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# The SHORT WAVE Magazine

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## INDEX TO ADVERTISERS



# SHORT WAVE MAGAZINE


(GB3SWM)

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## CONTENTS




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### AUTHORS' MSS

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E. & O.E.

FOR THE RADIO AMATEUR AND AMATEUR RADIO

# The SHORT WAVE Magazine

## 1964-1965

*Every Good Wish, for Christmas*

*and the New Year,*

*to all our Readers and Trade Friends,*

*at Home and Overseas*

*from*

*The Editor, Management and Staff*

*of*

**SHORT WAVE MAGAZINE**

*WORLD-WIDE COMMUNICATION*

**Front panel view of the receiver discussed in the article by G3HTA, showing the neat layout and professional appearance that have been achieved. The controls are, top row, left to right: AF gain, NL adjust, AVC switch, main tune, band switch (1-6), IF gain and RF gain. On the lower line the controls include AM/USB/LSB select, panel RF trimmer, and Q-multiplier control. The set uses 14 valves in all, is self-contained for power, and the RF-mixer front end is the "Electroniques" tuning heart type QP-166, with other standard "Electroniques" items.**

# DESIGN FOR A COMMUNICATIONS RECEIVER

## DOUBLE-CONVERSION — FOR AM/CW/SSB RECEPTION— INCORPORATING MANY INTERESTING FEATURES

**J. D. FORWARD (G3HTA)**

FOR some time a need for a new receiver which would match up to present-day requirements had been felt. The old Eddystone S.640 had done good service since being licensed, and the thought of mods. to it was not considered to be the answer.

After giving assistance to a friend with his problems in constructing a receiver much experience was gained, especially in the chassis construction most suitable and the type of circuits which would work best. From this experience some firm ideas of requirements were established. A personal delight is that of seeing amateur-built equipment finished to a professional standard—to achieve symmetrical layout without detriment to efficiency is considered by the writer to be one of the difficulties in design. All the components for the Rx shown here are readily available items on the market (some may even be found in the junk box) but it is estimated that this receiver could be constructed from all new components for about £30-£40.

### Circuit

A front-end tuning unit had previously been constructed but the physical dimensions were not now suitable. The *Electroniques* QP-166, which is only 6in. square, fills the requirement ideally. Little need be said about this unit since it is a production job and the alignment and tracking were found to be near enough. The only adjustments necessary were the setting of the oscillator trimmers to the band edges, but this was about the last job to be done. The valves used are an EF183 RF amplifier and an ECH81 mixer, producing an IF of 1·62 mc. High or low impedance inputs are available, the 75-ohm version being considered most suitable.

The output is fed directly into the second mixer, this again is an ECH81. In seeking maximum stability the conversion oscillator would best be crystal controlled, but at the frequencies involved it was considered that this expense was not justified when a high-stability oscillator unit could be used, while retaining the facility to switch the frequency HF or

*The receiver described here, with the circuitry and excellent illustrations, will be of great interest to many readers as representing a constructional project within the capacity of anyone having experience of building amateur-band apparatus up to the level of what might be called superhet standard. No very detailed final drawings or parts lists are given because the experienced constructor will know how to select, adapt and modify for his own requirements.—Editor.*

LF of the signal frequency. The stability by this method is found to be more than adequate and does not add any complexity to the alignment. The advantage of being able to switch the local oscillator so as to select either the upper or lower sideband *plus* the carrier does not appear to have found the favour it deserves with constructors. It can be seen from Fig. 1 that by choosing the required oscillator frequency an IF is produced that contains one sideband and the signal carrier, the other sideband being obtained by selecting the other oscillator frequency. This facility alone makes SSB reception much easier provided good IF selectivity is also available. There is also another advantage, that of reducing heterodyne interference. If, for example, the receiver is being used with the upper sideband selected and a signal carrier appears so that it is present in the first IF at 1621 kc, then a 1 kc note will be heard. By switching to the lower sideband the unwanted signal will appear, well attenuated, outside the IF bandpass.

The following two stages are IF amplifiers at 85 kc. Ideally, the transformers used should have a means of adjusting the coupling as well as the frequency so that a reasonable shape-factor is obtained. Such transformers do not appear to be available, and though a successful attempt was made to construct a transformer with these features, the physical dimensions did not suit the rest of the design. The type used are very selective, and a test was made which confirmed the response claimed by the manufacturer. If they are resonated with the ferrite cores in a position near each other at the centre, then the selectivity will be reduced, resulting in a better audio response when tuning modulated transmissions. If on the other hand the station activity is limited to CW only, then the transformers may be resonated with the cores in the "out" position. This will give quite a sharp peak to the response curve resulting in virtually "single-signal" reception. AM phone can be taken on this adjustment, but some distortion is present due to the attenuation of the carrier with respect to the sideband.

Provision is made for the gain of both amplifiers to be manually controlled as well as having AVC applied.

Two detectors are provided, the conventional envelope detector for AM reception, and a product detector in association with the carrier insertion oscillator for SSB and CW working. The latter is considered a worthwhile addition, despite the extra switching required to fit in with the facilities

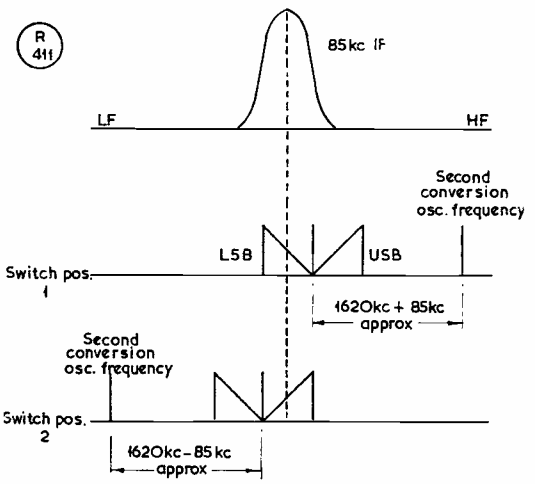



**Fig. 1. The 85 kc IF channel can be produced by placing the conversion oscillator either HF or LF of the first IF. By switching from one frequency to the other, the sidebands are transposed, so that either the upper or lower sideband will appear in the IF pass-band.**

previously available in the station. The arrangement is that when a switch on the transmitter control panel is operated, the transmitter VFO will come on, the key contacts short circuit, and at the receiver the carrier insertion oscillator comes on so that the VFO and receiver may be adjusted to the same frequency. If AM is being used, then switching on the carrier insertion oscillator (CIO) will have no effect as it will only work with the product detector, which is not now in use. In order to get around this problem a set of contacts on the AM-CW/SSB switch are wired so that on AM the CIO is coupled to the diode detector *via* a small capacitor. The netting facility now exists on AM without the need for much manual switching.

**Noise Limiter**

To provide a really effective noise limiter to work with a highly selective IF amplifier is something of a problem. The usual type of negative-and-positive clipping device, although not so effective as when used with high IF's, does give a worthwhile noise reduction. Care should be taken when selecting a value for R28. A suitable method is to substitute R28 for a variable resistor of about 100K and adjust it for maximum clipping with the noise limiting control in the fully-clockwise position. When the value has been determined, the variable resistor should be replaced by a fixed resistance.

The S-meter is in the simple Wheatstone Bridge type of circuit, the meter being accurately calibrated after the final alignment. The value shown for VR3 is suitable for the normal range of screen currents, whilst the ratio arms, *i.e.* the 220K resistor and the resistance represented by the screens of the valves that have AVC applied, will vary the range and sensitivity of the meter. The values chosen will permit calibration from S1 to S9 plus 12 dB, the reference

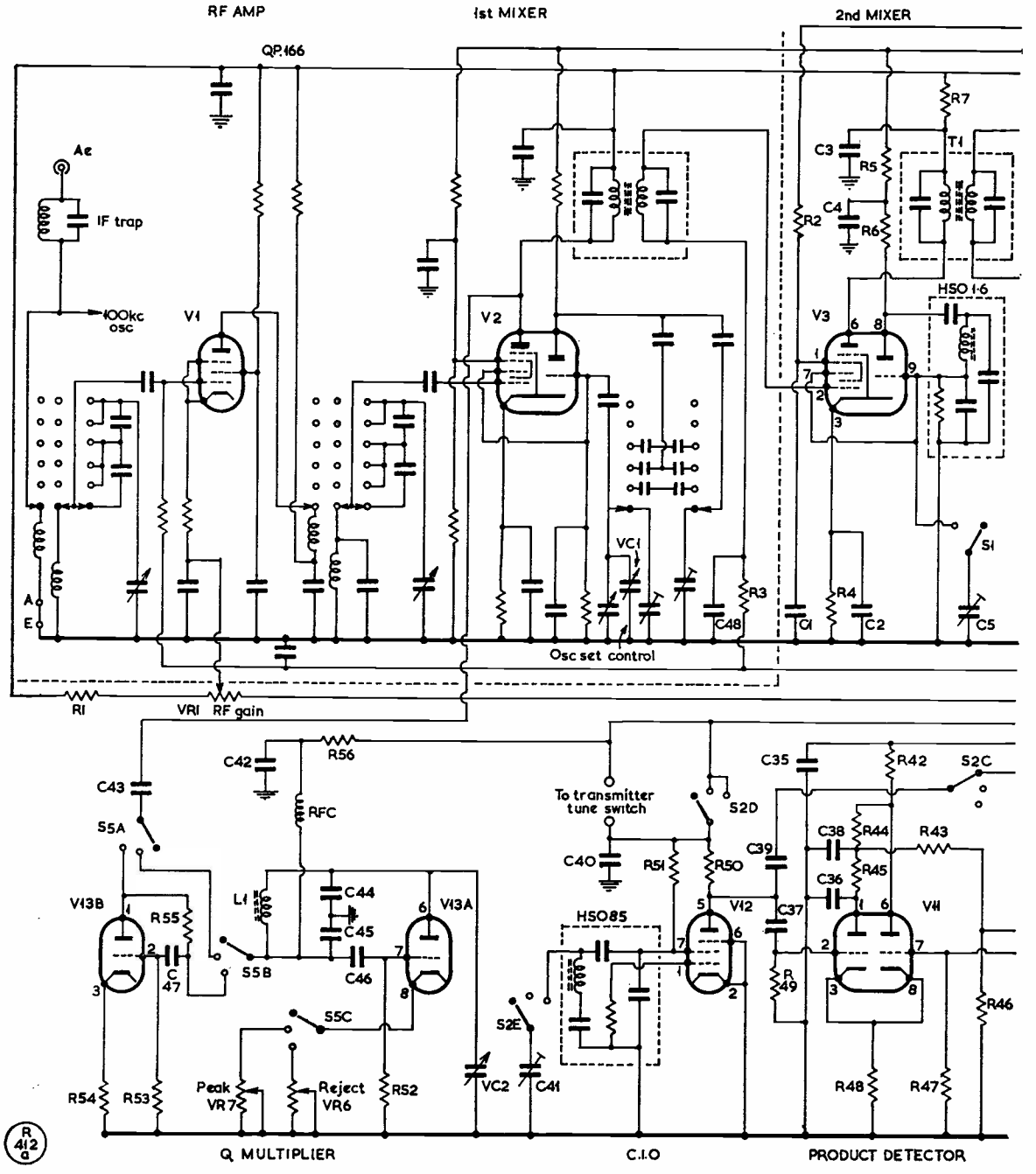
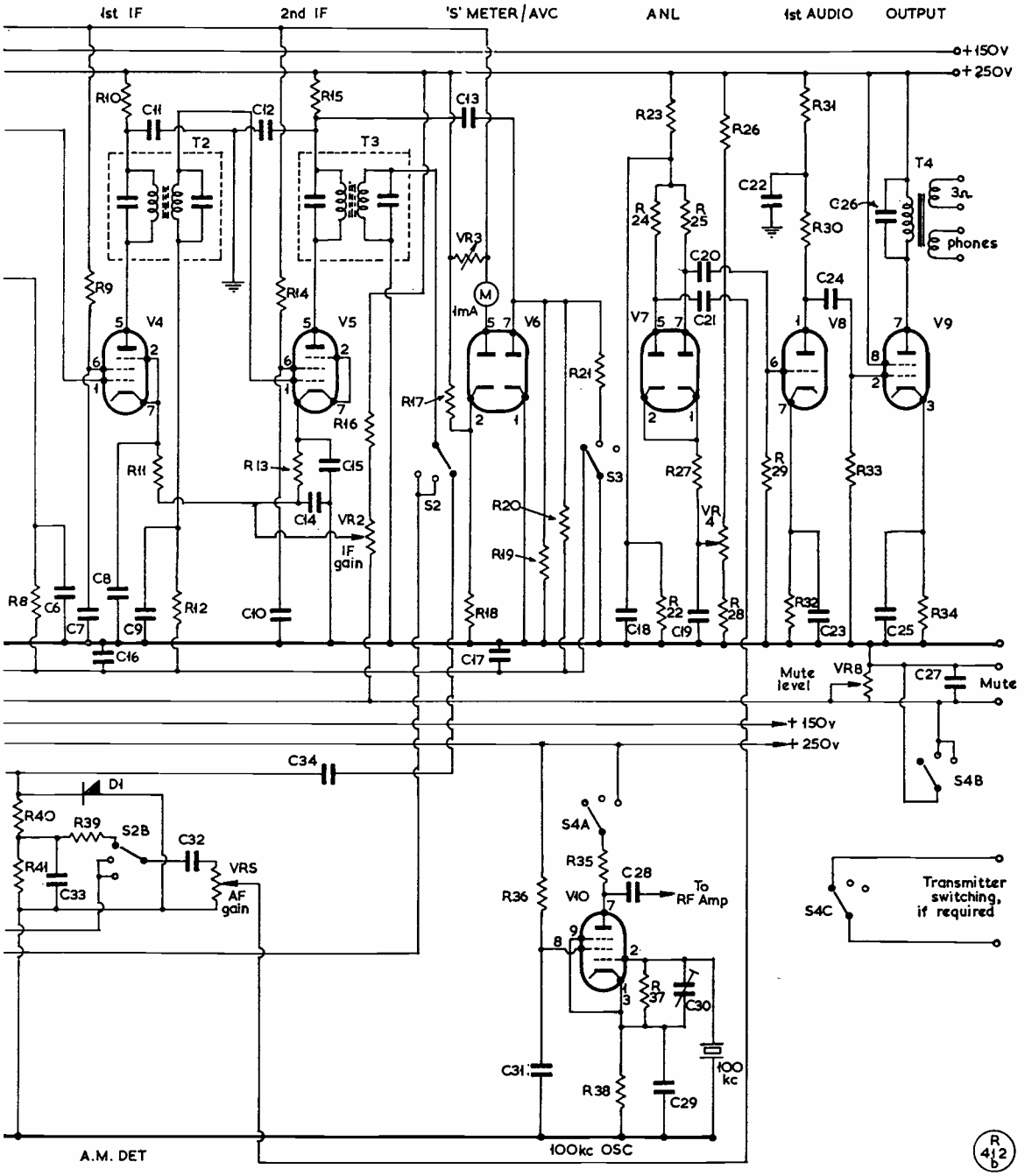



Fig. 2. CIRCUIT COMPLETE OF THE




**G3HTA RECEIVER—Table of Values on p.593.**

level being 1 $\mu$V for S1 and 6 dB per S point. If it is required to increase or decrease the range, then a 500K variable resistor could be substituted for the 220K and replaced by a fixed resistor when the new range has been decided.

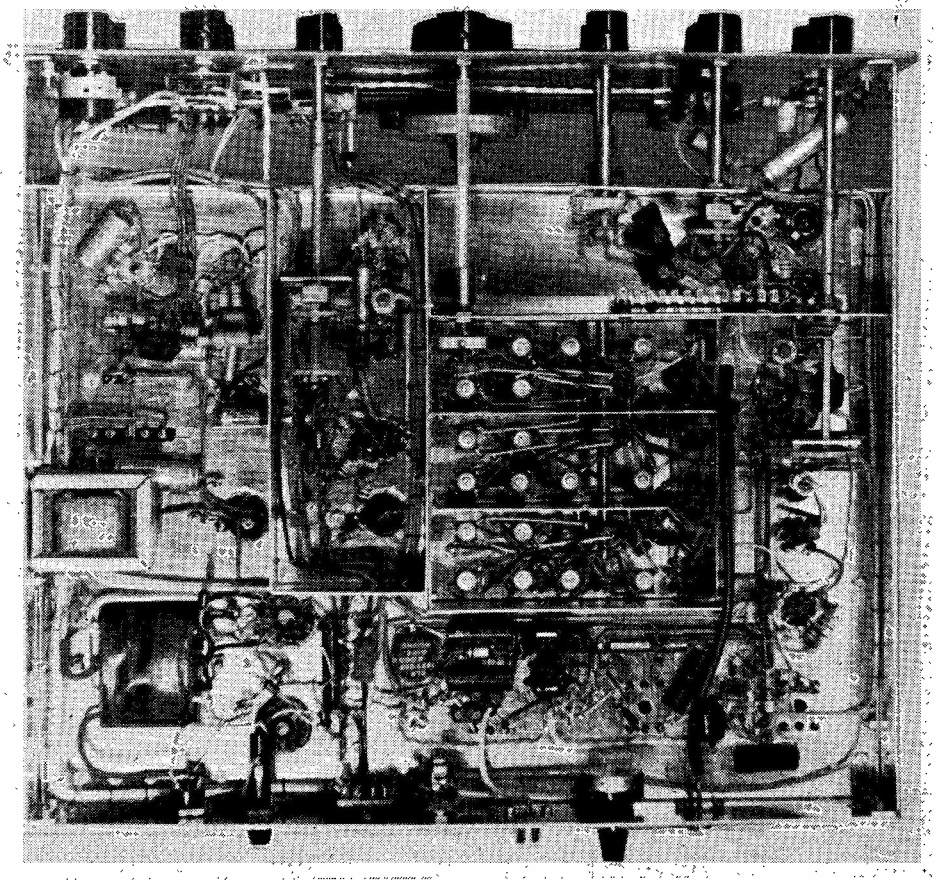
There is nothing special that need be said about the output stages. An output transformer was available which had a low turns-ratio winding in addition to the usual 3-ohm secondary and this was found to be ideal for a phones output. If such a transformer is not to hand, a phones output could be provided from the anode of the 6C4 in series with a 0·1 $\mu$F condenser to chassis, the phone jack being connected at the earth end.

**Carrier Insertion Oscillator**

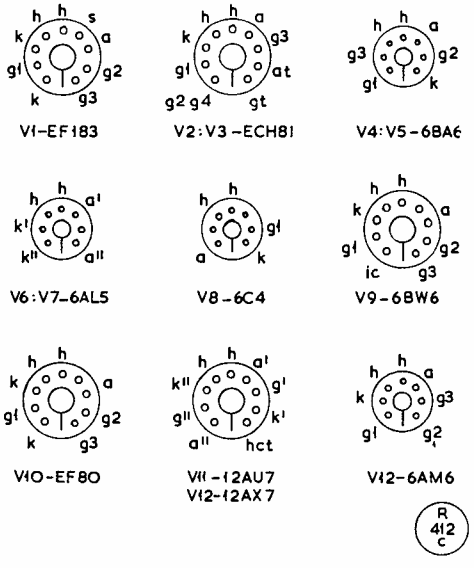
There were many conflicting ideas and thoughts about the Carrier Insertion Oscillator. In the past, to receive SSB it was necessary to adjust the tuning and the CIO frequency control to resolve a signal. With the sideband switching facility in the second conversion oscillator it would now be necessary to have the CIO working at a fixed frequency. A further position of the AM-SSB/CW switch is used to connect a trimmer across the high stability oscillator unit; this allows for the reversal of the sidebands, as indicated by the switch at the second conversion oscillator. This obviates the need for a variable CIO control whilst still permitting all the facilities mentioned for the second conversion oscillator.

The 100 kc crystal marker will give satisfactory calibration beats up to 30 mc. The trimmer is used to zero the beat with any of the known standards. (The higher the frequency of the standard transmission, then the greater the accuracy of the adjustment.) The control for this oscillator is shared with the standby switch, *i.e.* Standby-Receive-100 kc.

Although the selectivity is extremely good, the



**Under-chassis layout in the G3HTA receiver described in the text. The positioning of the "Electroniques" QP-166 tuner unit can be identified. Note the screened compartments, the laced wiring where long runs of bunched leads are involved, and the generally neat and tidy construction. While most readers might not wish to reproduce this receiver exactly as illustrated — opinions vary about layout and much depends upon what material is already available — many will find ideas in this design for incorporation in their own equipment.**




**Valve Base Data—Fig. 2, pp.590-591.**

provision of a Q-multiplier is well worth while. To introduce it at 85 kc would be almost impossible due to the existing selectivity and the size of the peak, or notch, produced. At 1·62 mc the opposite is apparent, but by using a small capacitor for varying the frequency of the Q-multiplier then accurate control is obtained.

### Construction

The receiver, complete with its own power supply, is housed very comfortably in a cabinet 18in. x 16½in. x 9in. The chassis design is due to G3TJW, who has found this particular layout most convenient for his own receiver. The chassis top finishes 2½ inches from the front panel, as this permits easy wiring and a symmetrical layout for the front panel, and there is also ample room for the Eddystone dial. Angle plates to the front panel also form the chassis sides and give added mechanical stability to the whole assembly. All the metal work is in 14 gauge aluminium except for the screens located under the chassis, these being in 20g. A convenient method of marking the chassis ready for drilling is by pasting a large sheet of graph paper over the top. This will speed the job of marking out and help in a symmetrical layout. The paper should be left on until the drilling has been completed. When soaked off, the chassis is left clean and undamaged.

The front-end unit has to be partly let through the chassis so that the dial assembly and capacitor spindle line up. It will be necessary to remove the fixing lugs from the front end and re-fix them at a new position so that the unit projects for half-an-inch below chassis.

Some of the switches are mounted under the chassis near the circuitry which they control; for these small mounting brackets had to be made. Other controls are either mounted on the front panel or on the under chassis screening. Every constructor no doubt has his own preferred method of wiring in the components (some have to be seen to be believed). The method used here is to provide single-layer tag strips at the side of each stage or group of stages, with the components either between tags or from tags to valve base as required. Where a number of wires run together they are laced with fine string or better still PVC.

The heaters are wired in two chains with 20 gauge twisted PVC, one side of the supply being earthed near the transformer. No hum troubles are experienced by this method.

The Philips type trimmers which are used in the CIO and conversion oscillators are fitted on threaded brass pillars (similar to those found in the RF-24 units). In addition to providing a convenient mounting it also brings the tag of the trimmer level with the switch tag so that they may be soldered together, thus providing good mechanical stability.

