The SHORT WAVE Magazine

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VOL. XVII MARCH, 1959 NUMBER 1

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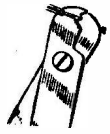

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The SHORT WAVE Magazine

EDITORIAL

Vindication

In this space last month we discussed the matter of alleged interference by U.K. 160-metre amateurs with Coast stations transmitting in the 1800-2000 kc range. Not only did these remarks obtain support from some unexpected quarters, but it was also pointed out that in most instances amateurs could (and in fact do) work through or over Coast stations without causing them the slightest trouble. For example, Wick Radio is a very strong signal in Southern England when he is working trawlers inside the Arctic Circle; but a group of amateurs in, say, Sussex, in contact locally amongst themselves, would just not be heard by ships working Wick Radio.

Actually, this is the sort of situation which frequently does arise on Top Band in the evening hours. From end to end, there is a jam of Coast stations, all well over the S9 mark, and all in contact with ships in their band above 2000 kc. Amateur QSO's are going on between — and in some cases, over — them, depending to a great extent on the locality factor. There is a process of automatic segregation, in that where the amateur stations are attempting GDX working, they naturally take care to avoid the Coast stations, because of their QRM potential. On the other hand, if the amateurs are working locally, with their own signals so much stronger to one another, they can work through the Coast stations because they can tolerate the QRM.

This is what has been going on for years. That in all this time there have been barely half-a-dozen official complaints (whether justified or not it is impossible to say) proves that in practice interference caused by amateurs is negligible; that the system as outlined here last month is working satisfactorily; and that 160 metres is being operated on a shared basis to its maximum capacity. If this is good enough for the Coast stations, it ought to be accepted by everyone else concerned.

Austin Forbes G6FO.

CW/Phone Transmitter for Five Bands

WITH VOX CONTROL AND AUTOMATIC SEND-RECEIVE SWITCHING

A. ROWLEY (G3JWZ)

In this design, the points of particular interest are that it incorporates voice-control for speech working, and automatic change-over, with full break-in operation on CW. Using a pair of QV06-20's in the PA, input can be up to 150 watts.—Editor.

IN the few years that the writer has held an amateur licence he has built a number of transmitters, each being more advanced in design, construction and facilities than the last one. The transmitter to be described is the latest, and (to the writer's mind, at least !) almost the ideal.

The points considered in the design of this transmitter were as follows :

(1) Coverage of amateur bands from 3·5 mc to 28 mc.
(2) Speedy band-changing.
(3) To operate and tune with minimum trouble.
(4) All controls on the front panel.
(5) Transmit-Receive switching in one operation.
(6) Reasonably low harmonic output.

The resulting design gives the following facilities :

(1) Single-knob band-change.
(2) All band coverage (3·5 - 28 mc).
(3) Easy operation: Transmit-Receive switching by one switch, or by break-in if required.
(4) Voice-control while using telephony, if desired.
(5) All leads brought out at the rear of the cabinet.
(6) Automatic aerial change-over by a T/R switch.

A block diagram of the general arrangement is shown in Fig. 1, alongside.

Circuit Description

The Variable Frequency Oscillator : The VFO uses a 6AC7 in a Colpitts circuit, as in Fig. 2. The tuned circuit is enclosed in a shielding box, separate from the valve chassis, to which it is connected by two lengths of coaxial cable. The 6AC7 is followed by two isolating stages using 6AM6 valves. As the VFO operates in the 3·5 mc band a lot of isolation is needed. The second 6AM6 is tuned to the centre of the 80 m. band by means of a slugged coil, L2 in Fig. 2. The oscillator grid leak is split into two sections to facilitate the application of a blocking voltage for control purposes (to be described later).

Driver and Multipliers : This is basically the standard arrangement frequently employed in bandswitched transmitters, and is shown in Fig. 3. The first valve, a 6AG7, amplifies the VFO output to drive the PA on 3·5 mc. The level of drive is controlled by a potentiometer, R9, which varies the screen voltage on the 6AG7 ; the second valve, a 6F6M, doubles to 7 mc. The third stage, taking a 5763, doubles to 14 mc or triples to 21 mc, while the fourth, also a 5763, doubles to 28 mc.

The 6AG7 at V4 is grid-block keyed at all times ; the other valves take little or no current when undriven.

