permission to operate from ZD5, ZS8, ZS9 and the FR7 islands.

HS1AK/P, Arno, has been heard talking freely to W stations. It is presumed from this that Thailand has now been removed from the list of countries with which American amateurs are not permitted to communicate.

Once again correspondents are thanked for their co-operation, and acknowledgement is made to the *West Gulf DX Bulletin* (W5IGJ), the *LIDXA Bulletin* (W2FGD/W2MES), *DX'press* (PA0FX), *The DX'er* (Northern California DX Club), *Florida DX Report* (Florida DX Club), and the *DX News Sheet* (Geoff Watts). Please send all items to arrive not later than **13 April** for the **May** issue, **11 May** for the **June** issue, and **15 June** for the **July** issue.

RSGB Amateur Radio Call Book

The following are corrections to the 1966 Edition of the RSGB Amateur Radio Call Book.

G2TX, A. R. C. Johnston, " Horsemans," Newbrighton Road, Emsworth, Hants.

G2AHC, R. W. Bishop, 26 Wood Ride, Petts Wood, Kent.

G2FQF, E. Lancashire, 115a Houghton Road, Thurnscoe, Nr. Rotherham, Yorks.

G2AIO, S. Fenwick, 115 Church Hill Road, East Barnet, Herts.

G3DQY, J. Vaughan, 181 Godstone Road, Whyteleafe, Surrey.

G3GMR, C. Scothern, 29a Coronation Road, Bolton Road Estate, Radcliffe, Lancashire.

G3LTV, W. E. Robinson, 244 Utting Avenue, Walton, Liverpool 4.

G3NJK, F/Lt. V. J. De Bono, 19 Delamare Close, Manor, Wigginton, Yorks.

G3PMH, March and District Radio Society, 88b High Street, March.

G3PUS, 342 (Ealing) ATC Amateur Radio Club, Windmill Road, London, W.5.

G3RKQ, Alan J. Balmforth, 37 Kew Crescent, Sheffield, 12.

G3RTQ, J. A. Hordern, 111 Ridgacre Lane, Quinton, Birmingham, 32.

G3RZG, M. S. Box, 9 Connaught Road, Weymouth, Dorset.

G3SID, M. P. Fox, " Leigh Villa," Middle Leigh Street, Somerset.

G3TQL, J. H. Jones, 97 Ravencroft Road, Ashmore Lake, Willenhall, Staffordshire.

G3TTC, K. M. Orchard, 25 Kenmore Drive, Yeovil, Somerset.

G3UGF, R. J. Constantine, 14 Holdsworth Terrace, Shaw Hill, Halifax, Yorks.

G3UKI, B. J. Curnow, 112 Mount Gould Road, Plymouth, Devon.

G3UOT, A. C. Turner, 96 Cippenham Lane, Slough, Bucks.

G6CY, A. S. Clacy, The Brow, Stylecroft Road, Chalfont St. Giles, Bucks.

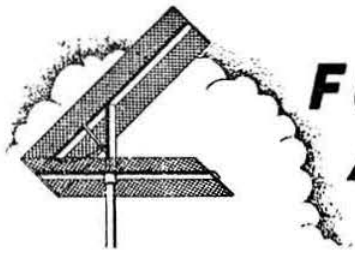
GI5DX, E. J. G. Tucker, Rockport, Craigavad, Holywood, Co. Down.

GM3CIX, L. J. McDougall, 5 Cumnock Drive, Auchenback, Barrhead, Renfrewshire.

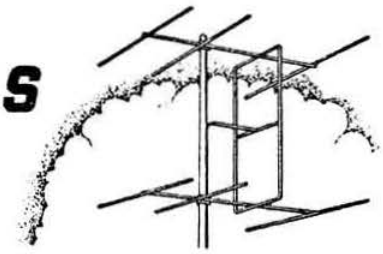
GM3TBV, W. H. Vann, 52 Urrdale Road, Glasgow, S.1.

GW3PPD, R. S. Dodson, 75 Queen Street, Pembroke Dock, Pembrokeshire.

GW3TSH, R. J. Wilcox, " Hazelhurst," 33 Trecwen Road, Pembroke Dock, Pembrokeshire.



FOUR METRES AND DOWN



By F. G. LAMBETH, G2AIW *

THERE is no doubt that the people who went portable during the Second 144 Mc/s Contest (Open) on 5 and 6 March enjoyed the excellent weather and the rather good propagational conditions which occurred over the entire period of 24 hours. Indeed, as these notes are being prepared on 8 March, we are still under the influence of the same high pressure system which dominated our weather over the week-end. Pressure was reasonably static in the south of the United Kingdom at 1022 millibars.

The general impression would appear to be that good strong signals were heard and being worked at distances up to and including 250 miles in all directions. These observations are made from the south of England.

GW3RUF/P from his excellent location in Breconshire was a mighty signal; perhaps his best contact was with F9NJ (Lille) over a distance of approximately 300 miles. F9NJ had 158 contacts, 29 of which were with the United Kingdom, and claims GW3RUF/P as his ultimate in distance. He informed the writer that he has now contacted 306 different G stations on 2m. G3BA reports no trace of any Scottish stations during the period of the contest and confirms earlier statements about propagation. G2JF reports plenty of activity from the nearby continental stations, in particular PA0. Out of a total of 180 contacts 52 were with PA0, 35 with F, 15 with ON4, six with DL/DJ, and the remainder with the UK.

Another outstanding signal during the open contest was G3OXD/A. GW3HQ and G3HXN were both S9, but no London stations were heard. G3OCB, incidentally, still runs a sked with G3BA at 22.00 GMT on Monday evenings (s.s.b.). G3XC would like to run skeds with any stations wishing to contact Cornwall provided they are located in a suitable place and are able to operate on c.w.

G3JGJ went out portable on 6 March to the north side of Mardon Down about 2 miles NE of Moretonhampstead and just over 1000 ft. a.s.l. The first station heard on arrival at 13.05 was G3RXK/P (RS 58) with some QSB. He was called for some time with no reply. Then GW3DFF/P (2 miles W Swansea) was heard, but again there was no reply. G6HV (nr. Tiverton) was then heard at S9 and after that GW3DFF/P was worked at 58, with G3JGJ 59. GW3DFF/P was running 50 milliwatts to all-transistor gear. After this, GW3CBY (running 4 watts to a 6J6) was raised, with reports 59 both ways. G6HV was then worked, followed by GW3TSH/P and GW3SRG. There was then a c.w./phone QSO with G3RXK/P, after which drizzling rain brought on a close-down for lunch (15.28 GMT). At 17.15, G3JGJ went to a portable site on top of the hill by his home QTH 1100 ft. a.s.l. Things were very quiet then and the only station heard was G3IGV (Cornwall) calling CQ at 59, but no QSO.

G3LTF (Galleywood) operated on s.s.b. for a while during the contest, working a few PAs and one DL. He formed the impression that continentals listen for s.s.b. far more than our operators. One hears many discussions as to whether one valve is 0·5db better than another, whereas by changing to s.s.b. one notes a 6db improvement in signal-to-noise ratio. On 7 March G3LTF worked DJ7CL, DL6PI, F3JN (Paris) and PA0MJK. The latter was using a transistor transmitter with 3·5 watts input. DJ7CL (Bonn) was putting in an RS 56 signal with a 0·5 watt transistor transmitter!

Future contests to remember are: 16-17 April, Second 70 Mc/s (Open), and on 8 May, the Third 144 Mc/s (Portable) Contest.

Two Metre News

G3XC (Indian Queens), after three months' absence, feels that it is about time another report should come from the very active Cornish V.H.F. Group; very active, because even in poor conditions the group has been meeting each month, sometimes rather frustrated because owing to the geographical position it is not possible to invite some of the more " sophisticated " lecturers, and meetings tend to revolve round certain topics. However, six members have each agreed to read up a particular subject, preferably one of general interest to v.h.f./u.h.f. audiences, such as cavity resonators and parametric amplifiers. One topic which has been discussed recently is bad weather experienced during field day over the last two or three years. The outcome was that the Cornish Radio Amateur Club voted sufficient money for a caravan, and it now has a very useful vehicle which is to be wired up and sound-proofed for three stations.

G2CZM (Chesham) claims the first GD/YU on 2m, having worked YU2HB from GD2CZM (nr. Port St. Mary) on 4 July, 1965. This was most likely sporadic *E* considering the reports: YU2HB, 58 and GD2CZM/P, 59. The home built

* 21 Bridge Way, Whitton, Twickenham, Middlesex. Please send all reports to arrive by **7 April** for the **May** issue, and **6 May** for the **June** issue.

mobile rig runs 15 watts to a QQV03-20A p.a., the modulator being a couple of 2PGT7 transistors in Class B. The receiver consists of a Nuvistor converter into a Command Receiver, and he uses a J-Beam 4-over-4 slot aerial at 28 ft.

G3DNR (Broadstairs) reports that he has been working on the band for a year, and has found the effort rewarding. All the equipment is home-brew, the transmitter running 10 watts to a QV06-20 p.a. with series gate modulation. The aerial is a J-beam 8-over-8 slot at 40 ft. 170 ft. a.s.l. with a very good take-off for the continent. The converter is a 6CW4 Nuvistor into a Marconi B36 tuning 4-6 Mc/s. Conditions were very good during 5-7 March and especially during the latter evening, when DJ9AXA, ON4CB, ON4DA, ON4MI and PA0LB were worked.

G3NNW (Rochdale) went completely v.h.f. after an s.w.l. friend was issued with a Sound Licence B. A home-brew converter with a pair of A2521's in the front end is now used for 2m. The aerial is a 4-over-4 at 15 ft. A transmitter is under construction with a 6146 in the p.a., and when this is ready the frequencies used will be 145·7 and 145·65 Mc/s.

G2CUZ (Southport) would like to add his support to a 2m c.w. section, provided it is towards the h.f. end of the band. This would ensure that the remote stations in the North West would at least have a look away from the 144 Mc/s end. He feels that it is this lack of co-operation in searching the whole band which makes many feel like deserting the band plan, especially when there is an opening.

G3OHD (Petts Wood) thinks that the apportionment of the available 2 Mc/s in the 144 Mc/s bands between the various geographical regions should depend not only on the number of active stations in the region but also on the average distance between stations. A hundred stations spread through Wales or the Scottish Highlands do not need as many kc/s as a hundred stations crammed into Rutland would do!

Calculations made some time ago appeared to show that the allocation in Zone 3 of 144·25 to 144·5 Mc/s is a good deal more generous to its population than the rest of the regions. G3OHD's very tentative suggestion therefore is that 150 kc/s should be detached from this zone, and classified as an open section. Needless to say, great opposition is expected from the zone itself!

A4242 (London N21) has now obtained a G & D converter. The aerial for the band is only a halo at present, but a 6 element Yagi will go up shortly. On 70 and 432 Mc/s a 4 element and 6 element Yagi respectively are used. It is proposed to build gear for 23 cm, and A4242 would like to hear whether there is much activity in North London on this band.

G3LTF received a telegram recently concerning the ARTOB balloons, saying that the programme is to put them up each Sunday at 10.30 GMT and each Tuesday at 17.00 GMT. The frequencies as advised by DL3YBA are: 144·080-144·100 Mc/s c.w. only, 144·100-144·115 Mc/s s.s.b. only and 144·115-144·122 Mc/s for DX stations situated more than 600 km from Hanover (which includes the UK). DL0DW gives further information on the launching dates on 3770 kc/s at 10.30 GMT.

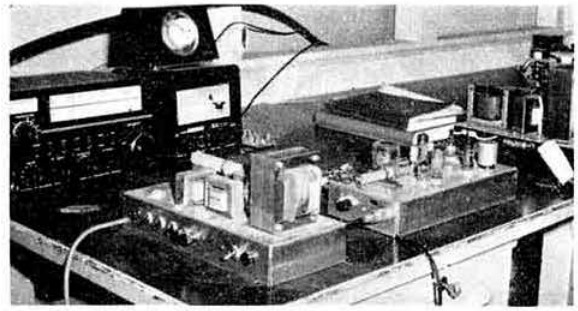
V.H.F./U.H.F. BEACON STATIONS

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3ANG	Craigowl Hill, Dundee	145·985 Mc/s	A1	
GB3CTC	Redruth, Cornwall	144·10 Mc/s	A1	North-East
GB3GEC	Hammersmith, London	431·5 Mc/s	A1	
GB3GI	Strabane, N.I.	145·990 Mc/s	A1	
GB3LER	Lerwick	145·996 Mc/s	A1	S
GB3LER	Lerwick	70·305 Mc/s	A1	N/S
GB3LER	Lerwick	29·005 Mc/s	A1	N/S
GB3VHF	Wrotham, Kent	144·50 Mc/s	A1	North-West

RSGB V.H.F. BEACON STATION GB3VHF

The frequency of the Society's v.h.f. beacon transmitter at Wrotham, Kent, when measured by the BBC Frequency Checking Station, was as follows (nominal frequency 144·50 Mc/s):

Date	Time	Error
15 February	11.31 GMT	30 c/s high
22 February	14.55 GMT	140 c/s low
1 March	15.27 GMT	150 c/s low



Members of the Finnish Society have been experimenting with colour television transmission, and some of the equipment used in the tests is shown on the table in the photograph. The Drake 2B is the 144 Mc/s master receiver, and the unit in the centre next to the power pack is a 430 Mc/s 3 watt transmitter.

Four Metres

G3FDW (nr. Retford) is now installed after his recent move from Cumberland, and is fully operational working in a Channel 2 TV area with no TVI problems. The rig has been rebuilt and now runs 150 p.e.p. input s.s.b. to a QQV06-40 p.a. The aerial is the now well tried " Cumberland Monster": a 4-over-4 Gamma matched beam at 35 ft. Apart from the recent 4m contest, activity has been disappointing, but conditions have been very poor. The high spot has been a regular sked with G3BA at 75 miles—with signals on s.s.b. far superior to 80m! Other participants in these skeds would be more than welcome on 70·15 Mc/s. In fact any contacts are welcome and can be made on a.m./m.c.w./c.w./s.s.b. as required. GB3LER has been heard on 70·305 Mc/s for hours on end, and it is surprising how many times it comes out of the noise. The meteor pings peak to about S7. The " v.h.f. Paradise " of the Midlands and South-East seemed to produce only a complete and utter silence recently apart from G3BA. G3FDW asks if anyone else is active at all? There were more contacts up in Cumberland, where the score was over 110 stations, in 42 counties.

G2CUZ (Southport) would like to take G3PLX to task for referring to Merseyside as an area of high activity on this band. Apart from Sunday morning the band is very much noted for its silence. A 4m band plan is not needed, for weekday activity is needed first.

Seventy Centimetres

G8AAF (nr. Beaconsfield) is now active, using 7 watts on approximately 433·3 Mc/s. Conditions during February were poor, and it is hoped that the barometer will go up soon. The best DX was G3NNG, 42 miles over the Chilterns, who can normally read signals off the back of G8AAF's 10 element Yagi! Both G8AAF and G8AMK (Bracknell, 432·1 Mc/s) are looking for QSOs most evenings and Sunday mornings.

From 1 April, 1966, EI2W (Sandyford, 6 miles S. Dublin) will be operating on 432·3 Mc/s using a 96 element (4 × 24) beam. The transmitter will have 20W input to a QQV03-20. The converter is a " Shropshire " low loss. The operating times will be 18.00 to 20·00 hours GMT, every evening when conditions are good. The elevation is 1000 ft. a.s.l.

Ex-BRS27487 (Blackpool) is now licensed as G8ANY and G6ABY/T. He is at present working in Birmingham and hopes to work portable from Birmingham and District.

In Blackpool, operation is on 433·62 Mc/s with 22W to a QQV03-20A tripler/p.a. Sound or vision contacts every third Sunday morning would be appreciated and skeds can be arranged with anyone interested. The vision source is a flying spot scanner and is almost completed. Operation on 70cm will have commenced on 20 March from Blackpool, the vision frequency being 437·4 Mc/s. Portable operation near Birmingham will run at about 4 watts on 433·08 Mc/s. Contacts in the evenings and during certain weekends will be welcomed.

G3NNW (Rochdale) uses an 8-over-8 slot at 20 ft. and can radiate 2 watts using an A2521 tripler and A2521 amplifier, but as the converter refuses to work, a transistorized one, similar to that in the July 1965 BULLETIN, is under construction. A 15W transmitter using a DET24 in the p.a. is also being built, and the frequency will be 433·664 Mc/s. The rig should be in operation by the time this is printed. G3NNW feels that item 5 in the band plan proposals in the January BULLETIN may be the most satisfactory one.

G8ADU (Peterborough) is staying in Finchley, London, from 17 to 22 April and will be taking a 90W transmitter. He hopes to make some skeds with stations in the vicinity as he is not certain what the mid-week activity is like. The frequency used will be about 432·4 Mc/s.

G8AAC (Barnsley) says that the most active station locally is probably G8AKQ, who is on every Wednesday, Saturday and Sunday regularly. Known as a DX-TV enthusiast because he monitors distant TV stations he always has accurate knowledge of propagation conditions. He has worked stations in PA and OZ and can usually work G3ILD (Darlington) under any conditions. Using a flying spot scanner, under the call G6ABK/T, he transmits test signals to Leeds every Wednesday night from 23.00 to 24.00 GMT. G8AAC has a poor QTH with the best outlook to the NW. G8AAN (York) and G3RND (Pontefract) have heard the G8AAC carrier, but the only station worked so far has been G8AKQ. G8ACC's transmitter was built by G8AGQ (Sheffield) using a QQV02-6 in the final modulated by a pair of EL91s. G8AGQ is also active using a QQV03-20A in the final. Other stations in the area regularly worked by G8AKQ are G3ENO (432·15 Mc/s) and G3LLE (433·5 Mc/s). Other frequencies include: G8AAC (432·108), G8AGQ (432·4), G8AKQ (432·57 to be changed to 433·75), G3RND (434·1) also G8AAN (433·75).

Seventy Centimetres Amateur Colour Television

On 23 May, 1965, in connection with the V.H.F./U.H.F. Meeting Finnish radio amateurs accomplished an extremely difficult task: the broadcasting of live colour TV pictures on the 70cm band.

Members of the radio amateur club of the company OY AGA AB, "AGA: n Radioamatoorit ry." supported the idea, and during their spare time, in the evenings, they constructed a 434·0 Mc/s (picture carrier) transmitter to broadcast colour TV. The power of the transmitter is about 3W using a QQE04-5 as the final amplifiers.

The construction of the transmitter is simple, although some time was spent trying to find a suitable modulation method: grid modulation proved the best. The studio equipment necessary for developing the pictures was borrowed from OY AGA AB. The distance between the transmitter and the receiver was about 3 km.