At last a method of labelling the panel has been found which will not scratch off. By using *Letraset* instant lettering and a great deal of care a very neat finish can be obtained. There are also white lines

## Table of Values

**Fig. 2. Circuit complete of the Receiver by G3HTA**

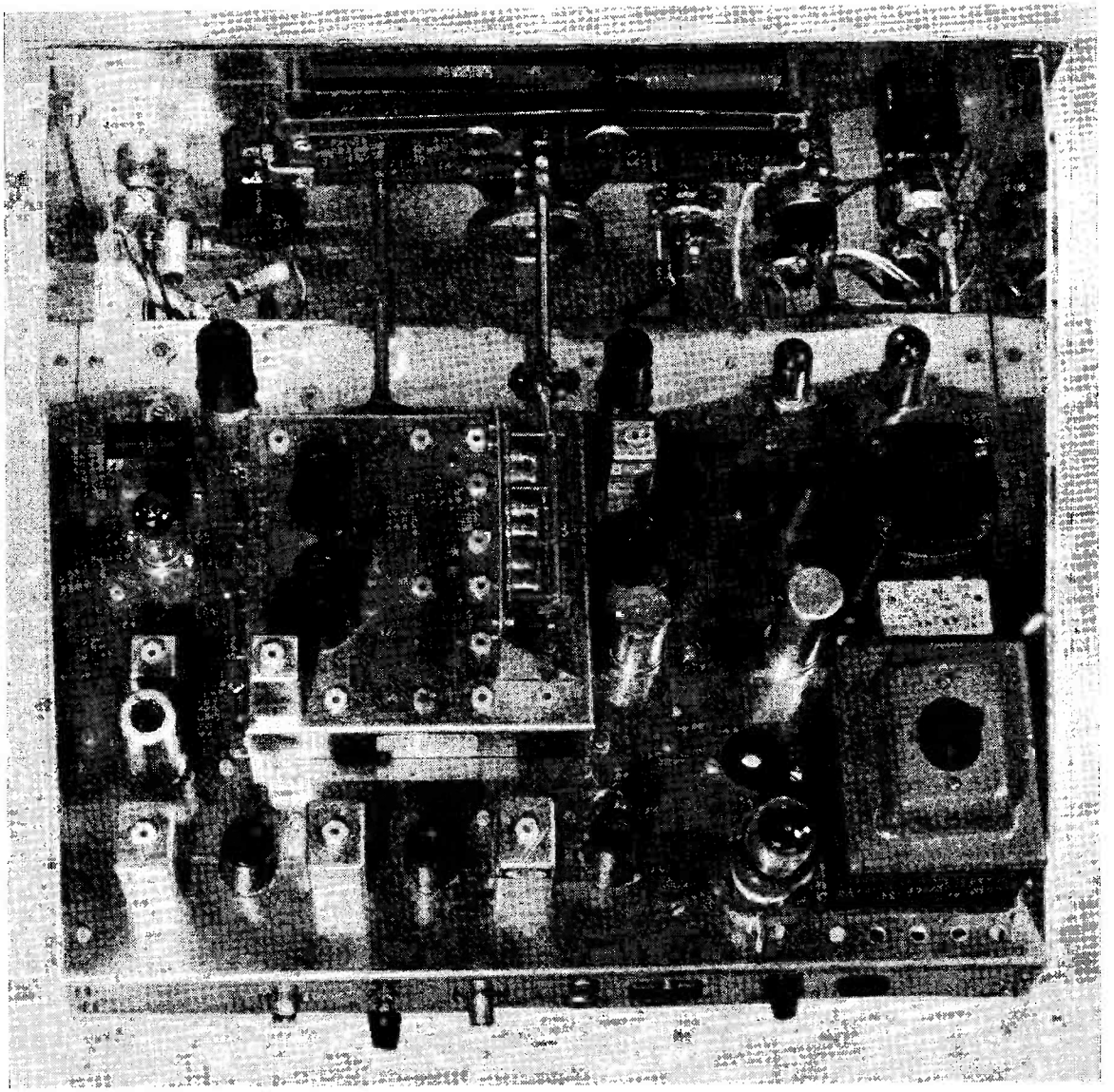
| | | |
|---|---|---|
| C1, C2, C3, C4, C16, C27, | = | 0.01 μF, 500v. disc ceramic |
| C7, C10, C11, C12, | = | 0.1 μF, 350v. |
| C19, C40 C6, C8, C9, C14, | | |
| C15, C17 | = | 0.1 μF |
| C18 | = | 0.25 μF |
| C20, C21, C24 | = | 0.01 μF |
| C22, C42 | = | 4 μF, 350v. |
| C26 | = | .001 μF, mica |
| C29, C43 | = | .001 μF, silver mica |
| C23, C25 | = | 25 μF, 25v. |
| C36, C38 | = | .002 μF |
| C47 | = | .003 μF |
| C35 | = | 8 μF, 350v. |
| C13, C34 | = | 50 μμF, silver mica |
| C37 | = | 100 μμF, s/m |
| C32, C33, C46 | = | 500 μμF, s/m |
| C28, C39 | = | 5 μμF, s/m |
| C44 | = | 250 μμF, s/m |
| C45 | = | 750 μμF, s/m |
| C5, C30, C41 | = | 3-30 μμF, trimmer |
| VC1 | = | 5 μμF, variable |
| VC2 | = | 12 μμF, var. |
| R1 | = | 27,000 ohms, 2w. |
| R2, R28, R44, R46, R51 | = | 47,000 ohms |
| R3, R8, R12, R27, R35, R36, R43, R49 | = | 100,000 ohms |
| R4 | = | 330 ohms |
| R5, R9, R14 | = | 39,000 ohms |
| R6, R31, R38, R45 | = | 10,000 ohms |
| R7, R10, R15, R40 | = | 2,200 ohms |
| R11, R13 | = | 100 ohms |
| R16 | = | 39,000 ohms, 2w. |
| R17 | = | 1,800 ohms |
| R18, R22, R23, R24, R30, R34 | = | 220,000 ohms |
| R19 | = | 4.7 megohms |
| R20, R25, R37, R47 | = | 470,000 ohms |
| R21, R29, R33 | = | 1 megohm |
| R26 | = | 56,000 ohms |
| R32 | = | 270 ohms |
| R39, R56 | = | 4,700 ohms |
| R41, R50 | = | 22,000 ohms |
| R42 | = | 33,000 ohms |
| R48 | = | 820 ohms |
| R52, R53 | = | 2 megohms |
| R54 | = | 1,500 ohms |
| R55 | = | 180,000 ohms |
| VR1, VR2, VR4 VR3, VR6, | = | 10,000 ohms |
| VR7 | = | 5,000 ohms, preset |
| VR5 | = | 1 megohm, log. |
| VR8 | = | 25,000 ohms, preset |
| D1 | = | OA79 |
| S1 | = | Single pole, 2-way |
| S2A-E | = | 5 pole, 3-way |
| S3 | = | Single pole, 3-way |
| S4A-C | = | 3 pole, 3-way |
| S5A-C | = | 3 pole, 3-way |
| T1, T2 | = | 85 Kc. (*Electroniques* DIF.1 Series 2) |
| T3 | = | 85 Kc. (*Electroniques* DIF.1/0 Series 2) |
| HSO 1.6 | = | *Electroniques* |
| HSO 85 | = | *Electroniques* |
| L1 | = | *Electroniques* QL2 |
| M | = | 0-1 mA DC |
| QP 166 | = | *Electroniques* Coil Pack |
| RFC | = | 2.5 mH |
| V1 | = | EF183 |
| V2, V3 | = | ECH81 |
| V4, V5 | = | 6BA6 |
| V6, V7 | = | 6AL5 |
| V8 | = | 6C4 |
| V9 | = | 6BW6 |
| V10 | = | EF80 |
| V11 | = | 12AU7 |
| V12 | = | 6AM6 |
| V13 | = | 12AX7 |
| V14 | = | VR150 |

available which can be cut to length and used to indicate switch positions and so forth. The panel is first finished in the required colour, then the lettering applied. At this stage they will easily come off, but if the whole panel is then sprayed with clear cellulose, a lasting scratch-proof finish is obtained.

**Alignment**

To carry out the alignment of any receiver requires patience, accuracy and a knowledge of just what one is doing. There are, however, for most of us, limits as to the facilities available, and a limit to our ability to use such facilities as may exist. The method adopted by the writer requires only the use of a signal generator and some sort of output meter.

First the IF's are aligned starting with an input to the second mixer at 85 kc. If the transformers are too far out it may be necessary to inject the signal at a later stage and work back. Consideration should be given here to the point made earlier on, with regard to the cores being adjusted to the "in" or "out" positions. The first IF channel will have been set during manufacture and should require no adjustment.



**A view into the interior of the G3HTA receiver showing general layout plan and the placing of the main components on an overall chassis dimension of 17 in. by 15 in. The coil pack, with the two valves and the IF can, is the "Electroniques" item QP-166. Iron-core components are mounted to one side, and the IF cans along the rear drop are T1, T2 and T3. The crystal calibrator stage V10 is alongside the coil pack. Another photograph shows the under-chassis arrangement.**

The next step is the second conversion oscillator, but first put the switch in the position where the 3-30 $\mu\mu$F trimmer is out of circuit. Connect the signal generator output to the first mixer grid at a frequency of 1·62 mc and adjust the core of the HSO 1·6 for an indication on the S-meter. This is only a preliminary adjustment and a rough setting is all that is required here.

The CIO is next adjusted by tuning in a sideband transmission in the 14 mc band. The AVC switch is put in the "slow" position and the transmission tuned for maximum signal. The HSO 85 core is then set (with the 3-30 $\mu\mu$F trimmer switched out) until the best intelligibility is obtained. It may be necessary slightly to alter the core of the HSO 1·6 to get the best results. This being satisfactory, the CIO switch is positioned so that the 3-30 $\mu\mu$F trimmer is in circuit and is adjusted as before, only this time on an SSB transmission in the 3·5 mc band, without touching the cores of either of the HSO units. Restore the CIO switch so that the USB is selected and find an SSB transmission in the 14 mc band. Adjust the main tuning for maximum signal, then the core of the HSO 1·6 for maximum intelligibility. The HF position alignment is now completed and the receiver will respond to the USB.

A note of the positions of the conversion oscillator and CIO switches should be made for the purpose of sign writing the panel later. To adjust the conversion oscillator for the LF position and reception of the LSB, turn the switch so that the 3-30 $\mu\mu$F trimmer is in circuit, the CIO switch remaining untouched. Tune the receiver to an SSB transmission in the 3·5 mc band as before, and set the trimmer for best intelligibility. The receiver will now respond to the LSB.

All the adjustments thus completed, the Rx may be tested by tuning an SSB transmission and changing over both controls. The intelligibility of the signal should remain unaltered. It will also be noticed that on CW, only one sideband will be heard, *i.e.* no audio image. The other sideband will be received by changing over one of the controls.

**Results**

The one point of regret in the whole project could have been easily avoided with a little forethought. The "oscillator set" condenser was not fitted until after the dial had been calibrated. Only then was it discovered that this additional capacity could not be taken up by the trimmers in the front end! So take care, and fit the oscillator set capacitor *before* calibration.

Since the completion a considerable amount of time has been spent just listening around the bands without any attempt to switch on the transmitter. The pleasure of being able to tune, and hold, a weak signal in a band full of QRM is something not experienced before. A small amount of drift is noticed when first switching on, but this soon settles down and SSB transmissions can be copied without continually having to alter the tuning.

The whole project from the design stage to completion took about nine months of leisure time, but for G3HTA this has been the most rewarding piece of constructional work yet attempted.

## SUPERCONDUCTIVITY

When materials are cooled down to near absolute zero a number of extraordinary things happen to them; among these is the appearance of *superconductivity*. In some conductors, as the temperature is lowered, at a quite well-defined point the electrical resistance becomes truly zero; the purer the material the sharper the drop in resistance to zero becomes. Once in the superconducting state electric currents can be set up and kept running in a circuit indefinitely without dissipating any power. The magnetic properties of superconductors are also very unusual—in the superconducting state, a low magnetic field is completely excluded from the interior of the material. If the magnetic field is sufficiently increased superconductivity can be destroyed. There are some 24 elements that are known superconductors at present and also some 500 or more alloys and compounds (carbides, nitrides and even some oxides). During the last few years some compounds and alloys have been discovered that can remain superconductive even in very high magnetic fields. They can be used to make solenoids in which magnetic fields in excess of 100 kilo-oersted have been generated.

These remarkable phenomena will be discussed by Dr. D. H. Parkinson, Head of the Physics Group, Royal Radar Establishment, Malvern, in his December invitation lectures at the Institution of Electrical Engineers, Savoy Place, London, W.C.2, on Wednesday and Thursday, December 30/31.

## LICENCE GROWTH FIGURES

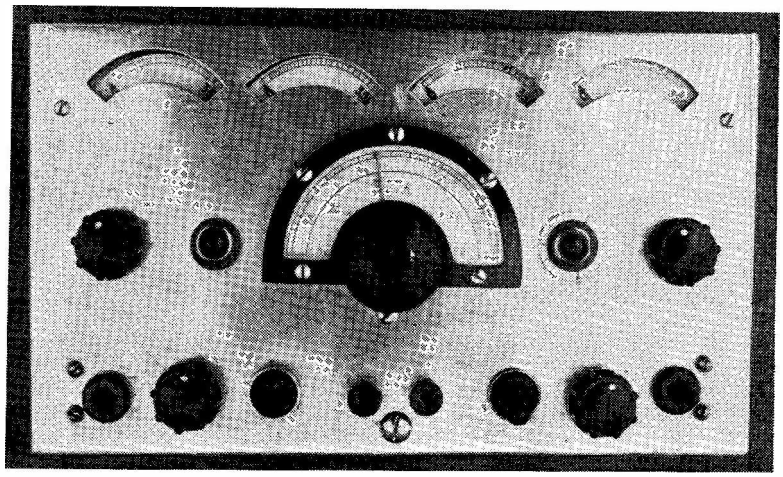
A check through the *Call Books* of the last few years reveals that for the 12 months October 1962-'63, there were 706 new amateur transmitting licences issued in the U.K. The corresponding figure for the period October 1963-'64 is 836, which includes the new G8AAA (VHF phone only) series, and G6AAA/T for ATV transmission. Since there are more than 100 in the two latter catagories together, it is evident that the VHF and /T facilities are definitely encouraging a good many people who might otherwise never become active experimenters. The comparable figures for EI are ten new ones 1962-'63, and eleven during 1963-'64.

***The Readers' Small Advertisement section of "Short Wave Magazine" establishes the second-hand value of all amateur-band apparatus—see pp.631-640***

# TRANSISTOR TRANSMITTER FOR 80-METRE PHONE

RUNNING 30-40 WATTS INPUT, FULLY MODULATED

T. J. McCROSSAN (EI7A)



**Front view layout of the 30-watt transistor Tx. The neat meter appearance is produced by mounting the instruments on a frame, which is then fitted to register with the panel cut-outs. Illumination lamps are also arranged at rear to floodlight the meter faces, the light being diffused by a perspex strip immediately behind the panel. The meter indication, left to right, is Mod., Buffer, PA and RF output — see text. The central dial is for tuning on VFO, and the crystal sockets are immediately below.**

*This design is particularly interesting because it offers the practical possibility of an all-transistor transmitter running reasonable power, and—since construction can be kept small and compact—would be very suitable for mobile as well as for fixed-station working. The RF transistors specified are not cheap, but they are available and obviously have a considerable range of application on the RF side in amateur-band equipment.—Editor.*

HAVING built a 16-watt transistor audio amplifier driven off a 12-volt battery, and being fascinated by the quite humless mush from the speaker, with amazing power when modulated, the thought occurred to the writer that if only one could have a transistor RF section to correspond—what a combination for mobile operation.

When the *Texas Instruments* 2N1046's became available, it seemed as if the idea could possibly be realised. So four of these 2N1046's were obtained, and the experiment got under way. The notes following discuss the result:

In all, the 80m. phone Tx uses 10 transistors, six in the AF section with four on the RF side, and the case measures 5½in. high by 7in. deep and 9in. wide. All transistors are p.n.p. as this fits in with the conventional +ve chassis on British cars. For foreign cars, the circuit can be changed simply by connecting all −12 volt lines to ground, and running the grounded current points in the diagram to the +12v. source.

### Circuit Points

The audio section has an OC71 as the microphone preamplifier, into an OC71, driving an OC72 as second audio amplifier, into an OC26, driving a pair of OC26's in push-pull Class-B, TR9-TR10.

The RF section consists of a 2N1046 CO/VFO on 80 metres, switchable for CO or VFO, link-coupled into a 2N1046 buffer, TR3, also *via* link;

## Table of Values

**Circuit of the 80m. 30-watt Transistor Tx.**

| | | | |
|---|---|---|---|
| C1, C3 | = 2 μF, 12v. | R10 | = 620 ohms |
| C2, C4, | | R11 | = 27 ohms |
| C5, C9 | = 100 μF, 12v. | R13 | = 180 ohms |
| C6, C14 | = 100 μμF | R14 | = 18 ohms |
| C7 | = 250 μμF | *R15 | = 0.5 ohms |
| C8, C11, | | R16 | = 300 ohms, 2w. |
| C13 | = 0.25 μF, 12v. | *R17 | = 4.7 ohms |
| C10 | = 300 μμF | *R18, | |
| C12 | = 500 μμF | R19 | = 0.25 ohms |
| C15 | = 120 μμF | R20 | = 5.2 ohms, 1w. |
| C16 | = 50 μμF | Tr1, | |
| R1 | = 150,000 ohms | Tr2, | |
| R2, R21 | = 10,000 ohms | Tr3, | |
| R3 | = 1,000 ohms | Tr4 | = 2N1046 (*Texas*) |
| R4 | = 1 megohm, potentiometer | Tr5, | |
| | | Tr6 | = OC71 |
| R5, R7, | | Tr7 | = OC72 |
| R12 | = 10 ohms | Tr8, | |
| R6 | = 270,000 ohms | Tr9, | |
| R8 | = 330 ohms | Tr10 | = OC26 |
| R9 | = 80 ohms | | |

TABLE OF COIL VALUES

L1 — 30 turns 24g. on ⅜-in. dia. slugged former, tapped 3 turns up, with 2½-turn link.

L2 — As L1, but tapped 2 turns up, with 3-turn link.

L3 — 21 turns 18g., 1½-in. dia., spaced, tapped 1⅛ turns from cold end for pair 2N1046's, or at 2 turns for one 2N1046. 3-turn link.

L4 — 55 turns, 30g., on ¼-in. dia. slugged former.

NOTES: *Resistors R15, R17, R18, R19 can be made up using short pieces of spiral electric fire element, metered to value. Except for these and R16, R20, all resistors are rated ½-watt. Except the tank coil L3, all coils are close-wound.

this drives a pair of 2N1046's in the final, connected in parallel.

In all power transistors used in this transmitter, collector and case are common, and are insulated from chassis by the thin mica washer supplied with the transistor. The back of the chassis acts as a heat sink for the audio/driver transistor OC26 and the push-pull OC26's, also for the RF buffer 2N1046. The oscillator transistor is mounted on a small dividing panel between oscillator and buffer sections, with the RF final transistors on a copper plate 8in. by 4in. screwed to the back of the chassis—*see* photographs.

Little copper fins 2½in. square were screwed on with the RF transistors when mounting and are connected to case, but with the collector are isolated from earth. These fins were only needed when running the PA at over 40 watts input; the final was run for long periods at more than this input to test durability.

If one wishes to economise and get going quickly, a carbon microphone used into the base of the audio driver, with a transistor output transformer reversed, could be tried. With one 2N1046 in the final, the modulator can be run at 12 watts input.

First cost may seem to be high with these 2N1046's, but when one considers that no expensive power converter for high voltage generation is required, and the transmitter only takes 3 amps. quiescent, peaking to 5 amps. on modulation, it is an economical proposition both to build and to run, since there is no stand-by current used on "receive."

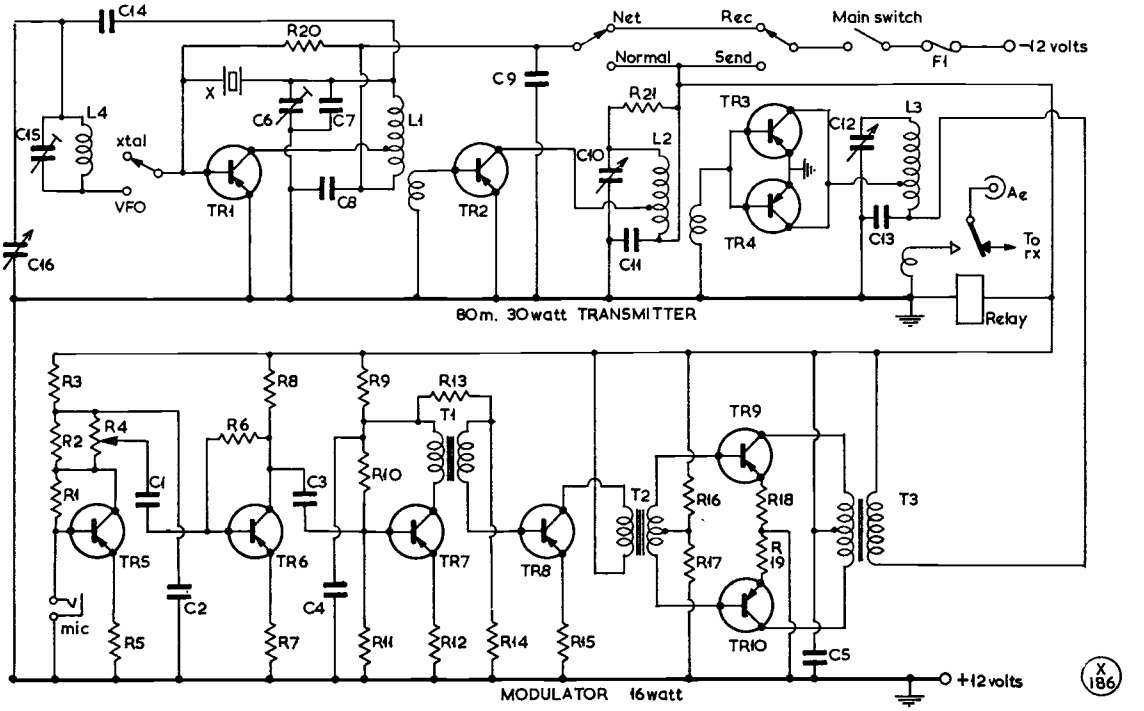
**General Notes**

The transmitter could be much smaller than shown in the photographs because a lot of room has been taken up with meters and the high-Q PA coil, but in the original experiments it was thought advisable to be able to prove all stages by meter—although since it has been found that the transmitter can be tuned up with an RF current indicator only, once the tuning of the circuits is roughly noted. Tag boards and sub-panels can be used for each unit to ensure that it is working correctly.

Have a resistor in series with the battery in every original test of stages—say, 10,000 ohms for a start—and gradually reduce voltage until it is decided that current is not excessive and that there are no short circuits. Then the battery can be connected up direct.

If, as in writer's case, a car battery is used, it can be tapped at 2 volts; start at this voltage and work up.

Always use a meter in series to check consumption on first test, and check twice—note that the collector is negative with all transistors in this rig. (A fuse in circuit would also be advisable if there is no cut-out

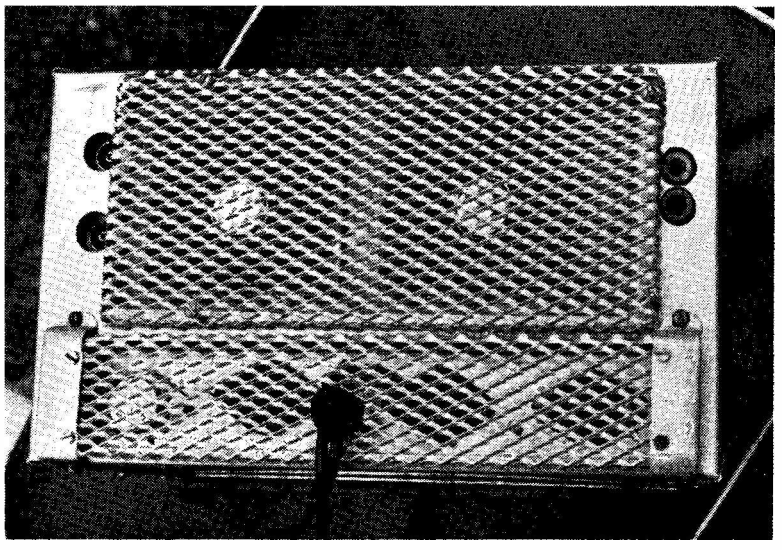



**Circuit complete of the 80-metre transistor transmitter, designed and described by EI7A, and using 2N1046's on the RF side. This is one of the very first all-transistor amateur-band constructor equipments to run a reasonable power input — hitherto, most TTx designs have been in the QRPP category, giving only a watt or two of output. Though intended for 80-metre mobile, the rig could of course also be used on the bench, and the circuit is adaptable for HF-band operation merely by substituting the appropriate coils. As shown by the circuitry around Tr1, either VFO or CO excitation can be used. In initial experiments with this circuit, particularly on the higher frequencies, it would probably be better to start with crystal only. The 2N1046's will draw 3 amps. or more at 12 volts when correctly driven and loaded.**

on the meter.) Incidentally, with power transistors, a short to earth on the battery side of the collector load is not disastrous, but a short on the emitter side could mean complete destruction!

To set up the CO, screw or unscrew core until the transistor goes into oscillation—and at this point it is thrilling to hear the "thump" in the receiver. Now switch to VFO and check for a beat note. Then adjust the core of L4 to put the oscillator on 80 metres. Do not calibrate until the transmitter is finished, as connecting up other stages and fitting adjacent components may affect calibration.

No current will flow in the buffer stage until drive is applied. After applying drive tune C10 for resonance dip; you can check that some drive is available for the PA by touching the output link with a piece of wire, when the Rx S-meter should go hard over.

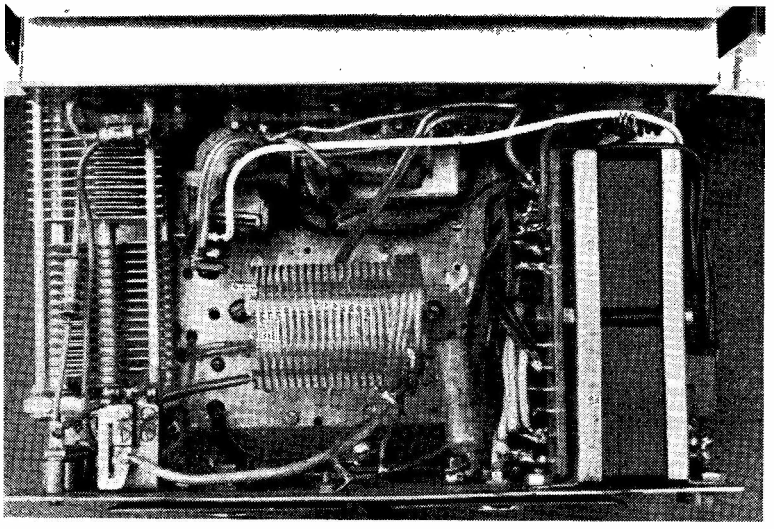


**Rear view of the EI7A 80m. TTx, running a good 30 watts, fully modulated, using transistors only. Since those mounted on the rear panel dissipate some heat, speaker grille material is fitted to provide ventilation.**

Now for the PA: With the transistors mounted on heat sinks, about the only thing that is really critical is the impedance-match tapping points on the tank coil. Very little will be gained by changing from the suggested tap positions and here a warning—if tapping is tried more than one-third way up the coil, it could ruin the transistor because the breakdown voltage will be exceeded.

For those who want to wind a PA coil L3 of smaller size with different turns, the optimum tap is 1/10th the total number of turns, or slightly less, counted from the cold end, for *one* transistor; or 1/18th of the total for two transistors. The link consists of 1/8th of the total number of turns used on the tank coil.

The aerial change-over relay used by the writer is the tiny one out of the Command Transmitter, and is easily modified for the present purpose.