Power Amplifier: This is fairly conventional, using a pair of QV06-20's (6146) in a pi-network output circuit, Fig. 4. A switching arrangement—S2A-2B—allows the amplifier to be used as a linear for SSB (with external exciter). Under key-up conditions plate current is cut off by −250v. bias. On SSB the bias is

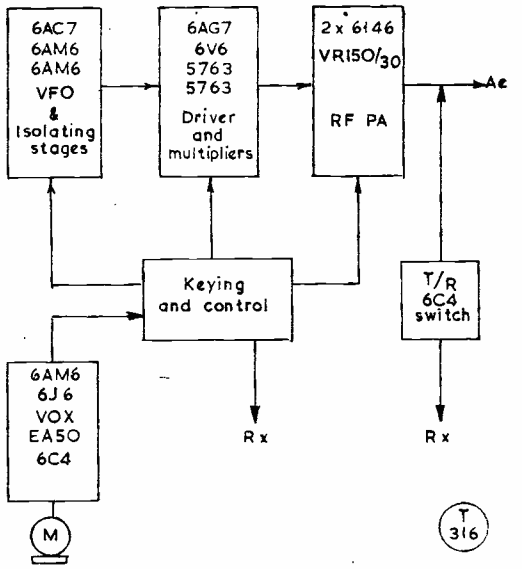


Fig. 1. Block diagram of the transmitter layout, showing inter-connection of the units, as described in the text.

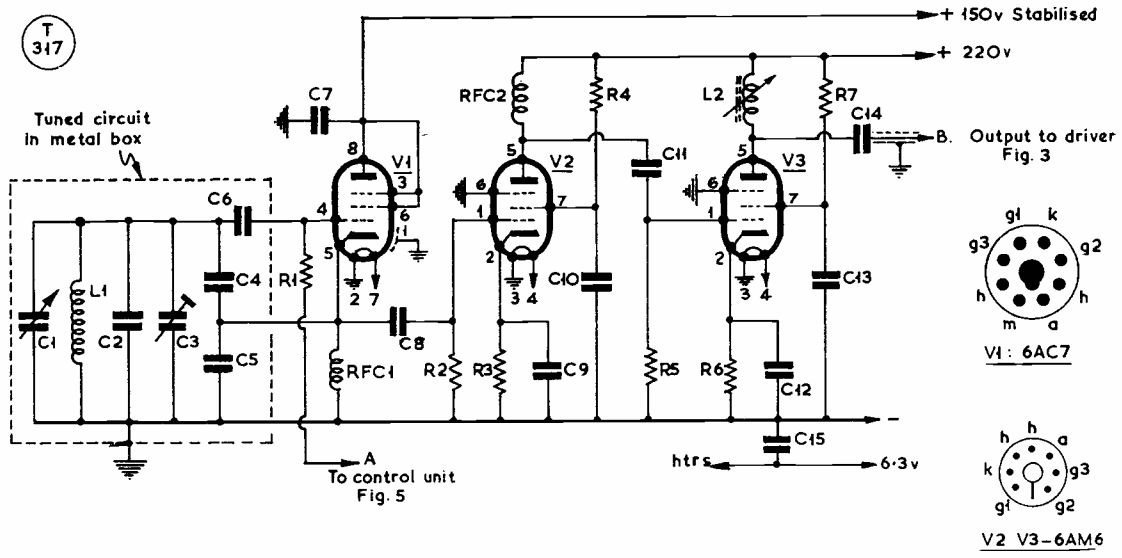


Fig. 2. The VFO and isolating stages for the band-switched transmitter described by G3JWZ. The primary frequency generating circuit is fully screened, and the 6AC7 oscillator is followed by two 6AM6 stages. The VFO is brought into the automatic change-over control circuitry, and the transmitter can be operated VOX.

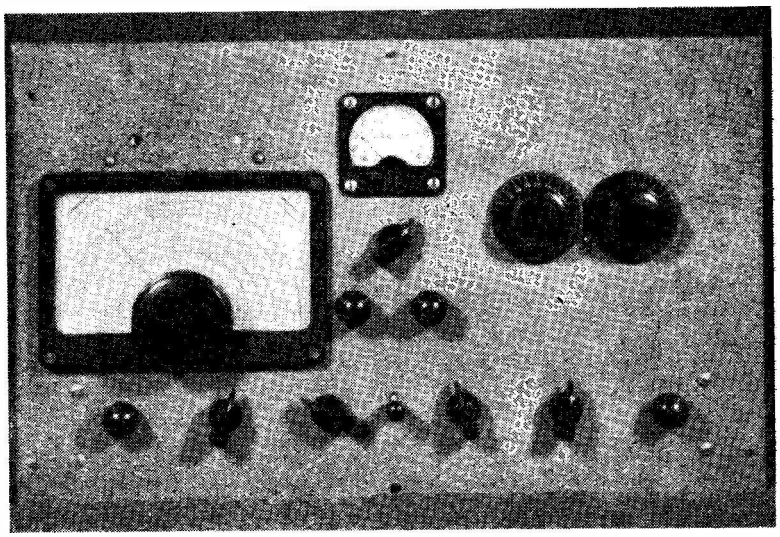
chosen, by R16, to be the correct value for Class-AB1 working. The voltage for the PA screens is obtained from the 300-350v. HT supply *via* an audio choke, L5; the choke is necessary to enable the PA to be plate modulated. The VR150/30 is used to prevent the screen voltage from soaring to 300v. when the key is up. It also makes tuning up easier as the voltage remains constant under different loading conditions, thus limiting plate current. (QV06-20's take a tremendous amount of plate current if tuned without care.) On telephony the VR150/30 must be taken out of circuit, by S3A, to enable the screen voltage to swing at audio frequency.