Amateurs in Finland have also previously experimented on TV, but this was the first time in Finland, and as far as they know the first time anywhere that amateurs have started to experiment broadcasting colour films.

Twenty Three Centimetres

On 9 March, G3LTF had a QSO with G8AEJ (Penge) whose signals were RS 58 and who returned RS 54. G3LTF's equipment at present is a 2·5 ft. diameter dish-aerial at 50 ft. with a feeder loss of 3db. The transmitter runs 35W output from a 2C39A p.a. stage with 1kV on the anode, modulation being n.b.f.m. The receiver is a trough line mixer with a 1N23E parametric amplifier working, but only giving about 4-5db noise factor. G3LTF hopes to be ready for 23cm e.m.e. this spring.

Three Centimetres

G3TMG (Southsea) has been building s.h.f. equipment for the 10 Gc/s band, including a complete test bench for v.s.w.r. He would be pleased to have any up-to-date information on reported amateur experiments in the 3cm band especially with respect to low power moonbounce. Can anybody help? As G3TMG says, these microwave bands are those of the future, and any research now can be of the greatest value.

LX—DX

The latest list of members of Reseau Luxembourg records that no less than 62 hold LX1 calls. LX2FB (W8OSM) holds the first licence issued to a foreign amateur. Two LX1 and one LX2 licence holders are non-members of RL.

Portrait of Fred Easher

(Continued from page 238)

tortoise with legs extended, in walking position. This is a complex variable, dependent, it is thought, on such factors as: time since last meal, distance to Mrs. Esher, distance to nearest junior op., etc.

h_f = height of lowest part of fence above ground.

Unfortunately, at this point Fred Esher decided to retire to an old shoe box in the garage until the following spring Equinox or thereabouts, so further experiments had to be postponed. Advantage of this respite was taken, however, to concentrate on the theoretical aspects of the problem.

Fred is an individualist, and therefore hardly to be classified as a radio controlled model, which would enable him to transmit 5 watts on 27 Mc/s without studying for a licence. Unfortunately, however, little progress has been made trying to get Fred's Morse up to 12 words per minute owing to his aforementioned retirement, or even to persuade the GPO to consider application for him to sit the Morse examination with any degree of seriousness.

News from Headquarters

Region 1 IARU Conference at Opatija

The RSGB delegation to the Conference of Region 1 IARU societies to be held at Opatija, Yugoslavia, from 23 to 27 May will be led by the Society's President, Mr R. F. Stevens, G2BVN. Other members of the delegation are Mr E. G. Ingram, GM6IZ, Mr L. E. Newnham, G6NZ, and Mr G. M. C. Stone, G3FZL (V.h.f. Manager).

New Member-Society of IARU

The Nigerian Amateur Radio Society has been elected a member of the International Amateur Radio Union and is now also a member of IARU Region 1 Division. The Society has 12 licensed members and will be represented at the forthcoming Region 1 Conference in Opatija by the QSL and Awards Manager, Dr Michael Dransfield, 5N2AAF, G3JKO.

Vacancy on the Council

Election of Council Member for Zone D

Mr H. E. Perkins, G3NMH, of 24 Hook Street, Hook, Nr. Swindon, Wilts., and Mr G. Twist, G3LWH, of 80 Bell Barn Road, Stoke Bishop, Bristol, 9, having been duly nominated to fill the vacancy of Council Member for **Zone D** (Regions 6, 9 and 17), a ballot becomes necessary.

Corporate members resident in **Zone D (Regions 6, 9 and 17)** are invited to record a vote for one of the two candidates in the form prescribed below:

Ballot for Council Member for Zone D

I wish to record my vote in favour of Mr.....
for the vacant office of Council Member for Zone D. I certify that I am a fully paid-up Corporate member of the Society resident in Region 6, 9 or 17.

Signed .....

Call-sign or BRS No. .....

Ballot papers should be typed or written on a post-card and posted to the General Manager and Secretary, Radio Society of Great Britain, 28 Little Russell Street, London, W.C.1, to arrive not later than **5 p.m. on 29 April, 1966.**

ONLY CORPORATE MEMBERS RESIDENT IN REGIONS 6, 9 AND 17 MAY VOTE.

Mr Perkins was nominated by Messrs. D. J. Goacher, G3LLZ, T. N. Ayscough, G3KAD, P. H. Greenwood, G2BUJ, F. G. Whatley, G3JOT, D. E. Alesbury, G3HSV, R. G. Rugg, G2BRR, J. A. Partridge, BRS26294, I. S. Partridge, G3PRR, E. J. Andrews, G3JAP, and D. T. Boffin, G3HS.

Mr Twist was nominated by Messrs. F. H. Chambers, G2FYT, D. F. Davies, G3RQ, R. Shaddick, BRS19727, E. C. Halliday, G3JMY, W. P. Lewis, G3IFV, D. V. Newport, G3CHW, H. J. Gratton, G6GN, R. E. Griffin, G5UH, C. G. Manning, G2IK, and A. A. Uppington, G2BAR.

Region 2 Representative

The Council has appointed Mr K. Sketheway, BRS20185, of 51 Baret Road, Walkergate, Newcastle-upon-Tyne, to the office of Region 2 Representative.

Mr Sketheway will hold office until 31 December, 1968.

RSGB QSL Bureau Sub-Managers

The QSL Manager for reciprocal licensees with call-signs in the series commencing G5AAA, is Mr E. G. Allen, G3DRN, 65a Melbury Gardens, London, S.W.20. Mr P. R. Cox, G3RYV, 38 Ridgway Crescent, Tonbridge, Kent, is handling cards for the current series G3UAA to G3WZZ.

Reciprocal Licensing

Reciprocal licensing agreements have now been made between the United Kingdom and Austria, Belgium, Luxembourg, Netherlands, Monaco, USA, the German Federal Republic and Portugal.

Members may obtain information on licensing in these countries from the following authorities:

Austria—Direction générale des postes et des télégraphes, Wien.

Belgium—M'l'Administrateur général de la Régie des télégraphes et des téléphones, 42 due des Palais, Bruxelles III.

Luxembourg—M. le Directeur de l'administration des postes et télécommunications, Avenue Monterey, 8a, Luxembourg.

Netherlands—Radio Controledienst, PTT, Kortenaerkade 12, The Hague, Holland.

Monaco—M. le Directeur des télécommunications, Ministère de'Etat, Palais du Governement, Monaco.

USA—Federal Communications Commission, Washington, DC, 20554. (Request Form 610-A).

Federal Republic of Germany—Bundesministerium für das Post-und Fernmeldewesen, Koblenzer Strasse 81, 53 Bonn.

Portugal—Administrador Geral dos Correios, Telégrafos e Telefones, Rue de S. José, 20. Lisbonne 2.

The first Americans to receive British amateur radio licences were M/Sgt Glen Grazier, G5AAA/K0JBA, left, and Capt Everett Worrell, G5AAB/W3MDI, shown at the MARS Station at RAF Northolt.
(Photo by courtesy of US Air Force)

London Lecture Meeting

There was an attendance of 75 at the Society's London Lecture Meeting at the Royal Society of Arts on 9 March 1966 when the Rev. Paul Sollom, O.S.B., Ph.D., B.Sc., D.I.C. A.C.G.I., G3BGL, lectured on "Aerial Farming in a Monastery."

Few could have realized how much research G3BGL is able to carry out with the limited facilities at his disposal. In a remarkably short time, however, the audience began to appreciate the resourcefulness of the lecturer who has assembled a most efficient station equipped with a wide variety of aerials.

The evening began with a colour film illustrating the life of a Monk of the Order of St. Benedict, which also surveyed the magnificent position of Douai Abbey for v.h.f. DX! G3BGL is particularly fortunate in having his shack located immediately over a defunct artesian well, providing a remarkably good earth connection. The aerials too are well sited, atop a 60 ft. mast constructed from somewhat unlikely materials—water-pipe and broken bedsteads—but this has no detrimental effect on the efficiency of the station.

The description of the station was a most interesting feature of the lecture, but the most instructive and enlightening period was Paul Sollom's discourse on his current research project: the propagation of long distance v.h.f. radio signals, with particular interest in the effect of reflections from aircraft. Tape recordings of the sound channel of Lille TV on 174·1 Mc/s exhibited the familiar "chuff-chuff" fading common on v.h.f., and these demonstrations were backed up with a lucid explanation of how Paul Sollom has related his phenomenon to the passage of high flying aircraft along the flight path "Green-One." The first recording was particularly impressive, and was appreciated to an even greater extent when the true identity of the locomotive superimposed on the recording was revealed! The theory of why signals reflected from aircraft behave in the manner observed was revealed clearly with the aid of a microwave demonstration. At the conclusion of the lecture, G3BGL surmised that it might be quite probable to find, in the not too distant future, amateurs actually using aircraft as a mode of communication, and perhaps utilizing a flight timetable to arrange schedules.

The chair was taken by the President, Mr R. F. Stevens, G2BVN, and a vote of thanks was proposed by Mr T. Lyell Herdman, G6HD.

Headquarters Fund List No. 28

The following are additions to the list of those who have contributed to the fund: F. Kendrich, G3CSG, Petter Sjostedt, G. Slaughter, G3PAO, D. S. Reid, J. Tye, J. MacIntosh, GM31AA, H. G. Hughes, GW4CG, D. P. Filen, A. J. Shepherd, H. Hoover, W6ZH, H. J. Platt, 25243, Radio Communications Exhibition H.Q. Fund Raffle.

Total amount contributed to date: £2,247 16s. 10d.

Representation

The following have been appointed Area Representatives:

CREWE AND DISTRICT:

R. H. Owen, BRS26847, 10 Circle Avenue, Willaston, Nantwich, Cheshire.

NORWOOD AND SOUTH LONDON:

T. J. Knappett, BRS27143, 279 Brownhill Road, London, S.E.6.

PRESTON:

G. Lancefield, G3DWQ, 191 Higher Walton Road, Walton le Dale, Preston, Lancs.

The following have been appointed Affiliated Society Representatives:

SURREY RADIO CONTACT CLUB:

S. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, Croydon.

DORKING AND DISTRICT RADIO SOCIETY:

W. Walsh, G3HZJ, 4 Meadowbrook Road, Dorking, Surrey.

Silent Keys

We record with much sorrow the passing of the following amateurs:

V. A. Cruxton, BRS 22663, Hollowell, Northampton.

J. Ostens, G2OS, Newcastle-upon-Tyne, Northumberland.

D. O'Connor, G3GIO, Guildford, Surrey.

YU0IARU Active

To provide world-wide publicity for the IARU Region I Conference which is to be held in Opatija, Yugoslavia, from 23-27 May, 1966, the Yugoslav National Amateur Radio Society (Savez Radioamatera Jugoslavije) is operating a special station, YU0IARU, from its headquarters in Belgrade. The station is active daily from 12.00 to 13.00 GMT on 14·1 Mc/s a.m. and periodically on c.w. and a.m. on other bands.

Reports and contacts will be acknowledged by a special QSL card.

Harry the Chess Champ

From IRTS comes the news that Harry Wilson, EI2W, who has achieved much distinction in the field of Amateur Radio, recently scored in an entirely new field—Chess. He was winner of the handsome Freestone Cup for 1965, one of the outstanding trophies available to the Irish chess enthusiast.

Obituaries

F. J. W. Walters, G3LIE

We record with deep regret the sudden death on 7 February of F. J. W. (Bill) Walters, G3LIE, of Trumpington, Cambridge.

G3LIE, who always took a keen interest in Society affairs, will be remembered by many members for his work as Honorary Treasurer of the 1960 National Convention. A member of the Committee of the Bristol Group before he moved to Cambridge 10 years ago, Bill took an active part in the organisation of the previous National Convention held in Bristol in 1954.

Although having interests in the export field which took him on several business visits to the Near and Far East, Bill's principal activities were on the lower-frequency bands, in particular 80m.

To his widow and family we offer our deep sympathies in their sad and unexpected bereavement.

D.F.D.

A. L. Megson, G2HA

It is with regret that we announce the passing of Mr A. L. Megson, G2HA. He was one of the very first radio amateurs, radiating from Bowdon, Cheshire and in 1912 there appeared a long account of his activities in the *Daily Mail* and *Manchester Evening News*. Since those days his call-signs have been G2GZ and later G2HA.

We offer our deepest sympathy to his family in their great loss.

F. E. Moor, G2CIP

We very much regret having to record the death of Ted Moor, G2CIP, at the early age of 46 years.

His father was G2AG, which naturally meant that Ted was brought up with Amateur Radio from a very early age. Throughout his life, he was a most keen, helpful Amateur, and took part in all the activities of the Aindsale Radio Club, of which he was Chairman. He was certainly very well known over the world, for he spent most of his time on the air in recent years on 20m s.s.b. and c.w.

He will be sadly missed by all, and we extend our very deepest sympathy to his widow and family.

N.H.

W. Grieve, G5GS

It is with regret that we report the death of W. (Bill) Grieve, G5GS. Bill was one of the original old timers, obtaining his first licence in 1913. His interest in Amateur Radio never declined, for even while in hospital, Bill was arranging to get back on the air from a new bungalow. All who knew him (and there were many) will miss his warm Scots voice on the air. All have lost a friend.

A.H.L.

Society Affairs

A Brief Report on the February, 1966 meeting of the Council

THE meeting was held on 5 February, 1966, and was attended by Messrs R. F. Stevens (President), N. Caws, J. Etherington, J. C. Foster, L. N. Goldsbrough, J. C. Graham, E. G. Ingram, L. E. Newnham, A. D. Patterson, W. A. Roberts, J. F. Shepherd, G. M. C. Stone, J. W. Swinnerton and E. W. Yeomanson (Members of the Council), John A. Rouse (General Manager and Secretary) and P. C. M. Smee (Assistant Secretary).

Apologies for absence were submitted on behalf of Mr F. K. Parker and Mr Louis Varney.

Northern Ireland Beacon Station

It was reported that test transmissions from GB3GI were taking place. (A notice regarding GB3GI was published on page 192 of the February issue of the RSGB BULLETIN.—EDITOR.)

Recommendations of Committees

The Council accepted recommendations relating to the provision of miniature cups for the recipients of major trophies, and the results of the Second 432 Mc/s Contest 1965 (*V.H.F. Contests*), the results of the RSGB 21/28 Mc/s Telephony Contest 1965 and the Second 1·8 Mc/s Contest 1965 (*H.F. Contests*) and to financial arrangements for the 1966 International V.H.F. Convention (*V.H.F.*).

Membership and Affiliation

The Council approved 137 applications for membership (93 Corporate and 44 Associate) and 14 applications for transfer from Associate to Corporate grade.

The Council granted affiliation to Brunel College Amateur Radio Society, East Lancashire Amateur Radio Club and Maidenhead and District Amateur Radio Club.

RSGB Intruder Watch

The Council discussed at some length the administration of the Society's Intruder Watch. During the discussion, it was suggested that the organizational work should be simplified and eventually absorbed by Headquarters.

It was agreed to refer the question of simpler organization of the Watch to the GPO Liaison and TVI Committee with power to co-opt members with specialist knowledge.

Costs of Contests Administration

It was agreed to make a six-month check of the time devoted to contests administration by the Headquarters staff, as part of a general assessment of the cost of running contests.

International Amateur Radio Union

It was resolved to cast the Society's vote in favour of the election to the IARU of the Club de Radio Experimentadores de Nicaragua and the Central Radio Club of the Czechoslovak Socialist Republic.

Elementary Articles

Consideration was given to the production of articles for the RSGB BULLETIN describing simple equipment. After considerable discussion, it was agreed to refer the matter to the Technical Committee with power to set up a special sub-committee and to co-opt members if necessary.

Publications

The Council reviewed the Society's publishing programme for the current year and authorized the EDITOR to commence preparatory work for new editions of several publications. The Council noted in particular that the First Edition of the *Amateur Radio Circuits Book* was out of print and that a further printing of the 1966 edition of the *RSGB Amateur Radio Call Book* might be necessary.

Region 12 Meeting

Formal approval was given to the holding of an Official Region Meeting in Region 12 during August.

" Profiles " of Council Members

It was agreed to re-institute the " profiles " of Council members in the RSGB BULLETIN. (The new series will start in May.—EDITOR.)

New Headquarters

It was reported that arrangements had been made for a survey of a property in London, WC1, which might be suitable as a new headquarters. The property had a floor area of about 2600 sq. ft. on five floors. (A subsequent report showed that the property was unsuitable.—EDITOR.)

Reports of Committees

The Minutes of the following Committee Meetings were received as reports: Membership and Representation (16.12.65), V.H.F. Contests (3.1.66) and H.F. Contests (13.1.66).

The Council was in session for 2½ hours.

Appeals for Rare Drugs

Members are reminded that the policy of the British Red Cross Society is not to accept requests for rare drugs from individual radio amateurs even when such requests are passed on to them via the police authorities. The British Red Cross Society recommend that when a United Kingdom amateur is asked by a foreign amateur to accept a message for a rare drug he should advise the sender to contact his National Red Cross Society.

Only requests from, or through, National Red Cross Societies, can be dealt with by the British Red Cross Society. Any drugs obtained would be sent to the National Red Cross Society concerned.

GB2RS SCHEDULE

RSGB News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.15 a.m.	Belfast
	10.30 a.m.	North Midlands
	11 a.m.	North West England
	11.30 a.m.	South West Scotland
	12 noon	North East Scotland
145·10 Mc/s	9.30 a.m.	Beaming north from London
	10.00 a.m.	Beaming west from London
145·8 Mc/s	10.15 a.m.	Beaming south from Belfast
145·30 Mc/s	10.30 a.m.	Beaming north west from Sutton Coldfield
	11.00 a.m.	Beaming south west from Sutton Coldfield
145·50 Mc/s	11.30 a.m.	Beaming north from Leeds
	12 noon	Beaming east from Leeds

News items for inclusion in the bulletins should reach Headquarters not later than first post on the Thursday preceding transmission. Reports from affiliated societies and from non-affiliated societies in process of formation will be welcome.

Fourth RSGB 7 Mc/s DX Contest

THIS contest unfortunately produced a lower entry than for the previous year. This is rather disturbing as there appears to be no real reason why. The very few comments regarding rules throw little light on the subject. Can it be that the non-amateur " noises-off " are winning the day on 7 Mc/s? Admittedly many people who made contacts in the event did not submit a log, but this is general in all contests.

The hard facts of the contest held on 16-17 October (telephony) and 6-7 November (c.w.) are that R. G. Cary, G3DYY, having been placed second in 1964 has taken first place in the c.w. section. His total of 2342 points made from 205 contacts gives a comfortable win over F. H. Cooper, G2QT, who totalled 2241 points from 171 contacts. A surprising fact emerges from scrutiny of these two logs in that G3DYY made 40 bonus contacts and G2QT made 46.