**Upper chassis view of the 30w. transistor Tx, showing the PA tank assembly; the coil, L3 in the diagram, has been made high-Q and its constructional detail is given in the Table of Coil Values. In this picture, the modulation transformer T3 is to the right, and the mounting for the four meters (out of their cases) is visible along the top of the photograph. The 2N1046's in the PA are mounted with cooling fins.**

The RF stage will not take current until drive is applied. Insert, say, a 100w. resistor in series to battery, load transmitter with a 100 watt lamp in series with an RF meter connected to link, and tune PA for maximum RF reading on meter. Then remove resistor and connect up direct to the 12v. supply, when PA current input should rise to over two amps. and the lamp should glow. A 100-watt lamp does not load the PA as heavily as a dipole aerial or loaded whip with matching section, but it is ideal for tuning up and testing. At this stage, if the tank is treated with contempt or accidentally touched, one would receive a fairly severe RF burn off it.

Now re-tune transmitter all through for maximum RF whilst still keeping a DC ammeter in series with the PA stage to ensure that current is not exceeding

3 amps. If it does, detune buffer slightly to reduce drive. Now you can load the transmitter into the station aerial and try for a QSO.

**Modulation**

If you have any type of audio amplifier with either 3½, 7 or 15 ohms output impedance you can connect the winding in series with the collector feed to the tank coil and the amplifier will (or should) modulate the transmitter. The transformer in the modulator designed for the transmitter was purposely tapped at 3½, 7 and 15 ohms for experimental matching, but on tests it seemed not to be critical, and worked well on any tapping. The 15-ohm tapping was used.

Component values for the modulator are not too critical, and surplus items may be used, as was by the writer in a lash-up. But if 100 per cent modulation is to be attained with reasonable quality, driver and modulator transformer must be adequate.

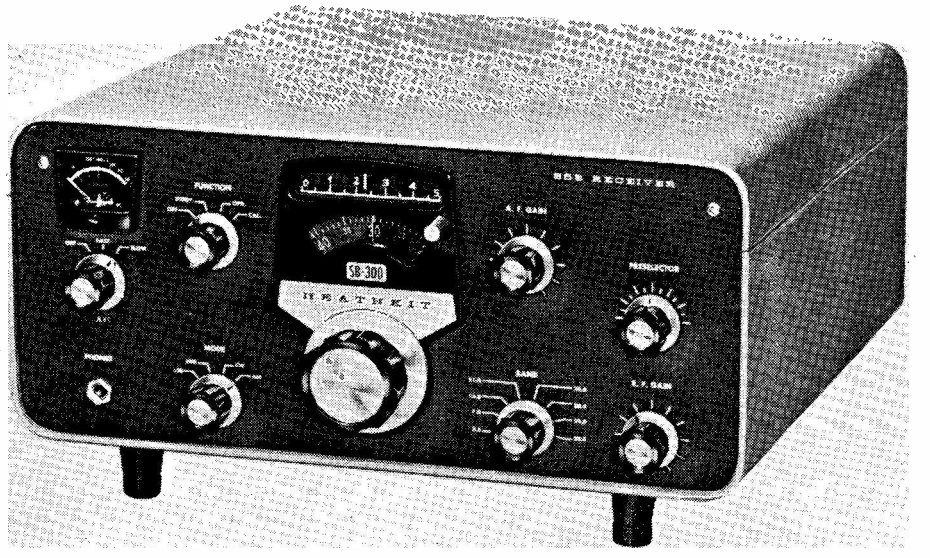
Transistors for audio amplifiers are not critical, and the writer uses cheap surplus unmarked types, also when designing and experimenting. The only one that perhaps was a little critical was Tr7, as it has to have a milliwatt output equal to an OC72, or better, to excite the driver sufficiently.

There is no TVI from this transmitter even when used beside a TV set. Although quite a lot of screening has been incorporated, it was found quite unnecessary in lash-ups of the circuit afterwards. The two final RF transistors could be mounted on the front panel, where the meters are in this version.

**Aerial System**

A 19 Set variometer was used to match output into a centre-loaded whip, and performed very effectively—G, GI, EI, GD and GW having been worked on 80 metre phone on the whip, with very good reports. The Continent has been raised on phone with a low-slung dipole, which can be plugged directly into the transmitter. Whilst the writer's interest on mobile is 80 metres only, this transmitter can also be made to operate on 160, 40 or even 20 metres with some alterations, but basically the same circuits. All meters were originally 300 mA RF types available as surplus at half-a-crown each. The thermo-junction was removed and the meter coil connected directly to its terminals. The basic movement is 0-2 mA and they were suitably shunted and inserted in the supply leads to modulator, PA and driver. The RF indicating meter was not shunted, but fed from the output link through a 47K resistor, a surplus diode, and the meter to earth.

In case readers be deterred, perhaps because of the mechanical arrangement or not having tried transistors before, from having a go at a transistor transmitter, it is emphasised again that one can depart very much from this physical layout, possibly making it much simpler mechanically, and obtain similar if not better results. In fact, if one took any three coil-and-capacitor arrangements, even preset, and a crystal and lashed it up *per* the circuit it would work. Whether or not screening is required, the unit can be made robust, neat and stable.




**Last month in this space we showed the new Heathkit Model SB-400 Sideband Transmitter. Here is the matching receiver, the SB-300, which gives a frequency coverage of 3.5 to 30 mc, amateur-band only, in eight ranges. The receiving modes, selected by switching, are LSB, USB, CW and AM; sensitivity is better than 1 μV for a 15 dB Sideband signal; the selectivity is to 5 kc at 60 dB down on SSB and 2.5 kc/60 dB down on CW, with image and IF rejection better than 50 dB. The IF channel is 3.395 mc. The SB-300 involves 10 valves and incorporates all the refinements required for stable and selective amateur-band working.**

# DESIGNING COAXIAL RESONATORS FOR UHF

## CALCULATIONS FOR SQUARE AND CIRCULAR CAVITIES

J. M. COX

IT is well known that as frequency increases it becomes more difficult to design and construct efficient lumped-constant tuned circuits. The frequency at which the transition from lumped-constant to coaxial resonators takes place is not clearly defined. The two-metre amateur band lends itself to the use of conventional tuned circuits and coaxial resonators, but when one considers the 70 cm. band a coaxial resonator becomes mandatory.

The number of valve types that may be employed as high power amplifiers at VHF and UHF are limited and in fact there appears to be only one such readily available in any quantity that will permit operation in the 70 cm. band at maximum power input levels. The valves in question are the 4X150/250 series of power tetrodes. The 4X150 is available from time to time through surplus channels at reasonable prices and can be run at inputs of up to 200 watts at 500 mc.

### Design Considerations

In the design of a quarter-wave coaxial resonator the physical dimensions of the valve used govern the basic dimensions of the cavity to a large extent. In the case of the 4X150 the diameter of the valves anode, $1\frac{5}{8}$ inches, dictates the diameter of the inner conductor of the coaxial line. The inner diameter of the outer conductor for optimum efficiency should be between 3 and $4\frac{1}{2}$ times the diameter of the inner —in this case between $4\frac{7}{8}$ and $7\frac{5}{16}$ inches. From the graph of Fig. 1 for circular coaxial lines we see that for such dimensions the characteristic impedance of the line will be between 66 and 90·5 ohms. Unfortunately brass or copper barrel of even the smallest diameter, $4\frac{7}{8}$ inches, is both expensive and hard to come by. There is, however, no reason why the outer conductor of the coaxial cavity should not be made square. Such a cavity can be readily constructed from sheet brass or copper, a three-sided box configuration being used. The lid or fourth side of the box should be a tight fit. For a square-section outer conductor, the expression for the characteristic impedance becomes

$$Zo \simeq 138 \log_{10} \frac{1.178D}{d} \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

where D is the internal dimension of the box side, and d is the diameter of the inner conductor.

Fig. 1 shows graphically the relationship between Zo and the ratio D/d for both square-section outer conductor and the more conventional cylindrical type. For an impedance of 75 ohms. a reasonable value to choose, the dimensions of a square coaxial outer conductor must be approximately $4\frac{7}{8}$ inches.

Having determined the characteristic impedance of the line to be used we must now find the capacitance across the end of the line. In the case of a quarter-wave section, where one end is shorted to earth (to RF, that is), the total capacitance will comprise the output capacity of the valve *plus* the capacity of the tuning condenser used. With a half-wavelength section, the line may be considered as two quarter-waves with the valve output capacity at the end of one section and the tuning capacity at the remote end of the other. In the case of the half-

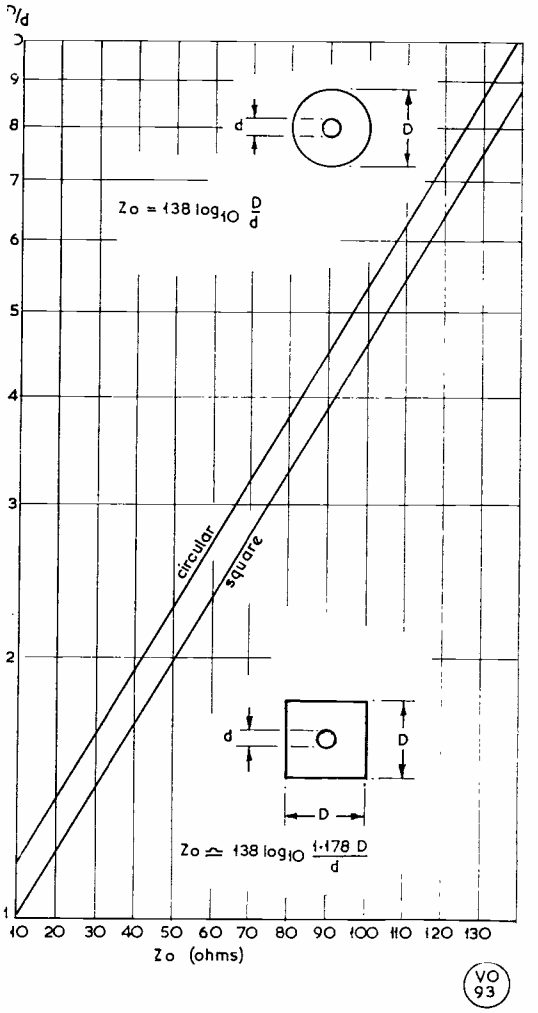



**Fig. 1. Ratio of inner conductor diameter to outer conductor dimension, D/d, plotted against impedance, Zo, for both square and circular outer conductor.**

wavelength line the HT should be fed in at the electrical centre of the two quarter waves.

The output capacity of a 4X150 is 4·5 $\mu\mu$F and for 433 mc the tuning capacity may conveniently be made ·75 $\mu\mu$F. Having determined the total load capacity of the line, 5·25 $\mu\mu$F, the required inductive reactance of the line can then be determined. Basic tuned circuit theory tells us that at resonance,

$$X1 = Xc \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

*therefore,*

$$X1 = \frac{10^6}{2\pi fc} \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

where c is in $\mu\mu$F, f is in mc, and X1 is in ohms,

$$X1 = \frac{10^6}{6{\cdot}284 \times 433 \times 5{\cdot}25}$$

$$= 69{\cdot}98 \text{ ohms}$$

From this value of X1 and the already determined value for the line characteristic impedance, 75 ohms, we can find the physical length of the line from the expression

$$X1 = Zo \tan \frac{2\pi l}{\lambda} \quad \ldots \quad \ldots \quad (4)$$

where Zo is the characteristic impedance of the line in ohms,

l is the length of the line,

and $\lambda$ is the wavelength.

(l and $\lambda$ should be in identical units, for example, inches.)

The wavelength may be readily found from the equation

$$\frac{11790 \text{ ins.}}{f \text{ (mc)}} \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

for 433 mc, $\lambda$ = 27·2 inches.

Re-writing expression (4) we can arrive at an expression for l thus,

$$l = \frac{\lambda}{\lambda\pi} \tan^{-1} \frac{X1}{Zo} \quad \ldots \quad \ldots \quad (6)$$

For convenience, Fig. 2 shows a graph expressing tangents of angles in radians. In use the part of expression (6) $\frac{X1}{Zo}$ is located on the tangent axis of Fig. 2 and the resultant radian read off from the horizontal axis.

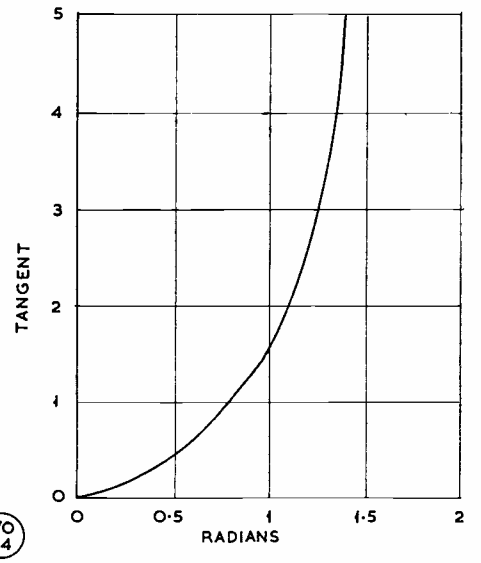



**Fig. 2. Tangents of angles in radians (Tan$^{-1}$), as discussed in the text.**

Substituting in expression (6)

$$l = \frac{27{\cdot}2}{6{\cdot}284} \tan^{-1} \frac{69{\cdot}98}{75}$$

$$= 3{\cdot}29 \text{ inches.}$$

The tuning capacitor, ·75 $\mu\mu$F in this case, may consist of two 1-inch diameter discs spaced approximately a quarter inch. One disc should be soldered to the coaxial inner conductor adjacent to the valve anode, and the other disc attached to a length of 4 B.A. stud rod and controlled through the outer wall of the coaxial cavity. Some form of stop should be fitted to the adjustable disc to prevent it touching the fixed disc. The full HT voltage appears across this tuning capacitor.

## AMENDMENTS AND CORRECTIONS

In the circuit on p.463 of the October issue, there are ambiguities. With an ECC189 the cathode bias resistor should be 35 ohms, and with an ECC85 it is 47 ohms; in either case, the grid resistor is 270K; and base connections for the ECC85 and ECC189 are identical.

In the "Do You Know That" piece on p.529 of the November issue, the item attributed to G4LU was actually sent in by G3FKU—who got the money!

It is hoped to re-commence the series "Practical Applications of Semiconductors" in the January issue, our contributor having now returned from America, where he has been studying the latest techniques.

# RTTY Topics

SUCCESSFUL T/P DEMONSTRATION AT EXHIBITION — RTTY CONTEST COMMENT — MORE ABOUT TERMINAL UNITS — THE MARCONI TYPE HU.11 CONVERTER

**W. M. BRENNAN (G3CQE)**

A QUICK glance back over the past year is enough to convince one that it has indeed been notable as far as U.K. RTTY is concerned. Apart from the expected increase in the number of RTTY stations, perhaps the most heartening fact is the great improvement in the supply situation with regard to T/P's and associated equipment. The lack of this sort of ironmongery at reasonable prices has always been the factor which has limited the growth of RTTY in this country. However, over the last two or three months there have been more machines available to amateurs than during the whole of the previous few years. And by all accounts there is no shortage of would-be T/P owners, either. The new Amateur (Sound) Transmitting Licence accepts RTTY operation as a normal amateur activity. (Previously, special permission was necessary.) The actual licence terms leave little to be desired as far as RTTY is concerned and indeed the only real restriction is that RTTY is not permitted on 160 metres. This was in fact suggested to the G.P.O. by U.K. RTTY'ers themselves some three years or so ago and it was immediately taken up and written into the RTTY permit by the licensing authorities.

**RTTY at The Show**

One of the attractions at the recent exhibition was the live RTTY demonstration put on by G3IIR. On-the-air demonstrations of VHF RTTY were given with G3BPT (Gravesend) providing the other end of the link. 80m. was also used for demonstrations. Equipment on show included a Creed 7B T/P, 85R typing reperf., 1B Auto-Tx and various items of terminal equipment including the ex-Army T.U., the Receiver Adaptor C.F.S. (ZA.39384) and its companion power supply. Some of these units were in fact being offered for sale in another part of the hall by one of the exhibitors. Those manning the RTTY stand were subjected to a barrage of questions about the whys and the wherefores of operating teleprinters by radio to an extent which surprised even the most optimistic advocate of RTTY. Plans are already being made to put on a similar show next year.

The British Amateur Radio Teleprinter Group is the body representing RTTY in this country and its membership is at present around the 200 mark. At the Annual General Meeting there was an attendance of over forty people. This included a strong contingent from Holland and some from Northern Ireland. Part of the proceedings was an interesting lecture given by PAØLQ on the subject of Terminal Units and also on the application of transistors to T/P keying circuits. PAØLQ is the second operator at the V.E.R.O.N. Hq. Station PAØAA and he mentioned that the most consistent reports of reception of the RTTY bulletins transmitted weekly by PAØAA are received from U.K. amateurs. A certain amount of RTTY equipment was on sale at the meeting and at least one visitor from Holland left the meeting cheerfully facing the prospect of carrying a complete 7B page printer (all 67 lbs. of it!) back with him.

**The Contest**

Once again the printer motors have cooled down after what must surely be the biggest and best RTTY Contest yet. At times during its two evenings, RTTY signals took up a large portion of the 20-metre band and the pile-up was often three or four layers thick. It seemed that the only course of action was to use every available filter and then switch the printer on to see just which signal managed to squeeze through and produce some copy that could be worked on for points! Trying to work at the edge of the crowd was just as hazardous, for the edge of the crowd quickly became the thick of it as the tide of stations ebbed and flowed. Twenty was without doubt the most useful band for this event and during the contest period it was wide open to most parts of the world at some time or other. Conditions were good enough for the American West Coast stations to work into Europe and a number of W6 and W7's were able to make good use of the opening. Since it transpired that Europe was the main source of RTTY DX for the W's during this contest, it is nice to be able to record that for once the East Coast W's did not have it all their own way with the European DX. VK2EG was burning the midnight oil, too, for it was in the early hours his time when several European stations, including PAØFB, swapped serial numbers with him. Outstanding of the DX signals heard in this country on 20m. were FG7XT, YV5AVW, 5A5TR and KP4XM. By far the most powerful signals came from Italy in the shape of I1RIF and I1AHN, who were both running up monumental scores.

Fifteen metres also proved to be very lively indeed and during daylight it gave some very easy contacts with Canada and the U.S.A., with 5A3TX there to provide an equally easy African QSO. The real surprise of the contest was what happened on forty metres. Although this band is almost always open to the U.S.A. during the early hours, it has tended to be rather neglected. This time, however, there were a fair number of stations checking over the 7040 kc spot at the start of the contest and in no time at all S9 reports were being exchanged between various W's

and G3HKR, I1AHN, DL1VR and SM6CSC. I1RIF, the winner of the two previous events, had intended resting on his laurels and merely playing the part of an interested spectator this time. However, the unusually lively activity on 40m. was just too much of a temptation and so I1RIF was soon in the thick of it once again—with a very good chance of pulling off the hat-trick.

**At the British Amateur Radio Teleprinter Group meeting during the recent Exhibition — left to right: G6CW, G2UK (founder of the B.A.R.T.G.) PAØVDZ, PAØXW, PAØLQ and PAØFB. All are active on RTTY, on various bands from HF to VHF, and the PAØ contingent made up a special party to come over for the Show.**

The European countries heard running T/P's were G, GI, GM, DL, ON4, OZ, F, I1, LA, SM, OY and PAØ. Although until the logs are sorted out it is difficult to say, it does seem as though there was little or no activity from Asia for that final continental multiplier. As far as the European stations were concerned it looks as though much more use could have been made of the 80m. band to give extra country QSO's. As it was, this was almost neglected. Most of the participants comment on the high standard of operating and everyone once again seems to have enjoyed the tussle.

**Another Contest**

Almost every year at the end of the S.S. Contest the participants are faced with the prospect of a whole year before the next chance to do some contest operating comes around. The result is that thoughts are turned towards a second contest. It is almost certain now that another one will be held, probably in March of next year, and it is hoped that this also will become an annual event.

**Other News**

It seems that RTTY operation from Japan has ceased for the time being because it is not strictly legal under the terms of the present JA licence. This sort of thing has happened in other countries in the past and the final outcome is usually that there is a re-appraisal of the licence terms and the necessary changes are made to enable the keyboard pounders to get busy again. It is to be hoped that this will once more be the case as far as the JA and KA stations are concerned.

The projected DX-pedition by FG7XT had to be postponed due to Hurricane "Cleo." However, FG7XT now expects to continue with the trip in early December and so you have not missed the chance to work St. Martin, Aruba and St. Barthelemy —yet!

Another edition to the European RTTY community is Austria, with both OE1HQ and OE7RQ reported active on 20m. using Creed 7B machines. OY7ML is also back on the active list, with a Creed 7B printer. His previous machine (a Lorenze T36LO) has been passed on to OY1PU and will shortly be put on the air.

**All well known on the air, either as RTTY operators or on VHF. Left to right: GI3GXP, GI5AJ, G2FUD and GI3HXV. Seen together at the Seymour Hall during the Radio Communication Exhibition.**

**Terminal Units**

In "RTTY Topics" in the October SHORT WAVE MAGAZINE it was mentioned that no less than four different types of T.U. (or RTTY converter) had appeared in the surplus shops at some time or another. This remark promptly brought enquiries as to just what these types were. In fact, three of these units have been mentioned in these columns before. First there is the A.T.M. FSR.1.1X, otherwise known as the "Adaptor Receiver Frequency Shift AP.66862." This was fully covered in "RTTY Topics" for April 1963. It is now in widespread use by many U.K. stations and needs little more description. An ex-Army T.U. that has recently become available in sizable quantities is the Receiver Adaptor C.F.S. (ZA.39383) and the companion power supply unit is also to be had. A short description of these was included in this column for

June 1963. The third type of T.U. is the A.T.M. Freq. Shift Converter Model FSY.1.1. This has only been mentioned briefly but it is in fact an improved version of the A.T.M. FSR.1.1.X. The main improvement is the provision of a signal bias control. This latter facility can easily be added to the FSR.1.1X and will be discussed in this feature in the near future.

T.U. number four is a complete newcomer to amateur circles. Its full title is the M.W.T. Co. Ltd. Recording Unit Type HU.11. The unit is intended for use in the conversion of either FSK or CW signals into the DC signals necessary to operate either a T/P or in the case of Morse, an undulator. The HU.11 is an AF type of converter—that is, it requires either a two-audio signal input from a receiver for FSK operation and a single-tone input for CW working. The centre-frequency of the unit is 2550 c/s but the circuit design is such that an error of 1 kc in the tone input can be accepted and corrected for by the unit itself. Within this margin the tuning is therefore not so critical as the majority of converters. Actual tuning in of the signal is facilitated by two neon indicators on the front panel. One neon is arranged to strike when the tuning is high and the other when it is low. Both flash together when tuning is correct The HU.11 is completely self-contained, having its own PSU which includes the standard 80-0-80v. supply necessary for operating the T/P electromagnet. In all, some nine valves are employed and there are no relays whatever in the unit, the keying of the T/P being achieved by means of two KT61 valves. A control is provided to enable the receiving operator to adjust operation to compensate for any signal bias on the incoming signal. The circuit is such that the effects of impulse noise are greatly reduced and the makers claim that satisfactory operation will still be obtained when the input signal-to-noise ratio is only 10 dB. The unit will operate satisfactorily on any total shift in the range 400 to 1,000 c/s and for correct limiting the input signal may be any level between +20 and −25 dBm—quite a dynamic range. The input impedance is the usual 600 ohms.

Unlike the A.T.M. audio types of T.U., the HU.11 does not possess a built-in input band-pass audio filter. All selectivity must therefore be provided before the signal is fed to the converter. For amateur use, the provision of a BPF at the input to the unit would most certainly improve its performance on our crowded bands. Such an addition would of course limit the degree of signal mis-tuning that the unit could tolerate but the improvement would be well worth this disadvantage. At a later date it may be possible to describe this T.U. in greater detail. For the present it could well be added to the list of gear that should be on the list of those looking for a good T.U.

This must be all for the present—but the writer would like to take this opportunity of wishing the Compliments of the Season to all who have read thus far. "EU for now" *de G3CQE.*

# SUGGESTIONS FOR THE RA-1

## SMALL MODIFICATIONS FOR IMPROVED PERFORMANCE

**J. R. CLARKE (G3OWQ)**

THE RA-1 receiver offers a great deal to the radio amateur for a very moderate price. It has very good stability, is extremely sensitive and has optimum bandspread on all bands. The selectivity is reasonable and can be improved with the use of a Q-multiplier. All this with the attraction of a very compact appearance makes a very good buy.

The modifications suggested here are an attempt to gild the lily and to overcome some inherent weaknesses in an otherwise satisfactory receiver.

BFO stability leaves something to be desired. The author's receiver needed constant attention to the BFO inductance. On careful analysis the trouble was established as thermal drift. The condensers in the BFO can should be changed for the high-stability type without temperature compensation. Whilst on the topic of the BFO, the replacement of the switch by a 20 $\mu\mu$F variable condenser will enable fine zero adjustments to be made while retaining the upper and lower sideband facility by simply turning the pointer on the knob towards the legend. It is advisable to zero the BFO with the vanes of the condenser half meshed. Negative temperature coefficient capacitors can be shunted across the variable if necessary.

### S-Meter Change

The S-meter as fitted on the RA-1 is a moving-iron type. An improvement can be made by removing this meter and substituting a decent moving-coil instrument of 0-1 mA or similar sensitivity. In the author's case the new meter is the square-face type, placed in the perspex scale. It will be necessary to shunt the movement with a lower resistance than that in the original circuit.