Aerial Change-over Switch: This uses a 6C4 (V11, Fig. 4) connected to the PA tank circuit *via* a coupling capacity C32. The circuit functions as an amplifier when the transmitter is inoperative, but when the transmitter is on, a high bias is developed across the grid leak, R20, cutting the valve off. The receiver is then effectively disconnected from the aerial. The output circuit is tuned (by the coil assembly, L8-L12) to enable a small amount of gain to be obtained

Table of Values

Fig. 2. VFO and Isolating Stages for Five-Band Transmitter

C1	= 100 $\mu\mu$F variable	R3, R6	= 300 ohms ½w.
C2	= 15 $\mu\mu$F silver mica	R4, R7	= 33,000 ohms ½w.
C3	= 50 $\mu\mu$F trimmer	RFC1,	
C4, C5	= .001 μF silver mica	RFC2	= 2.5 mH RF choke
C6	= 100 $\mu\mu$F mica	L1	= 20 turns of 22g. on ½in. dia. former
C7, C9, C10, C12, C13, C15	= .001 μF disc ceramic	L2	= 90 turns of 30g. on ½in. dia. slug tuned former
C8, C11, C14	= 100 $\mu\mu$F mica	V1	= 6AC7
R1, R2, R5	= 47,000 ohms ½w.	V2, V3	= 6AM6



Front view of the five-band switched transmitter described in the article by G3JWZ It incorporates VOX and automatic change-over.

on "receive."

Control Circuitry: The control valve, V12 in Fig. 5, is a 12AU7 to enable blocking voltages to be obtained automatically for transmit-receive switching. With the key up the right-hand (B) section of the 12AU7 is cut off by the full value of blocking voltage applied to its grid. This voltage is also applied to the 6AG7 and QV06-20 grids. The left-hand (A) section is adjusted to pass sufficient current to develop 15 volts across its anode load (R24). This voltage is used to cut off the VFO. When the key J1 is pressed the VFO blocking voltage disappears and the drive comes on. The 6AG7 and PA do not conduct immediately, but do so when the condensers C39 and C27 (Fig. 4) are discharged through

Table of Values

Fig. 3. Driver and Multiplier Stages for the Five-Band Transmitter

C16 = 500 $\mu\mu$F disc ceramic
C17, C18, C26 = .001 μF disc ceramic
C19 = 3-30 $\mu\mu$F trimmer
C20, C22, C24, C25 = 100 $\mu\mu$F mica
C21, C23 = 3-12 $\mu\mu$F trimmer
R8 = 300 ohms ½w.
R9 = 50,000 ohms wire wound variable 3w.
R10 = 15,000 ohms 3w.
R11, R12, R13 = 33,000 ohms ½w.
Rx = For 350 volt supply, Rx 7,000 ohms, 5w. For 300 volts Rx is 5,000 ohms, 5w.
RFC3 = 1.5 mH RF choke
S1a-S1e = 5-way ceramic switch
V4 = 6AG7
V5 = 6F6M
V6, V7 = 5763