Placed third for the second successive year is J. M. Drudge-Coates, G2DC, following hard on G2QT's heels with 2213 points.

The multi-operator section of the c.w. event, showing a very reduced entry, has been won by J. Duckworth, G3FM, nobly assisted by G3NKS, G3OVL and G3RCY. This quartet amassed 2632 points from 203 contacts, including 50 bonus contacts. Second position goes to J. M. Lyons, GM3GUJ, joined by GM3UBK, totalling 1243 points. They narrowly defeated UA3KBO into third place by 12 points.

Conditions as far as the UK were concerned have been reported to be anything from poor to fairly good. But all seem unanimous regarding the QRM from Europe, the lack of VEs, only a few USA signals and great difficulty in getting through to the VK/ZL areas. The log from VK5KO contains a list of partial or incomplete QSOs, all of which were ruined by European signals demanding QSLs from him. No matter where he tried to go he was followed unerringly by certain stations.

There are reports of South America being heard, but only a very few stations were contacted. W2JAE did report that on the Sunday he could hear G stations all day but they did not hear him. Also reported missing were UA, though UB5, UR2, etc, helped to repair this deficiency. G3JVJ suggested that the UA stations boycotted the contest now they no longer count as separate areas for bonuses.

The receiving side of the c.w. section, also down in numbers, has completed a hat-trick of wins for E. Howell, BRS 24775. His total of 2496 points, an increase on his 1964 entry, gives a very handsome win over F. C. Powell, BRS18461 (fourth last year) with 1255 points.

The telephony section of the contest was very poorly supported with only 27 single-operators, one multi-operator and 21 receiving entries. The small number of entries was a disappointment to the Contests Committee particularly in view of the activity on the band during the contest. Several of the leading stations exchanged numbers with well over 100 different stations and examination of the logs indicates that at least 200 overseas and between 40-50 UK stations were active.

L. M. Lyske, G13CDF, the highest scorer in 1964 also, leads the single operator section with a score of 2350 points. He is closely followed by G3FPQ with 2308 points. The highest overseas entrant is OX3JV. All three used s.s.b., as did the majority of entrants.

The receiving section has been won by M. Chamberlain,

C.W. SECTION—SINGLE OPERATOR

Posn	Call-sign	Points
1	G3DYY*	2342
2	G2QT*	2241
3	G2DC	2213
4	G8PB	2055
5	G4QD	1950
6	G3HS	1930
7	G8FC	1762
8	G2LU	1710
9	G3EYN	1565
10	G3RRU	1525
11	G3JVJ	1515
12	G3APN	1370
13	G6CJ	1335
14	G3KLH	1295
15	G3KSH	1292
16	W2JAE*	1235
17	G3SEP	1220
18	DJ2SRA*	1215
19	SM5CBC*	1140
20	OK3BU*	1062
21	G6TC	1055
22	G2DSF	1050
23	F8OP*	1047
24	G2GM	1040
25	SP5YC*	1035
26	UB5QS	1030
27	SM5CCE	1025
28	G3GEW	1018
29	W1HGT*	1000
30	GW3NJW*	980
31	9M4LP*	950
32	I1VIB*	942
33	VK3XB	940
34	G8DI	897
35	OH3ZN*	895
	W8JIN*	895
37	G3MGL	855
38	F2PO	845
	G3RWL	845
40	F9NF	795
	G3GGS	795
42	GI3OTV*	790
43	G8KU	785
44	UP2KNP*	775
	VE1TG*	775
46	SM5AHQ	770
47	G3GSZ	755
48	DJ2GG	750
	OK1CIJ	750
50	OZ2NU*	747
51	9H1AB*	745
52	LA5IH*	730
53	F3IZ	715
54	SM4DRD	710
55	LA7H	700
56	G2ZR	695
57	SM1OY	690
58	HA1SB*	687
59	DL3MO	685
	SM5DUL	685
61	LA2Q	680
62	G2AJB	675
63	HB9QA*	670
64	G3FBA	665
65	SM5BDS	660
66	DL1JC	650
	G3IGU	650
	G3JKY	650
	LZ2KRS*	650
	UB5OF	650
71	SM2DPB	645
72	OH2BDS	620
	YU3TY*	620
†	G3NQW	605
74	YO9HP*	605
75	SP8ARY	600
76	G3ORU	595
	SM4AZD	595
	TF3AB*	595
79	UR2FU*	587
80	F2OO	582
81	PA0LV*	570
82	HB9DX	560
	UT5BP	560
84	UB5ZE	555
85	SM3DNI	540
86	HA9PB	535
	OK2BCN	535
	YU1SJ	535
89	YU1ACI	532
90	GM3RFR*	530
	HA3GA	530
92	F9DW	525
93	OK3KAG	520
94	YO2AIJ	492
95	SM5CJP	482
96	OK2BCH	480
97	YU4EBL	477
98	OH5UQ	470
99	UP2AW	465
100	OK3CEG	452
101	W2IWP	445
102	SP3BBH	430
103	LA1H	425
104	G3TMG	415
105	UD6BV*	405
106	DL1IP	400
107	LZ2KHN	397
108	SM5BXT	385
109	OH5VF	380
110	G3RJB	375
111	HB9ADB	372
112	OH2BO	360
113	LA9TH	355
	YO2QP	355
115	YO8GP	335
116	OK1NK	330
117	OK2BFX	325
	SM7BEX	325
119	HA5AI	320
	SM5AOG	320
	VK5KO	320
122	OH5VD	310
123	OH3WL	282
124	UB5AE	270
125	SM4CLU	260
126	OH2BFS	255
127	YO8HG	252
128	W1WY	240
129	ON4CE	227
130	YO9KPD	215
131	G3ILO	120

C.W. SECTION MULTI-OPERATOR

Posn	Call-sign	Points
1	G3FM*	2632
2	GM3GUJ*	1243
3	UA3KBO*	1231
4	DM3OE*	690

TELEPHONY SECTION—SINGLE OPERATOR

Posn	Call-sign	Points	Posn	Call-sign	Points	Posn	Call-sign	Points	Posn	Call-sign	Points
*1	GI3CDF	2350	9	G3PEU	1065	17	DJ2UU	470	25	SM4DXL	200
*2	G3FPQ	2308	*10	OD5BZ	975	*18	UA1KBX	425	26	SM5A1O	135
3	G3OEV	2030	*11	DJ5BV	930	19	HB9UD	335	27	SP6ATB	130
4	G3DYY	1701	12	G3PQF	855	20	G3KSH	305			
5	G5HZ	1548	13	DJ2YE	640	21	VE3BPV	285			
6	G3NLY	1535	14	DL9HC	590	22	G3PZO	275			
*7	OX3JV	1190	15	G3OHP	535	23	I1PHN	240			
8	G3NAC	1170	*16	PA0LV	530	24	GI3OTV	210			

TELEPHONY SECTION MULTI-OPERATOR

Posn	Call-sign	Points
1	G3RAA	875

RECEIVING SECTION—C.W.

Posn	Identification	Points	Posn	Identification	Points	Posn	Identification	Points
1	BRS24775*	2496	3	A3942	1210	5	A2966	535
2	BRS18461*	1255	4	BCRS195*	1000	6	UP2-21061*	115

RECEIVING SECTION—TELEPHONY

Posn	Call-sign	Points	Posn	Call-sign	Points	Posn	Call-sign	Points	Posn	Call-sign	Points
1	A3724*	1725	7	BRS26003	1208	13	BRS26189	623	18	A4552	335
2	BRS26444*	1575	8	A3699	985	14	BRS26870	460	19	BRS26116	165
3	G11051	1455	9	A3926	948	15	A2966	430	20	A4207	105
4	A3942	1421	10	A4308	941		DE-A-6767-RO-1*	430	21	A4161	50
5	A4273	1383	11	A4065	912						
6	A4410	1214	12	A4048	703	17	A4068	356			

* Certificate Winners † Late Entry

A3724, with 1725 points. Last year A3724 was twelfth. 150 points behind comes P. J. Baxter, BRS26444, who did not compete last year.

Comments from Competitors

" The sooner the length of the contest is increased to that of last year, the better we will all be in temper and health. At least last year one could get some sleep, now it is impossible " (G3DYY).

" Unable to complete the full time" (G8FC).

" Suggest making contest 12.00 Saturday to 09.00 Sunday —inadvertently ' blinked ' and the time changed from 15.45 to 18.45." (G3JVJ).

" For the second time—a power supply failure brought contest to a premature end! Moral—build your own." (G3KSH).

" Enjoyed contest, operating standards good—usual crop of stations sending ' pse QSL ' instead of number." (G3FBA).

There were few other comments submitted with logs other than " thanks for contest," " enjoyed contest," etc. The Contests Committee wishes to thank all those who made any comments at all and gratefully acknowledges check logs from EI9F, F5AI, G2KW, G3TSS, G6VF, GM2HCZ, SM3CJD, SM5BGK, SM6CKU/MM, Y0GLG and ZL1HV.

A. M. Lyske, GI3CDF, achieved first place in the single operator section of the Telephony contest.
(Photo by BRS4319)

With a score of 2342 points, R. G. Cary, G3DYY, won the single operator section of the C.W. Contest. The transmitter is a KW Viceroy, with a Drake 2B receiver. A T.O. Keyer was, of course, used in place of the microphone during the contest.
(Photo by courtesy of the Newcastle Chronicle and Journal)

Letters to the Editor

Neither the Editor nor the Council of the Radio Society of Great Britain can accept responsibility for views expressed by correspondents. Letters for inclusion in this feature should be concise and preferably not more than 200 words in length.

National Field Day

May I bring to the attention of all forthcoming participants in the RSGB National Field Day that the Famagusta group of the Cyprus Amateur Radio Society will as usual be operating a station during the contest. The sole intention will be to compete for the award of a certificate to the Commonwealth station providing most points to participating portable stations in the UK. We shall be using the call-sign ZC4SS and will operate under strict portable conditions. We hope to contact as many G portables as possible. Operation will be on all bands from 80 up and we shall have a Vee beam pointing directly at Britain.

In addition to attempting to gain the above mentioned award we shall also be trying to retain the Cyprus Field Day Cup, which is awarded to the Cyprus portable station giving most points to participating Gs. There will probably be at least one other station on the air during the period, also portable, and attempting to gain the Cup and RSGB certificate.

As the Government of the Republic is still not licensing radio amateur stations we will be operating from within the bounds of the Sovereign Base Area—hence the ZC4 call. However, should licence restrictions be removed within the Republic we shall be on the air with the call-sign 5B4SS.

We look forward to June and would like to stress that twelve points are scored for working a Commonwealth Portable Station.

N. F. Hobbs, ZC4CK/G3CKK

Famagusta, Republic of Cyprus.

NFD Rules

Since our club is one of the very much anti-240V a.c. p.e. set types, I was most interested to read the comments of GM3GDX on the NFD rules.

I am afraid that he misses the point in several ways. The original concept of NFD was surely to encourage chaps to devise light portable gear for this specialized use, and not to take out the home station complete with a private mains supply. Any club having sufficient funds can do this with very little initiative apart from hiring a pantechnicon.

The temptation is always there in the above case, to turn up the wick if things are sticky, and when we read of a group " building a 65 watt transmitter specially for Field Day", as we did in one journal last year, we often wonder how many really do stick to the humble *ten* watts as we do with our 5763s, remembering that with a 240V p.e. set the usual 807 or 6146 outfit can run a comfortable 50 watts or more.

In these days of " one-upmanship," the rules should be made as sticky as possible, to ensure fair play all round, leaving it to the standard of operating to decide the winners.

To return to Mr Hamilton's letter, I doubt if the big boys could get on the air in a week during an emergency, with that amount of gear to remove without warning, including the elaborate arrays pictured in the Bull from time to time.

Norman Horrocks, G2CUZ

Honorary Secretary, Ainsdale Radio Club

Ainsdale, Southport, Lancs.

Assistance for the Blind

An enormous amount of assistance has been given to the Blind by members of the RSGB and from small beginnings many years ago the team of helpers now exceeds 2,000, but the numbers of blind people they are serving is increasing at an even greater rate and we are once again having to appeal for more helpers throughout most of Britain.

This appeal has had the support of the RSGB on a number of occasions, as well as the GPO and the BBC, and something of the order of 20,000 blind people are now being assisted by people who have just the knowledge that is possessed by radio amateurs. All readers who would like to help or who would like further information should contact me at the address below.

D. Finlay-Maxwell, A.M.I.E.E., G3BGA

c/o John Gladstone & Co. Ltd.,
Wellington Mills,
Huddersfield.

TVI

Most amateurs would agree that TVI is one of our greatest problems. Following a most interesting discussion with many stations on 80m on Sunday afternoon, 23 January, I would like to make the following suggestions which I hope you will find space to publish.

(1) A suitable vehicle should be equipped so that field strength measurements can be made on all frequencies from 160 to 2m, including all TV frequencies (preferably not needing connection to a mains electricity supply).
(2) It should also carry a good selection of filters, traps, etc., with some available for sale.
(3) It could probably be staffed by part time volunteers appointed in the various regions, with travelling and subsistence allowances payable.
(4) I am sure all amateurs would contribute, say, £1 for its purchase and pay for its use and help when needed.
(5) The correct diagnosis and actual harmonic levels with relation to the TV signal strength are vitally important for us to know. This is far from a solution to all the other problems, but we must begin by having " clean " equipment ourselves.
(6) The Society, I feel, should do a little more to hammer out a definite level of harmonic suppression acceptable to the Post Office, rather than the nebulous term of " No undue interference."

E. G. A. Jackson, G3CDE

Burpham, Guildford.

EFI

I wonder whether any other readers know of a cure for interference from electric fences. I am moving to a country QTH and although mobile tests prove it to be good for propagation, incoming signals, from 80m to 15m, are met with S9 + 40 pistol shot from an electric fence just half a mile away. Various suggestions have been made, from lawyers to wire-cutters after dark, but an amicable middle course is clearly indicated, and I would welcome any practical suggestions.

D. R. H. Jolly, G3TJY

30 York Road, Broadstone, Dorset.

V.H.F. Contests

I fully endorse the feelings displayed by Mr S. F. Brown, G4LU, in his letter published in the March Bulletin.

The way in which the Committee have attempted to impose their intentions are to be deplored. I fail to see how any plan can be considered to be fair to all band users while stations continue to announce their tuning intentions when concluding a call.

Regimentation is not likely to improve the pleasures which one hopes to enjoy by participation in a contest, and I have yet to be convinced that the band plan is likely to achieve anything.

G. A. Jeapes, G2XV

Great Shelford, Cambridge.

NATIONAL FIELD DAY 1966

FINAL DATE FOR ENTRY 27 APRIL

Members responsible for stations participating in this year's NFD, to be held on 4-5 June, are reminded that details of call-signs and frequencies to be used, together with the name of the group, club or affiliated society concerned, must reach the Contests Committee at RSGB Headquarters not later than Wednesday, 27 April, 1966. The information should be set out as shown in Rule 6 on page 51 of the January 1966 issue of the RSGB BULLETIN.

Maritime Mobile Licence

The issue of the revised Amateur (Maritime) Licence by the GPO is indeed good news and is welcomed after this long period of negotiation. The Royal Naval Amateur Radio Society first asked the Admiralty to approve and submit the requirement for improved licence conditions to the GPO early in 1961. Thanks are due to the RSGB/GPO Liaison Committee for their help in the matter.

The RNARS has amongst its members many past and present professional and amateur operators who have had considerable experience operating afloat. Should any amateurs, who are contemplating taking out a /MM licence, require any help and advice on the subject they are welcome to get in touch with the Secretary, RN Amateur Radio Society, HMS *Mercury*, Leydene, Petersfield, Hants.

A. J. R. PEGLER,
Commander Royal Navy,
C.ENG., A.M.I.MECH.E., A.F.R.AE.S., G3ENI
Chairman, Royal Naval Amateur Radio Society
Petersfield, Hants.

Subscriptions

With the fall in the value of money compared with pre-war standards, few members can quarrel with the increase of subscription to £2 10s.

Council has the power, however, to waive subscriptions in the case of blind persons, and those with severe physical disablement, a gesture which all will applaud.

Nevertheless, there is a class of member who, to my mind, is deserving of thought. There are an increasing number of licensees in the student class, some only 14 years old, or not much over, who, if already Associates must transfer to Corporate Membership on receiving their " tickets," in accordance with Society regulations. The increase in subscription can be a large item in the budget of these younger members. I know of a fair sprinkling of resignations for this very reason, and other potential members who cannot join because their pockets will not stretch to it.

I wonder, for a start, if the Society has a " break-down " of resignation figures in the younger age group, and if this is serious, can any alleviation be afforded without unduly embarrassing Society funds?

During the past few years the RSGB has made strenuous efforts to encourage the younger element, who could well be the future strength upon which the Society must rely. There seems a strong case for reduction of subscriptions for licensees under a certain age, always provided they fall in the student class. It would be interesting to hear other members' views.

I may add we operate this system locally, as otherwise I do not think that there would be a club!

E. JOHNSON, G2HR

Chingford, London, E4.

Reciprocal Licensing

You may be interested to learn that I am currently resident in the US, and am active as G3MHV/W6. I experienced no difficulty in obtaining a US permit, and the information you have published (February BULLETIN) contains the essential details. Applications must be made on Form 610-A, and these are obtainable from the FCC, in Washington, DC, or from any FCC field office (located in all major US cities). The FCC ask for applications to be submitted at least 60 days prior to the proposed commencement of operation, but I applied for a permit to operate " as soon as possible " and received one within about six weeks. These permits expire after one year, or when the alien's home licence expires, the latter being applicable to British amateurs. If anyone requires further details about these permits, it is suggested that they refer to the April 1965 edition of *QST*, page 35.

I hope that this information will be of some use.

(DR) TERENCE G. LANGDON, G3MHV/W6
University of California, Berkeley, California, USA.

" Why Mobile on Grandad's Band "

One or two of we Grandads who fought so hard to retain the use of Top Band at Geneva, take a dim view of the derogatory remarks of G3DXN and others.

Top Band is popular for mobile because of the extreme simplicity of the equipment. Granted that we have a QRM battle on our bands, at the moment, but even with conditions as they are, it is a thoroughly viable medium at any time of day. As sunspot conditions change, much of the present QRM will disappear during daylight. In any case, amateurs seem to watch the tele in the evenings, rather than go on the air, and not many people work mobile after dark.

There's plenty of life in the old Grandad band yet.

A. O. MILNE, G2MI

Bromley, Kent.