At about 29 mc the appearance of a "birdy" is noticeable at certain control settings. This is break-through from the 19th harmonic of the BFO. If it is desired to remove this entirely (it can be rather a nuisance when copying the beacons) a screen of copper should be placed between the IF strip and the tuning heart. Why this is necessary is rather a mystery. It is normal for the front-end aluminium chassis to provide adequate shielding, but in this case the "birdy" was completely eliminated by the screen, so the existing shield does not seem sufficient.

Some additional cooling of the under-chassis is desirable. This can be best effected by opening

the three holes over the dropper resistors to form a slot of the same width as the diameter of the individual holes.

**HT Stabilisation**

An extra refinement, incorporated in the writer's Rx but not absolutely necessary, is to stabilise the second 150-volt line. An OA-2 will do the job but watch the maximum current passed through the tube when the RF gain control is reduced. The advantages of stabilising this rail is that when the RF control is backed off, in the original circuit, the BFO note changes. With a stable rail the interaction between controls is negligible.

Others have remarked on the ease with which SSB can be resolved when these small modifications have been made. They are worth doing and a great improvement has been realised in return for the work performed.

## G9BF CALLING

***More Good Stuff!***

Tremendous public pressure regular continuation this important series real technical articles proved by many enquiries (well, two letters es one p.c.) why no G9BF piece last month—Is he ill? Can we send him get-well card? Does Editor know or care how much circulation depends eager readers having best es latest from G9BF stable? Is old horse still with us es if not why not, what's up?

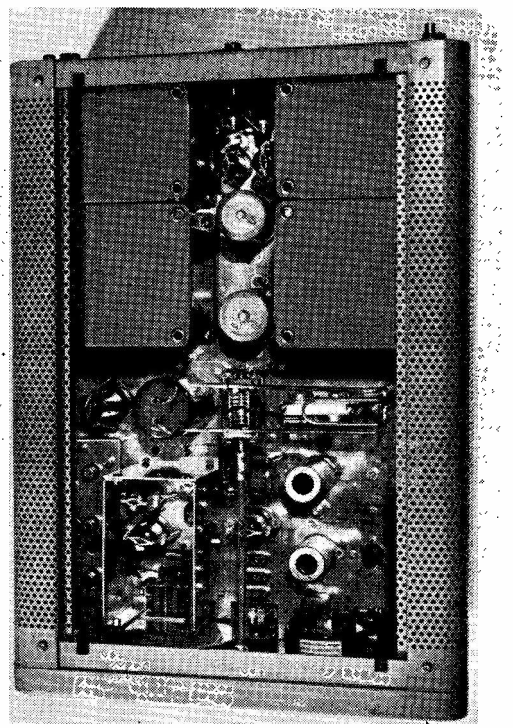
Ur G9BF much gratified such esteem even if one reactionary revisionist did say "I think G9BF ought to be suppressed—it's just a load of old codswallop." This "codswallop" stuff unknown G9BF—can you eat it, drink it, catch it on fire or use it as emetic? Es what's difference between "old codswallop" es, say, "fresh codswallop." *What is codswallop?* Anyway, word sounds slightly vulgar so no place this column, always written with close attention ethics correct English composition, spelling, syntax es all that guff.

G9BF now making urgent efforts interest Afro-Asian group in GDX. Any Afro-Asian chaps arriving London Airport to chalk off G Govt. about something or other always instantly recognisable because inevitably wearing dark glasses. *(Dark glasses, at London Airport, in winter*—cheoor!) No offence meant but G9BF puzzled—could dark glasses actually be Jap transistor hearing aid *(Dark glasses, at London Airport, in winter!).* Never mind, important thing is that unless Afro-Asian *babujis* grasp significance G9BF contribution little hope for Geneva es all that official biz.

Of course, no trouble unofficially—just generate maximum RF urge at base ant., tell XYL another large gin-and-Italian pse (tnx), drive push-pull 813's to full output with 4,000v. fed to tank, es off to go. (813 marvellous bottle; just breathe some gin-and-It on grid es up goes PA plate current, no trouble at all.) Plenty EU boys only too psed contact G9BF under full QRO condx, giving reports like "Ur my first G9 pse ur QSL mine sure es tnx vy ur sigs RST RST RST 599 599 599x vy FB pse rept name es QTH hi hr QRM ur my first G9 tnx QSL es vy FB dr OM tnx CQ CQ CQ DX." This sort EDX easy for G9BF es long list exotic stuff like YU, HA, LZ, UP, DM, YO es UA crowding into log, all sure QSL es tnx. Test with G9BF Tx when opening session for EDX (useful point for beginners note) is watch behaviour street lamps when calling CQ. If they brighten on key-down, rig is putting out the RF; if they go dim, Tx is sucking the power. Either way, no trouble es all FB (just watch those street lamps when calling CQ).

No momentary problems at G9BF. All going vy FB es DX easy with push-pull 813's at full blast. Only slight worry is why Afro-Asian boys arrive *London Airport* wearing *dark glasses,* in *winter*—cheoor.

(Really, we must stop this. It could be very embarrassing. But come to think of it, why *do* they wear dark glasses, at London Airport, in winter?—*Editor.*)



**The Green & Davis Transverter Type 20-2 is an adaptor for converting a 14 mc SSB transmission into the two-metre band. It will do this without modification to existing equipment, with transmission and reception on the same frequency on any channel over 144-146 mc. What is called split-frequency operation is also possible, with a choice of three fixed channels on "transmit," and free tuning over the whole two-metre band on "receive." The unit is completely self contained and will also handle AM in the same way.**

## 60TH ANNIVERSARY OF THE INVENTION OF THE THERMIONIC VALVE

*Sir Ambrose Fleming, F.R.S.*

The "Fleming Oscillation Valve," the forerunner of today's vast range of specialised valves, was discovered by Sir Ambrose Fleming just sixty years ago, in November, 1904. Perhaps one of the most important electronic discoveries of the century, this invention heralded the birth of the electronics industry. Today, the transistor is fast replacing this early discovery, but it will be many years before the high power valves, handling power in terms of megawatts and using the same basic principle of cathodic emission as Fleming's valve, are replaced by solid state devices.

At the time of his discovery, Sir Ambrose was Professor of Electrical Engineering at University College, London, and since 1899 had been Scientific Adviser to The Marconi Company. He was very closely associated with Marconi himself and had played a leading part in the design of the powerful transmitting equipment of Poldhu in Cornwall with which Marconi made his first successful wireless transmission across the Atlantic in 1901.

In his search for better methods of detecting electro-magnetic or wireless waves, Sir Ambrose, recalling the results of earlier research involving the passage of electric currents through rarefied gases, conducted a series of experiments utilising some of his original apparatus. This new work led him to the discovery of the "Fleming Oscillation Valve," the first thermionic valve produced in the world. This was quickly recognised by The Marconi Company and the "valve" was soon put into full production.

During his years at University College, Sir Ambrose Fleming trained many hundreds of engineers who later made their names in the radio industry and his many public lectures on scientific subjects held the interest of thousands. He continued to lecture until ninety years of age, when he still displayed the wonderful energy and enthusiasm which held his audiences spell-bound throughout his career.

Sir Ambrose died in his 96th year on April 18th, 1945, at Sidmouth, where he had spent the last few years of his intensely active life in retirement—full of honour, if not of riches, and deeply respected.


**Our stand at the 1964 Radio Communication Exhibition, Seymour Hall, London, W.1, held during October 28-31, and rated as being the best yet in terms of attendance and business done, with records broken all round. This photograph was taken during the afternoon of the opening day, which normally is regarded as "quiet."**

# Miscellany

**INFORMATION — OPINIONS — IRRELEVANCIES**

Not many months back one of these paragraphs commented on the fact that the AT population of the world had passed the 300,000 mark. The total to date, as given by the latest *Call Books*, is 382,628, so it requires no crystal ball to predict that the level 400,000 will be reached very early in the New Year. Note, also, that these published figures completely omit the U.S.S.R., whose total of amateur stations remains a mystery, but is said in some quarters to be as high as 100,000, counting all the operators of the many "Klub" stations.

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How old must one be, to be an Old Timer? In *QUA* (South Hants Group) we read of a Bournemouth SWL who travelled by train to Waterloo, with his bike, and spent his day thus:— In the morning he visited BBC1 and BBC2 TV at Crystal Palace; in the afternoon he "viewed" the GPO Tower in Central London, *en route* for Brookman's Park. Arriving there at 6 p.m., he was shown the Light and Home Service transmitters, but when he mentioned "2LO" he was shepherded into a corner of the machine-room, and there stood the original Eckersley Tx . . . to receive which he had constructed his first crystal set, in the early 20's. Then back to Waterloo, by bike, to catch the last train to Bournemouth! And all this happened on the BBC's "Open Day"—August 22. Full marks for enthusiasm, we should say.

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One of the new G8 - - -'s writes to enquire what their status will be with us. Will they be looked on as "those lazy few" who can't be bothered with a Morse Test, or as specialists giving more time to the technical side of VHF equipment than to operating it? The short answer is that they are part of the great body of enthusiasts in Amateur Radio, and that their news and gen. will be as welcome in our columns as anyone else's.

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Our feature "Do You Know That ——" has carried innumerable uses for unwanted ball-point pens. G3NWT sends another—he points out that they are an unrivalled means of purchasing ink at roughly £15,000 per gallon. . . .

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It is not generally known that the Quad originated in Ecuador as a solution to a peculiar aerial problem at the broadcast station HCJB. The combination of rarefied atmosphere (at 10,000ft.) and damp air rising from the jungles caused terrific corona discharges from the tips of the Yagi beams, and the chief engineer (W9LZX) was inspired by the idea of an "antenna with no ends." So he started with a folded dipole pulled into a square, added a square reflector . . . and there was the first Quad.

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Who is the oldest active amateur in the world? *QST*, October, mentions W8QP, who is 91. Any advance on that?

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W8MGQ describes himself as "a collector of colourful phrases used in Amateur Radio," and hopes, one day, to publish a glossary. Our trouble is to keep up with them, and half the expressions in a glossary would surely be superseded by the time it was published! Two that he mentions are "Whirling Joe" (ground-plane antenna, but we can't think why) and "Grab-to-gab" (push-to-talk). All of which shows that you can't be with-it all the time.

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How about the radio amateur who was so adamantly against the introduction of the metric system that he called "CQ 6ft. 6¼in."?

("*Mobile News*," *A.R.M.S.*)

— • • • —

Grain-of-Salt Department?—G3MYF forwards a cutting from the *Yorkshire Post* concerning TVI caused by "an old lady stroking her cat." It seems that "serious interference was caused on her neighbours' TV screens by static electricity." *That* we could possibly swallow (with a slight effort), but when we are told that other cases of mysterious reception trouble could stem from pet lovers, a mild case of boggling sets in.

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The sending of "599" in its abbreviated form "5NN" seems peculiar to CW operators on Top Band (where nearly everyone is 599 these days). Is it generally known that there *does* exist an official set of abbreviations for the figures? Simply strike off the redundant dots, or dashes, and you have it. Thus 1 is A; 2 is U; 3 is V . . . 7 is B, 8 is D and 9 is N. (In case you're wondering about 4, 5 and 6—they have to remain as they are, since you can't shorten them in that way.)

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Hint for Editors: Club Magazines frequently meet a crisis when absolutely no one has written in to say what he is doing. The luckless editors might take courage in both hands and follow the example of W3NL, who, writing in *Auto-Call*,

Washington, D.C., has invented a complete column of news about the members of one club which has failed to report. And very funny it is . . . W4 - - - is learning Morse, and already knows four letters; he acquired a 1 kW spark set but found there was no mike with it . . . W3 - - lost his job as a wine-taster because he swallowed too much of the stuff. . . . Another member is the new parking lot attendant at the Pentagon . . . and so on. It seems pretty certain that a genuine report will show up next month. Club Scribes could copy!

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From a Club Magazine: "Potential members, visitors, etc. are always welcome." We are still trying to figure out what that "etc." might mean . . . burglars, bandits, infuriated neighbours, fraud squad, *etc.*, we presume!

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Very few CW enthusiasts seem to realise how useful the "Z" code can be to them, although extracts from it are regularly published in the *Call Book*. Some things can be said which the "Q" code does not cover, such as: ZWO, Send words once only; ZZH, Try Again; ZGS, Signals Getting Stronger; ZGW, Signals Getting Weaker; ZCL, Transmit Call Letters Intelligibly. And a few more frivolous ones, such as ZPE, Punch Everything; ZRC, Can You Receive Code? ZUB, We have been Unable to Break You. The whole thing is well worth studying, if only to amaze your friends and make them look the signal up . . . but, seriously, many of the Z signals say things easily adapted to amateur usage and would save a lot of time.

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Heard on Eighty Metres: "Every time I first switch on there is a loud report, but there doesn't seem to be anything wrong." (But the station concerned has not now been heard for some weeks!)

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The Central Electricity Generating Board now uses nearly 6,000 VHF sets either fitted in its engineers' vehicles, or rigged as walkie-talkies. The network operates between 72 and 86 mc, also between 165 and 170 mc, and new systems are planned in the UHF band at about 450 mc. Communication between Central Control Room and the Power Stations is by landline, but there is a radio network as a back-up. Restoration of supplies in an emergency has been much speeded up as a result of the mobile installations. *(North Kent "Newsletter")*

## *Do You Know That —*

—— The resonance of an unknown LC combination can be worked out by converting it to a series-tuned circuit, connected across the aerial terminals of a receiver. If the Rx tuning is then swept through a wide range, a sharp increase in signal (or noise) will be found at exact resonance of the LC combination. *(GI3MMG.)*

—— An easy way to make soldered aerial connections outdoors is to wrap cored solder round the cleaned-up joint and bind the solder on with aluminium foil. Then heat the joint using a candle, cigarette lighter or small blow-lamp till the flux in the solder burns off. Unwrap the aluminium foil—and you find a perfect joint. *(G3OOQ.)*

—— QRM from TV time-bases, likely to be particularly troublesome on Top Band, can often be significantly reduced by decoupling the mains lead at the TV receiver itself, or in the shack. Each lead should be by-passed to a good earth (*not* the TV Rx chassis) using ·01/·025 μF condensers, rated at least 250v. AC. *(G3TFR.)*

—— To run a feeder underground, the lead can be inserted in a suitable length of plastic hose-pipe, which nowadays is cheap and readily available. The ends of the pipe should be carefully caulked to prevent moisture from entering. Ordinary plastic hose is virtually immune to soil erosion and the effects of damp and, buried a few inches, will be there for as long as it may be wanted. *(G3SHM.)*

—— When filing aluminium, chalk rubbed on the file will prevent the teeth from clogging. *(GM3KLA.)*

—— A useful set of small instrument screw-drivers, in five graduated sizes suitable for meter screws and the like, can be obtained from most Boots shops having a photographic department. *(G3LPT.)*

—— The small metal boxes, in a range of sizes from 3in. up, as used by electrical contractors, have many uses for items of radio gear. They come in square and rectangular shapes, complete with lids, and finished jap black. Any local firm doing electrical contract work, or the sales counter of the town Electricity Authority, could probably supply. *(G3FKU.)*

—— Excellent flexible wander leads (for a multimeter or anything similar) can be made by pulling out the centre conductor, with its plastic insulant, from a length of coax. You are then left with the braid, now used as a conductor, with its flexible p.v.c. covering. To strip off the sleeving easily, it helps if the length of coax is warmed up a bit first. *(G3TIR.)*

—— Used ball-point pen cases, fitted with a small pipe-cleaner at the writing end, can be used for cleaning switches and other small parts if the body of the case is filled with cleaning fluid. To prevent constant dribbling, the top-end plug should be kept on when the tool is not in use. *(B. McGrath, Glasgow.)*

If you have an idea you think worth half-a-guinea for appearance under this heading, send it in. No circuits or diagrams, please—just something that can be explained clearly in a few words. Payment is made immediately on publication.—*Editor.*

# COMMUNICATION and DX NEWS

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

IT goes against the grain to start on a carping note, so near the Season of Good-will, but this matter has been in the background for a long time, and the moment has come when it must be dealt with.

In short, it is this: Why do people who call themselves *amateurs*, indulging in a *hobby*, feel it necessary to dodge the regulations, ignore gentlemanly agreements, and deliberately go in for cheating on a large scale?

It is fairly common knowledge that our colleagues in the ARRL, who deal with DXCC matters, are confronted from time to time with forged QSL's, highly-suspect QSO's and general skulduggery. Furthermore, there is plenty of evidence that the power used is not always the figure as given in the book.

After hearing that several DX'ers had produced QSL's for contacts which they had never made, a small group of G's (including the writer) made a test case of it. Faked log entries were sent, accompanied by the necessary "dollar bill," to the self-styled QSL manager for one rare DX-pedition which none of the group had happened to work. Result—we all got our beautiful QSL's and could have put the score up by one. Just as easily as that! In actual fact, quite different action was taken, as a result of which someone's credentials are now being investigated rather thoroughly.

Regarding power—it is so universally assumed that some stations use many times their licensed power that *anyone* putting out a conspicuously good signal is, nowadays, automatically suspect. This is unfortunate, because an outstanding signal may be the product of an ultra-efficient aerial or a superb QTH or, in some cases, both.

But many of those in the swim of things are now so cynical that they assume that the big signals come from big power and little else.

For some strange reason which is hard to explain, we rate the use of excess power as a good deal less reprehensible than the faking or purchasing of QSL cards; it's just a different kind of cheating, and that's all one can say about it—except that the chap who runs excessive power takes the obvious risks, whereas faking QSL's is plain dishonesty.

Other strange happenings which have been investigated and *proved* in several cases are the working of a "rare one" on SSB *via* phone-patch through someone else's station; the use of someone else's callsign on CW—on behalf of a friend, who is told when he gets back from work "All right, you've got him," and told what to put in the log; the fatuity of an MC, so-called, who relays the distant station's report to someone who has "worked" him without hearing him—and so on.

What's fascinating is the motivation behind all this. What satisfaction does anyone get from proclaiming, by word of mouth or in print, that he has worked, say, 300 countries, if he himself knows perfectly well that he hasn't? It's a strange kind of mentality.

Those who don't bother much about QSL's have at least the knowledge of a clear conscience if they tell the truth about their countries-worked score, although they have no means of proving it. But . . . in view of all the above, *do QSL's prove it, anyway?*

Take a personal case: So-many have been worked over the years from G6QB, but the QSL's are short by roughly 30, because not everyone can be bothered to chase with airmails and dollar bills. But if we say we have worked X-

**ZONE-BAND TABLE**

| Station | Zones Worked | | | | | | Total Zones |
|---|---|---|---|---|---|---|---|
| | 28 mc | 21 mc | 14 mc | 7 mc | 3.5 mc | 1.8 mc | |
| G2DC | 40 | 40 | 40 | 36 | 25 | 5 | 186 |
| W6AM | 36 | 39 | 40 | 37 | 23 | 9 | 184 |
| G6QB | 38 | 40 | 40 | 34 | 20 | 7 | 179 |
| G3DO | 39 | 40 | 40 | 28 | 24 | 2 | 173 |
| G3IGW | 36 | 38 | 38 | 32 | 18 | 11 | 173 |
| G3HZL | 27 | 39 | 39 | 28 | 14 | 2 | 149 |
| OH3NY | 32 | 30 | 40 | 25 | 10 | 7 | 144 |
| G3NOF | 34 | 38 | 39 | 10 | 8 | 1 | 130 |
| G3PEK | 2 | 21 | 35 | 30 | 17 | 4 | 109 |
| G3RDC | 3 | 14 | 38 | 11 | 3 | 1 | 71 |
| G3IDG | 20 | 23 | 17 | 3 | 2 | 2 | 67 |
| G3OLN | 2 | 7 | 11 | 16 | 3 | 4 | 42 |
| G3PLQ | 1 | 8 | 7 | 3 | 3 | 5 | 29 |

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

countries, we *know* that we have done just that. It can't be proved —but if the other fellow doesn't believe it, we simply couldn't care less.

The sad thing about all this is the state of cynicism into which people seem to be falling. When a G works an outstanding piece of say, Top-Band DX, the general reaction is "On Ten Watts? Not . . . likely!" When someone wins a contest, the most frequent comment is "Well, look at the power he uses." And, now, it's even got to the stage where a QSL from a rare station, honestly earned, is automatically treated with some degree of suspicion, thanks to the machinations of one or two dishonest "QSL managers," so called. There's something pretty rotten in the state of Amateur Radio, as long as all this goes on . . . but what do we do about it? The fortunate fact is that it only applies to a small minority—the great body of DX operators play to the rules, because that seems the obvious and most convenient thing to do!

**Aerial Gen.**

Replies to last month's suggestion about more gen. on aerial systems are beginning to come in, and we hope they will continue, since it's an almost inexhaustible subject.

The most ambitious system this month is outlined by G3WW (Wimblington, Cambs.). It started some years ago with a conventional Quad (3-band with bamboos) which showed signs of disintegrating until the bamboos, including new ones, were taped and coated with some special varnish. Last July this new one went up on a three-section steel tower, and gave far better results (as did the old one) than the trapped Yagi used meanwhile.

Recently, though, G3WW decided to gild the lily (as *per* G3NVA in the May, 1963, issue of SHORT WAVE MAGAZINE) and added a Yagi reflector and director to the Quad; he also put in the Yagi driven element, in the centre, but with a separate feed. (Only someone with a tiltable tower could cope with the mechanics of all this!) The acquisition of a Millen Antenna Bridge caused some scares (and some astonishing resonant frequencies) but after several up-and-down journeys the thing was tamed. And the tower winch is now motorised too, with the aid of the cable normally used for the electric lawn mower!

Requests for details of the (reputed) aerial-farm at G6QB are easily met. A 20-ft. dural mast on the chimney of the bungalow forms the home-end anchorage for two long wires, each with a *total* length, from the shack, of 275ft. One runs downhill to another 20-ft. dural, mounted amid gorse bushes on a kind of hummock; the other runs level for about 100ft. where it is supported by a 40-ft. dural mast in the garden, and then runs off downhill and cross-country to a small tree at the required distance.

Either leg can be used as an end-fed long wire, or the two can be combined to form a very unconventional V-beam with no feeders. From time to time other small variations—such as ground-planes and V-shaped dipoles—appear and disappear. Right now one of the long wires has also disappeared after a stormy night! But still the DX can be worked.

One station with a beautiful Top-Band aerial is G3SED (Portsmouth), who is now fixed up with an 85-ft. vertical section surmounted by a "capacity hat" of three 52-ft. wires. Down below are ten 132-ft. radials, and the whole is fed with 80-ohm coax. The tuning and loading at the base is described as "super-critical," but when bang-on it gives much better results than the former half-wave at 50ft. W's on 160m. have been worked as late as 0915 GMT and as early as 2230.

By contrast, GW3AHN (Cardiff) has been working 21 mc under a sort of self-imposed penance, using a rotary dipole 25ft. high and a maximum input of 25 watts! The lists of DX, on both CW and SSB, compare pretty favourably with any others received this month, which just goes to prove something-or-other—possibly that some of the super-aerials that we hear of are not so hot, after all.

G3PLQ, aboard m.s. *Kumba*, is temporarily an SWL on Top Band but this time he has a "fab" aerial with a 216ft. top and 56ft. downlead, the whole thing being 89ft. above the ship's loadline. And all this over the perfect ground—salt water! It must be frustrating to use this for transmission on non-amateur bands only—working the Coast Stations to give his TR's.

G3CAZ (Burnham) has a home-brew triband Quad only 25ft. up, but says it seems to equal a 3-el. Yagi at 60ft.; he was the leading G in the single-operator class of the Phone Section of the 1963 ARRL Contest, using 120 watts of AM.

GM3IAA (Inverness) has now put up a couple of "VS1AA-type Windoms" (fair enough—he invented them!) arranged in a Vee-formation, and by doing perms with these and his other two 90-footers he gets good coverage all round, on several bands. After studying his diagram we decided that he has at least *ten* different configurations to choose from; then he spoilt it by saying that he sometimes gets good results by using a pair of them fed in parallel, rather than in anti-phase. This should give another ten! (Reminds us of the forty-year old theory, propounded by a famous Old Timer, that "the DX worked is inversely proportional to the area of uncluttered sky still visible from the shack"—in other words, the more wire you can get out, the better.)

**Top Band Doings**

It seems that we are already into the DX Season for One-Sixty, without realising it. There has been a great volume of DX traffic of various kinds, and from W1BB's bulletin the following notes may be of interest:

"The weekend of October 31/November 1 saw the band well opened, although WWV was only sending N5 (he has been N7 almost every day since). VP2AV worked W1BB for a new First, giving Stew his 82nd country on 160 metres—(82 countries on 160 metres—*pheoor*) . . . OX3DL showed up unexpectedly and, also

# Reporting the HF Bands

with W1BB, made yet another First; he has been fairly active since, and quite a few G's have worked him . . . VQ2AS/W1BB, yet another . . . ZS6BCT was very much there during the summer . . . 9L1HX made it to the U.S.A. for the first time, with W1BB and K1KSH.

OY7ML has showed up again on the band; other Europeans to break in on the DX scene have been OE3JL, 9A1VU and ZB2AF. Out in the Far East, the very first Japanese contact on the 160m. band was made when JA3AA worked VS1LP.

Remember the dates for the **Trans-Atlantic Tests** this season: *December 6 and 20; January 3 and 17; February 7 and 21.* See last month's issue for details of the calling and listening schedule . . . and **don't** call the W/VE stations on their **own frequency,** or you will end up with a very red face.