Table of Values

Fig. 4. RF Power Amplifier and T/R Switch stages

C27, C28, C36 = .001 μF disc ceramic
C29 = .002 μF 2,000v. mica
C30 = .001 μF 1,500v. mica
C31 = 350 $\mu\mu$F variable
C32 = 10 $\mu\mu$F 1,000v. mica
C33 = 500 $\mu\mu$F mica
C34 = 2-gang 500 $\mu\mu$F midget variable
C35 = 100 $\mu\mu$F mica
C37 = .001 μF mica
R14 = 15,000 ohms 1w.
R15, R21 = 100 ohms ½w.
R16 = 50,000 ohms potentiometer, 2 watts
R17, R18 = 47 ohms ½w.
R19 = Meter shunt (to read 300 mA)
R20 = 4.7 megohms ¼w.
S1f = 1-pole 5-way ceramic switch
S2A-S2B = 2-pole 2-way ceramic switch
S3a = Part of Phone/CW switch
S4A-S4B = 2-pole 5-way ceramic switch
S5 = 2-pole 2-way ceramic switch
M = 0-10 or 0-15 mA FSD moving coil
CX1, CX2, CX3 = coaxial sockets
RFC4, RFC6 = 2.5 mH RF choke
RFC5 = 130 turns 26g. on ¼in. ceramic former
L3, L4 = Anti-parasitic chokes
L5 = 8 Henry, 50 mA LF choke
L6 = 4 turns 14g. 1¼in. dia. 1¼in. long
L7 = 18 turns 16g. 2in. dia. 2½in. long (tapped at 1, 3 and 9 turns from L6 end)
L8-L12 = Small slug-tuned coils to cover ranges 3.5-28 mc, with Rx link windings.
L13 = 4 turns 22g. ¼in dia.
V8, V9 = QV06-20 (6146)
V10 = VR150/30
V11 = 6C4

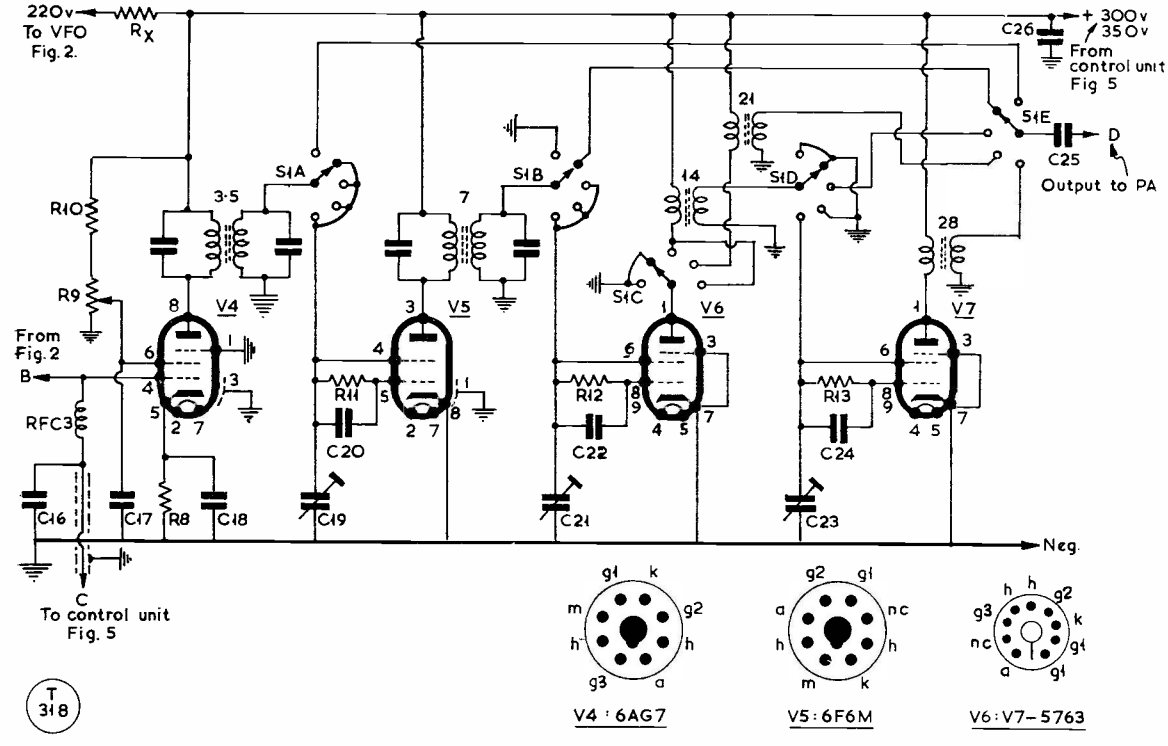


Fig. 3. Circuitry for the driver-multiplier stages in the G3JWZ five-band transmitter; the general arrangement of the band-change and multiplier sections is conventional, with 5763's for V6 and V7.