Your correspondent G3DXN says that the use of a loaded whip aerial for 160m mobile is technically ridiculous.

May I suggest that if he finds it so, the " slavish " use of Top Band by mobileers is not the only thing which he should find mysterious. Aerials might well be another such subject.

H. S. CHADWICK, G8ON

I was interested to read G3DXN's comments on the inefficiency of 160m mobile.

Although not being mobile myself on v.h.f., I can quote a local 2m station, G3BYY/M, who has had many fine QRM free QSOs for over a 100 miles with an input no greater than the 10 watts allowed on 160m. I have had good QSOs with similar mobiles on 2m from the home QTH up into the Shropshire area and even into Germany when conditions are good.

Previous experience in the Army Signals soon convinced me of the limitations of mobile radio in the 2-4 Mc/s range, even with a quarter of a kW input!

L. G. COOTE, G3AHB

Slough, Bucks.

Hertz

May I be permitted to pass some observations on the proposed anachronism of substituting " Hertz " for " cycles per second " when defining frequency.

Generally speaking, the terminology applied to electronic components, or circuit functions, are indicative of their electrical performance, and thus the individual terms are logical. For instance, the terms resistor, capacitor, inductance, valve, amplifier, oscillator, flip-flop, gate, and counter, to name but a few, are meaningful in themselves since the words describe.

Such is not the case with units of measurements, with one exception, and this is the manner in which frequency is at present defined. The term " cycles per second " is meaningful and precise. The *Oxford Dictionary* states that a " cycle " is a " recurrent period of events," and since a.c. is a recurrent phenomena, there would seem no better way to specify frequency than that which finds universal acceptance at the moment.

On the other hand, the proposed term " Hertz " is as meaningless without definition as are Farad, Ampere, Volt and Ohm, and it seems quite illogical to convert from a term which is self-explanatory to one which will require a definition—no matter how simple the definition may be.

I gather that the purpose of the proposed change is to perpetuate the name of Hertz. That Hertz belongs to that elite band worthy of the title of genius is not questioned, and, additionally, it is agreed that he deserves wider recognition. But then so do many more. Jet engines are not known as " Whittles," railway engines as " Stephensons", telephones as " Bells," nor screws as " Archimedeans." If " cycles per second " really are to become " Hertz " for this purpose, then let us at least do the job properly and distribute credit titles all round.

Of course, we will not have to mind putting up with the arguments and confusions which will arise from the mad scramble to get on the band-waggon prompted by a misplaced sense of national pride. We say that Marconi founded radio but, as is fairly common knowledge, our friends in the USSR are equally convinced that Popov fathered the science, whilst recently they have discovered that Baird was a " swizzer " who " nicked " the idea of television from a " comrade."

I rather suspect that the idea for the change originated during a mild dose of electrocution, for, if one gets inadvertently strapped across the public mains supply, one does indeed receive 50/60 Hertz (hurts) per second. On this basis one might be forgiven for assuming that a kiloHertz are a fatal number of Hertz, and a MegaHertz the female of the species.

Whilst it will probably prove futile, let us make a determined effort to resist the introduction of a meaningless word in place of a self-descriptive term.

PAUL HARRIS, G3GFN

Bognor Regis, Sussex.

" Propagation at 145 Mc/s "

I am disturbed to see published an article with such confusion of terminology as is shown by Mr J. C. Foster's " Propagation at 145 Mc/s." (February issue). The subject is unjustly notorious as being vague and belonging to the boffins and so anyone who attempts to write about it should be careful not to further confuse the issue.

The serious error is made at the beginning of the article where it is claimed that ground-wave propagation is possible. By definition, a ground wave (sometimes called a surface wave) propagates over the surface of the earth and depends for its existence on the flow of currents in the earth's surface. It is launched by fields which are set up between the transmitting aerial and the earth. At frequencies above 30 Mc/s the losses caused by the earth currents are so great that the ground wave does not extend more than a short distance from the aerial.

At frequencies above 30 Mc/s horizontal polarization is often used; i.e. the electric component of the electro-magnetic field lies in a horizontal plane. It is impracticable to establish differing potentials at two points on the earth's surface and so a horizontally-polarized ground wave is not possible. Hence we use some other propagation mode.

A transmitting aerial sets up a complex electro-magnetic field which can be resolved into two components. One of these components is capable of propagating away from the aerial and it does so in two ways: (a) as a ground wave which was described above and (b) as a space wave. The space wave is launched by fields set up between different parts of the aerial and so it can propagate independently of the earth's surface. This is the mode of propagation used at all frequencies above about 30 Mc/s. The different " modes " described by G2JF are, in fact, different mechanisms affecting the propagation of the space wave.

Normal transmission of a space wave is limited to line-of-sight paths where the transmitting and receiving aerials can " see " each other. Beyond this range only a weak diffracted field is received. The transmission of a signal directly between the aerials and also by a ground-reflected path results in the phenomenon of height gain. Transmission beyond the line-of-sight range (i.e. over the horizon) is essentially a freak occurrence and is dependent on the weather conditions over the transmission path.

In quiet weather, layers of air with differing refractive indices lay one over the other and, by forming multiple reflecting layers, duct the signals over long distances with very little attenuation. Such transmissions cannot occur when the weather is turbulent.

I have little quarrel with G2JF about forward scatter techniques but there are two points that he did not mention. Although high-gain aerials are necessary they must be aligned so that their beams overlap in the scattering area. Also the gain of the receiving array will not be realized because the scattered signal has a non-uniform phase front.

K. H. Green, BRS21334 A.M.I.E.R.E.

Stoke Poges, Slough, Bucks.

QSL Managers

I completely agree with the letter in the January issue of the Bulletin. Having done stand-in duty for both the Incoming and Outgoing Singapore Bureau all I can say is that I take my hat off to all QSL Bureau managers—G2MI in particular—and I can't for the life of me understand how he manages to find time to operate on the bands!

May he continue for many years yet doing the fine job that he is doing.

H. Pain, 9V1MT/G3ATH

Singapore Airport,
Singapore 19.

With due respect to my old friend G2MI I cannot agree with his remarks about QSL managers in the January correspondence column. There are many rare and semi-rare DX stations that either will not or cannot afford to supply the ever increasing demands of certificate hungry amateurs today. With the arrival of such worthy gentlemen as Jack Cummings, W2CTN, it became possible to obtain rare paste boards that would not otherwise have been possible to acquire. It is easy for a " common G " station to say that all stations should QSL if asked, but for some of these rare stations it has just not been possible, therefore I believe we owe their QSL managers a great debt of gratitude.

There was a certain amateur who once operated genuinely in AP2. It so happened that he came to Toronto, but whereas he had QSL'd some of his AP contacts, others were still trying to obtain his card, and I was approached on the subject. I found and met the AP, now a VE3, who explained he could no longer confirm any of these contacts, so I offered to take over the responsibility and thus some DXCC stations were able to advance their totals by one point.

Now I got pleasure out of this. I was not trying to seek to be " somebody " but in the spirit of Amateur Radio wished to help some fellow amateurs, including the AP who was grateful for this help. When I learn that a rare DX station has a QSL manager, I then can be reasonably certain that I shall indeed get the coveted QSL. This was a very chancy business before QSL managers came into existence.

A QSL manager is a broker. We do not think it immoral to employ customs brokers, so why should we not employ willing QSL brokers in Amateur Radio?

I freely admit there have been some dollar double-dealings; but in an imperfect world there always will be a few who will take advantage of a given situation. Must we therefore condemn such honest brokers as W2CTN, W4ECI and W2GHK?

I cannot accept G2MI's findings that the whole business is odoriferous. Rather do I hope that QSL managers will become a permanent part of this glorious hobby of Amateur Radio.

Who will offer for VE3BWY?

Ham Whyte, VE3BWY

Scarborough, Ontario, Canada.

Contests

I was pleased to see the comments in the Bulletin that even the " dyed in the wool " contest man finds the frequent contests of the present period too much for him. Those of us who are not completely mad agree with this comment and what the anti-contest amateur thinks about the situation may not be fit to print.

I wish to propose a policy which could do the impossible, i.e. please the pro-contest and anti-contest amateur alike. By those who are pro-contest I mean the sensible ones amongst us who for personal and family reasons do not wish to spend 48 hours of almost continuous operating in a contest in order to put up a reasonable showing.

Surely the present length of contests is ridiculous both from the operating and equipment point of view, taking the latter point equipment can be more objectively tested on a dummy load (well screened of course).

Those who are anti-contests must welcome a reduction in the length and a restriction on the introduction of new contests.

I suggest a " Code of Practice " for contests on the h.f. bands supported by the RSGB for international use. Let us act now before it is too late.

Of course my suggested code would not apply to v.h.f. or u.h.f. bands or other bands where due to low activity more contests would stimulate their use, i.e. 28 and 21 Mc/s in sun spot minimum periods.

My proposed international code of practice for contests on the h.f. amateur bands is as follows:

(i) No contest shall last longer than 24 hours in any period of 12 months.

(ii) Contests intended for entries within a single continent or country shall not last longer than 12 hours in any period of 12 months.

(iii) There shall be agreement not to introduce new contests and increase the total number of contests on the popular h.f. bands. To solve the problems of organizations who do not at present have their own " DX Contests " a rota system shall be formed so that various national organizations take turns to " sponsor " contests within a continental area.

(iv) A review should be made immediately to see whether the number of contests on h.f. bands could be reduced and/or the holding of similar national contests on the same date to reduce the number of weekends per year occupied by contests (e.g. as NFD coincides with other European field days).

When applying the above it should apply to contests already recognized such as ARRL, CQDX, BERU and should certainly be applied by the RSGB to *all* its contests as an example. My final word: I enjoy contests.

T. J. Brooke, GW3GHC

Llanrumney, Cardiff.

CONTEST NEWS

— RESULTS —— REPORTS —— RULES —

First 144 Mc/s (C.W.) Contest, 1966

The eighth annual 144 Mc/s C.W. Contest held on 30 January, 1966, attracted 47 entrants, an increase of five over the 1965 event. The highest scoring station and winner of the low power section is GW3RUF/P, operated by G3KXA from a location 2624 ft. a.s.l. near Partrishaw in Brecknockshire. GW3RUF/P made contact with 91 stations out of 120 shown to be active during the contest from the logs received. The winner of the high power section was G3OXD/A operating from the normal /A location near Dudley, in Staffordshire. The runners up in the low power and high power sections were G3NOH/P and G3FRV respectively. An analysis of the entries shows 41 G, one GC, one GM, and four GW stations.

Comments

G3OXD/A commented that while there was justification for giving a country bonus for GI, GM, GC and GD, there was no justification at all for giving a bonus to GW. It was further suggested that GW3RUF/P was bound to win the contest! The V.H.F. Contests Committee would like to point out that the purpose of the country bonus in this contest is to encourage the majority of stations in the countries concerned. These are the fixed stations, who, because of their low local activity, feel that their chances of achieving a good score are rather slim. A portable station, however, is entitled to take advantage of this bonus. It is worth noting that in the case of GW3RUF/P, had the country bonus not existed they would still have scored about 2400 points and won the contest. They would also have won if the points /km system had been used. If the country bonus had not existed the fixed GW stations would have been placed lower than their operations merited, under this scoring system.

This brings up the question of whether this scoring system should remain for this contest. Readers are reminded that this is now the only v.h.f. contest that is not scored on the points per distance basis. Bonus systems are all very well, but who should have a bonus? It could be forcefully argued that Northern England and the south-west should have a bonus! Those who are in favour of the present scoring system point out that the score is very easy to calculate. Surely the criterion is a fair scoring system and this is not necessarily synonymous with an easy calculation! From the entrants, only ten comment on this, of which five are in favour of retaining the present points per contact system. Can the Contests Committee imply that those who did not comment are in favour of retaining the present method? The rules for this contest will not be changed unless the majority of this year's entrants wish them to be changed. Comments will be welcomed.

Despite the one or two who commented on (what they considered to be) poor operating, several wished to see more c.w. contests in the 2m calendar. This is very encouraging but " where do all the c.w. operators go for the rest of the year " was seen on many entries. An entry was received for the Listener's Championship from A3942 and check logs are acknowledged from G3KKP and G2DHV.

RESULTS—FIRST 144 MC/S (C.W.) CONTEST, 1966

Call-sign	Section (Power) Low	High	Points	Contacts	County	Transmitter P.A. Valve	Power Input (Watts)	Receiver R.F. stage(s)	Aerial
GW3RUF/P	1		3160	91	Brecknock	QQV03-20A	25	Nuvistor	10 ele.
G3OXD/A		1	2330	83	Staffordshire	QQV06-40	100	6CW4	6/6 slot
G3NOH/P	2		2210	83	Buckinghamshire	QQV03-20A	18	two A2521s in GG	4/4 slot
G3FRV		2	1990	76	Sussex	QQV07-50	150	6CW4	10 ele.
G3NNG	3		1820	69	Berkshire	QQV03-10	10	GM290	6/6 slot
G2XV		3	1640	62	Cambridgeshire	QQV06-40A	100	6AM4	Stacked array
G3EIX		4	1630	64	Essex	QQV06-40A	140	6CW4	4 ele.
G3SHK		5	1570	61	Middlesex	4CX250B	150	Transistorised	10 over 10 ele.
G5DF		6	1550	63	Berkshire	QQV06-40A	90	not given	16 ele. Colinear
G3JCZ/A		7	1540	56	Northants.	not given	150	not given	10 ele.
G3ULU/P	4		1540	53	Somerset	QQV03-10	12	transistorised	6/6 slot
G3EDD		8	1520	59	Cambridgeshire	QQV06-40	120	EC88 (two)	4 × 6 ele.
G3COJ	5		1440	50	Buckinghamshire	QQV07-50	28	6CW4	4/4 slot
G3SHZ		9	1410	59	Middlesex	QQV06-40A	100	GM290	10 ele.
G3IMV		10	1360	58	Buckinghamshire	QQV06-40	60	6CW4	4/4 slot
G3LAS	6		1360	50	Hertfordshire	QQV03-20A	25	6CW4	10 ele.
G3UKV	7		1250	47	Gloucestershire	QQV03-20A	30	Nuvistor	8 ele.
GW3MFY		11	1210	35	Glamorganshire	QQV06-40A	100	6CW4	6/6 over 6/6 slot
G5HZ			1210	50	Oxfordshire	QQV06-40	60	Nuvistor	8/8 slot
GW3FSP		13	1200	34	Glamorganshire	QQV03-20A	40	6DS4	10 ele.
G8KL	8		1150	38	Staffordshire	829	30	6CW4	not given
G3TQZ	9		1100	39	Worcestershire	QQV03-20A	22	Two EC88s in GG	10 ele.
G3KAC	10		1150	36	Gloucestershire	QQV03-10	18	6CW4	8/8 slot
G3GNR	11		1110	40	Buckinghamshire	QQV06-40	30	6CW4	10 ele.
G3BHW		14	1110	37	Kent	QQV06-40A	60	6CW4	6/6 slot
G6RH		15	1070	39	Kent	QQV06-40	50	6CW4	9 ele.
GW5BI		16	1060	30	Glamorganshire	QQV06-40A	90	not given	10 ele.
G5DS			1060	45	Surrey	QQV06 40A	45	6CW4	6/6 slot
G2BLA	†		1030	45	Hertfordshire	QQV03-10	10	Nuvistor	6/6 slot
G2AXI		18	1000	36	Hampshire	QQV06-40A	100	two GG stages	4/4 slot
G3TR		19	960	40	Surrey	QQV03-20A	28	Nuvistor	10 ele.
G2DCG		20	940	31	Kent	QQV06-40A	100	Nuvistor	6/6 slot
G3MEV	12		900	38	Berkshire	QQV03-10	15	ECC84	4 ele.
G2WS		21	900	30	Warwickshire	QQV06-40	65	not given	4/4 slot
G3NJF		22	890	31	Lincolnshire	QQV06-40A	120	Nuvistor	6/6 slot
G30PX/A		23	870	37	London	not given	150	Nuvistor	8/8 slot
G2TH		24	860	34	Surrey	QQV03-20A	40	6CW4	6/6 slot
G3FD	13		840	29	London	QQV06-40A	29	transistorised	6/6 slot
G3ILO	14		780	26	Gloucestershire	QQV03-10	10	6CW4	4/4 slot
G5UM			780	29	Hertfordshire	QQV03-20A	20	not given	6/6 slot
GC2FZC		25	750	18	Guernsey	QQV06-40A	80	not given	8/8 slot
G3PYC		26	730	25	Sussex	QQV06-40A	90	not given	8 ele.
G3PDT		27	610	20	Warwickshire	2 × DET12 P-P	130	Nuvistor	10 ele.
G3OJE*	16		590	23	London	QQV03-20A	20	6CW4	6/6 slot
G5NU	17		520	18	Berkshire	not given	12	Nuvistor	6/6 slot
GM3TPY/P	18		230	6	Berwickshire	QQV02-6	9	AF139	8 ele.
G3MEW/P	19		190	8	Hampshire	not given	20	transistorised	8 ele.

* Member of the V.H.F. Contests Committee. † Late entry

Affiliated Societies' Contest 1966

The Affiliated Societies' Contest on 15 and 16 January 1966 attracted slightly fewer entries than the 1965 event. The competition was however no less fierce amongst the leading entrants, and this time the Maidstone YMCA Amateur Radio Club have secured first place with 2,395 points gained as a result of 233 contacts, of which 136 were with other Affiliated Societies. The Maidstone station, G3TRF, was operated by G3ORH, G3ORP, and G3REM.

Second place was taken by the Gravesend ARC, G3GRS, operated by G3MXJ and G6BQ, who made 130 club and 45 non club contacts. Third place goes to the Medway ARTS entry, G2FJA/A.

Examination of the table of results will show close placing in the first eight entries which made it necessary to subject some ten logs to extremely close scrutiny. As a result of this scrutiny considerable alterations were made to the leading scores, and it may be appropriate to mention the case of the station whose *claimed* score would have been placed second. After scrutiny, this station lost a considerable number of points, resulting in a final placing well outside the first ten. No less than fourteen Club contacts on this log had to be disallowed for points owing to the station's call-sign being misread by other entrants. In addition, 23 other errors were found in this log. Whilst this is a particularly regrettable example, many other entrants will observe that claimed scores have been amended by the checkers.