But don't imagine that these 0500-0800 sessions are the only times for working DX. There is more and more evidence that W's and VE's can be worked around 2300, and with so many other countries now on Top Band, one must be alert at all times except when it is broad daylight, working the local net.

Matti of OH3NY writes to say that he hopes the portables in rare U.K. counties will keep a look-out for him; he has worked 83 counties (81 confirmed) but naturally it's rather hard for him to find the really rare ones!

G3SWH (Bristol) is hoping for some DX, once his exam QRM is over; but he says he hasn't yet *heard* a W or VE because of hash from the 11 kV line, about twenty feet from the shack.

G3TQV (Wakefield) passed his R.A.E. in 1951 but has only just come on the air. He found that the use of low wire-netting fencing round the garden, rather than direct earth, improved Top Band results a lot; his aerial is 102ft. long, end-fed, so it needs a good earth or counterpoise. (But if you use chain-link fences or wire-netting you may have to do a lot of bonding to avoid scratchy noises in windy weather, as we know from experience.)

GM2HIK (Forfar) is yet another to make the top bracket with his score of 98/98—nice going. It was GI6TK/P in Fermanagh who clinched the deal. (GM2HIK says that publicity given in this feature to coming DX-peditions was invaluable to him.)

G3SED (Portsmouth), who seems to be the highest-scoring G3S-- in the table (74/90), and whose aerial details have already been given, is all set for a big season of DX. (If he can work W's until 0915 it seems pretty certain that he will be successful, too.) He says the OX's are only on until early December—OX3DL can be found on 1809 and 1826 kc most Sundays.

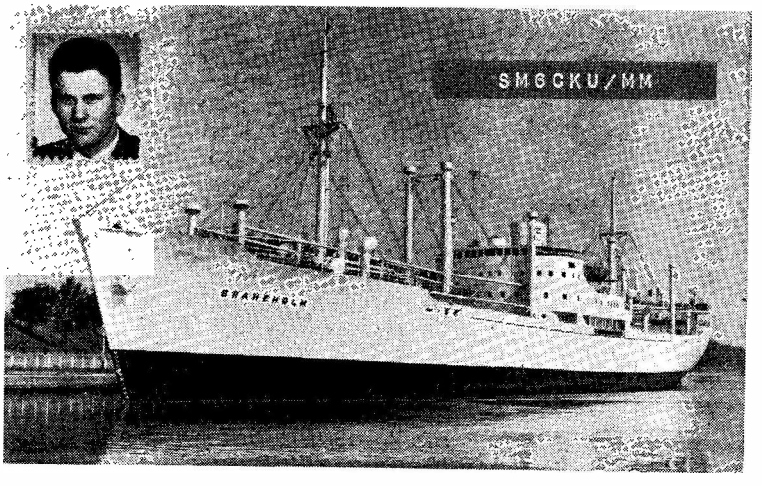
G3PLQ (m.s. *Kumba*) was in Stettin (Poland) for a while, and heard about 40 G's there. Next listening bout was off the Spanish coast, and by now he must be in the 9G1 and 9L1 region once more. He still hopes to make several personal QSO's down there and to get people interested in Top Band operation. Times and spot frequencies will be arranged whenever possible. Most of the QSL's for stations heard in Poland have been sent, so we will not give the full list here.

### The Overseas Mail

G3SBP, who is also *ex*-5N2RDG, writes from St. Thomas (U.S. Virgin Is.) to say that he has been there and in Puerto Rico for twelve months, and has of course been off the air. However, he hopes to operate from the *British* Virgin Is. soon—probably at weekends only. His present slight problem is that he has no transmitter, but he hopes to overcome that and show up on SSB and CW, mostly 14 mc.

Doug Higgins, well-known at various times as VQ6AB, 6O2AB, MP4TAN and DL2DF, now finds himself in Aden and has acquired another call—VS9ADF. He runs 50 watts to a vertical, is looking for the U.K. on all bands, and hopes to get a permit for One-Sixty. (But even on Forty and Eighty he finds the static a bit of a trial.)

Old friend WA2WOR/W4WFL writes to say that he is on the LF bands after a lay-off of several years. At present he is only trying




**If you hear or work SM6CKU/MM (or SM7AZL/MM) this is their smart ship, the m.v. "Braheholm," on the Swedish register, from which the signal comes. On 80m. SSB, the Tx is an HT-44, with an SX-117 as receiver. These boys also hunt around 7070 kc with Sideband.**

Forty CW, with 100 watts, but at least he has a 2-ele beam which, he says, looks frighteningly big. A recent QSO with DL9LJ/M1 was his first with San Marino (first even *heard*) during 13 years on the air.

News of a DX-pedition—but not to a "new one" as far as DXCC is concerned. John Farrar, recently 5B4JF, is accompanying an official Joint Services Expedition to Socotra, and hopes to have the call VS9SJF. Gear will be Heathkit DX-40U plus VFO, AR88, long wire (about 500ft.) and a "Joymast." He will be mainly on 7, 14 and 21 mc CW and hopes to operate for about four hours a day. For DXCC, Socotra is just Aden, VS9, but at least it will be a brand new one towards the IOTA Award. And the expedition is there from December until February, 1965—so there is plenty of time.

A note from VS9OC (RAF Masirah) reminds us that they are active, and hope that Masirah Island will not be overlooked for the IOTA Award (although, DXCC-wise, they count as Muscat and Oman). We have no doubt that the organisers of IOTA have taken due note of both.

**TOP BAND COUNTIES LADDER**

| Station | Confirmed | Worked |
|---|---|---|
| *Phone and CW* | | |
| GM2HIK | 98 | 98 |
| GM3KLA | 98 | 98 |
| G6VC | 98 | 98 |
| G5JM | 98 | 98 |
| G3REA | 98 | 98 |
| G3NPB | 98 | 98 |
| G3GGS | 98 | 98 |
| G2NJ | 98 | 98 |
| G3LWQ | 96 | 96 |
| G3PLQ | 92 | 95 |
| GM3IKD | 86 | 90 |
| OH3NY | 81 | 83 |
| G3SED | 74 | 90 |
| G3NOW | 74 | 82 |
| G3RHM | 73 | 78 |
| G3PPE | 60 | 72 |
| G3OJE | 55 | 56 |
| G3IDG | 51 | 56 |
| G3SWH | 41 | 61 |
| G3SJJ | 36 | 71 |
| G3SXW | 23 | 45 |
| G3SVW | 19 | 59 |
| *Phone only* | | |
| G3NPB | 88 | 88 |
| G5JM | 72 | 74 |
| G3RHM | 69 | 70 |
| G3PLQ | 55 | 58 |
| G2NJ | 54 | 54 |
| G3REA | 53 | 66 |

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

### The HF Bands

Considering the very low sunspot number, the HF bands continue to be amazingly good. *Twenty* has been yielding worldwide DX for a long time, and *Fifteen* really came to life some weeks ago. The surprise has been the break-through of W's in a big way on this band—even including W6's and 7's, who were hardly expected at this stage of the cycle.

GM3JDR worked *Fifteen* on both CW and SSB, but notes that the most distant station to the East was 4S7NE, whereas down in the southern parts of the U.K. there have been reports of VK's and JA's at S9. He also says that Twenty is different from last year; chiefly because it seems to be full of W's until it fades out, whereas last year, at this time, the South Americans were more prominent before closing time. New ones for GM3JDR were FB8WW and K7LMU/3W8 (*Twenty CW*) and FH8CD (*Fifteen SSB*).

GW3AHN, with his 25 watts and rotary dipole on *Fifteen*, as already mentioned, worked a fantastic bag of DX. Not just run-of-the-mill stuff, but stations like FB8WW, 8XX, FH8CD, XW8AL, W9WNV/XU, HS1X and some VP8's. On *Twenty* he found conditions "fairly good"—his SSB list includes HC8FN, KC6BK, VQ8AM, VR1B, ZL1ABZ, W9WNV/XU, K7LMU/3W8. But now he reports that the band is beginning to close by 1830-1930 most days, so winter conditions are with us already.

### A Good QTH

It is such a rarity to hear someone saying that he has a *good* QTH that we were glad to hear from G3FYR (Orpington). After three spells spent respectively as GW3FYR, VS9AI and GM3FYR, he moved to Bromley, Kent, where he was pretty discouraged by the results. However, recently he made another move of a few miles, and says that the first survey suggests that he has "struck the jackpot." Using nothing more than a Vanguard (50 watts CW and AM), and a 132-ft. wire running East-West, he worked more DX, and got better reports in the first few hours than he had ever dreamed of. On *Fifteen*, AM phone, he worked whole strings of W's with an average report of S9 plus 10 dB; other directions seemed almost as good. He says "Now I've tasted blood . . . now for some real DX-ing." (It has been realised for years that two QTH's only a few miles apart can be completely different . . . and this is not a matter of height, screening or anything that is readily apparent. What is it—soil conductivity?)

### Ten Metres

By an unfortunate slip of the typewriter, towards the end of last month's article, it was said that the **Ten-Metre Counties and Countries Worked Table** was to start as from October 1, 1964. This made nonsense of the previous statement that it should start from June 1, 1964. Please note, then: (*a*) Callsign; (*b*) U.K. Counties Worked; (*c*) Countries Worked, commencing date **June 1, 1964**—and let us have entries for this table right away.

G3IDG reports nothing worked on the 10m. band, but during the past month he heard ZC4AK, ZE1AS, 1BD, 1JE, 2JA, ZS6AMO, 5H3JI and 9J2WR, all on AM or SSB, and all between 0915 and 1140.

G3OAD found 10 metres pretty quiet at times when one would expect it lively, especially for Africa and South America; but he says it *has* opened several times to Central Africa, usually 1000-1130, but has closed suddenly and earlier than expected. During October he worked PY, LU, 9J, ZE and sundry Europeans; also heard ZS, LU, CX, CR7 and more

Europeans—also CR6 and UL7. And he was "stupefied" to hear G3RMF working W2JHN, but doesn't mention the time.

ZE2JA sends a list of Europeans worked during three week-ends in October, and we note they are all between 1045 and 1320 GMT. His outgoing reports varied from 56 to 59 plus 10; incoming ones were nearly all S8 up to S9 plus 20. The only non-European stations listed were a couple of ZC4's.

SWL Laurie Margolis reports quite a good spread of countries heard on Ten, including 5N2, 9G1, 9L1, 6W8, 9J2, 5X5 and ZS's. He wants a Ten-metre Counties/Countries table for *listeners*, and quotes his present score of 14/16. Actually, we don't see any reason why SWL's should not enter into direct competition with transmitters, in the same table—it being clearly understood that their scores are "Heard" and the others are "Worked."

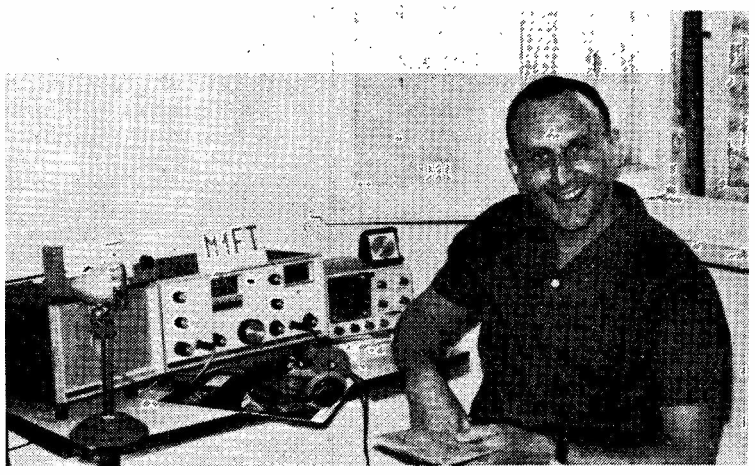
Present predictions are that the East-West path may well be opening as early as next Spring and Summer on the 10-metre band. Judging by the way *Fifteen* has come to life in the last couple of months, we shouldn't be surprised.

### Contests

The *CQ* (1964) SSB Contest results were briefly mentioned last month. We are now able to publish the full details. In the "All-Band" category the Top Ten were DL3LL (388,315), ZL1AIX (321,750), YV5BIG (273,969), G4CP (233,840), CX3BH (228,105), PZ1AX (226,570), VK2AHT (216,692), K2HLB (212,333), ZC5AJ (202,616), and WA2SFP (174,704). Congratulations to G4CP on putting the U.K. into the Top Ten—he was also having a go in MCC recently.

In the other categories, the 14 mc section was won by HC2JT, who, with his score of 354,522, would have come second even if he had made it an all-band entry! In front on 21 mc was W4RLS (20,405); for 7 mc K6AHV (4,365) and 3·5 mc GI3CDF (21,070). The latter is an amazing score, and all credit to GI3CDF for it.

Other high-scoring U.K. stations were GM3JDR (57,959 on 14 mc); G3KZQ (155,385 on 14 mc, and only just missing the "Top Ten" on that band); G2QT (66,700 on 14 mc); GM3IX (38,315 on 14 mc); and G5HZ, who, with his total of 3,619 on 7 mc, got into the Top Five for that band.




**When DL7FT was in San Marino recently, pictured here, he signed M1FT — and the project ranked as a DX-pedition (look up your gazetteer for San Marino). By the time you read this, you ought to have had your card if you worked M1FT — he was busy with the QSL's when this picture was sent in.**

As usual, the U.K. entry (of logs) was very small, although quite obviously a large number of G stations came on the air during the event. It seems that they like working them, but can't be bothered with the paper-work afterwards.

Next, the *ARRL DX Contest* (1964). Taking the CW section first, it is good to see G4CP not only top-scoring G, but Top European as well, with his single-operator score of 322,494. Also comfortably in the Top Twenty is GW3JI (245,616). Other high-scorers from the U.K. were G2QT (176,400) and G2DC (136,584). GI3OTV and GI3OQR both did well with 141,245 and 116,706 respectively.

Multi-operator scores seem to have been lower than the single-operator figures, but in that category GW3ITZ made the Top Twenty with his score of 98,000.

Now, turning to the *Phone* section, we find a pitifully small U.K. entry, the best score coming from the multi-operator station of GW3NWV (181,917). Highest G was another multi-op. entry, G3KFX, with 136,920. Both of these stations, and also G3LDI (22,960) made the Top Twenty for Multi-Operator stations. But the European champion in the phone section was not in the U.K. —it was DL1KB.

Congrats to all those whose calls are mentioned, especially to G4CP on becoming top European scorer on CW—a real achievement, this.

### Coming

*OK DX CW Contest:* December 6, 0001-2359 GMT. All bands, including 1·8 mc. Three categories: Single Op. all-band; Multi-op. all-band; and single-op. one band. Five-figure groups, consisting of RST and number of years the operator has been on the air(!). One point per QSO but three points for contacts with OK stations. Multiplier: number of *prefixes* worked on each band. Logs to Box 69, Prague 1, to be mailed before January 15.

*CQ Worldwide 160-metre Contest:* January 30-31, as before, but full details next month.

### This and That

G3IDG harks back to G3SEN's comment (last month), says he is glad to have provoked some reaction at last, after trying for many years, but wants to make it clear that his remarks on maximum

abbreviation in QSO's were meant to apply to crowded-band conditions. On Top Band on a Saturday morning, for instance, spin it out as much as you like! (Incidentally, G3IDG has scrapped his 150-ft. wire, bent in all directions, and is setting out to try his luck with a "Joystick" and 8-ft. feeder. Comparisons will be interesting.)

Two apparent piracy victims are G3LTN (Andover) who is on VHF only, but gets cards for alleged QSO's on 7 mc; and G3RRZ (BFPO 15) who is abroad in B.A.O.R. and has not been on the air since last May; but he now hopes to start up as a DL2, running 50 watts AM and CW.

The Danish amateur organisation, EDR, administers a little gentle correction to a recent note (published in good faith) to the effect that there would be a prefix change for the Faeroes "when a new government takes over the administration from Denmark." No such thing is going to happen, says OZ2NU of EDR, and asks where we got the original information—we simply don't remember, and have not kept any letters on the subject. However, it was Ungood—so please disregard, and our apologies to EDR.

### DX News Items

The knowledge is well spread around now that VQ8AM did *not* go to Rodriguez Is. during November; nor does he see any immediate hope of getting there. But Barry of VE8CO hopes to make it, possibly as early as January, backed up by the Hammarlund organisation.

DXCC credits for recent Neutral Zone (8Z4) operation have apparently been suspended by ARRL, "pending investigations" . . . The new radio party bound for Heard Is. does not appear to include an amateur radio operator, so the prospect of VKØ activity from that spot is not bright.

W9WNV reports that his contacts from XU and 3W8 numbered about 15,000 (more than half with U.S.A.). QSL's out in due course; if you sent a contribution you will get yours sooner —otherwise wait for Bureau. Don says that if his financial loss on this expedition is ever made good, he will undertake another, to four rare ones.

The R.A.F.-ARS is reported to be interested in activating Rockall, *if* it will be counted as a DXCC scorer (which it is bound to be, since it fulfils all the rules). A real chance of Rockall operation at last?

9M8 is officially the new prefix for ZC5 (North Borneo) but also seems to be used by ex-VS4's (Sarawak); could be that it is the new combined prefix for East Malaysia. (Why should it be so difficult to get the latest information?)

FB8WW (Crozet) active most afternoons around 14040 kc (T7) but is also sometimes on 21080 kc, 1130-1330, both AM and CW . . . FB8XX (Kerguelen) also 21082 kc CW . . . LU1ZC (South Shetlands) on 14050 and 21075 kc CW.

5W1AZ (Western Samoa) on 14030 and 14066 kc CW, early mornings; he is *ex*-ZK1BV . . . ZD8BB and ZD8RH both reported active, mostly 14 mc . . . VK9RB (Norfolk Is.) very much there, 14080 kc CW; VK9TL also scheduled to be on throughout January, all bands CW/SSB.

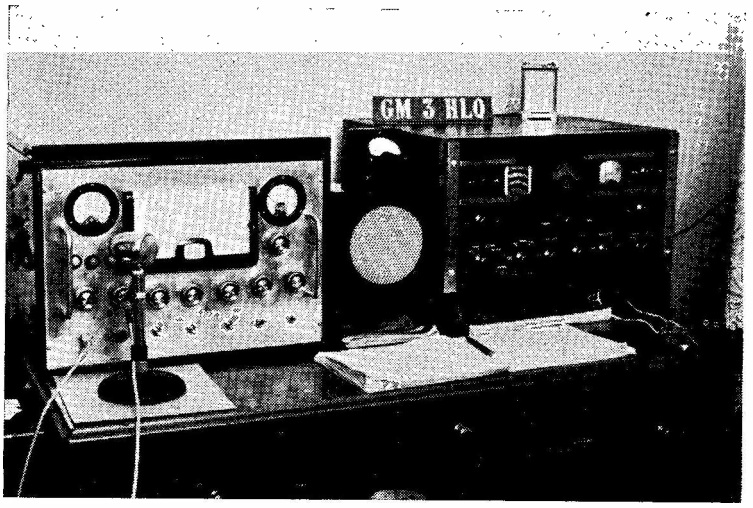
ZS6AP/KC4 is an expedition in Queen Maud Land—will be there until February; mostly 14 mc CW, after 1730 . . . All former VQ2's are signing 9J2 with same suffix letters as before (now Zambia).

VU2NRA (Andamans) is supposed to be there before now (not heard up to November 19). May be there two months, home-brew gear and good 3-el. beam . . . VQ1GDW has been heard again on 14 mc SSB, although Zanzibar should have changed prefix.

4U1SU operates from the Gaza Strip (Egypt); mostly SSB, 7 and 14 mc . . . CEØAH should be on from Easter Island the first few days in December (Ops. W4QVJ and W6UF) . . . Other reports suggest it may be CEØAJ . . . 4W1F and 4W1G both very active.

### Late Flashes

Nothing was heard of G3NIR on his scheduled operation from VR5, YJ1 and FK8 during November . . . New crews for the French stations in Antarctic regions are on the way out. FB8WW, FB8XX and FB8ZZ will be relieved; the HB9TL SSB rig will be taken to FB8XX for the




**Station of GM3HLQ, C.P. Callanan, 140 Glasgow Road, Strathaven, Lanarkshire, running 70w. on all bands from 10 to 80 metres. GM3HLQ says "my interests are nothing in particular, just working whatever bands appear to be good and making friends" — and what could be nicer than that in the context of Amateur Radio. GM3HLQ is also on Top Band and two metres, and says that, having a tolerant and a philosophical XYL, he is allowed a room to himself for radio — the lucky chap — and she even brings him the odd glass of supper when he wants to be left on the air (the fortunate fellow).**

coming year, and FB8WW, it is said, will be equipped with a commercial CW/SSB rig.

W8BZB/7G1 is on 21 mc SSB most days, 1500-1700 . . . 5R8AB has been widely heard on 7 mc, usually 7008 kc CW, around 1800-1830 . . . ZS2MI (Marion Is.) has been active on 21 mc CW and SSB, mostly mornings . . . FL8AK, very active during November and possibly still on, was operated by K1QHP.

DL9HF, on his African tour, signed 9J2WP for a while, then showed up at 7Q7PBD, with whom he stayed in early November. He was then due to move on to ZE, ZS9, ZS3 and CR6.

Apart from the other Easter Is. trip (which rumour even says was cancelled), CEØAG has been issued to VE3DGX, who will travel there in December on a medical mission from McGill University . . . FU8AG has been worked in Europe on 14 mc CW (0920) and FU8AA also reported on at weekends.

The Belgian Trans-Sahara Expedition was due to leave Brussels on November 21, with ON4VL equipped with AM/SSB for 14, 7 and 3·5 mc. Schedule takes in CN2, CN8, 7X2, 5U7, TT8, ST and HZ.

**Sign-Off**

And that seems to be it, somehow. So nothing remains except to send sincere Christmas Greetings to every reader of this piece and to all who help so reguarly to produce this feature. The deadline for the next is **Friday, December 11, first post;** for which everything should be addressed to "Communication and DX News," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. 73, BCNU and—MX!



## RENOVATION OF GBR, RUGBY

The transmitter used for very low frequency (VLF) transmission at the Post Office Radio Station at Rugby is being modernised. GBR has been in service for 40 years, and has world-wide coverage on 16 kc. Twelve 820-foot masts carry the aerial and the transmitter is used for the radiation of time signals as well as, for some 22 hours a day, of Morse transmission to ships and other listening points throughout the world.

The present output stage, consisting of 54 water-cooled triodes, is being replaced by three English Electric vapour-cooled valves type BY1144 and the lower power stages by three wide-band amplifiers. This will enable the present output power of 210 kW at 16 kc to be doubled and will also allow of teleprinter operation using FSK, in addition to the present hand-speed Morse. The English Electric BY1144 vapour-cooled power triode has an anode dissipation of 125 kW and will provide an RF power output of 200 kW, Class C unmodulated, at frequencies up to 27 mc—nice! Three are to be used, two in service to give 400 kW, and one as stand-by. The GBR PA tank (and what a tank!) will also be arranged to be self-compensating for changes in the electrical performance of the aerial due to changing weather conditions. The radiating system was completely renewed a few years ago and was itself a considerable undertaking.

## "ELECTROMAGNETIC WAVES"

This is the title of a new colour film produced for the Educational Foundation for Visual Aids—by whom it will be distributed—in close collaboration with Mullard Limited. The film opens with the early history of radiation in the familiar terms of light and heat and goes on to explain the enormous range of radiations which go to make up the electromagnetic spectrum.

A number of historical events are emphasised, starting with Newton's theory of the composition of white light, in 1680. The film goes on to describe the discovery of infra-red rays by William Herschel in 1800 and of the ultra-violet by Ritter in 1801. It then deals with the relationship between light, magnetism and electricity, as shown by Faraday in 1831, James Maxwell's theory of electromagnetic waves formulated in 1864. Röntgen's discovery of X-rays in 1895, and Rutherford's discovery of gamma-rays in 1900.

Finally, the applications of electromagnetic waves in research, medicine, industry, agriculture, communications, navigation and entertainment are touched upon.

The second part of the film opens with a chart showing the full range of the electromagnetic spectrum and covering, in order of wavelength and frequency, the bands of radio waves and microwaves, leading into the infra-red, the visible rays, the ultra-violet, X-rays and the gamma-rays. The film continues by advancing the theory of wave motion—using the analogy of ripples on the surface of water—and goes on to describe propagation and velocity, polarisation, transmission and absorption, reflection, refraction and dispersion, and diffraction and interference. Radio wave propagation is described, together with polar diagrams and aerial arrays. The optical propagation of narrow beams is illustrated in connection with television transmission and, in particular, transmission *via* artificial satellites. At this point masers and lasers are introduced, with a reminder that many of these new developments are still the subject of intensive research and that the history of the electromagnetic spectrum is still very much in the making.

***For this month's Small Advertisements—see pp.631-640***

# VHF BANDS

A. J. DEVON

A COUPLE of months ago, it was mentioned here, casually, that the autumn can often produce very good conditions for the VHF bands—well, what do you think about your November results! Or perhaps you weren't there for the remarkable opening over November 8/9, when the whole of Europe was workable from the U.K., with QSO's over distances of 400 miles and more quite commonplace and the two-metre band chock full of EDX from end to end. For that's how it was—and things have not been too bad for GDX since, either.

The Wx build-up suggested the possibility of a good opening, with a high-pressure ridge extending from north of the British Isles down into the Balkans. It stayed there long enough—and, fortunately, started to develop at the week-end, so that there were plenty of people about with the Rx on—to trigger off a high level of activity, and it was simply a matter of operating technique ("simply a matter of operating technique," he says.—*Ed.*) to sort out what one wanted. The period of peak conditions was from about mid-afternoon on Sunday 8th until the evening of Monday 9th—and the barograph trace shows a nice confirming shape.

To your A.J.D., these big EDX openings are just like taking the lid off Europe, to find underneath an enormous amount of VHF activity, normally only in pockets or areas, which get joined up by the development of the DX propagation condition, analogous to the removal of the lid. Anyway, however you look at it, a most interesting and rewarding session for all who could be on. And, as we shall see later, it was not only on two metres that things were so good.

### EA/UA by Meteor Shower

We must look now at some remarkable results by the MS mode. Going back to the Orionids appearance over October 18-22, our old friend EA4AO (Madrid) reports a tight schedule with CT1CO (Lisbon) which produced one-way results, with CT1CO heard in Madrid very consistently, the MS pings being much aided on occasion by good tropospheric conditions.

It was during these tests that CT1CO heard G5YV, as an identifiable signal—perhaps by now Harold has had fuller details. In the meantime, G5YV himself was on MS sked with UA1DZ in Leningrad, and they duly made it; Harold also was getting very good bursts of signal from LZ1AB (Sofia) but the latter did not receive G5YV at all, apparently because of a misunderstanding about frequencies. (One of the most important factors in successful MS working is absolutely accurate frequency setting—there is no time to search around.)

G5YV is one of our most enterprising and successful MS exponents, and in order to make proper use of the forthcoming meteor showers—the *Geminids* during December 10-13, and the *Quadrantids* due over January 1-4—he is on a twice-weekly HF-band sked with UA1DZ (who, of course, is dead easy to work on 20m. CW any time!) to fix operating times and frequencies and generally to get organised with the more efficient VHF stations in the Eastern European region able to perform in the MS mode. These include UA1MC, UB5KDO and UO5KAA. So we look forward to hearing further from Harold in due course.

And this is not the end of the MS story. Peter Blair, G3LTF, used the *Leonids* shower, due November 14-18, to work EA4AO—this was on November 17, 0100-0330, when they were getting very strong bursts (and "very strong" means up to S9+) for as long as a minute at a time.

Our congratulations to CT1CO, EA4AO, G3LTF, G5YV and UA1DZ on their outstanding VHF work, which continues to open up so many interesting possibilities. The necessary adjustments have been made in Countries Worked—with G3LTF now at 25C, and G5YV at 23C. It will be noticed that we have also taken in UA1DZ, at 24C, this being at his own special request, he being a regular reader. The interesting thing about his list is, of course, all those Russian prefixes, available for EDX contacts!

### October European Opening

Another old friend is OK2WCG (Brno) who reports a wide-spread tropo. opening, apparently confined to the Continent and in the general direction S/W to N/E, over October 28-30. LA, OH, OZ, SM, SP, UP2, UQ2 and UR2 stations were freely workable from DL and OK, with very high signal levels and considerable activity, though it was not a week-end period. OK2WCG himself was right in on all this, and as a result of it we are glad to put Ivo up to 19C in Countries.

### EDX on 23 Centimetres!

Also we are very pleased to be able to congratulate Jack, G2CIW (Birmingham) on a 23-centimetre contact with PAØCOB—this was on two-way phone, with signals around the S4-S6 mark over their distance of 270 miles (which could

be a new EU record), and it took place on Sunday, November 8, at 2215, probably about the peak of the opening already discussed. G3MCS is also understood to have worked ON4ZK (their distance being a bit shorter) and other 23 cm. QSO's during the opening were G2CIW with G3FP and G3LTF.

### The Tabular Matter

It is January '64 since last we were able to show the Two-Metre All-Time—so here it is again, made up to date to the best of your A.J.D.'s knowledge and belief, because all claims for it during the year have been carefully preserved. If it is not correct as regards your individual placing, that could be because we have not had a claim from you since the last listing was compiled, 12 months ago. Anyhow, what you find on p.618 is now the master-list, and can be amended as new claims are laid.

In the 70-Centimetre All-Time, G3EDD comes in at 30C, and there are about ten other movements. The Four-Metre A/T is in a very healthy condition, with some excellent stations-worked totals—G3OWA at 33C with 213S, no less, shows what can be done these days on the 70 mc band.

As ever, the Two-Metre Annual is very lively, with several G3T's (whom we are glad to welcome) joining for the first time. Several people have been asking "Where's Tom this year?"—we don't know, but he knows the rules! (*Hw*, G3BA?)

From time to time, it is suggested that we combine the 4m., 2m. and 70 cm. activity as a single table on an Annual basis, as being perhaps more significant as regards current operating results. The immediate objection would be, of course, that comparatively few people operate more than two of these bands. On the other hand, it could be suggested that such a Table might encourage multi-band operation. Your A.J.D. will bend his mind to this little problem during the Holiday (if any!) and it may be possible to throw out a few ideas during the next time or two.

### Some 70 Cm. Results

During the November opening, G2CIW started with a CQ on 433 mc at 1630 on the Sunday afternoon, which raised PAØCOB, and thereafter he went on to work another 21 stations, all on phone, 14 of them, in four countries, being at over 100 miles. Six more were heard, including the rare German beacon stations at 432 mc, signing DL2LFP. Pretty nice going!

G3PTM (Solihull), getting his new 70 cm. converter lined up at about the same time, was astonished to hear three DL's, two ON's, three PA's and OZ7SP—just like that—in addition to many G stations. Needless to say, G3PTM is hurrying on with his 70 cm. Tx, and in

## TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1964

Starting Figure, 14

*From Home QTH only*

| Worked | Station |
|---|---|
| 51 | G3EDD, G3SAR |
| 42 | G3HRH |
| 38 | G3CO |
| 36 | G3FNM |
| 34 | G3GWL, G3TNO |
| 32 | G3AHB, G3PSL |
| 29 | G2CDX, G3PTM |
| 28 | G3JHM/A, G4LU |
| 26 | G3FIJ |
| 25 | G3KWH |
| 23 | G2BJY, G3LAS |
| 20 | G3TKQ |
| 19 | G3IOE, G3THC |
| 18 | G5UM, G8VN |
| 17 | G2AXI, G3CKQ |
| 14 | G3KQF |

***This annual Counties Worked Table will run till August 31, 1965. All two-metre operators who work 14 or more Counties on the band are eligible for entry. QSL cards or other proofs are not required. After the first 14 worked, simply claim from time to time with counties as they accrue, giving callsign and date for the county worked. To keep the Table up-to-date, claims should be made at frequent intervals. Operators new to VHF are particularly invited to join Annual Counties.***

## FOUR METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8

*From Home QTH Only*

| Worked | Station |
|---|---|
| 49 | G3IUD, G3OHH (201) |
| 48 | EI2W |
| 43 | G3EHY |
| 37 | G2OI, G3PJK |
| 35 | G3JHM/A (210) |
| 33 | G3OWA (213), G3SKR (158), G5JU |
| 32 | G3NUE, G5FK |
| 30 | GM3EGW |
| 29 | G3PMJ |
| 26 | G3LQR |
| 25 | G2BJY, G3AYT |
| 24 | G3LZN |
| 23 | G3BOC |
| 21 | GI3HXV |
| 20 | G2AXI |
| 19 | G3BNL |
| 16 | G3BJR, G3FDW, G3HWR |
| 14 | G3OKJ |
| 13 | G5UM |
| 12 | G5CP, G5DS |
| 11 | G3LHA, G3OJE, G3SNA |
| 10 | G2BDX, G3ICO |
| 9 | G3EKP, GC3OBM |
| 8 | G3NNO, G3PRQ |

***This Table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required. Totals in excess of 100 different stations worked can be claimed and will be shown in brackets after the call.***

the meantime is testing by two-way cross-band, a notable contact being a full 2m./70 cm. duplex QSO with G3JQI in Norwich, at 145 miles.

Active on VHF for many years, G2OI (Eccles) is an occasional correspondent; he now writes to report about a dozen stations heard or worked on the 430 mc band during November, with the London beacon GB3GEC audible almost every evening. The Tx at G2OI runs 40w. to a QQV06-40A tripling, and the receiver has three A.2521 RF stages, the aerial for 70 cm. being a 20-ele stack at 32ft. G2OI is on the band every evening from 11.0 p.m. and Bill says he would welcome skeds, CW or phone, in any GDX direction—*QTHR*.

Next letter on the 70 cm. clip is from G3EDD (Cambridge), who leads off by saying "I had a very disappointing time over the November week-end, at least on 430 megs. There was old Gerry, G2XV, knocking of F, DL, ON, OZ and PA, while the best I could do was PA. I found out just how much attenuation the East Anglian heights can cause; I am only 54ft. a.s.l. and those hills

## TWO METRES

ALL-TIME COUNTIES WORKED LIST

**Starting Figure, 14**

***From Home QTH Only***

| Worked | Station |
|---|---|
| 96 | EI2W |
| 89 | G5YV |
| 88 | G3BA |
| 87 | G5MA, G6NB |
| 85 | G3CCH |
| 82 | G3AOS |
| 80 | G2CIW, G3EHY, G3HBW |
| 79 | EI2A |
| 78 | GM3EGW |
| 77 | G3IUD |
| 74 | G3KEQ, G3PTM (475) |
| 72 | G3BLP (1,226), G3DKF, G6XM |
| 71 | G3HRH |
| 69 | G3EDD |
| 68 | G3BW, G3CO (803), G3GHO |
| 66 | G2OI (585), G3JWQ (569), G3KPT*, *G5BD* |
| 65 | *G6XA* (333) |
| 64 | G5JU, G6RH |
| 63 | G2FJR (542), G3FAN (1,000), G3JYP, G4LU |
| 62 | G3BOC, G3NUE (510) |
| 61 | G2HIF, G3HAZ, G3SAR |
| 60 | G3PBV, G3DMU, G3IOO, G3LHA, G5DS (898), G8VZ |
| 59 | G2BJY, G4SA |
| 58 | G8OU |
| 57 | G8SB |
| 56 | G3WW (770) |
| 55 | G2HDZ (495), G3AQX, G5BM, GW3MFY, GW5MQ |
| 53 | G2AJ (519), G3JXN, G3LAS, G4CI |
| 52 | G2NH, G3FZL, G3OXD/A, G6XX, GM3DIQ, GW2ADZ |
| 51 | G3LTN, G5ML, GM3LDU |
| 50 | G3ABA, G3GSE (518), G3NAQ, GW3ATM |
| 49 | G3AYC, G3OJY* |
| 48 | G3FIH, G3FIJ (584), G3JHM/A, G3JLA, G3LAR, G6TA (487), GC2FZC |
| 47 | G3OJY, G5WP |
| 46 | G3BNC, G3MTI (242), G3OHD, G4HT (476), G5BY, *G6YU* |
| 45 | G2AHP (647), G2DVD (362), G2HOP, G2XC, G3BJQ, G3GFD, G3MPS, G6GN, GI3ONF |
| 44 | G2BHN (261), G3BK, G3DVK (282), G3DVQ, G3GSO, G3NBQ (218), G8DA |
| 43 | G2DDD, G2FCL (322), G3CCA, G3COJ, G3DLU, G3HWJ, G3KHA (262), G3KQF, *G3KUH*, G3NNG, G3WS, G4RO, G5DF, G5UM (1,161) |
| 42 | G2AXI, G3DO, G3IER, G3PSL, G6CI (220) |
| 41 | G2DHV/P, G2CZS (282), G2FQP, G3JAM (481) |
| 40 | G3CGQ, G3FUR, G3OWA, G5MR (366), G8KL |
| 39 | G2IQ, *G3GBO* (434), G3LTF, G3NOH, G3OSS, G3VM, G8IL (325) |
| 38 | G3APY, G3CKQ, G3HTY, G3KQF*, G8VN (190) |
| 37 | G2FNW, G2FZU (180), G3KWH (271), G3MAX, G3NLR, G3OSA, G8DR (482), GC3EBK (260) |
| 36 | G2DCI (155), G3CXD, G3DLU*, G3HWR, G3IIT, G3OBD, G6CB (312), G8IP |
| 35 | G3FYY (235), G3HCU (224), G3IOE, G4LX, G5TN |
| 34 | G2AHY (295), G2CDX, G3AEP, G3ILD, G3IOE*, G8IC, G8NM |
| 33 | G2BDX, G3HHY (125), G3ICO, G3PTO, G4JJ/A |
| 32 | G3AHB, G3BYY* (274), G3HIL, G3NNK (325), G3OBB, G8QY, G8VR |
| 31 | F3XY, G3HXO, G3KPT (180), G5RP |
| 30 | G3FRY, G3GOP (208), G3GVF (129), G3IRA, G3KEF (110), G5NF, GM3JFG, GM/GW5UM/P, GW8UH |
| 29 | G2CVV, G3AGS, G3AKU |
| 28 | G3ITF, G3NPF, G3PKT (283), G8DL, GM3BDA |
| 27 | G3CVO (231), G3DAH, G3ISA (160), G3JGY, G3LDY (102), G3LTF/A, G6GR, GI3GQB, GW3CBY (122), GW3GWA |
| 26 | G2BRR, G3CFR (125), G3KGU (315), G3MED, G3SM (211), G3YH, G4MR (189), GC3OBM |
| 25 | G2BLA (138), G3JHM, G3JMA, G5SK, G6PJ |
| 24 | G3FD, G3FEX (226), G3FXG, G3FXR |
| 23 | G3BDQ, G3CWW (260), G3HSD (168), G3OPR (144), G5PY, G8VN (125)* |
| 22 | G2DRA, G3AGR (135), G3ASG (150), G3BPM, G3GVV, G5AM |
| 21 | G2AOL (110), G3IWJ, G6XY |
| 20 | G3EYV |
| 19 | G2HDR, G3GCX, G5LQ (176) |
| 18 | G3DBP, GC2CNC |
| 17 | G3EGG, G3MHD (195) |
| 16 | G3FRE, G3MLS |
| 15 | G3IWA |
| 14 | G3CYY, G3OZF, G5FK |

***Note: Figures in brackets after call are number of different stations worked on Two Metres; starting figure for this classification, 100 stations worked. QSL cards are not required to verify for entry into this Table. On working 14C or more, a list showing stations and counties should be sent, and thereafter added to as more counties accrue.***

* New QTH

three or four miles away are about 400ft. higher in the direction of the Continent." Hard cheese, Brian—but you're not doing so badly! And we hope you are not referring to Gog-Magog (regarded as mere excresences on the landscape when A.J.D. wore the gown).

Still on 430 mc, EI2W reports the first EI-GI contact on the 430 mc band—this was with GI3KYP/P on October 24, and is the 24th "First" that Harry has made for EI on VHF.

### The Four-Metre Reports

You have been referred already to the 213S worked by G3OWA (Coulsdon, Sy.)—who says that though more stations are appearing, most of the activity seems to be in the south-east; TVI could be the factor here.

Very successful on 70 mc is G3JHM/A (nr. Worthing), at 210 different stations worked on 4 metres, who can raise the GDX in Lancs. without much difficulty; he is now running a regular sked with GW3LJP (Llandrindod Wells) at 10.0 a.m. on Sundays, to test what is obviously a very difficult path.

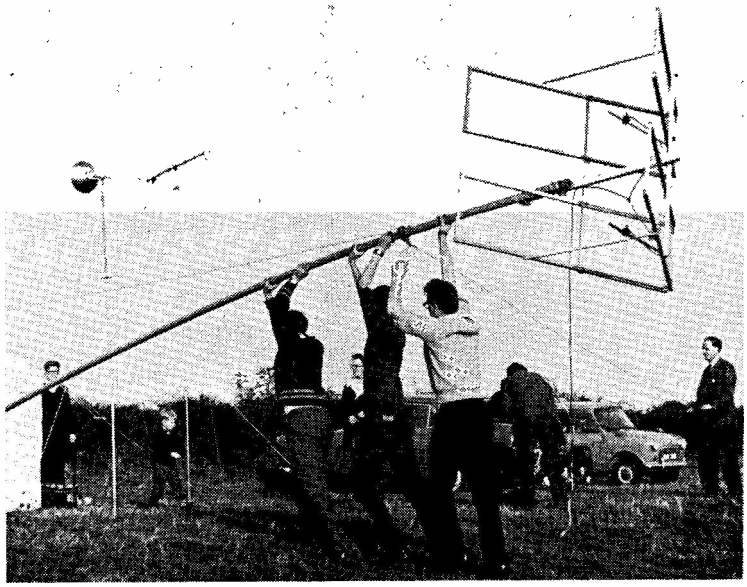
G3SKR (Wembley) has only been on the 70 mc band for three months but in that time has accounted for 158 stations in 33 counties and four countries.

From Manchester, an operator signing himself "G3PMJ IV" has been out /P with a B.44 Mk. II rig modified for 4m., finding it possible to have a "5 & 9 each way" QSO with a station not even audible at the home QTH. He mentions G3SKR as a very consistent signal in Lancs. on both CW and phone, and asks "If he can do it, where are all the other London stations?" And G3PMJ also gets a good signal from G3JHM/A, at a much greater distance.

An interesting 4-metre QSO for G5JU (Birmingham) was with GW3TCU/P (nr. Welshpool), when G5JU/M was in Herefordshire—well!

### Two-Metre Gleanings

Of course, the bulk of this month's mail is about results on two metres during the big opening of November 8-9—and in it some very interesting stories are told.



**Raising the 70 cm. aerial when the Bristol group turned out for a recent VHF field-day. Working the 23 cm., 70 cm. and two-metre bands, they raised eight stations and heard ten more, on 70 cm., with G3LTF as best GDX logged; G2CIW was also heard. The two-metre 6-ele Yagi and 23 cm. bowl reflector are shown in the background.**

For instance, on the Sunday afternoon, G5JU put out a CW/CQ, to have two stations come back with a one kc beat between them—one was SM6BCX and the other DJ2DN! DX on a plate, as Jerry says! He also remarks on the complete collapse of the Band Plan, with many well-known stations squeezing LF so as not to be left out of the scrummage.

G3IOE (Newcastle) found that on this occasion even the PA's and DL's were tuning the HF end; he heard an OK on the Sunday evening, but lost in QRM. Though G2JF was working OZ's, none could be heard in Newcastle (this fits in with the Wx pattern, incidentally—and your A.J.D. could go on for pages about what should and could have been heard or worked, and why it wasn't).

G3PSL (Loughborough) raised an interesting one on November 8—DL9GS/M; they must both have been quite surprised! G2CIW records reception of the Norwegian beacon LA1VHF on November 9. (First your A.J.D. knew that they have one—thanks, Jack!)

Having already accounted for many of the EU countries available on two metres, G3SAR (nr. Sevenoaks) concentrated for rare U.K. contacts, like G3BJD for Cumberland and G3JYP in Westmorland. But again he missed GM3HLH, heard at good strength working EU's. On the 9th, some G's were getting on well with the OZ's, not audible at G3SAR, though on previous occasions he has been able to work Scandinavians when nobody else could. This looks like a classic case of ducting, when you can be *too* high! G3SAR runs a 6/6 at 700ft. a.s.l., and it could well be that he would have done much better if he had been only on the 275ft. contour (like your A.J.D.!). Later in the period, November 18, G3SAR found a nice southerly

## SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

| Worked | Station |
|---|---|
| 41 | G2XV |
| 39 | G2CIW |
| 36 | G3JMA |
| 35 | G3KPT, G6NF |
| 33 | G3JHM/A, G3LTF |
| 32 | G3JLA, G3LHA, G3LQR, GW3ATM |
| 31 | G3JWQ, G5YV |
| 30 | G3EDD, G3KEQ |
| 28 | G3HAZ, G3HBW, G3NNG |
| 26 | GW2ADZ |
| 23 | G3BKQ, G6NB |
| 21 | G3AYC, G3IOO |
| 19 | G3FIJ, G5UM |
| 18 | G2OI |
| 17 | G3BA, G3BNL, G3JHM/A, G3MPS, G5QA |
| 16 | G2DDD, G3BYY, G3MED |
| 15 | G4AC, G4RO |
| 14 | EI2W, G2BDX, G2HDZ, G3FAN, G5DS |
| 13 | G6XA |
| 12 | G3HWR, G3NJO/T, *G5BD* |
| 11 | G3HRH |
| 10 | G3IRW, G3LZN |
| 7 | G2HDY, G3JHM, G3OBD/P, G6AX/P |
| 6 | G3EKP, G3KHA, G3WW |
| 5 | G3FUL, G3IRA, G3IUD, G3LTN, G5ML |
| 4 | G3JGY |

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

opening, with F's workable right down to the Pyrenees and Bordeaux.

Over the November 8-9 period, G3PTM worked six DJ/DL's, five PA's and one ON4, with DL9AR as best DX at about 500 miles.

G3FNM (Sale, Ches.) was there when things began to happen and mentions contacts with three new countries to bring him into that Table at 8C. As G3FNM puts it "how delightful to have the opening of November 8-9 to the Continent"—which will be echoed by all who were on.

G3CKQ (Braunstone, Leics.) claims for the Annual, as does G3FIJ (Colchester), who is also on 70 centimetres.

On September 14 G3TNO (Horsham) got what he calls his "piece of paper," and immediately he opened up on two metres; his Tx can run 40-90w. depending on the mode, CW or phone; the beam is a 6/6 at 30ft.; and the Rx an E88CC arrangement into an HRO. In less than three months he has worked 34 U.K. counties on two metres. And gear is in hand for the 70 mc and 70 cm. bands.

G8VN (Leicester) suggests that November 8/9 "will be a high spot in the VHF calendar," and with his indoor beam worked ON5DK and PAØBN.

G4LU (Oswestry), on whom your A.J.D. has been relying for years for factual reports on what-goes-on, Missed The Opening. This does not mean that Stan has become inactive on two metres—it just proves that not everybody can always be there to catch all the chances. But he got in at the tail end of the evening of November 9 and had a wonderful time with the EU's still coming through—one particularly interesting contact being with DL9GS/M, who has been mentioned before.

G3THC (Wolverton) comes into the Annual at 19C, with 85 different stations worked in the course of 200 or so QSO's. G3TKQ (Colchester) writes "I am fairly freshly licensed and work solely on VHF, on all bands 4m. to 70 cm." He goes on to say that since August 21, when the ticket came through, he has worked 80 stations in 20 counties and five countries, running 25w. into a 6-ele. Yagi. The same mast assembly carries a 16-ele. stack for 70 centimetres and a 4-ele. for 4 metres.

DL9GS/M was in the neighbourhood of Cologne (look at your gazetteer) when he was making those extraordinary contacts on two-metre mobile, one of them being with G3AOS right up in Cheshire. Geoff worked him through a band full of EDX signals, not heard like it for many years.