Position	Call-sign	Club	Score
1	G3TRF	Maidstone YMCA ARC	2,395
2	G3GRS	Gravesend ARC	2,125
3	G2FJA/A	Medway ARTS	1,995
4	G3OWM	Newcastle Univ. RS	1,965
5	G3SSO	GCHQ ARC	1,950
6	G3TVS	Thames Valley ARTS	1,945
7	G3FM	Reigate ATS " B "	1,920
8	G6OI	Stourbridge DRS	1,900
9	G3ULT	Reading ARC	1,845
*	G3PIA	AERE Harwell ARC	1,840
10	G3GBU	Stoke-on-Trent ARS	1,795
11	G3FVA/A	South Manchester RC	1,790
12	G3MAR/A	Midland ARS " A "	1,785
13	G2CLN/A	Bromsgrove ARC	1,760
	G3REI/A	Reigate ATS " A "	1,760
15	G3EKW	Nottingham ARC	1,710
†	G3UUP/A	Ealing District ARS	1,710
16	G3STA	Verulam ARC	1,700
17	G3BA	Midland ARS " B "	1,630
	G2CUZ	Ainsdale RC	1,630
19	G3GHN	Clifton ARS " A "	1,625
	G3SRC	Surrey RCC	1,625
21	G2ASF	Coventry ARC	1,615
22	G3TIR	Crawley ARC	1,590
23	G3HNR/A	Northern Poly. ARS	1,580
† ‡	G3OHM/A	South Birmingham RS	1,570
24	G3OUL/A	Liverpool Univ. ARS	1,555
§	G5BK	Cheltenham ARS	1,545
25	G3SAD	Stevenage Dist. ARS	1,540
	G3GJL	Worcester Dist. ARS	1,540
26	G3OYU	Clifton ARS " B "	1,525
27	G3SJX	Purley RC	1,460
28	G4XC/A	Grimsby ARS	1,415
29	GM3RXT	North Ayrshire ARC	1,410
30	G2XP	Sutton & Cheam RS	1,385
31	G3EFX/A	Radio Society Harrow " A "	1,310
‡	G3PDT	Midland ARS " C "	1,285
32	G8FC	R.A.F. Locking ARS	1,235
33	G3MKX/A	Garendon School RC	1,225
34	G3OOU	Crystal Palace RC	1,220
35	G3SZF/A	Harlow Dist. RS	1,195
36	GI6YM	Belfast YMCA RC	1,185
37	G3BZG	Edgware DRS " B "	1,180
38	G3TCR/A	Basingstoke ARC	1,110
	G3UES/A	Ecclesfield ARS	1,110
*	GM3TKV	Moray Firth ARS " A "	1,090
§	GW3HGL	Conway Valley ARC " A "	1,080
40	G3ASR/A	Edgware DRC " A "	1,045
†	GM3NCS	Moray Firth ARS " B "	1,030
†	G3TWV	Newark SWC	980
41	G3RCV	Cray Valley RS	955
42	G3TAK	Durham City ARS	925
†	G3CMH	Yeovil ARC	895
43	G3RST	West Kent ARS	895
44	G3DDI	South Shields DARC	865
45	G3GDT	BBC Ariel Group	850
46	G3CXX	Manchester College ARS	830
†	GM3UKG	Moray Firth ARS " C "	830
47	G2TA	Harrow RS " B "	755
†	G3SUY	Havering Dist. ARC " A "	715
48	G3NAF/A	Speedbird ARS	665
†	G3TPJ	Havering Dist. ARC " B "	635
†	G3UEB	Newark SWC " A "	600
†	G3NJN/A	Blackpool-Fylde RS	580
†	G3TCD	Bishop Rawstorne School	530
49	G3TVR	Havering Dist. ARC " C "	380

* Rule 8—Call-signs of operators not on log.
† Rule 7—One operator only.
‡ Rule 6.
§ Rule 8—late entry.

It was necessary to disqualify eleven entrants for non-observance of Rule 7, which required more than one operator to be used during the Contest period. Three of these were victims of the bad weather, having explained that operators were prevented from reaching club stations by snow! Unfortunately, the Committee were unable to discriminate between these stations and the remainder. The Committee was particularly sorry to have to disqualify YL operator G3TNN, who operated the Blackpool and Fylde entry for the whole contest.

Two entrants were disqualified for non-observance of Rule 8, which requires the call-sign of the operator to be stated against each contact. The necessity for this rule was highlighted by the case of the misread call-sign referred to earlier, where the inclusion of the operator's call-sign enabled the checkers to " allocate blame " to one particular operator on the station concerned.

In general, log keeping standards were good, although the Committee still receives entries on scrap paper, and in various difficult-to-check forms.

Some entrants in the higher scoring bracket have obviously made it their business to take full advantage of the rule relating to non-club entrants by working large numbers of local stations who have not subsequently made further contacts. The Committee feels that this is not in keeping with the intention of the contest, which is to promote inter club activity, and is considering altering the rules accordingly for future events.

Comments from logs

" Wish Club stations would remember to send AFS": G3SRC and G3HNR.

" One /A station, if copied literally, had about eight letters in his call ": G3SSO.

" We have our own cabin in the school grounds and enjoyed ourselves enormously—the YL's provide soup, sausages and mash, etc." G3TCD.

" Suggest inclusion of rule similar to rule 16 NFD to prevent ' local arrangements ' being made "—G3SRC.

Check Logs

Check logs are gratefully acknowledged from the following stations: G3JVJ, G3LWQ, G3PHG, G6HD.

V.H.F. Listeners' Championship 1965

Held for the first time this year, the championship has got off to a fairly good start. Six members submitted logs for two or more events, while a further eight entrants for the two special listeners' contests submitted no further logs. It is to be hoped that the spirit of competition will encourage more entries in 1966, and close the many gaps in the results table. Surely there is more than one listener with equipment for the 70cm band! No entries were received in respect of the 1296 Mc/s contest, the 4m C.W. Contest, or any band other than 2m for V.H.F. NFD.

The leading entrant was R. A. Ham, BRS15744, of Storrington, Sussex, with a massive score of 13,675 points. Of these 6,120 were gained on the 430 Mc/s band emphasising the intention that the championship should be an all-band event. Mr Ham will receive the Hanson Trophy. Second is M. Harrison, BRS24733, whose score was obtained on the 2m band only. In his entry for September he remarks that he will be entering the transmitting events in 1966. M. Vincent is now licensed as G3UKV, M. Shaw as G3UYB and G. Rolland as GM8AKB.

The standard of logs was fairly high; there are obvious difficulties in making a good copy when the listener is receiving a weaker signal than either transmitting station. This is especially true when two locals are working each other because in that case the contest information is often given once only " for contest purposes "; the same QTH having been exchanged during every contest for several years. The listener, of course, does not have the advantage of asking for a repeat.

Equipment

Mr Ham's equipment is as follows:

70 Mc/s. An AF115 pre-amplifier and R216, a general coverage u.h.f. receiver recently found on the surplus market. At the

V.H.F. LISTENERS' CHAMPIONSHIPS 1965

	Entrant	144 Mc/s (1) (Jan.)	70 Mc/s (1) (Feb.)	144 Mc/s (2) (Mar.)	70 Mc/s (2) (April)	144 Mc/s (3) (May)	432 Mc/s (1) (May)	144 Mc/s (4) (July)	70 Mc/s (3) (July)	144 Mc/s NFD	432 Mc/s (2) (Oct.)	Total	2m Equipment R.F.	Receiver	Aerial	QTH
1	R. A. Ham, BRS15744		*655	2325	1740	1400	3540	*1220	*985	2090	2580	13675	AFZ12	68QX	4/4	Sussex
2	M. Harrison, BRS24733	1170		*945		1235		1285		2010		5700	6CW4	NC100	6	Manchester
3	M. Vincent, A3470	2110		1650		1285						5045	6CW4	R107	8	Gloucester
4	A. R. Poulter, A4048			1710	1045							2755	6CW4	8504	8	Surrey
5	A. A. Goacher, A3942	*305		795		615		370		810		2590	PC900	SX28	4	Sussex
6	D. J. Barlow, A3768			1140		735		575				2450	E88CC	HRO	6/6	Bucks
7	A. W. Blandford, BRS18572			1780								1780	6CW4	680X	8	Surrey
8	M. Shaw, A3973				1595							1595	RF26†	WS52	4†	Kent
9	G. W. Rolland, A3766			1590								1590	6DS4	VRL	5	Surrey
10	G. Swan, A3696			1500								1500	6CW4	888	6/6	Kent
11	J. T. Eden, A3604			1130								1130	6CW4	HRO	4/4	Warwicks.
12	J. K. McHugh, BRS26476			1110								1110	—	SX24	4	Berks.
13	D. J. Reid, A3993			555								555	E88CC	R107	1	Middx.
14	D. J. Butler, A4242				310							310	RF27	R109	1	London

* Scores not included in total: Rule 4. † 4m Equipment.

beginning of the year he used the two metre 4-over-4 for this band but a 2 element was put up for the July contest.

144 Mc/s. The PC86-PC88-EF95 converter in use early in the year was replaced by a pair of AFZ12s as r.f. amplifier and mixer. The 680X tunes 24-26 Mc/s as an i.f.

432 Mc/s AF139 pre-amp, PC88 trough line, and CS2A crystal mixer, fed from a 6-over-6 slot at 30 ft.

His station is at the foot of the northern slope of the South Downs. He finds it rather embarrassing to have very strong local stations operating from the hilltop behind him, but comments that this is offset to some extent by the attraction presented to other stations to point their beams in his direction.

Comments

One contestant preferred a " points per distance " form of scoring but a number of others commented that the simplicity of the " county " system outweighed any disadvantages. Most entrants sent interesting letters with their logs from which the equipment summary has been compiled. All found the contests most enjoyable and perhaps the introduction of a direct competitive element will encourage activity in the way that it has done for the 23 cm transmitting contests. The V.H.F. Contests Committee hopes to have many more listener logs to cope with in 1966.

Fourth 70 Mc/s Contest (C.W.) 1965

The 70 Mc/s C.W. Contest held on 5 December attracted a total of 21 entrants, 16 of these being in Section A. This shows an increase in the number of entrants of only one, which is by no means satisfactory considering the amount of stations known to be active on 70 Mc/s. However, it is hoped that this number will increase in next year's event.

The winner of Section A is Jack Hum, G5UM, a station that is nearly always known to be active during v.h.f. contests. Runner-up in this section was W. R. Steverson, G3JEQ, another station very active during v.h.f. contests. Both of these stations achieved a similar number of contacts, most of these being of short distance in the London area. The longest distance worked by G5UM was, in fact, 93 miles, and 112 miles by G3JEQ.

The winning station in Section B is the Albright & Wilson Amateur Radio Society G3OXD/A. This group has won by the large margin of 1802 points over the runner-up G3NUE/P.

Position	Call-sign	Points	Contacts	Location
		SECTION A		
1	G5UM	1099	32	Herts.
2	G3JEQ	1022	34	Surrey
3	G3NEO	960	15	Sheffield
4	G3PLX	959	21	Liverpool
5	G3SEK	956	18	Blackpool
6	G3OJE	829	30	London
7	G3PDT	807	15	Birmingham
8	G3FD	747	25	London
9	G3RLE	717	16	Yorks.
10	G3OHH	635	18	Cheshire
11	G3PMJ	628	18	Manchester
12	G3SXK	545	16	Essex
13	G3GOX	369	15	Middlesex
14	G3JKY	359	22	Kent
15	G2DHV	264	18	Kent
16	G2AVC	126	4	Middlesex
		SECTION B		
1	G3OXD/A	3132	43	Birmingham
2	G3NUE/P	1330	21	Worcs.
3	G3PPG	1220	19	Worcs.
4	G3KAC	934	14	Bristol
5	G3OUL/P	867	17	Staffs.

Equipment

Similar trends to other 70 Mc/s contests were followed on 5 December, with the 6CW4 leading in receiver r.f. stages, and by far the most popular aerial being the standard four element Yagi. There were few variations to this line-up.

Comments

Nearly all stations comment on the lack of activity, and conditions were described as only average. The longest distance covered was 140 miles between G3KAC and G3NEO, this being short compared with other 70 Mc/s contests. It is believed that this is almost entirely due to the lack of activity rather than conditions. G3JEQ and G3PLX were among several entrants who found the contest period too long, eight hours being the suggested length. The comments received will be carefully considered when the rules for 1966 events are prepared.

Certificates of merit will be awarded to G5UM, G3JEQ and G3OXD/A. No check logs were received from non-transmitting members for this contest. The committee wishes to thank the following for the check logs they kindly sent in: G2WS, G3KKP/A and G3LAS.

RSGB 21/28 Mc/s Telephony Receiving Contest

There were 40 entries for the 1965 contest, including one from overseas (YU-R5-523). The standard of log keeping varied considerably, and the accuracy of the entries left much to be desired in certain instances. Many entrants gave no indication of the equipment in use, although several receiving stations appeared to be very well fitted out, with rotary beams.

Posn	Call-sign	Points	Posn	Call-sign	Points
1	A4038	1421	21	BRS18461	620
2	A3254	1310	22	A4152	615
3	BRS22844	1280	23	A3902	615
4	A4048	1225	24	BRS27153	610
5	BRS24733	1145	25	A4067	595
6	BRS26444	1135	26	A4186	585
7	BRS26928	1100	27	A4311	565
8	BRS19682	1030	28	A4182	540
9	A4281	990	*	G8AAF	540
10	A3724	975	29	BRS26189	535
11	BRS24957	910	30	A4474	500
12	A4089	860	31	A3994	485
13	A4225	845	32	BRS25000	470
14	BRS26003	840	33	BRS24987	395
15	A2966	800	34	YU3-RS-523	335
16	BRS26094	785	35	A3926	335
17	BRS26298	750	36	A4399	330
18	BRS26931	710	37	BRS25387	270
19	A4552	685	38	BRS26676	265
20	BRS24550	635	39	BRS26431	210
			40	A4631	190

* Ineligible, rule 1.

CLUBROOM

A Monthly Survey of Club and Group Activities

For further information on membership or the activities of a particular club, application should be made to the person whose call-sign is indicated at the end of the item. Full addresses may be obtained from the RSGB Amateur Call Book.

AERE (Harwell) ARC is involved in a major turn-out and redecoration of the club shack, leading to a re-organization of the equipment, not to mention the disposal of a fair number of items which just seem to have materialized out of the blue. However, from *QAV* we gather than such is the speed with which this project is being tackled, it seems likely that by the time this is in print, all will be ship-shape and Bristol fashion. *G2HIF.*

Ainsdale RC is busily engaged in constructing two transistorized receivers for NFD, and hopes to have them completed well ahead of time. On 13 April, G2AMV and G3ERB will be leading discussions on Society affairs, and at which it is hoped members from the Chorley and Leyland Groups will be present. *G2CUZ.*

Basildon and District ARS held a very enjoyable junk sale in March. On 20 April G3ORT will be giving an illustrated lecture on s.s.b., during which a rig will be operating on 80 and 40m. Visitors will be very welcome. *G8AAO.*

Basingstoke ARC is meeting on 16 April to discuss plans for NFD, after which the GPO film "Ship to Shore" will be screened. *G3CBU.*

Bedford and District ARC continues to meet at the Westfield School, Queens Park, until more centralized headquarters are found. Full particulars of the club may be secured from *G3BVA.*

Bristol RSGB Group had a very informative lecture by Mr E. Theobald (ex G2DWI) on the production of printed circuits. Samples were displayed which showed the various processes to the final product, and through the courtesy of the lecturer, group visits are being arranged to see the commercial production of printed circuits. *G5UH.*

British Amateur Radio Teleprinter Group is still proceeding with the activity night on 3580 kc/s, but the support is disappointing. Peak activity in the UK is still to be found on Sunday mornings around 3540 kc/s. Some consideration is being given to the adoption of a 2m RTTY net frequency, bearing in mind band usage and band plans, and in these deliberations, the Dutch use of 145·8 Mc/s has been noted. *G2HIO.*

Cambridge and District ARC has, in recent months, had much closer liaison with the University Wireless Society, several members of which are regular visitors. One of them, Louis Arnold, is delighted at receiving the reciprocal licence G5AAE/K9ALP, even if it does seem a little laborious to send at times. On 15 April a Junk Sale is to be held, and for which it seems that "House Full" notices will again be required. *G5BQ.*

Chesham and District ARS has just completed a Top Band and 80m rig, but when the commissioning ceremony was performed, it was found that gremlins had sprinkled a fair number of bugs into the gear. The club would like to see more active members, and details may be obtained from *G3CLJ.*

The South Shields Amateur Radio Club held its Annual Dinner recently, and amongst the members and guests were (seated, left to right) G2BCY (Chairman), G3PRE (Treasurer) and G3PIX, accompanied by their wives.

Cheshunt and District RC meets on the first Friday in each month, and visitors are always welcome. The May meeting will be a lecture by Dennis Furby, G3EOH, who will discuss his combined Top Band and Two transmitter design. *G3EGB.*

Civil Service RS is meeting at the Science Museum on 5 and 19 April, the former for a lecture and film on "The Linear Accelerator," and the latter for the Annual General Meeting.

Clifton ARS is taking part in the second round of the interclub quiz on 16 April at Crystal Palace, while on 24 April, a D/F Field Day is to be held. Also planned is a transmitting Field Day on 15 May. *G3OGE.*

Cornish ARC has acquired a caravan following the suggestions of its V.H.F. Group. It is hoped to use this not only on Field Days, but also at Rallies and Exhibitions. Certain work is required on the caravan to adapt it to the uses in mind, and volunteers are needed to make up working parties so that this may be accomplished as soon as possible. *G3OCB.*

Coventry ARS continues to meet at Coventry Civil Defence HQ, and is planning an interesting programme for the coming months. New members and visitors are always welcome. *G3UOL.*

Crawley ARC meets on 27 April for a talk on "Wired Television," a subject which has been of some concern to certain radio amateurs of late. Plans for NFD are going ahead, with the subcommittee meeting regularly. *G3FRV.*

Cray Valley RS will be holding its AGM on 7 April. In his opening remarks the chairman G3JJC observes that when one looks at the dial of a general coverage receiver, then the amateur appears to have a dismally small frequency allocation. However, if these are compared to the amount of space allocated to other services, then the picture changes. What was not said is that certain services have been casting hungry eyes in the direction of the Amateur Radio allocations in recent months, and since allocations are to some extent influenced by usage, it falls to every operator to *really use* the bands, especially those at v.h.f. and u.h.f., and to which internal services have been making vocal claims. Dead bands are an invitation to lost bands. *G3JJC.*

Crystal Palace and District RC has taken a backwards glance at the past years work, and is very pleased that some new members have been attracted. In the near future, the club hopes to see the issue of the club call-sign, G3VCP, and they hope too that this will encourage a further growth in membership. *G3FZL.*

Derby and District ARS, with nearly 200 members, must rank as one of the largest clubs, but despite this, or perhaps because of it, they are now seeking to encourage an increase in the number of the fairer sex. Arrangements have been made to visit at least one place of interest each season, and as far as contests are concerned, although their position has steadily improved, further advances in this field are anticipated in the coming year. *G2CVV.*

Dorking and District ARS reports a substantial increase in the Top Band Net Activity schedules, which are, Sundays, 12.30, Thursdays and Fridays, 21.30. It is hoped that many of the SWLs take advantage of these transmissions, especially those on Fridays which are conducted in c.w. *G3UJU.*

East Lancashire ARC is a newly formed club which meets on the first Friday in each month at the YMCA, Blackburn. Membership already stands at 70, and the club is attracting junior members. Not satisfied with having a very comprehensive programme for 1966, consideration is already being given to the 1967 schedule. At the February meeting, the "surplus" sale attracted more whackey vagabonds than have ever been seen under one roof. After two and a half hours non-stop auctioning, all that remained were a few empty cartons. *G3NCZ.*

Echelford ARS will be holding its AGM on 27 April at the Links Hotel, starting at 7.30 p.m. sharp. Members are asked to make a special effort to attend, and visitors will also be welcome. *G3RHF.*

Edgware and District RS continues to meet on the second and fourth Monday in each month (but not on Easter Monday). As

At the Derby and District Amateur Radio Society's Annual Dinner in February, Mr R. E. F. Street was presented with the Founder Member's trophy by Mr A. G. Melville (right), President of the Society, for winning the 1965 construction contest.

a result of a talk by G3ERO and a demonstration of his home brewed Top Band D/F set in February, a club D/F contest is being arranged for the morning of Sunday 8 May. New members are assured of a hearty welcome. *G3RAA.*

First Class Operator's Club seem to have raised the temperature of their members, by the comments contained in a previous circular letter in which those who did not take part in the FOC Marathon were harangued. Certainly some stimulating and thought-provoking letters have resulted. *G3JLB.*

Glasgow RSGB Group is meeting on the 8 and 22 April, the former being for a talk by GM3MUY on mains transformers, and the latter to conduct a junk sale followed by a brains trust. An open invitation is given to anyone in the Glasgow area to attend the meetings of the group, membership of which is not limited to RSGB members. *GM3MUY.*

Grafton RS are faced with a black month in April, for the closure of the premises in which they meet means that there will be no meetings on the 8 or 15. However, all will be back to normal on the 22 and 29 which will be "Natter Nite," and Short Wave Listener's corner respectively. *G2CJN.*

Guildford and District RS is meeting on the 8 April for a taped lecture by G2UJ on 2m, while on the 22nd the AGM will be held. *G3KMO.*

Harlow and District RS has its headquarters at Mark Hall Barn, First Avenue, and is now operating under the call-sign G6UT, which is that of the late President, and is a memorial to him. *G3TJL.*

Harrow RS reports that the weekly meetings continue to be well attended, and is pleased to have G5AAA and G5AAB (reciprocal licensees from the USA) amongst its members. Recent activities have included a symposium on the BCC v.h.f. transceiver in which members and visitors from neighbouring clubs described modifications. April meetings will be on the 1st, 15th, 22nd and 29th. *G2TA.*

Loughborough University ARC has now acquired an NCX-5 transceiver and hopes to be active on all bands 80-10 under the call G3RLC. *G3SYQ.*

Magnus Grammar School RS reports that there was virtually 100 per cent attendance at the seventh Annual General Meeting: a record to be proud of. During March, some 20 members saw the most up to date equipment for investigating noise problems in bearings at the Ransome and Marles Bearing Co.

Mansfield ARS continues to meet at the New Inn at which visitors and SWLs are always welcome. A full programme including discussions, talks and junk sales have been arranged. *G8HX.*

Medway ARTS has finalized arrangements for a mobile rally which is to take place on 1 May at British Uralite Ltd, Higham, Rochester, Kent. Refreshments will be available, and there is plenty of room available under cover. Talk-in stations will operate from 10.00 as follows: 160m, G2FJA/A, 4m, G3TVH/A and 2m, G3TXS/A. National Grid reference 703738, sheet TQ 77. *G3CHD.*

Midland ARS has, as a result of its participation in the Boat Show, come up with a new name for the Information Desk; the Queer Questions Dept. Of more than passing interest is the reproduction of a Notice to Employees put up by the Burnley Cotton Mills in 1852, of which we like the best " The craving for tobacco, wines and spirits is a human weakness, and as such is forbidden." *G3JDJ.*

Mid-Warwickshire ARS reports that a start has been made on the club transmitter and that plans are afoot to have a stand at the forthcoming fête and carnival on 21 May. *G3EHA.*

Newark SW Club has preparations for NFD well advanced, and two stations will operate this year. Future programme items include subjects ranging from s.s.b. to DXpeditions. *G3TWV.*

North Midlands Mobile Rally is to be held at Trentham Gardens on Sunday, 24 April. A station on 3780 kc/s will provide s.s.b. talk-in facilities. *G3COY.*

North Kent RS has investigated the possibility of co-operating with the local authority in a " Twin-Town " scheme, but with reluctance, and in view of a possible financial obligation, has thought it best not to participate in the scheme. *G3PUI.*

Northern Heights ARS meets at the Sportsman Inn, Ogden on alternate Wednesdays at 7.30 p.m. The AGM is to be held on 13 April, and all members are urged to make an extra special effort to attend. *G3MDW.*

Paddington and District ARS is having a lecture on 13 April entitled " Relays." The club also reports that the prototype Top Band transceiver designed by G3MHQ as a club project has now been completed, and they are active on 2m under the club call G3PAD. Meetings are held every Wednesday. *G3PAD.*

Port Talbot RC continues to thrive, and is holding a Social on 5 April, to which invitations have been sent to clubs in adjoining counties. *GW4CG.*

Purley and District RC. The big news from Purley this month is that as a result of increasing membership, and the good attendance at meetings, they are now supplying free refreshments at all meetings in the future, and moreover, reducing the club subscription to 5s. from next year. In the days of ever mounting costs this is news indeed, and the committee of the club is to be congratulated. *G3FTQ.*

Plymouth RC had an attendance of 60 members and friends at its Annual Dinner which was the most successful to date. Discussion evenings, and slow Morse classes are to commence again so as to aid those working for their ticket. *G3SGV.*

Radio Amateur Invalid and Bedfast Club has a tape librarian who is literally nearly up to his neck in tape. There has been such a tremendous demand for the RAE and music on tape service that both his tape recorders are running almost red hot. Those who have sent in for these are asked to bear with him—he will get there in the end. *G3LWY.*

Reigate ATS is holding a Junk Sale on 21 April at the George and Dragon, and this promises to be as full of cut priced goodies as the others. Plans for participation in NFD are well in hand, as are those for V.H.F. NFD. *G3NKT.*

Salop ARS completes the winter section of its programme on 14 April with a constructional contest. The society has planned a variety of excursions for the summer months of the programme commencing in May.

Saltash and District ARC is meeting on 8 and 22 April, the latter being a film and supper night. Plenty of warning is given for the AGM which is to be held on Whit Monday, 30 May. *G2DFH.*

South Birmingham RS is meeting on 21 April at which slides are to be shown, followed by, if time permits, a discussion on the NFD arrangements. Vocal are those who complain of lack of support for the Sunday Net. Equally vocal are those who claim that if more than six stations take part, then they spread about 15 kc/s. Oh dear! *G3RUK.*

South London Mobile Club is meeting for its AGM on 23 April, and to which they hope all members will make a determined effort to attend. *G3LXN.*

South Shields and District ARC continues to meet each Friday from 7.30 p.m. in Trinity House Social Centre, Laygate, and visitors are always welcome. On the constructional side, the G2DAF converter is being built as an adjunct to the club station receiver. *G3KZZ.*

South Yorkshire ARS holds its meetings at the Stag Inn, Dockin Hill Road, Doncaster, on Thursdays at 8 p.m. Like any other clubs it would like a clubroom with lock-up facilities to foster the practical aspects of Amateur Radio, but in an overcrowded and expanding industrial town, it looks a forlorn hope. *G3SFO.*

Southampton Group meets monthly at the Lanchester building of the University. On 9 April, there will be a talk on d.c. power

(Continued on page 266)

RSGB Publications

28 LITTLE RUSSELL STREET, LONDON, W.C.1

	Post Paid
RSGB PUBLICATIONS	
Amateur Radio Handbook	36/6
Radio Data Reference Book	14/–
Technical Topics for the Radio Amateur	10/8
Amateur Radio Call Book	6/6
Radio Amateurs' Examination Manual	5/9
A Guide to Amateur Radio	5/7
Service Valve Equivalents (Fifth Edition)	3/6
S.S.B. Equipment	3/–
Communications Receivers (Second Edition)	3/–
The Morse Code for Radio Amateurs (Third Edition)	2/–
Log Book (RSGB)	7/–
ARRL PUBLICATIONS	
Radio Amateur's Handbook 1966 Edition	42/6
Buckram Bound	50/–
Antenna Book, 10th Edition	18/6
A Course in Radio Fundamentals	10/–
Hints and Kinks, Volume 6	10/–
Mobile Manual for Radio Amateurs	23/6
Radio Amateur's V.H.F. Manual	18/6
Single Sideband for the Amateur (Fourth Edition)	23/6
Understanding Amateur Radio	18/6
USA Licence Manual	5/–
CQ PUBLICATIONS	
Antenna Roundup	23/6
CQ Anthology, 1952–59	23/6
CQ Anthology, 1945–52	16/–
CQ Mobile Handbook	23/–
CQ New Sideband Handbook	24/–
RTTY Handbook	30/–
Shop and Shack Shortcuts	29/6
73 MAGAZINE PUBLICATIONS	
Care and Feeding of a Ham Club	8/–
Index to Surplus	12/–
Simplified Maths for the Hamshack	4/6
V.H.F. Antenna Handbook	15/–
EDITORS AND ENGINEERS PUBLICATIONS	
Radio Handbook (16th Edition)	78/–
Transistor Radio Handbook	42/–
AMERICAN MAGAZINE SUBSCRIPTIONS	
CQ (*Cowan*) Monthly (p.a.)	44/–
QST (*ARRL*) Monthly (p.a.)	43/6
Institutions, groups, etc. (p.a.)	50/–
73 Magazine Monthly (p.a.)	30/–
MISCELLANEOUS PUBLICATIONS	
Dictionary of Electronics (*Penguin*)	8/–
Guide to Broadcasting Stations (*Iliffe*)	5/6
Foundations of Wireless (*Iliffe*)	22/3
Log Book, 150 pages, opens flat (*Martins*)	21/9
Manual of Transistor Circuits (*Mullard*)	13/6
Radio Amateur Operator's Handbook (*Data*)	5/6
Short Wave Radio and the Ionosphere (*Iliffe*)	12/–
Short Wave Receivers for the Beginner (*Data*)	6/6
Transistor Radios, Circuitry and Servicing (*Mullard*)	5/9
Understanding Television (*Data*)	40/–
Wireless World Radio Valve Data (*Iliffe*)	8/6
MORSE COURSES	
G3HSC Rhythm Method of Morse Tuition	
Complete Course with three 3 speed L.P. records + books	84/–
Beginner's Course with two 3 speed L.P. records + books	60/6
Beginner's L.P. (0–15 w.p.m.) + book	50/–
Advanced L.P. (9–42 w.p.m.) + book	50/–
Three speed simulated GPO test. 7 in. d.s. E.P. record	11/6
RSGB Morse Instruction Tape (900 ft.)	35/–
RSGB Morse Practice Tape (450 ft.) (both at $3\frac{3}{4}$ i.p.s., up to 14 w.p.m.)	20/–
SHACK AIDS	
Easibinders, round backed, gold blocked, for RSGB Bulletin	16/6
Easibind Year Stickers (1964 or 1965)	1/6
QRA Locator, Western Europe	5/6
RSGB Countries List	1/–
Panel Signs, transfers (*Data*)	
Set 3: White Wording	4/9
Set 4: Black Wording	4/9
Set 5: Dials (Clear Background)	4/9
Set 6: Dials (Black Background)	4/9
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Area Representatives Badge (ARs only)	10/–
Members Headed Qto. Paper (100 sheets)	10/6
Call-sign Lapel Badge (with RSGB or RAEN Emblem, pin or stud fitting)*	6/–
Call-sign Lapel Bar*	5/–
Tie Clips (with RSGB Emblem)	5/–
RSGB Lapel Badge ($\frac{1}{2}$ in. size) stud or pin fitting	2/–
Plastic Window Sticker (RSGB or RAEN Emblem)	1/3

**Delivery 6–8 weeks*

(Stamps and Book Tokens not accepted)

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives by the first of the month preceding publication. A.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Standing instructions cannot be accepted.

REGION 1

Ainsdale (ARS).—13, 27 April, 8 p.m., 77 Clifton Road, Southport.

Allerton (Liverpool) (SRHS).—Thursdays, 8 p.m., 3rd Allerton Scout Group Headquarters, Church Road, Woolton, Liverpool.

Blackburn (ELARC).—7 April, (NFD Arrangements), 21 April (Visit to Preston Air Traffic Control), 5 May (Mullard film show on transistors), 7.30 p.m., YMCA, Limbrick, Blackburn.

Blackpool (B&FARS).—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate. Morse tuition from 7.30 p.m.

Bury (B&RRS).—12 April, 8 p.m., Old Boars Head, Crompton Street (private room).

Chester.—Tuesdays, 8 p.m., YMCA, except first Tuesday in each month.

Crewe & District.—2 May, 8 p.m., Earl of Crewe Hotel, Nantwich Road.

Eccles (E&DAC).—Tuesdays, 8 p.m., Patricroft Congregational Schools, Shakespeare Crescent, Patricroft, Eccles. Every Thursday, club Top Band net at 20.30 hours.

Liverpool (L&DARS).—Tuesdays, 8 p.m., Conservative Association Rooms, Church Road, Wavertree.

(ULARC).—11, 25 April, 9 May, 7.30 p.m., Students' Union, 2 Bedford Street North, Liverpool 7.

Macclesfield.—12, 26 April, 10 May, the George Hotel, Jordongate.

Manchester (M&DARS).—Wednesdays, 7.30 p.m., 203 Droylsden Road, Newton Heath, Manchester 10.

(SMRC).—Fridays, 7.45 p.m., Rackhouse Community Centre, Daine Avenue, Northenden.

Morecambe.—6 April, 4 May, 125 Regent Road.

Preston.—12, 26 April, 10 May (on the second Tuesday in each month the meetings commence with a Morse practice), 7.30 p.m., St. Paul's School, Pole Street.

Southport (SRS).—Wednesdays, 8.30 p.m., Sea Cadets Camp, The Esplanade.

Stockport.—6, 20 April, 4 May. The Blossoms Hotel, Buxton Road, Stockport.

Wirral.—6, 20 April, 4 May, Harding House, Park Road West, Claughton, Birkenhead.

REGION 2

Barnsley (B&DARC).—8 April (no meeting), 22 April ("G2DAF Transmitter," talk and demonstration by R. Smith), 7.30 p.m., King George Hotel, Peel Street.

Bradford.—19 April ("Amateur Radio on the Cheap," by D. G. Wilkinson, G3RNI), 7.30 p.m., Bradford Technical College, Great Horton Road.

Catterick.—Tuesdays and Thursdays, 7.30 p.m., Clubroom, Vimy Road.

Durham.—Alternate Thursdays, Vane Tempest Community Centre, Gilesgate.

Northern Heights.—13 April (AGM), 27 April ("Design and Construction of small Mains Transformers," by K. Walton, M.A.S.E.E., G3IKS), 7.30 p.m., Sportsman Inn, Ogden.

Scarborough.—Thursdays, 7.30 p.m., rear of 3 Trinity Road.

Spen Valley (SVARS).—7 April ("70cm," by J. P. Billingham, G8AAC), 21 April (Visit to Birkett Ltd.), 28 April ("TVI," by GPO), 8 May (Visit to Radio Astronomy Dept., Sheffield University), Grammar School, Heckmondwike.

REGION 4

Derby (D&DARS).—6 April (Visit to BBC TV Station, Sutton Coldfield), 13 April (Surplus Sale), 20 April (Visit to Rolls-Royce High Altitude Test Plant), 27 April (D/F Practice Night No. 1), 4 May (Surplus Sale), 7.30 p.m., Room 4, 119 Green Lane, Derby.

Heanor (H&DARS).—19 April (Coffee Evening, ladies invited), 7.30 p.m., Heanor Technical College, Ilkeston Road, Heanor, Derbyshire.

Loughborough (LARC).—Fridays, 8 p.m., Club Room, Bleach Yard, Wards End, Loughborough.

Magnus GS (ARS).—Tuesdays, 3.50 p.m., The Junior Physics Lab., Magnus Grammar School, Newark.

Melton Mowbray (ARS).—21 April ("Microwave Radio Relay Systems," by J. L. Bowley, G3FXP), 7.30 p.m., St. John Ambulance Hall, Asfordby Hill, Melton Mowbray, Leics.

Newark (NSWC).—Mondays, Thursdays, 7.30 p.m., The Hall, Guildhall Street, Newark, Notts.

Nottingham (ARCN).—Tuesdays, Thursdays, Room 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham.

Worksop (NNARS).—Tuesdays (RAE Class), Thursdays (Lecture Night), 7.30 p.m., Club Room, 13 Gateford Road, Worksop.

REGION 5

Bedford (B&DARC).—13 April (Social Evening), 28 April (Preparation for NFD), 7.30 p.m., Westfield School, Queen's Park, Bedford.

Cambridge (C&DARC).—8 April (Good Friday, club closed), 15 April (Grand Junk Sale), 22 April (Informal), 29 April ("Ham Radio in USA," by Louis G. Arnold, G5AAE/K9ALP), Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge.

(CUWS).—Formal meetings suspended for the Summer Term. G6UW on the air from the Grange Road HQ, Cambridge.

Luton (L&DARS).—Tuesdays, 8 p.m., ATC Headquarters, Crescent Road, Luton, Bedfordshire.

March (M&DRAS).—Tuesdays, 7.30 p.m., rear of Police Headquarters, High Street, March, Cambridgeshire.

Royston (R&DARC).—Wednesdays, 8 p.m., Manor House Social Club, Melbourn Street, Royston, Hertfordshire.

Shefford (S&DARC).—Thursdays, 7.45 p.m., Church Hall, High Street, Shefford, Bedfordshire.

REGION 7

Acton, Brentford & Chiswick (ABCRC).—19 April, 7.30 p.m., at AEU Club, 66 High Road, Chiswick.

Ashford (Middx.) Echelford (ARS).—13, 27 April, 7.30 p.m., Links Hotel, Ashford.