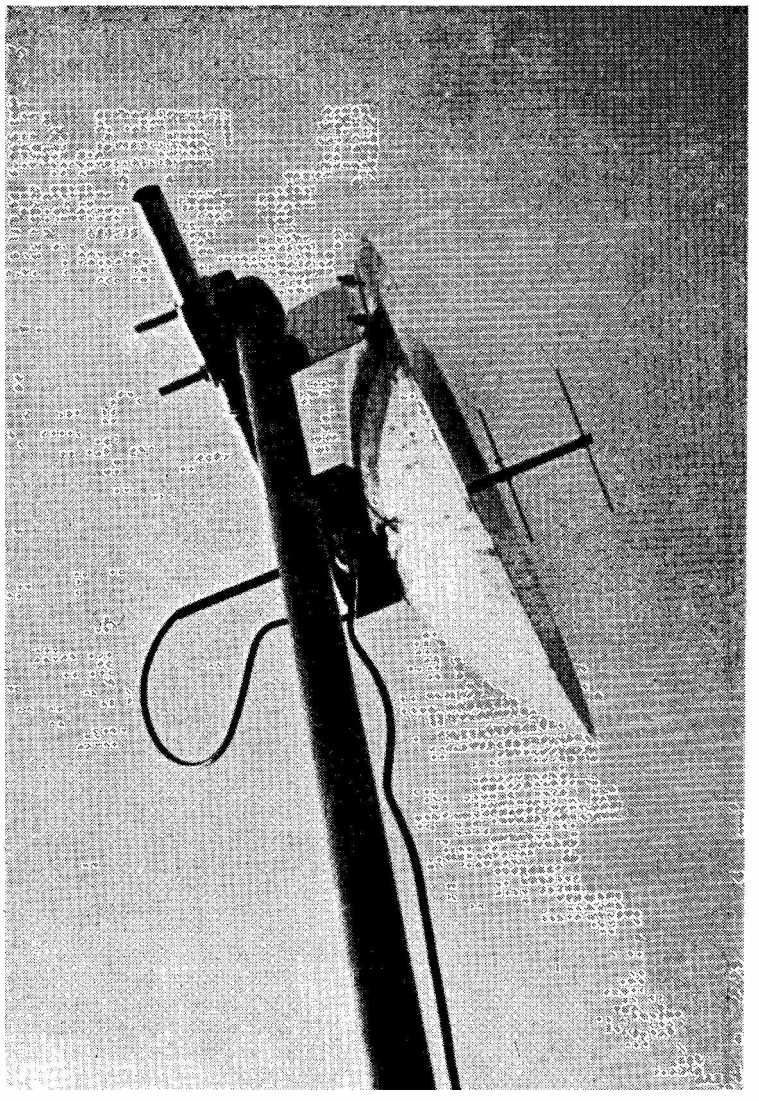
As it happened—or, as some would say, by an extraordinary chance—G3LWM, normally of

## TWO METRES

COUNTRIES WORKED

Starting Figure, 8

| | |
|---|---|
| 26 | ON4FG (DL, EA, EI, F, G, GC, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UP, UR, YU) |
| 25 | G3LTF (DL, EA, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UR) |
| 24 | UA1DZ (DL, DM, G, HB, HG, LA, LZ, OE, OH, OHØ, OK, ON, OZ, PA, SM, SP, UA, UB, UC, UO, UP, UQ, UR, YU) |
| 23 | G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP, UA, YU) |
| 21 | G3HBW |
| 19 | G3CCH, OK2WCG |
| 18 | G2JF, G6NB, ON4BZ |
| 16 | G3BA, G3BLP, G3CO, G3GHO, G3KEQ, G5MA, G6RH, G6XM, PAØFB |
| 15 | G2CIW, G2XV, G3AYC, G3DKF, G3EDD, G3FZL, G3HRH, G3RMB, G4MW, GM3EGW |
| 14 | G2FJR, G2HDZ, G3AOX, G3FAN, G3HAZ, G3IOO, G3JWQ, G3KPT, G3LAS, G3NUE, G3PBV, G3SAR, G3WS, G4LU, *G5BD*, G5DS, G6LI, G8OU |
| 13 | G2HIF, G2HOP, G3AOS, G3DMU, G3DVK, G3EHY, *G3GPT*, G3GWL, G3IIT, G3LHA, G3NNG, G3OHD, G3PSL, G6XX, G8VZ |
| 12 | EI2A, EI2W, F8MX, G2BJY, G2CDX, G3BNC, G3GFD, G3GHI, G3JAM, G3JLA, G3JXN, G3OBD, G3PTM, G3WW, G5CP, G5JU, G5ML, G8DR, GW2HIY |
| 11 | G2AJ, G2AXI, G2CZS, G3ABA, G3BDQ, G3BOC, G3GSO, G3IUD, G3JHM/A, G3JYP, G3JZN, *G3KUH*, G4RO, G4SA, G5UD, G6XA, GC2FZC, OK1VR, PAØVDZ |
| 10 | G2AHP, G2FQP, G3BK, G3DLU, G3FIJ, G3GSE, G3KQF, G3LAR, G3LRP, G3LTN, G3MED, G3OSA, G3XD/A, G5MR, G5TN, G5UM, G8IC, GW3ATM, GW3MFY, GW5MQ |
| 9 | G2BHN, G2DHV, G2DVD, G2FCL, G3BOC, G3BYY, G3FUR, G3OJY, G4LX, G8GP, GC3EBK, GI3ONF, GM3DIQ, GM3LDU |
| 8 | G2BDX, G2DDD, G2XC, G3AEP, G3AGS, G3AHB, G3CCA, G3EKX, G3FNM, *G3GBO*, G3HCU, G3HWJ, G3KHA, G3PKT, G3MPS, G3VM, G5BM, G5BY G8SB, GM3JFG |



**For a VHF/UHF field test over October 18-19, the Bristol Amateur Radio Club (signing G3OUK) had a 2ft. parabolic reflector system consisting of a driven element with a parasitic lug, tuned into the 23-centimetre band. On this, they heard GW3ATM (Chepstow) in contact with G3MPS (Bridgwater) on 1296 mc. Their equipment consisted of a half-wave trough-line on a CV-291 as mixer, with an ECC85 as head amplifier. No actual 23-centimetre contact was obtained.**

Ware in Hertfordshire—was also out mobile on two metres during the evening of November 9. Leaving Birmingham round about 6.15 and getting home shortly after 10 p.m., during the run he had twelve /M contacts, covering much of England and including PAØCML. His two-metre mobile equipment consists of a 12w. T.W. Tx, with the matching transistor Rx, using a halo on the car. Well might he say "I wish there was more activity like this on two metres during the early evenings."

G3BDS (Worcester) is often out /P in Herefordshire on Sundays and would be glad to sked with anyone wanting that county—he is *QTHR* and here again the gear is T.W. equipment, either halo or 5-ele. Yagi, depending upon whether G3BDS is /P or /M, and that depends upon the Wx.

Jack, G5UM, signs in to bring his claims up to date on three bands—70 mc, 144 mc and 430 mc, which shows that he is one of these versatile chaps who get the most from VHF. And if you think that this is just a bit of guff to fill the line, we would draw your attention to the fact that G5UM has now worked more than 1,160 different stations on two metres, and 110 on 70 centimetres.

### This Ducting Business

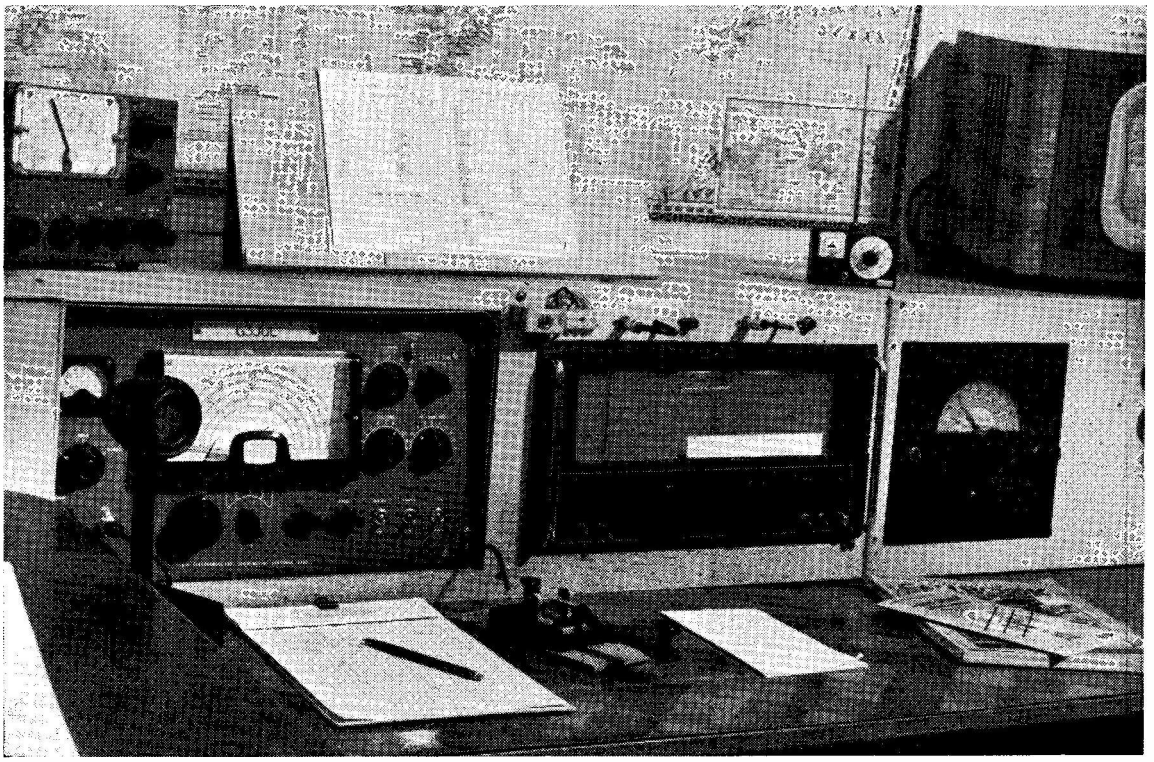
Brought up in this space last month were the oddities about beacon reception—why could we hear GB3LER when no GM's were coming through and what is the significance of GB3VHF at GDX.

From Birmingham, G5JU says that he can often hear the Cornish beacon when there are no signals at all to be heard from the south-west. (Fair enough—this could mean that nobody down there was on.) But the odd thing is that when G5JU does receive Cornish stations, he cannot hear the beacon! The same inexplicable pattern repeats itself with the Wrotham beacon.

From up in Newcastle, G3IOE reports exactly the same sort of thing in relation to GB3VHF. During one GDX session recently, when the beacon at Wrotham was hardly audible, stations from the Kent-Surrey area were coming in well.

### Dead-Line—

And that about wraps it up. Have a good Christmas, keep a drop for the New Year and, as far as this feature is concerned, let's hear from you again not later than **Friday, December 11,** if we are to have a story to tell in the January issue. Keep the fire in, and a Happy New Year.—*de A.J.D.*



# THE OTHER MAN'S STATION

## G3JUL

THE owner of this station, Geoff Voller, G3JUL, of 13 Marlborough Road, Ashford, Middlesex, is also well known as chief operator on GB2SM, the amateur-band station maintained at the Science Museum in South Kensington, London.

He first became interested in Amateur Radio in 1944, as a short wave listener, graduating to full licence in 1953. He served in the R.A.F. as a wireless operator during which time he was associated with the Iraq Club station YI2AM. CW operation is preferred with a strong bias towards competitive activities and the station which he has assembled is designed with this object in mind.

The main transmitter is a K.W. Victor with a CW Valiant for standby and local working. The receiving equipment includes an Eddystone 750 with DB-20 preselector and crystal controlled converter. The various facilities such as antennae and receiving ancillaries can be selected by means of switches and a plug/socket arrangement, so that the function of the station can be rapidly changed.

All transmissions are continuously monitored on Channel 1 for TVI and other equipment is held in reserve for emergency use in the rare event of failure of the main rig during long contests.

With very little space in which to erect aerials it has been possible, with careful planning, to include in the garden a 7 mc dipole, a 132-foot wire (much bent) and a three-band ground-plane, together with a Reinartz Loop and a fixed, two-element, 28 mc beam directed towards the U.S.A., in the roof space.

Despite the restrictions imposed by a difficult location 25 contest class and 200 operating awards have been accumulated including WAZ, WAS, WPX and CHC (1st U.K.). G3JUL is a member of F.O.C., and in addition to the activities of his home station, spends a good deal of time keeping GB2SM up to the mark.

# THE MONTH WITH THE CLUBS

## By "Club Secretary"

*(NOTE: No Club Reports Next Month — MCC Results only)*

ANOTHER **MCC** is over, and as we await the incoming of the logs it seems certain that all records have been broken again. From a QTH in South-East England, nearly 120 Club stations were heard, including four GW's, four GM's, one GI and (surprise!) one GD—all QSO'ing at a tremendous pace. It really seemed that the limiting factor has now become the speed at which the operator can send and receive. The higher the entry, the more difficult to work all possible clubs during the time available—owing to the time factor and nothing else!

A colleague left his receiver on 1825 kc, feeding into a tape recorder, for a total of two hours; listening to the tape, afterwards, revealed 82 club stations making QSO's on this single spot frequency. (The receiver's selectivity was left "wide open," naturally.) It also revealed the owner of a ghastly T7 note, a real rock-crusher, who was getting reports of T9 from some, T8 from others . . . also the fact that many, many stations called CQ, had a perfectly readable reply to it, but called CQ again without seeming to have heard anything.

Some clubs must have had *(a)* Poor locations, or *(b)* Poor receivers, or *(c)* Deaf operators, since weak stations calling them *never* got a reply. (One Club in the south was answered by three GM's but heard none of them.) But of course the QRM level varied in different parts, and the mutual interference between the stronger Club stations must have been serious at times.

However—it really seems to have been a cut-and-thrust contest, and the winning stations in each region will deserve much credit. Logs are awaited with considerable interest.

Next month the usual full report will appear, and as usual we have to remind secretaries and scribes that **routine reports are not wanted for the January issue,** as all available space will be devoted to the MCC Results.

Once again we send our Christmas Greetings to all Club Secretaries, Officers and members, with the hope that 1965 will be another record-breaking year for them. May *your* Club flourish during the coming year, as never before.

**HON. SECRETARIES PLEASE NOTE**

**For the next (January) issue individual Club reports are not required because, as usual, the space will be devoted to the MCC Story. Normal Club reporting will resume with the February issue, for which the closing date is Friday, January 15, addressed: "Club Secretary," Short Wave Magazine, 55 Victoria Street, London, S.W.1.**

### ACTIVITY REPORTS

Christmas Parties and AGM's fall thick and fast during the coming month, but most clubs manage to keep their normal activities going. At **Uxbridge,** for example, they have a "Bangers-and-Mash" supper on December 7, at which G3FZL has promised to appear and give a short talk; on the 21st G3JXC will be talking about Test-Gear Techniques; and January 4 is scheduled for the AGM. Note the new meeting-place: Railway Arms, Vine Street, Uxbridge.

**Swindon** forward a very pleasantly-written report, in the local paper, of their activities. A well-written and unsensational piece of journalism, but reporters will never be cured of talking about "radio hams."!

**In this space in the September issue, we mentioned Sid Warren, who has been much helped by members of the South Birmingham Radio Society — in particular G3JAO, G3PJU and G3RUK — to qualify for his licence. Sid is now G3TPC, on the air in his own right, with the backing of the great movement of Amateur Radio and all that it means, to help him overcome the disability of a wheel-chair existence after an active life. Let it be noted that G3TPC received no favours in qualifying for his call — he bad to take and pass the R.A.E. and the Morse Test, just like anyone else. What made it possible for him was the support and encouragement of the South Birmingham boys.**

This one, however, has since been enlisted as a club member. A large Christmas Junk Sale is booked for December 9, at the new meeting-place (Deers Leap Hotel, Penhill), and there will be a social function in January, mainly for the YL's and XYL's. A series of R.A.E. lectures is also scheduled.

Transceivers, including the new National NCX-5, will be demonstrated at the December meeting of **Acton, Brentford & Chiswick.** December 8, 7.30 p.m. at 66 High Road, Chiswick.

**Barnsley** held their Annual Pie Supper on October 30, and state that the unorthodox Quiz which followed produced unusually low scores (due to the slowing of mental processes by the quantity of food!). On December 11 G2AFV will be talking about Break-In Keying, and will demonstrate a practical model.

**Loughborough,** now installed in their new premises at Bleach Yard, Wards End, will see a Film Show by G3FYV on December 4. Then on the 11th they will have a Mullard Tape Lecture, with slides—"An Introduction to Electronics." The 18th is booked for their Christmas Sale, after which there are no more meetings this year.

From **Mid-Warwickshire** we gather that the demonstration of Heathkit gear at their October meeting was well attended. This one was confined to test gear, and the use of some of the more sophisticated items was explained and demonstrated. Early in the New Year they hope for a further demonstration, covering receivers and transmitters.

The only event at **Slade** during December is their Annual Fun-and-Games Evening—their big social event for everybody, which includes a cricket match! But the club, including its own Tx, G3SRS, is always open and available to members, with discussion meetings on Wednesdays.

**Southgate** faithfully follow the pattern already mentioned, with their AGM on December 10 and their Christmas Party on the 12th. The former will be at Atlasta Lodge, 7.30 p.m., and the latter will be held at Oakmere House, High Street, Potters Bar, 7.30-11.30 p.m. Tickets are available from G3RPN.

The date for the AGM at **Stockport** is December 16; their Hot Pot Supper was due to be held just before publication date, on December 2, and the G2ARX Trophy was to be presented at that event. Next meeting after all this will be on January 13, when G2ARX will talk about Amateur Radio in the Pre-War Days.

**West Kent** announce an Exchange and Mart (well, it sounds better than "Junk Sale") on December 11; the Christmas Party on the 18th; and a "Natter-Nite" on January 8. All their meetings are at 7.30 p.m. at Culverden House, Culverden Park Road, Tunbridge Wells. We note, by the way, that a new Article of Association for this Club is worded thus: "It is a condition of membership that all members of this Society will comply with the GPO regulations relevant to Amateur Radio."

**Bath Spa** have recently moved to new headquarters (7 Lambridge Mews, Larkhall, Bath), where they will meet at 8 p.m. on Mondays and Thursdays. Their secretary is G3TLV (*see* panel) and treasurer G3LYW.

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

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London, W.3.
A.E.R.E. (HARWELL): C. Sharpe, G2HIF, Building 347.3, A.E.R.E., Harwell, Berks.
BARNSLEY: J. A. Ward, G4JJ, 44 Northgate, Barnsley.
BATH SPA: G. C. Wynes, G3TLV, 14 Brook Road, East Twerton, Bath.
BLACKPOOL & FYLDE: J. Boulter, G3OCX, 175 West Drive, Cleveleys, Blackpool.
BRADFORD: E. G. Barker, G3OTO, 63 Woodcot Avenue, Baildon, Shipley.
CANNOCK CHASE: C. J. Morris, G3ABG, 24 Walhouse Street, Cannock.
CHESTER: R. Trickey, G3DRB, 31 Penzby Avenue, Chester.
CLIFTON: J. Rose, G3OGE, 63 Broomfield Road, Beckenham, Kent.
CORNISH: W. J. Gilbert, 7 Poltair Road, Penryn.
COVENTRY: E. E. Snow, G3TKO, 11 Lupton Avenue, Coventry.
CRAWLEY: R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley.
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
EAST WORCS.: M. J. Nicholas, G3TOI, 12 Crabtree Close, Lodge Park Estate, Redditch.
EX-G CLUB: N. F. Thompson, W8YHO, 1368 Roslyn Avenue, Akron 20, Ohio.
GUILDFORD: H. Mead, G3OXI, 41 Egley Road, Woking.
LOUGHBOROUGH: G. P. Bateman, G3LCG, 24 Farndale Drive, Loughborough.
LOUGHTON: A. W. Sheppard, G3JBS, 11 Barfields, Loughton.
MELTON MOWBRAY: D. W. Lilley, G3FDF, 23 Melton Road, Asfordby Hill, Melton Mowbray.
MIDLAND: C. J. Haycock, G3JDJ, 360 Portland Road, Birmingham 17.
MID-WARWICKS: H. C. Loxley, 51 Guy Street, Warwick.
NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax.
NORTH KENT: P. G. Wells, 25 St. David's Road, Hextable, Swanley, Kent.
PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
R.A.I.B.C.: Mrs. F. E. Woolley, G3LWY, 10 Sturton Road, Saxilby, Lincoln.
RADIO CLUB OF SCOTLAND: A. Barnes, GM3LTB, 7 Park Terrace, Glasgow.
READING: R. G. Nash, G3EJA, 9 Holybrook Road, Reading.
REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.
RODING BOYS' SOCIETY: R. J. Phipps, 51 James Lane, London, E.11.
SLADE: D. Wilson, 177 Dower Road, Four Oaks, Sutton Coldfield.
SOUTHGATE: R. E. Wilkinson, 33 Amberley Road, London, N.13.
SOUTH HANTS: G. J. Meikle, G3NIM, 34 Victoria Road, Netley Abbey.
SOUTH BIRMINGHAM: J. Rowley, G3TQO, 195 Castle Lane, Solihull.
SOUTH LONDON MOBILE CLUB: L. W. Wendon, 112 Leathwaite Road, London, S.W.11.
SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.
STOCKPORT: G. R. Phillips, G3FYE, 7 Germans Buildings, Buxton Road, Stockport.
SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
SWINDON: I. S. Partridge, G3PRR, 104 Grange Drive, Stratton St. Margaret, Swindon.
TORBAY: Mrs. G. Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay.
UXBRIDGE: F. J. P. Offord, 43 Greys Road, R.A.F. Uxbridge.
W.A.M.R.A.C.: Rev. A. Shepherd, G3NGF, 1 North Street, Crewe.
WEST KENT: H. F. Richards, 17 Reynolds Lane, Tunbridge Wells.
WIMBLEDON: E. N. Hurle, G3RZN, 156 Monkleigh Road, Morden, Surrey.
WOLVERHAMPTON: J. Rickwood, G3JJR, 852 Stafford Road, Fordhouses, Wolverhampton.
WORTHING: R. J. Tarr, G3PUR, 245 South Farm Road, Worthing.
YEOVIL: D. L. McLean, 9 Cedar Grove, Yeovil.

Although this is their first report to appear in our columns, the Club has been active since 1952.

At the Ladies' Night at **Bradford,** to be held on December 15, members will be showing their colour slides (which seems a good idea if they are not *all* of interiors of shacks). Then on January 5 the Club is holding a joint informal meeting with members of the Spen Valley and Leeds groups. Both meetings will be at Cambridge House, 66 Little Horton Lane, Bradford.

More films and slides will be in evidence on December 10 at the **East Worcs.** meeting. This will be at the Old People's centre, Redditch, and G3HZG will be showing a record of hs "ham-hop" holiday in Scandinavia.

Yet another Christmas Party —the Social Evening arranged by **Guildford** for December 19 at The Otter, Ottershaw, at 8 p.m. This is described as "a light-hearted evening in the seasonal spirit," to which ladies and friends are invited. Normal meetings are now held at the Guildford Model Engineering Society's Hq., Stoke Park.


**GW3MMU operating GW6GW, the Blackwood Radio Club station, always on the air for Club nights, mainly on 160m. CW. The basic equipment is a CR-100 Rx and a CNY-1 transmitter. During the recent Jamboree-on-the-Air a party of local Scouts was entertained and a DX-100U added for HF-band working. And, of course, GW6GW was batting it out with the best of them in MCC.**

The recorded lecture by W1BB on Top-Band DX brought along a record turn-out of more than 60 to **Northern Heights.** The following week they ran the tape through again for the benefit of Spen Valley members who visited them. December meetings are on the 9th (Annual Dinner) and the 23rd (Ragchew), and serious business starts again on January 6 with a talk on SSB by G3ADQ.

This same talk was due to be given to **Spen Valley** during November; the only December meeting there is on the 10th, and will be a Film Show. January 7 will be their Ladies' Night, and on January 21 the subject will be Radio Astronomy.

The only December meeting at **Worthing** will be on the 14th, when technical films will be shown. Adult Education Centre, 8 p.m. **Wimbledon,** too, have only one meeting, and that is the AGM on December 11, at the Community Centre, 28 St. George's Road, S.W.19.

**Blackpool & Fylde,** on the other hand, go right ahead with *four* meetings in December. On the 7th they have a tape lecture—Problems of Space Travel; on the 14th, a demonstration of home-built oscilloscopes by G3OPT; on the 21st, their Constructors' Competition and distribution of prizes; and on the 28th a Questions and Answers session. All at the clubroom at Squires Gate—7.30 for 8 p.m.

**Derby,** who now circulate their syllabus on a neat printed card, also have a full month. December 9 is their Constructors' Contest; December 16 an Open Evening (Juniors' meeting and Committee meeting); the 23rd their Annual Christmas Party; and on the 30th, The Year in Retrospect, with members bringing along their own transparencies of 1964.

The **London U.H.F. Group,** who meet on the first Thursday of each month at the Bull and Mouth, Bloomsbury Way, W.C.1, will already have held their December meeting (on the 3rd) before this is published. But January 7 is booked for a Social Evening, a discussion on 1965 developments and programmes, and a Junk Sale (although they call it "members' disposal of VHF/UHF equipment"). Wine-and-cheese refreshment will be provided.

The December meeting at **Melton Mowbray** falls on the 31st, on which date G4MK and Mr. D. Fisher will be talking about The Use of Test Gear. In the clubroom, St. John Ambulance Hall, Asfordby Hill, 7.30 p.m.

At **Wolverhampton** there will be a talk and demonstration (but no details available) on December 7 at 8 p.m.; and, on the 21st, an appropriately-styled meeting called "The Receiver I'd like for a Christmas Present." Then, early in January, they will hold their New Year Party.

**Chester** will have a technical film show on December 8, and a Christmas Surprise Night on the 15th. On the 22nd there will be a general discussion, and the year's activities will end on the 29th with a Net Night. Normal meetings are at the Y.M.C.A., Chester, at 8 p.m.

Improvements to the workshop at **Clifton** are now complete, and G3GHN, the Club Tx, is active on One-Sixty and Two. December 4 is the date for the annual Constructional Contest judging, and an informal social will probably be held in the clubroom just before Christmas. Normal meetings, every

Wednesday and Friday at 225 New Cross Road, London, S.E.14.

At their AGM in November, **Peterborough** decided to keep their sub. at 5s., also to hold a rummage sale and a Mobile Rally to help with the funds. They are very glad to have acquired an old windmill as a clubroom and station—this is just behind the Peacock Inn on the London Road, and will be open to visitors every Friday night.

**Reading** have brought their December meeting forward by a week to the 19th, and it will take the form of a Junk Sale and the judging of the Constructional Contests. Their Annual Dinner will be held on January 9, at The White Hart Hotel, St. Mary's Butts—applications for tickets to the hon. sec. Finally, their AGM—on January 30 at the Palmer Hall, West Street, Reading, which it is hoped that *all* members will attend.

At their recent meeting, **Torbay** welcomed two visitors from the Exeter Club, and also their own member, G3BBF, now home from Malaysia, where he did sterling work as VS1LV. A talk and film show was given by F. Hawken.

One of the large membership groups who only meet on the air is the **Ex-G Club,** open to any amateurs born in the U.K. and now domiciled abroad. They have a worldwide net every Sunday, 1900 GMT on 14346 kc, and a worldwide CW meeting on Saturdays, 2100 GMT on 14065 kc. Informal get-togethers can also be found on Saturdays and Sundays, 14260 or 21395 kc, according to conditions. Certificates are issued, for working or hearing a specified number of member stations; they are scattered all over the world. The president is W3HQO, secretary W8YHO, and U.K. liaison is handled by G4MJ, who will supply details of membership and awards on request.

**Crawley** will have an Informal Meeting on December 9, and their AGM on the 23rd. The latter will be at Trinity Congregational Church, Ifield, at 8 p.m.