Bexley Heath (NKRS).—14, 28 April, 7.30 p.m., Congregational Hall, Chapel Road, Bexley Heath.

Chingford (SRC).—Alternate Tuesdays, 26 April, G3RYF, 17 Forest Drive East, Leytonstone, E11.

Croydon (SRCC).—12 April, 7.30 p.m., Blacksmiths Arms, South End.

Dorking (D&DRS).—12 April (Informal Meeting), 8 p.m., Wheatsheaf, 26 April (Junk Sale), 8 p.m., Star & Garter, Dorking.

Ealing (E&DARS).—Tuesdays, 7.30 p.m., Northfields Community Centre, Northcroft Road, Ealing, London W13.

East Ham.—Tuesdays fortnightly, 7.30 p.m., 12 Leigh High Road, East Ham.

East Molesey (TVARTS).—First Wednesday each month, Prince of Wales, Bridge Road, East Molesey.

Edgware & Hendon (EADRS).—11, 25 April, 8 p.m., John Keble Hall, Church Close, Deans Lane, Edgware.

Gravesend (GRS).—20 April, 7.30 p.m., RAFTA Club, 17 Overcliffe Road.

Greenford (G&DARS).—22 April, 8 p.m., Greenford Community Centre, Oldfield Lane, Greenford, Middlesex.

Guildford (G&DRS).—8, 22 April, 8 p.m., Guildford Model Engineering Society in Stoke Park.

Harlow (DRS).—Tuesdays and Thursdays, 7.30 p.m., Fridays (Junior Section, Theory and Practical, conducted by L. Cox, G3PRN), 7.30 p.m., Mark Hall Barn, First Avenue.

Harrow (RSH).—Fridays, 8 p.m., Roxeth Manor School, Eastcote Lane.

Havering (H&DARC).—13, 27 April, Romford.

Holloway (GRS).—Mondays and Wednesdays (RAE and Morse), 7.30 p.m., Fridays (Club night), 7.30 p.m., Room 35, Montem School, Holloway Road.

Hounslow (HADRS).—18 April, Canteen, Mogden Main Drainage Department, Mogden Works, Isleworth.

Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (nr. Seven Kings Station).

Kingston.—14, 28 April, 8 p.m., YMCA, Eden Street, Fridays (weekly Morse classes, 2 Sunray Avenue, Tolworth).

Leyton & Walthamstow.—19 April, 7.30 p.m., Leyton Senior Institute, Essex Road, London, E10.

London U.H.F. Group.—No meeting during April.

London Members' Luncheon Club.—12.30 p.m., third Friday in each month, Whitehall Hotel, Bloomsbury Square, Holborn.

Loughton.—8, 22 April, 7.30 p.m., Loughton Hall (nr. Debden Station).

New Cross.—Wednesdays and Fridays, 8 p.m., 225 New Cross Road, SE14.

Norwood & South London (CP&DRS).—16 April, CD Centre, Catford, SE6.

Paddington (P&DARS).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2a Warwick Crescent, W2.

Purley (P&DRC).—15 April, 8 p.m., Railwaymen's Hall (side entrance), 58 Whytecliffe Road, Purley.

Reigate (RATS).—21 April, 7.30 p.m. (Junk Sale), George & Dragon, Cromwell Road, Redhill.

Romford (R&DRS).—Tuesdays, 8.15 p.m., RAFTA House, 18 Carlton Road.

Scout ARS.—21 April, 7.15 p.m., Baden Powell House, Queens Gate, South Kensington.

Science Museum (CSRS).—19 April (AGM), 3 May ("Simple Test Equipment"), 6.30 p.m., Science Museum, South Kensington.

Sidcup (CVRS).—7 April (AGM), 7.30 p.m., Congregational Church Hall, Court Road, Eltham.

Slough (SDR Group).—First Wednesday in each month, 8 p.m., United Services Club, Wellington Street.

South London Mobile Club.—7-10 April (DXpedition to Wales), 23 April (AGM), 8 p.m., Clapham Manor Baths, London, SW4.

Southgate & District.—14 April, 7.30 p.m., Parkwood Girls' School (behind Wood Green Town Hall).

St. Albans (Verulam ARC).—20 April, 8 p.m., ("Transistor Equipment," by W. Marshall, G3SBA), Marconi Instruments Service Department, Hedley Road.

Sutton & Cheam (SCRS).—19 April, 8 p.m., The Harrow Inn, High Street, Cheam.

Welwyn Garden City.—14 April, 8 p.m. ("Air Traffic Control," by John Graham, G3TR), the Backhouse Room, Handside Lane.

Wembley (GECARS).—8 April (Visitors please ring ARNold 1262 first).

Wimbledon (DARS).—13 May ("Quartz Crystals," by G3OLM), 10 June ("International Amateur Radio," by G6CL), 8 p.m., Community Centre, St. Georges Road, Wimbledon, London, SW19.

REGION 8

Crawley (CARC).—13 April (Informal. For details contact G3FRV), 27 April ("Wired TV," by E. G. James, Esq.), 8 p.m., Trinity Congregational Church Hall, Ifield.

Worthing (WARS).—28 April (Raychew, Morse, and Club Station), Adult Education Centre, Union Place, Worthing.

LONDON MEMBERS' LUNCHEON CLUB

will meet at the White Hall Hotel, Bloomsbury Square, London, W.C.1.

at 12.30 p.m. on Fridays, 15 April, and 20 May, 1966

Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

REGION 9

Bath.—22 April, 7.30 p.m., RNR Training Centre, James Street West, Bath.

Bristol.—29 April, 7.15 p.m., New Physics Theatre, Royal Fort, Bristol University, Woodland Road, Bristol 8.

Burnham-on-Sea (B-o-SARS).—Second Tuesday in each month, 8 p.m., Crown Hotel, Oxford St., Burnham-on-Sea.

Camborne (CRAC).—First Thursday in each month, Staff Recreation Hall, SWEB Headquarters, Pool, nr. Camborne.

Exeter.—First Tuesday in each month, 7.30 p.m., George and Dragon Inn, Blackboy Road, Exeter.

Plymouth (PRC).—Tuesdays, 7.30 p.m., Virginia House, Bretonside, Plymouth.

Saltash (S&DARC).—Alternate Fridays, 7.30 p.m., Burraton Toc H Hall, Warraton Road, Saltash.

South Dorset (SDRS).—First Friday in each month, 7.30 p.m., Labour Rooms, West Walks, Dorchester.

Torquay (TARS).—Last Saturday in each month, Club HQ, Belgrave Road, Torquay.

Weston-super-Mare.—First Friday in each month, 7.15 p.m., W-s-M Technical College.

Yeovil (YARC).—Wednesdays 7.30 p.m., Park Lodge, The Park, Yeovil.

REGION 10

Cardiff RSGB Group.—15 April (Annual Dinner), Grand Hotel, Cardiff, 18 April (Film show), 7.30 p.m., TA Centre, Park Street, Cardiff.

REGION 11

Conway Valley (ARC).—14 April ("Mobile Operation," by Mr R. Jones, GW3MDK), 7.30 p.m., Cross Keys, Madoc Street, Llandudno.

REGION 13

Edinburgh (LRS).—14 April, 28 April (Junk Sale), 7.30 p.m., YMCA, South St. Andrew Street, Edinburgh.

REGION 14

Auchenharvie (A&DARC).—Tuesdays and Thursdays, 7.30 p.m., Auchenharvie Community Centre, Stevenston, Ayrshire.

Ayrshire.—Third Sunday in each month, 7.30 p.m., Conservative Club, Sturrock Street, Kilmarnock.

Glasgow.—Second and fourth Fridays in each month, 7.30 p.m., in the Christian Institute, Bothwell Street, Glasgow.

REGION 16

Basildon (BDARS).—20 April (Lecture, "S.S.B. Working"), Mayflower Restaurant, 3 May (Social), details from G3IJB.

Chelmsford (CARS).—3 May, 7.30 p.m., Marconi College, Arbour Lane, Chelmsford.

LOOKING AHEAD

24 April.—North Midlands Mobile Rally.
30 April.—Scottish V.H.F. Convention.
1 May.—RSGB National Mobile Rally, Texas Instruments, Bedford.
1 May.—Medway Mobile Rally, British Uralite Ltd., Rochester.
14 May.—Midlands V.H.F. Convention.
12 June.—RSGB National Mobile Rally.
10 July.—South Shields Mobile Rally.
14 August.—Derby Mobile Rally.
11 September.—RSGB National Mobile Rally, Woburn Abbey, Bedford.
9 December.—RSGB Annual General Meeting.

Great Yarmouth (GYRC).—Fridays, 7.30 p.m., the Manager's Office, the Old Power Station, South Quay, Swanstons Road, Great Yarmouth.

Ipswich (IRC).—Last Wednesday in each month, 7.30 p.m., Red Cross HQ, Gippeswyk Hall, Ipswich.

Norwich (NARC).—Mondays, 7.30 p.m., the Club Centre, 140 Oak Street, Norwich.

REGION 17

Harwell AERE (AEC).—Third Tuesday in each month, 7.30 p.m., AERE Social Club.

TV and Radio Show 1966

The 1966 Show, to be staged for the trade only at Earls Court, London, from 22 to 26 August, is assured of ample support from industry. Nearly 50 stands have been booked of which about a dozen have been taken by distributors or agents for products made abroad.

Exhibition in Ireland

On 30 April—to coincide with the Annual General Meeting of the Irish Radio Transmitters' Society—an Amateur Radio Exhibition (the first in Ireland) will be held at the South County Hall, Stillorgan.

Mine Host and Hostess

Angus and Doris Murray-Stone who have operated from Saudi Arabia, Nigeria and other "exotic" DX countries are now mine Host and Hostess at The Queens Hotel, Queens Street, Ulverston, Lancashire.

CONTESTS DIARY

16-17 April	-CQ WW DX S.S.B. Contest
16-17 April	-Second 70 Mc/s Open, and 70 Mc/s Listeners' Contests* (see page 119, March 1966)
23-24 April	-PACC Contest
24 April	-D/F Qualifying Event, Rugby* (see page 192, March 1966)
30 April-1 May	-Helvetia 22 Contest
8 May	—Third 144 Mc/s (Portable) Contest (see page 195, March 1966)*
22 May	—D/F Qualifying Event
28-29 May	—First 432 Mc/s (Open) Contests (see page 195, March 1966) *
29 May	—1296 Mc/s Contest (see page 195, March 1966) *
4-5 June	—CHC/FHC/HTH QSO Party
4-5 June	—National Field Day (For rules, see page 51, January 1966)
19 June	—D/F Qualifying Event
3 July	—Fourth 144 Mc/s (Portable) Contest *
9-10 July	—1·8 Mc/s Summer Contest
17 July	—D/F Qualifying Event
24 July	—Third 70 Mc/s (Portable) Contest *
31 July	—D/F Qualifying Event
13-14 August	—WAE Contest (C.W)
3-4 September	—V.H.F. NFD *
10-11 September	—WAE Contest (Phone)
11 September	—80 Metre Field Day
18 September	—D/F Final
16 October	—Second 1296 Mc/s Contest *
15-16 October	—RSGB 21-28 Mc/s Telephony Contest
15-16 October	—Second 420 Mc/s Contest *
29-30 October	—RSGB 7 Mc/s DX (Phone) Contest
12-13 November	—RSGB 7 Mc/s DX (C.W.) Contest
19-20 November	—Second Top Band Contest
4 December	—Fourth 70 Mc/s (C.W.) Contest *

* Qualifying contests for V.H.F./U.H.F. Listeners' Championship

Mullard Meetings

The Mullard Films and Lectures Organization will hold meetings at the following places during April: 5th, Leicester (Co-operative Hall); 6th, Swindon (McIlroys Restaurant); 19th, Douglas, Isle of Man (Villiers Hotel). All meetings commence at 7.45 p.m. and the programme will include a talk on transistors followed by films entitled *Thin-film Microcircuits* and *Electromagnetic Waves, Part II*. Members will be welcome at meetings but it is advisable to write in advance, when time permits, to Mr Ian Nicholson, Mullard House, Torrington Place, London, WC1, for a ticket. Refreshments will be served at all meetings.

RSGB Amateur Radio Call Book

The following are corrections to the 1966 edition:

GW3UCJ, M. J. P. Evans, 4 Gower Crescent, Baglan, Port Talbot, Glam.

G6KPX/T, R. S. Howard, The Lodge, Maidenhead Court, Maidenhead, Berks.

G6RIZ/T March and District Radio Amateur Society, 88b High Street, March, Cambs.

G3EMY/ZC4RM, R. Moreton, 23 Thackeray Road, Kings Norton, Birmingham 30.

G3HCM, D. Dumbleton, 11 Woodburn Close, Allesley Park, Coventry.

G3KRT, G. L. D. Hodges, 102 Torrington Road, Ruislip, Middlesex.

G3UKR, D. Cotter, 4 Radstone Court, Hill View Road, Woking, Surrey.

G6RS, R. K. Sheargold, 32 Badmington Road, Maidenhead, Berkshire.

Clubroom (Continued from page 262)

supplies. The clubroom welcomes visitors on Wednesday and Friday evenings of each week.

Stockport RS is well ahead with its programme, and advises us of meetings to be held on 4 and 18 May. *G3MBQ*.

Stratford-upon-Avon and District RC has a major event during April. This is a Mobile Picnic to be held on the 23rd at Wilmcote Men's Club starting at 3 p.m. Wilmcote is one and a half miles North of Stratford on the A34. Talk-in will be on 160m by G3PGU/A, and to support the ensuing rag chew will be a junk sale. *G3OOQ*.

Surrey Radio Contact Club seems to have a very full programme in which one of the more important items, if not the most important item, is the AGM to be held on 12 April at the Blacksmiths Arms, South Croydon, starting at 8 p.m., sharp. *G3KGA*.

Sutton and Cheam RS has been giving much thought lately to the interests of junior members, and to assist them in their discussions, the committee has invited constructive suggestions from these members. This is certainly the way to foster the club spirit. On 19 April, the AGM takes place, and the club hopes that all members will turn up in force. *G3HSK*.

Swindon and District ARC has changed its venue to the Old Scout Hut off Moredon Road where they now have a large room which can be divided into two by a folding partition. Between 27 and 30 April, the club is taking part in the Adult Education Exhibition at the Town Hall. In view of the amount of work involved in arranging aerials and in setting up the stand, the cry is "All hands to the pump." *G3LLZ*.

Thames Valley ARTS is meeting on 6 April for a talk on Mobile Operating by G2ANX, and on 4 May for a talk on Nuclear Power. *G3JKA*.

Verulam ARC has been troubled by deliberate jamming, and an assortment of weird noises on its Top Band Net. A concerted effort is to be made, backed by Direction Finding equipment, to locate these pirates, and once they are located, they will get no warning from the club, just a visit by the GPO who will undoubtedly confiscate the equipment and take the appropriate action. So what some people may consider as a " bit of a laugh " or a "giggle" in a bent and twisted way will pay the appropriate penalty. On a more pleasant note, the April meeting will be on the 20th at which G3SBA will be talking on his transistorized equipment. *G3GJX*.

Welwyn ARC will be meeting on 14 April for a talk on " Aircraft Control by V.H.F." by G3TR. The club reports that its latest licensee is a member of the " younger set," Trevor Baker—twice winner of the Junior Constructor's Cup—who holds the call G8ANS. *G5UM*.

Wirral ARS will be meeting on 6 and 20 April, while on 4 May there will be a sale of surplus items. In the issue of the *Newsletter* under review, there is a useful article on grid block keying penned by G3TKN, which, in its conclusion, slyly suggests that modulators should be thrown into the Mersey. Eileen O'Brien may well have coined a new term in the use of 161 when signing off, being the sum total of 73 and 88. Will it catch on? *G3FOQ*.

Yeovil ARC is meeting on 27 April for a junk sale, and having cleared the AGM in February, is looking forward for another year of progress. *G3TTC*.

Deadline for the **May** issue is **7 April.**
Deadline for the **June** issue will be **5 May.**

Second International Convention
KNOKKE, BELGIUM
16-18 September, 1966

Full details may be obtained from V. Claeys, ON4UM, Hoogstraat 68, Beersel, Belgium, or from Bob Fevery, ONL1322, Meerminlaan 22, Knokke, Belgium.

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENT RATES. Members' Private Advertisements 3d. per word, minimum charge **5s. Trade Advertisements 9d. per word,** minimum charge **12s.** All capitals **1s.** per word, minimum charge **18s.** Write clearly. No responsibility accepted for errors. Use of Box number **1s. 6d.** extra. Send copy to **Sawell & Sons Ltd., 4 Ludgate Circus, London, E.C.4.** Remittances should be made payable to Sawell and Sons Ltd.

FOR SALE

OFFERS. Oscillator 145 MO/XL, 807 4-CV45 4003A. Power pack 392, 2-CV54, spare valves, suitable technical college. Many years BULLS, SW Mags, Practical Wireless. WANTED. Heathkit DX.40 VFO VF1U. Power pack TX/RX 19 set. Standard wire gauge. South London. Box V7257, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

HEATHKIT 3 in. Scope OS-1 with additional Mumetal CRT Shield, also Manual. £24 o.n.o. Hopton, 330 Wetmore Road, Burton, Staffs.

MOBILE POWER—60 and 100 watt transformers for 12 to 300/600 volt d.c. Transistor power supplies—High efficiency type—some have bias winding—ideal for B44 etc—circuit and data supplied, 60 watt 35s., 100 watt 40s. each. 2 metre and 4 metre Nuvistor converters, crystal-controlled, with internal p.s.u., £7 10s., less p.s.u., £6. 2 metre 15-18 watt r.f. section, ideal mobile or 70cm driver, £8. W6DPU electronic keyer, complete with paddle—very good—£10. Small comprehensive oscilloscope, £12. S.a.e. details any item or please add postage. B. M. Sandall, G3LGK, 21 Dale View, Ilkeston, Derbyshire.

COMMAND RECEIVER 1·5 to 3 Mc/s modified for mobile use, £5 10s. or exchange for 2 metre converter. 12 Mitchell Road, Palmers Green, London, N13.

EDDYSTONE 740, excellent condition, unmodified home made S meter Eddystone circuit, £20 or near offer. Roth, 4 Camden Road, Somerton, Somerset.

AMERICAN CONVERTER AM914 225 to 400 Mc/s for 240 volts a.c. Offer also HE/30 RX and Decca-Intercontinental portable 10 to 2000, new, £55, take £35. Apply Sutcliffe, 103 City Road, Bradford. 24144.

HEATH HW32 20 metre transceiver, PTT, mike and p.s.u., £60. TE-900 20K/volt multimeter, £9. One 4CX 250F with base and chimney, £5. G3SEE, QTHR. ENT 1343.