Meetings are now held on the first and third Thursdays, 8 p.m., at **Cannock Chase,** but on December 16 there is a special evening visit to Sutton Coldfield, to see the new BBC-2 station in action. Booked for January 7 is a lecture-demonstration on the KW-2000, by G3FZW.

Fund-raising efforts by **Reigate** produced a profit of over £50 from their first Jumble Sale, held in October. A percentage was also levied on the proceeds from the annual Junk Sale, the same month. On December 19 the trophies for the Annual Constructional Contest will be presented, and the judges will be members of the Crawley, Dorking and Purley Clubs. The AGM will be on January 16—also at the George and Dragon, Redhill.

**Yeovil** will be decorating their clubroom in December, but meetings will continue. Two young members have just got their callsigns, and it is hoped to put the Club Tx on the air (Top Band) on club nights.

The December meeting of **Surrey (Croydon)** will be held on December 8, when a Mullard representative will talk on Modern Electronic Components. The **Roding Boys' Society,** who once again had an excellent exhibit at the Show, are returning to " more mundane projects," as they say. A lecture series for younger members is being run by the seniors, helped by G3JIX, and this, it is hoped, will lead to the R.A.E. next May for some of them.

### Club Publications

**The WAMRAC** *Circular Letter* (October) consists mainly of news of members, as always, and now gives " sked times " at which individual members can be found on the air. **Coventry** publish *CQ CARS* which gives the following details of meetings: Film Shows on December 7 and January 4; Top-Band Tx Construction on December 14 and January 11; Social Evening on December 21. There is also an article on Radio Astronomy by G3ROD, and some brief remarks on Ergonomics by G5GR.

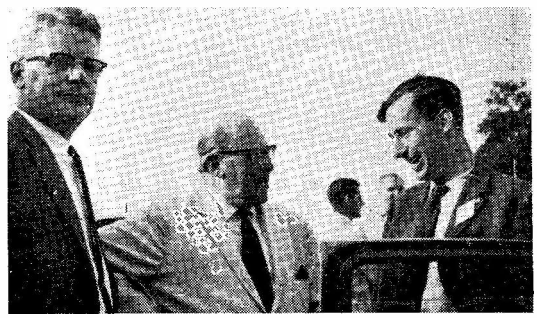
The **Radio Club of Scotland** goes from strength to strength with its *GM Magazine,* with Activity Reports, Band Surveys, VHF, RTTY, Mobile and Social-Notes sections. It also includes a section run by the Tape-Recording enthusiasts north of the border.

**South London Mobile Club** are unique, so far as we recollect, in including in their *G3SLM Newsletter* a *recipe,* by the XYL of one of their members . . . and they announce that this publication will appear quarterly in 1965, much enlarged and more ambitious.

The **Loughton** *Newsletter* does not give details of meetings later than November, but we do gather that they meet on publication date (December 4) for a technical film show. They have been involved in a Closed-Circuit TV demonstration at Loughton Hall, given by the Chelmsford branch of the B.A.T.C. in conjunction with the Television Viewers' Council.

The **North Kent** *Newsletter* gives a report on the October meetings, and the dates for the November events. We conclude that the December meetings will be on December 3 and 17—Congregational Church Hall, Bexleyheath, 8 p.m.

The *Newsletter* of **A.E.R.E. (Harwell)** is as interesting as ever, with a strong VHF accent and a forthright editorial mainly concerned with the apathy of the " ordinary member," who, nevertheless, is the mainstay of clubs and societies—which couldn't exist without him.



**Caught in an unguarded moment at the RSGB's Woburn Rally — left to right: Noel Eaton, VE3CJ, Canadian Director for the ARRL; Austin Forsyth, G6FO, of " Short Wave Magazine " and Geoff Stone, G3FZL, of the RSGB.**
*shot by G3NMR*

**Southgate** publish a short but lively *Newsletter*, and from the November issue we gather that they are running this year's Barnet Christmas Party—with assistance from local clubs. This will be held at Oakmere House, Potters Bar, on December 12 (7.30-11.30 p.m.). Further details of meetings in earlier note.

From *QSP* **(South Birmingham)** we learn that they have a Junk Sale on December 17 and a demonstration of members' equipment on January 21. A special point of interest is that two SWL members have now acquired their licences (G3TQI and G3TQO) and have both gone straight on to the committee—an excellent sign. (The latter has become hon. sec.—*see* panel.) Sid Warren, now G3TPC, to whom reference has been made before (and *see* p.623), has been granted honorary life membership of the Club. Also worth a mention is the fact that their excess of income over expenditure, which was only £2 odd in the previous year, amounts to £40 14s. 2d. for the current year, which must please them all.

The *Cornish Link* **(Cornish Radio Amateur Club)** is strong in VHF notes and news, but also includes an 80-metre review and test reports on current equipment. (No details of future meetings, though.) A later report mentions the visit, by a party of 14 members, to the Exhibition; the fact that the Club participated in the recent Scout radio jamboree; and the starting of an R.A.E. class.

**HON. SECRETARIES PLEASE NOTE**

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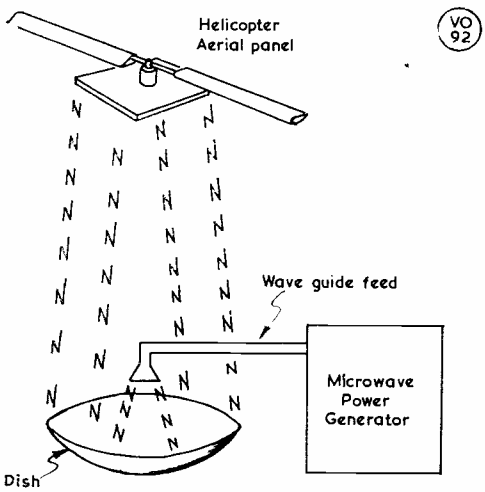
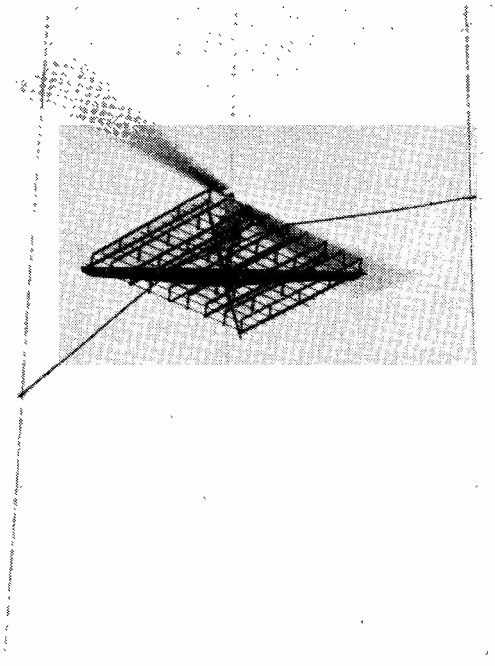
**South Hants.**, in their monthly *QUA*, report on past meetings, at which the average attendance has risen to 40. And the editorial ruminates on the complexity of modern equipment and the fact that we are no longer ahead of, or even level with, our commercial colleagues, on whom we now have to rely for "crumbs from the drawing-board, or bench." The Southampton Group meet on December 12.

### From Overseas

We also acknowledge receipt of the following publications from more distant parts: *Auto-Call* (September and October), from the Foundation for Amateur Radio (Washington, D.C.); *Collector and Emitter* (Aeronautical Center A.R.C., Oklahoma City); *MARTS Newsletter* (Malaysia Amateur Radio Transmitters' Society).

*For Readers' Small Advertisements—see pp.631-640*



**On the right, a 6ft. model helicopter powered solely by radiated microwave energy. The framework carries a complex of diode rectifiers, resonant at the frequency, producing a DC supply for the helicopter motor. Since the model is in free flight, it rises on guide wires to prevent it spinning off the beam. On the left is a representation of the electrical set-up — a 5 kW generator feeds a dish to reflect the power vertically at the helicopter. The significance of the experiment — carried out by the Raytheon Company of America for the U.S. Air Force — is that by using about 500 kW, it is estimated that a permanent flying platform could be maintained at altitudes up to 50,000 feet, and kept in position over the beam. The platform itself could be used for long-range TV transmission, missile detection, as a beacon station and for other types of navigational aid, and for weather reporting.**

# NEW QTH's

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

**EI7AU,** P. J. Fagan, 50 Belton Park Road, Donnycarney, Dublin, 9.

**G3BRT,** G. O. J. Parfitt, 58 Rodbourne Road, Westbury-on-Trym, Bristol. *(Re-issue.)*

**G3DAQ,** R. Braithwaite, 40 West Drive, Mickleover, Derby. *(Tel. Derby 53585.) (Re-issue.)*

**G3SVP,** V. H. A. Parker, 38 Hailstone Close, Springfield, Dudley, Worcs. *(Tel. Dudley 54543.)*

**G3TCQ,** Amateur Radio Club, R.A.F. Station, North Luffenham, Oakham, Rutland.

**G3TEH,** A. R. Storey, 23 Foster Street, Stairfoot, Barnsley, Yorkshire.

**G3THD,** D. Livesey, B.Sc., 93 Princes Avenue, Hull, E. Yorkshire. *(Tel. Hull 42500.)*

**G3TIK,** D. R. French, 98 Austen Paths, Stevenage, Herts.

**G3TIV,** T. Hope, 19 Deene Close, Corby, Northants.

**GI3TJJ,** J. Boyce, 6 Westland Street, Londonderry.

**GI3TJM,** R. Miller, Ardkeen, Coolreaghs Road, Cookstown, Co. Tyrone. *(Tel. Cookstown 3335.)*

**G3TKA,** P. S. Duncan, 18 Pickering Road, Hull, E. Yorkshire.

**G3TKU,** W. R. Griffiths, 16 Crewe Road, Shavington, Crewe, Cheshire.

**G3TLB,** K. R. Smith, 97 Southwood Road, Rusthall, Tunbridge Wells, Kent.

**GI3TLQ,** D. McMenamin, 58 Iniscarn Road, Londonderry.

**G3TMB,** J. M. Baker, 7 Highcliffe Gardens, Redbridge, Ilford, Essex. *(Tel. CREscent 6315.)*

**GI3TME,** R. Hargan, 8 Epworth Street, Londonderry.

**G3TNP,** C. H. Webb, 61 Avondale Road, Rayleigh, Essex.

**GD3TNS,** A. Sinclair, 1 Marathon Drive, Douglas, I.o.M.

**G3TNU,** J. J. Smith, Clarendon House, Croft Road, Ipplepen, Newton Abbot, S. Devon.

**G3TNY,** K. J. Spooner, 76 George Pope Road, Norwich, Norfolk. NOR. 33.N.

**GW3TOB,** B. A. Coughlin, 11 Goetre Fach Road, Killay, Swansea, Glam. *(Tel. Swansea 23861.)*

**G3TOG,** Miss Florence Martindale, 7 Richmond Park Road, East Sheen, London, S.W.14.

**GI3TOH,** C. P. Ford, 23 Hill Close, Ballykelly, Limavady, Co. Derry.

**G3TOI,** M. J. Nicholas, 12 Crabtree Close, Lodge Park, Redditch, Worcs.

**GW3TOL,** D. H. Breeze, 33 Wimmerfield Crescent, Killay, Swansea, Glam.

**G3TON,** A. M. Fentham, 84 Hollyhurst Road, Sutton Coldfield, Warks.

**G3TOZ,** G. F. Parkhurst, Fir Crest, Flackley Ash, Peasmarsh, Rye, Sussex.

**G3TPA,** L. Metcalfe, 11 Rockley Close, Almondbury, Huddersfield, Yorkshire.

**G3TPB,** J. C. Knight, The Corner House, Manor Road, Tongham, Farnham, Surrey. *(Tel. Aldershot 24044.)*

**G3TPG,** J. R. King, 92 Stanton Road, Regents Park, Southampton, Hants.

**G3TPK,** R. G. Wells, 127 Chestnut Avenue, West Wickham, Kent.

**G3TPS,** M. A. Green, 3 Castle Drive, Heswall, Wirral, Cheshire.

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SMALL ADVERTISEMENTS. READERS—*continued*

CONSTRUCTORS! High quality major components for transmitters and modulators, good selection, cheap, s.a.e. lists.—Box No. 4034, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

R.216 complete with PSU and all cables, brand new, £40. AVO-8, new, with leads, manual, £15. TW 2-metre Tx and Nuvistor converter, IF 4-6 mc, complete with TW matching mains PSU, brand new, installation complete, £35. Command Rx, 3-6 mc, professionally modified, new, £4 10s. Minimitter mobile Tx and control box, £14. '3FIF whip aerial, £4 10s., Top Band Command Rx, £7 10s. All new condition or complete mobile installation, £24. Carriage extra. WANTED: Signal generators TS497B/URR, TS413/A/U, SX-100 Rx.—Box No. 4035, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CR-100, good condition, with noise limiter and signal strength comparison meter, £15.—Cooke, 76 Falcon Road West, Sprowston, Norwich, Norfolk. *(NOR 73R.)*

WANTED: Lattice Tower, suitable for Quad. Kokusai filter. £7 10s. Valves, transformers, meters, crystals, all cheap.—G3IDW, Orchard Cottage, Hook, Swindon.

FOR SALE: K.W. "Vanguard" transmitter, 160-10m., £30. Eddystone 840A Receiver, £35. Near offers considered.—Hall, 24 Calthorpe Road, Walsall, Staffs.

SALE: Hallicrafters PE-110B power unit, £10. WANTED: Any manuals for Hallicrafters Transmitter-Receivers HT-11, HT-14, HT-8, BC-699, also BC-433 Manual.—Box No. 4036, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: R.308 front ends, 19-145 mc in five switched bands, into an IF of 9·72 mc.—Box No. 4037, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: SSB Tx and Rx, such as Hallicrafters, Collins or similar, also Vanguard. Cash.—Box No. 3073, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: A Novice Band in the British Isles.—C. Forrister, 368 Rush Green Road, Romford, Essex.

**SALE: Hartley 13A double-beam Oscilloscope complete with leads, manual and graticule, £25 o.n.o.? Heathkit V7A-U.K. Valve Voltmeter with HF probe, £9. Both very good condition. WANTED: Prop Pitch Motor, Hy-Gain 7 mc or 7/14 mc beam HT-18.—G3FPQ, Markham Oak, Bucks Horn Oak, Farnham, Surrey.**

TCS Receiver, transmitter and comprehensive power unit for sale. Complete station in excellent condition. Bargain at £15. Will deliver to 50 miles.—G3KAD, 59 Malvern Road, Swindon, Wilts.

**BANDSWITCHED QRO Linear** with pair of QY4-250's in AB, B & W *Pi*-Network, Silicon PSU, housed in Imhofs cabinet, commercial appearance, little used, £65 o.n.o.? 1½-3 kV PS components, 10 μF 1,500v. working oil filled capacitors (4), transformer, choke, 24 1,000v. p.i.v. Diodes, £8 the lot.—G3NMH, 6 Haven Close, Stratton, Swindon, Wilts.

SALE: CR-100/2, S-meter, manual, speaker, perfect order, £18.—Thurlow, 19 Gravel Hill, Croydon, Surrey. *(Tel. ADD 2761.)*

DX-100U, professionally wired, mint condition and excellent performance, with manual, £50. Going SSB.—GW3SFC, 30 Well Place, Aberdare, South Wales.

SMALL ADVERTISEMENTS, READERS—*continued*

SECONDHAND H/Duty ball-bearing cabinet runners, 100 per cent mechanically, closed 15⅜in. extended 30⅜in., 5s. pair plus 3s. 6d. p. & p.—Swinborne, 6 Comberton Road, London, E.5. *(UPP 6224.)*

BARGAINS: B & W Phaseshift network, new, 35s. Signal Corps Ant. relay (12v.) with 3 amp. RF meter, 7s. 6d. TCS loading coil, 10s. Modified TCS control/speaker, contains mains to 12v. DC for relays, 10s. Model MT-316 Multimeter 20 k.p.v., £1. Jap S-meter (new) lighted, 10s.; unlighted model, 7s. 6d. 898 dial, £3. 36 Set dummy load, 5s. Two new 300 mA meters, 5s. each. Brass meter calibrated SWR/power watts, 200 μA, 10s. One amp. RF meter, 7s. 6d. New RCA 5U4GB's (two), 5s. each. 3585 kc crystal, 2s. 6d. Two Eddystone Diecast boxes, 2s. 6d. each. Relay 28v., works on 12v., two C/O, 5s. Mains transformers: Parmeko 500-0-500v. at 450 mA, £1; Douglas 12·6v. at 5 amp., 5s.; Thorardson 250-0-250v. at 150 mA, 7s. 6d.; 130v. at 20 mA, 5s. Chokes: Parmeko 10H at 150 mA, 10s.; two Westcool 10H at 150 mA, 5s. each; Electrovoice 10H at 120 mA, 7s. 6d. Capacitor 6 μF 1,500v., 7s. 6d. Collector or carriage extra.—Stone, 18 Glenluce Road, Blackheath, London, S.E.3.

HRO-5T unmodified, coils, speaker, power supply, manual. Central Electronics sideband adaptor and Q-multiplier, with built-in power supply for 230/240v. and 450-460 kc IF, with manual and connecting plugs. KW-500 linear amplifier, immaculate, with manual. What offers?—G3HCT, Brooklands, Ullenhall, Solihull, Warks. *(Tel. Henley-in-Arden 2176.)*

FOR SALE: R.208 and manual, £6; R.1392, £3; RF-26, 10s.; 358X manual, 10s.—After 12 noon: Clark, Hillside, Butchers Hill, Shorne, Nr. Gravesend, Kent.

WANTED: Viceroy Mk. III or IV. SALE: HRO BS coils, 10 and 80 metres, £2 each; 15 metre BS, 45s. 2s. 6d. postage on each.—Stead, 2 Cliff Road Gardens, Leeds, 6.

WANTED: 2-metre converter, also transmitter and PSU, preferably T.W.—Box No. 4038, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: K.W. Vanguard transmitter, 10-160 metres, excellent condition, £30. R.C.A. AR88D receiver, S-meter, re-valved, crystal band-edge marker; complete with matching speaker and manual, £37 10s. BC-221AF frequency meter, complete with charts and AC mains stabilized PSU, £13. All items delivered Home Counties, otherwise carriage extra.—G3RDG, *Speedwell 8831, QTHR.*

VICEROY **Mk. III** (Int. PSU), as new, £120 o.n.o.?—G3KZW, 43 Beacon Road, Billinge, Wigan, Lancs.

GOING MOBILE? K.W. Valiant, £30. Dependapac PSU, £15. Heathkit Mohican, £25. Minimitter Mobile 3-band Tx and PSU, £20. All units in good used condition. Prices include packing and transportation by passenger rail service to any part of U.K.—GI3PLL, Ballycastle, Aghanloo, Limavady, Co. Londonderry, N.I.

PORTABLE British Transistor Trav-ler battery Tape Recorder, 10½ x 7¾ x 5in. unmarked, complete with microphone and weatherproof zip-up carrying case. Cost 29 gns., bargain at 12 gns.—G2VV, 53 Thames Street, Sunbury-on-Thames, Middx.

SALE: W.1191 Wavemeter, official and amateur charts, headphones, good order, £7 o.n.o.?—G3OAZ, Akehurst, Stevens Cottage, Ipplepen, Devon.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: Minimitter mobile whip antenna, 160-metre, mounted on one section of Shirack for attachment to roof of car; together with 80-metre coil and top section, £7 10s.—G3RDG, *QTHR. (Speedwell 8831.)*

FOR SALE: Heathkit Q-Multiplier, made up **not aligned** 450 kc IF, new, £6.—Thirlaway, 91 North Road, East, Wingate, Co. Durham.

**FOR SALE: AR88/F (not LF) later type of D-model with IF gain control, £30. Two AR88 speakers, £2 10s. each. R.C.A. AR88D instruction book, 10s. BC-221 with spares and 190 page manual, £12. HRO power pack converted to drive BC-221, £3. AC mains Class-D wavemeter with spares and manual, £6. Another similar without spares and manual, but complete and working, £4 10s. R.1155 with power pack and speaker, £7. G3HSC Morse record, 12s. 6d. BRS Morse record, 12s. 6d.** *RSGB Handbook,* **new, 12s. 6d.** *ARRL Handbook,* **12s. 6d. Prefer buyer call, inspect and collect, but delivery possible 100 miles London area on expenses basis.—Box No. 4039, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**

**VICEROY Exciter BK/CW, silicon rectifiers, little used, £48. TCS-12 Receiver, £4. RCA 2000-0-2000v. 0·5 amp., £4. Dubilier 4 μF, 4 kV, 15s. Carriage extra.—G3NYQ, 24 Wrenbeck Avenue, Otley** *(Tel. 2219)* **Yorks.**

SALE: £8, 2-metre Transistor Converter, 12v., six transistors, 1st class condition, or EXCHANGE similar condition 70 cm. Converter, not transistor.—Johnson, 3 Folly Gardens, Wymondham, Norfolk.

SX-28, £29 10s.; R.45/ARR7, 0·5 to 43 mc, £19 10s.; National NC-57, £20; HRO, Navy type, all coils, PSU, £20; Telefunken E.52B/2, 1·5 to 25 mc, £25; CR-300/1, 15 kc to 25 mc, £12 10s.; RCA/VLF, 15 kc to 600 kc, £7 10s.; RV.19, 300 to 600 kc, £5. Kendon SSB Exciter, crystal filter, all-band, £25. TF.144G, complete, £22 10s. BC-221, £12. G73, £6 10s. Salford 106 Wavemeter, £7. Windsor 45B Valve Tester, £12 10s., EMI automatic monitor, £5 10s. TR.1986, £6. SCR-522 with QQV06/40, £5. Redifon GR174, 50-150 mc, AM/FM, £7 10s. Marconi TF.340 output Meter, £8 10s. All carriage extra.—Porter, 26 William Street, Londonderry, N.I.

COMPLETE STATION in excellent condition. Minimitter Top 2-7 and Eddystone S.640 with matching loudspeaker and heavy duty A.M. Morse key, £40 (carriage 30s.). Rep. Octone 8-chan. Tx/Rx. 54in. MTB and Piper tracer aircraft with 54in. wingspan, engines and servos, etc., bargain, £50. Eddystone 898 dial, new, 62s. 6d. Kokusai mechanical filter MF.455-10K, brand new, £9. SSB phasing exciter (2250 kc) complete, 70s. Power supply to G2DAF spec., £6. Woden DTM-17 750/250 mc, £3. VQ4EV 2m. converter, 30s. RF-26, 12s. 6d. Other items as November 1964 *Short Wave Magazine;* s.a.e. enquiries, carriage extra.—G3MOE, Westbury Road, Cheltenham, Glos. *(24217.)*

**REQUIRED URGENTLY: Manual for AR88LF, write first, stating condition and price to Jack Gleave, 9 Merton Avenue, Hazel Grove, Nr. Stockport, Cheshire.**

HEATHKIT (works assembled) RA-1 with Q-multiplier/xtal calibrator/matching speaker, as ew, £42 (list price £72). Eddystone S.640 (unmodified, unmarked), £25. Export model PR-120V 150-watt 5-band AM/CW Tx and LPF (no TVI), £50 o.n.o.? WANTED: (buy or part-exchange) Drake 2B or SX-111.—Box No. 4041, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: R.107, excellent condition, 19 Set Variometer fitted, handbook, £12. Buyer can collect or pay carriage.—Meisenbach, 11 Carrs Yard, Whitby, Yorks.

FOR SALE: CR-100 rewired in PVC, £12. Hallicrafters S.27, £10. Both in good working order. Buyer collects.—72 Elmstone Road, Rainham, Kent.

EDDYSTONE 840A, working order, with two cabinet speakers, £20. Buyer collects Saturday afternoon.—15 Waverley Gardens, Grays, Essex.

WANTED: QRO 10-80 AM/CW Tx. Details of condition, line-up performance, etc., to—21 Chaucer Road, Chelmsford, Essex. *(4967 evenings.)*

CR-100 rewired in PVC, front end modified, S-meter, crystal calibrator, noise limiter, manual. excellent condition, £20. R.1392, oscillator mod. 95-150 mc, £5.—Lee, 15 Cedar Road, East Croydon, Surrey.

**A.T.R. Inverter, input 110v. DC, output 110v. AC, 60 c/s 350w. continuous, almost as new, £20 o.n.o.? Eico 720 90w. crystal controlled CW transmitter, 115v. AC input, £22. Buyer please collect.—M. B. Dolan, 15 Ringwood Road, Headington, Oxford.** *(Tel. 63000 evenings.)*

TCS and Rx with pre-amplifier, rotary 12v. power supply, connecting plugs, control box including speaker, £30. Tripletone stereo amplifier, 5 watts per channel, little used, £15. Minimitter LPF, £2. CR-100. £15. K.W. Valiant 10-160 metres, Dependapac transistor power supply, £45. London area.—Box No. 4040, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Minimitter converter, amateur and commercial, £15. 25 reels paper tape for Type 3 printer, 25s. CFS IF terminal Unit, £5. Canadian Marconi No. 9 Rx, 1·75-5 mc, £5. Terminal unit AP.66862 with power pack, £15. Pair of No. 38 Walkie-Talkies, £3.—B. Davies, 16 Mulkern Road, Holloway, London, N.19.

KW-77, as new, £85, with matching speaker. Top Band SSB Rig, £15.—Thomson, Sunnyholme, Fairview, Basildon, Essex.

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