CSE2A10 = 2MC10WTTX / 12VBATT = NEXT MONTH

HEATHKIT MOHICAN good condition, little used, with instruction manual, £22 o.n.o. or exchange for TW Two-mobile RX.—G. J. Marwood, G3NZF, 12 Hampshire Court, Abdon Avenue, Selly Oak, Birmingham 29.

MINIMITTER MERCURY. Good condition, can be seen working, overhauled. £40 o.n.o.—G3GHS. Low 3741, 164 Hook Rise, North Tolworth, Surrey.

AR88D, PVC wiring, "S" meter, resprayed silver grey ripple, matching speaker. Demonstration 50 miles, £35.—G6ZH, 29 Thorpe Place, Tattershall, Lincs.

METALWORK.—All types of cabinets, chassis, racks, etc., to your own specifications.—Philpott's Metalworks Ltd., (G4BI), Chapman Street, Loughborough.

S.S.B. STATION. Viceroy Mk. III with ½ lattice filter. KW 77 receiver complete with relay, mike, etc. all in mint condition, £210. Box No. V7261.

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EMIGRATING. For sale. Minimitter de luxe Transmitter, 120 watts, A.M./C.W., £30. Eddystone 358X receiver, 32 kc/s-32 Mc/s. 32-90 kc/s coil missing, £10. Minimitter low pass filter, £1. Panda A.T.U. 150 watt model, 50/-. All above for £42. Plus home built 100 watt transmitter, faulty. Can be used for spares. Has UM2 transformer, valves, etc. Sound make tape recorder, 2-track 3-speed in working order. Could do with overhaul, £10.—R. Thyer, G3KTW, 9 Lyndhurst Avenue, Castleton, Rochdale, Lancs.

TRANSISTOR DC/DC Convertors. Brand new. Standard input 12V output 250V. 100mA. 8 gns + 4/- P. & P. Other input/outputs to your specification—quotations by return. SAE for full details. Also many valves—S.a.e., Wheeler, G3RHF, 88 Village Way, Ashford, Middx.

HRO and P/Pack with 5 B/Spread Coils. DB20. Preselector less P/Pack. 21 Mc/s Xtal Controlled Convertor less P/Pack and Xtal (3·5) £25 the lot. Buyer collects.—G6VC, V. H. Curling, 66 Burch Road, Northfleet, Kent.

AMATEURS, your QSL cards at reasonable prices. £1 (100). ACE, (Dept. R), 330, Wetmore Road, Burton, Staffs.

APPOINTED Northern agents for KW Electronics Ltd. Full KW range now in stock. KW Vespa, KW 2000, KW 2000A, KW 600 Linear. Full Codar range also in stock. Distributors for "Joystick." Trade supplied. We can supply Eddystone, National, Eagle & Lafayette equipment. Shure 201 microphones £4/5/-. AR88D's, £45, £40, £35. TW Topmobile £14. CTX2. Tx £12/12/-. New SR550 Rx £60. SR600 95 gns. RSGB Publications.—Stephens-James Ltd., 70 Priory Road, Liverpool, ANField 3141.

MECHANICAL FILTERS to order. 455 kc/s 2·4 kc/s wide at 6db points. Complete with i.f. transformers, only £9. Also available a few UHF transistors types GMO290, GMO378 and AF139 at 15/- each.—Box No. V7258, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

HA350 LAFAYETTE receiver £69, HA230 £30 and Star SR600 at £94 all receivers brand new.—Box No. V7259, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

HALLICRAFTER S-120 £15, Heathkit g.d.o. £7/10/-. Heathkit Q-Multiplier QPM-1, £6. Codar PR30, £3/10/-. TM-59er S-Meter, £2. Joystick standard model, £2/10/-. S.a.e. for list of other items.—D. R. Ronson, 5 Alexandra Road, Harrogate, Yorks.

MOHICAN general coverage receiver. Heathkit. Bandspread on 10-160. S meter. BFO. AF/RF, factory built, professionally aligned. Few hours use. £20.—Watford 31640 (days) Chesham 3448 (evenings).

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COLLINS 32S1, 75S1, up-dated to S3, 6146B's 280 watts, 516F-2 P/S, extras, demonstrate London, £298 all. Box No. V7262, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

RCA AR8516L Communications Receiver. Perfect unused condition and first class alignment. £135. 18 Kidborough Road, Crawley. Telephone Crawley 22695.

EDDYSTONE 940 48-30 Mc/s. 1st class condition, handbook, £80. Eddystone 770R 19-165 Mc/s a.m., f.m., c.w., good condition, £80. Offers to Whitford, 37 Chestnut Drive, Polegate, Sussex. Tel: Polegate 4659.

CDR ROTATOR and Table Indicator with control table. Mostly TR32JR 2-element beam. £20. Berry, 26 Falcon Road, Bingley, Yorks. Tel: OWR66—5218.

600 WATT Matching Linear to KW 2000, uses four PL 505's, self contained power supply, also change over relay for Antenna. 100%. £30. G3DRF. Tel: Malmesbury 2281.

EDDYSTONE EC10. Owned by the late BRS27379. New, hardly ever used due to illness. Including AC Power Pack, £40.—G3OFU, Glendale, Bollinway, Prestbury, Cheshire. Tel. Prestbury 89710.

500W LINEAR Green Davis, PGLA.1. New condition, excellent appearance £60. o.n.o.—G4HU, 34 Birch Avenue, Romiley, Cheshire.

SSB/AM/CW TX. Geloso VFO, SB10U, 6146, Plate/Screen/AM, PSU, FB job. £55. Heath 5in oscilloscope, £18 o.n.o. Prefer buyer inspects/collects.—GM3PML, Dalmara, Carslogie Road, Cupar, Fife.

KW2000A. A few months old, hardly used complete with a.c. power supply and speaker, £195. Hallicrafters H.T.37 Transmitter 10-80m. A.m., c.w. s.s.b., unmarked in original case. Handbook, £105. LA 600 Linear, 6 months old and not used since checked by makers 3 months ago, £70. Heathkit SB10U s.s.b. adaptor beautifully constructed and working perfectly, £30. Drake 2B Receiver complete with Calibrator, Q Mult., speaker and including full coverage 10 metres, £85. Wanted: 2 & 4 metre gear, Ham M Rotator, Tribander Beam.—Terry Edwards, 188 Broadhurst Gardens, London, N.W.6. MAIda Vale 6638.

HEATHKIT R.A.1., £30. "Q" Mult., £5. DX40 and V.F.1. £30. PR30, new, £5. Reason going abroad. Half carriage paid.—Williams, Ketsby, Louth, Lincs.

AR88L.F. in excellent condition, tuning meter, R.C.A. loudspeaker in cabinet, £35 o.n.o.; Collaro "Studio" tape deck, needs slight attention, £2/10/- o.n.o.; R.F. signal generator, perfect, £3/10/- o.n.o.—Gillman, "Wedgwood," Portesbery Road, Camberley, Surrey. Telephone: Camberley 3811.

STUD MOUNTING SILICON RECTIFIERS. 800, 600, 400, 200, 100 P.I.V. 6 amps at 4/6 each or 4 for 16/-. Wire-ended 400 P.I.V. 500 m/A 12/- doz. Silicon N.P.N. Transistors similar to 2N706 18/- per doz, £5 per 100. GJ7M rectifiers 1/9 each. Brush VHF Transistors AF131, AF132, AF133 at 4/6d each. B.T.H. GT 31, GT 32, Transistors 50/- per 100. Thyristors 250 P.I.V. 10 amps. 9/6d. 50 P.I.V. 80 amps, 50/- each.—J. Birkett, 9 Steep Hill, Lincoln. Phone 20767.

C4100/2, NL/SM/ME, £15. Condition good. A snip. G2BCH.—29 Crossways, West Clacton, Essex. Buyer please collect.

K.W. 2000 A.C. and D.C. P.S.U. Shure type 201 microphone. Excellent condition. Offers.—c/o M. Derbyshire, "The Blossoms," Green Lane, Cabus, Garstang, Lancs.

4X150A, £3. 829B, 30/-. 2E26, 5B254M, 17/6. All new. Collins mechanical filter type F455Z56426 for s.s.b., with 455 kc/s B7G crystal, £12. Clevite ceramic 455 kc/s filter, 4 kc/s bandwidth, £4.—Box V7265, c/o RSGB BULLETIN, 4 Ludgate Circus, E.C.4.

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£35 National N.C.98 RX. Good condition, all bands and general coverage, band spread on 80 to 10 metres, self-contained power supply.—G3OQU. Phone: Kinver, Staffs. 2642.

EXPERIMENTAL 16 valve Hamband 160 to 10 metre RX. Electroniques front end, all unit built, amateur construction, own power supply stabilized. Double conversion and partly built calibrator, less Xtal, a.m. c.w., s.s.b. No cabinet, £18. Buyer collects. BRS 14431, 255 Purbrook Way, Leigh Park, Havant, Hants.

2N441s and "hardware" for sale, unused. Highest offer secures. Please enclose s.a.e. D. C. Hare, Tallis, Holt, Norfolk.

ENTIRELY NEW preselector for S.W.L.'s. A tuned Pentode amplifier with built-in antenna tuner, 1·8/32 Mc/s. Tunes Antenna and Amplifies signal simultaneously. Only £6/18/- powered. S.a.e for specification.—Hamgear Electronics, 29 Carlyle Rd., Norwich.

60W 10/80 TX. PSU, £10. B.C.348R. Silicon. PSU Manual, £10. B44, 4m Crystal, £6. HMV PB Car Radio, tunes top band, £10. Top Band, Command RX, £5 10s. UM2, £2. OSSB/U Scope, Manual, £20. 160m TX, PSU, £8. P. and p. extra.—G3TFN, Elms Bungalow, Whitefield, Lancs.

BC453 Command Q5'R a.m., s.s.b., detector, improved audio o.p. good cond., £4/10/-. KOKUSAI mech. Filter 2·1 kc/s. MF45510K, plus carrier XTL's the lot £8/10/-.—G3TRM. Tel: Ashtead 4987 evenings.

WANTED

HAS ANYONE, anywhere, " CQ " Magazine dated March and April 1945 for disposal, to complete my collection?—G3IDG, 96 George Street, Basingstoke, Hampshire.

CHEAP C.W., TX., preferably covering 14 Mc/s, maximum price £5. Also information on the NC 120. Please state price. V. J. Blackmore, 8 Bancks Street, Minehead, Somerset.

WANTED Heathkit Mohican Receiver or similar, state price and condition, would consider faulty one. Also AR77 Mains Transformer. Box No. V7263, c/o RSGB BULLETIN 4 Ludgate Circus, London, E.C.4.

P.S.U. G2DAF Tx.Mk.11 or H.T. transformer only, also required, mains transformer, Cossor 1035 (Single transformer model). Sumption Post Office, Wentbridge, Pontefract, Yorks.

WANTED.—All types of communications receivers, test equipment, tape recorders, amplifiers, etc. Prompt cash payment.—Details to R. T. & I. Electronics Ltd., Ashville Old Hall, Ashville Road, London E.11 (LEYton 4986).

KW2000 WANTED. Preferably with AC and DC PSU's. Can collect 100 miles. State condition and price.—G3LHZ-QTHR (Crawley, Sussex).

PSU for B2 TRANSMITTER, write Pettman, 17 Birchdale, Gerrards Cross, Bucks.

HRO RX. P.S.U. and Coils. C.D.R. Rotator. Mosley TA33 JNR or 5NR. Full particulars: Box V7264, RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

WANTED urgently for Lorenz receiver, up to 10 German base valves PV12, P2000 and one P2001. Can anybody help? Starbuck, 22 Alwold Cres., Lee, London, S.E.12.

TA33JR and feeder also 10X type crystal between 1500 k/c-1545 k/c. G3RNV QTHR.

BC-221, must be first class instrument with original charts. GM3TDS—QTHR or Phone Stepps 2709, after 7 p.m.

VALVES X101, KT101, and any servicing gen on HMV R/gram type 5401. Cash or exchange 813's, crystals, etc. Gorrett, 36 Rasper Road, London, N.20.

BUY OR BORROW. Handbook for ex-admiralty Murphy receiver MR121. Ward, Hartley, Green Lane, Milford, Godalming, Surrey.

MISCELLANEOUS

TWENTY-FIRST REUNION. Ex. 15119 & Ancillaries. April 23, Pathfinders Club, Mount St., London. Further gen. contact: Proverbs, 144 Broadway, Yaxley, Peterborough.

PATENTS and TRADE MARKS. Booklet on request. Kings Patent Agency Ltd. (B. T. King, G5TA, Mem. RSGB, Reg. Pat. Agent).—146A Queen Victoria Street, London, E.C.4. (Phone: City 6161). 60 years' refs.

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SITUATIONS VACANT

An Electronic Instrument Technician

is required by

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of the

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for the Instrumentation Section of the Physics Department to assist in the Installation, calibration and maintenance of elecronics instruments used for radioactivity measurements.

Applicants should have served a recognised apprenticeship or had equivalent training and should be experienced in pulse, high voltage or electrometer circuit techniques. Experience in the maintenance of pulse height analysers will be an advantage.

Starting Salary, according to age and qualifications, on a scale of £1,015 (linked to age 26) to £1,080 rising by annual increments to a maximum of £1,210.

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Apply to Personnel Officer, The Radiochemical Centre, White Lion Road, Amersham, Bucks., quoting Reference No. T. 17.

TELECOMMUNICATIONS ENGINEER

Required by the GOVERNMENT OF UGANDA for service in Ministry of Internal Affairs (Police) on contract for one tour of 21-27 months in the first instance. Salary (including overseas addition) according to age and experience in scale £1,188-£2,202 a year. Gratuity 25% of total emoluments. Educational allowance. Outfit allowance £30. Liberal leave on full salary. Accommodation provided at reasonable rental, or hotel allowance in lieu.

Candidates, between 30 and 45 years of age, must possess a City and Guilds Final Certificate course 49 or equivalent qualification with at least 6 years practical experience including installation and maintenance of fixed and mobile V.H.F equipment (A.M. and F.M.); H.F. medium and low power S.S.B. and D.S.B. transmitters and receivers; Radio teleprinter equipment; small diesel and petrol electric generating plants. Duties will also involve the supervision and instruction of local maintenance staff under training.

Apply to CROWN AGENTS, M. Dept., 4 Millbank, London, S.W.1 for application form and further particulars, stating name, age, brief details of qualifications and experience, and quoting reference M2T/62331/RC.

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TELECOMMUNICATIONS SUPERINTENDENT

required by the GOVERNMENT OF THE GAMBIA, Posts and Telecomms. Dept., on contract for one tour of 18/24 months in the first instance. Commencing salary in scale (including inducement pay) rising to £1,920 a year according to experience. Tax free gratuity at rate of 25% of salary drawn. Outfit allowance £40. Free passages. Liberal leave on full salary.

Candidates, preferably 35 to 50 years of age, should possess C. & G. Inert. Cert. in Telecomms. (Radio) or equivalent and have had ten years experience in Telecomms. including VHF and Carrier, at least 5 of which should have been in Africa. Qualifications in Line Transmission, Telephony (including Auto) and maintenance of Auto-Exchanges and Creed Teleprinters would be an advantage.

The duties involve frequent travel in the Provinces and the ability to supervise by example.

Apply to CROWN AGENTS, M. Dept., 4 Millbank, London, S.W.1, for application form and further particulars, stating name, age, brief details of qualifications and experience, and quoting reference M2T/62700/RC.

GLASGOW UNIVERSITY LINEAR ACCELERATOR

TECHNICIANS

Applications are invited for posts as Technicians or Senior Technicians at the Kelvin Laboratory, N.E.L., East Kilbride. Experience of microsecond pulse circuitry, R.F. centimetric systems, high vacuum installations or radiation monitoring would be a recommendation. Minimum qualifications for senior posts H.N.C. or equivalent.

Salary scales:
Technicians—£660 to £935 per annum.
Senior Technicians—£910 to £1,140 per annum.
A supplement of £50 is paid to holders of H.N.C. or equivalent.

Posts qualify for local authority housing.
Applications stating age, qualifications and experience should be addressed to The Professor of Natural Philosophy, The University, Glasgow, W.2.

WIRELESS TECHNICIAN

A vacancy exists for an experienced Wireless Technician to undertake duties involving the installation and maintenance of VHF and UHF mobile radio equipment for the Birmingham City Police. Salary in accordance with Miscellaneous Grade V £800 to £910 per annum. Applications from candidates over 21 years of age giving full details to: Chief Constable, Newton Street, Birmingham 4.

MANAGER required for small expanding radio, electrical and components wholesaler. Midlands area. Must be able to organize and willing to work. Salary and commission.—Box V7266, c/o RSGB BULLETIN, 4 Ludgate Circus, E.C.4.

SITUATIONS VACANT (contd.)

TELECOMMUNICATIONS TECHNICIANS

required by the GOVERNMENT OF ZAMBIA, General Post Office, on contract for one tour of 36 months in the first instance. Commencing salary according to experience in scales (including Overseas Addition) indicated below. A supplement of not less than £200 a year is also payable. Gratuity 25% of total salary drawn. Liberal leave on full salary or terminal payment in lieu. Free passage. Quarters at low rental. Children's education allowance.

Candidates for appointment as EQUIPMENT TECHNICIANS (salary scale rising to £1,855 a year) should possess Inter. C. and G. Cert. and must have had at least 10 years' training and experience in one or more of the following branches of telecomms. engineering: (i) Carrier; (ii) H.F. and V.H.F. Radio; (iii) Auto Exchanges; (iv) Telegraphic Machines. Overseas experience; " B " year C. & G. Certs. and a knowledge of external telephone distribution systems and subscribers installations would be advantages. Age limits 26-45 (Ref: M2T/62916/RC).

Candidates for appointment as LINE TECHNICIANS (salary scale rising to £1,580 a year) should possess at least two appropriate C. & C. Certs. and must have had at least 10 years' training and experience in one or more of the following branches of telecomms. engineering: (i) underground and overhead cable distribution; (ii) overhead line systems; (iii) subscribers installations. Overseas experience, Inter. C. & G. Cert. and familiarity with other aspects of telecomms. engineering would be advantages. Age limits 26-45. (Ref. M2T/62959/RC).

Apply to CROWN AGENTS, M. Dept., 4 Millbank, London, S.E.1, for application form and further particulars, stating name, age, brief details of qualifications and experience, and quoting the relevant reference.

SITUATIONS WANTED

AMATEUR. Married, three children, at present employed Marine Electronics, Far East. Seeks employment Southern England, preferably country districts, consider anything to avoid break up of family. Available January 1967. Box No. V7260, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

INDEX TO ADVERTISERS

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