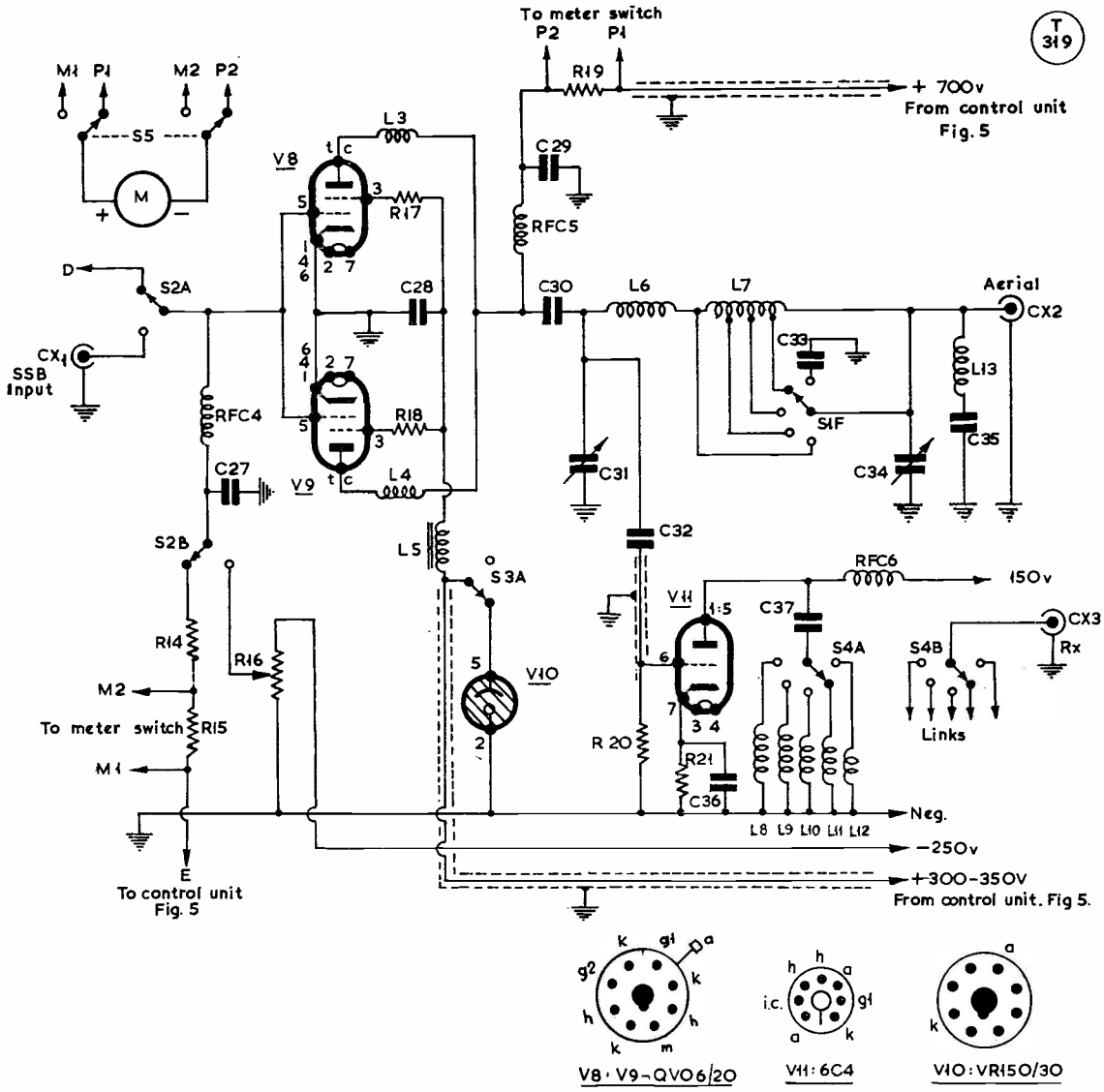


Fig. 4. The RF power amplifier stage in G3JWZ's band-switched transmitter uses Mullard QV06-20's (6146's), in the conventional paralleled PA layout with pi-section network. What makes it different, however, is the T/R ("transmit-receive") automatic change-over switch, the circuit of which is shown round V11. The five inductances L8-L12 can be resonated on each of the bands 3.5 to 28 mc, and enable some input gain to be obtained on "receive." For C32 it may be advisable to use two 20 μμF 1,000v. condensers in series.

their grid leaks R28 and R14. By this time any click or chirp on the VFO signal has disappeared and so does not appear in the output. When the key is lifted the 6AG7 and PA are cut off first of all and then, after a slight delay, the VFO. Therefore, any chirp or click occurring when the VFO switches off is not passed on.

The relay, RLA1, in the anode circuit of the right hand (B) section of the 12AU7 triode operates on pressing the key and its contact breaks the RF and IF cathode circuits of the receiver. The variable resistor R29 placed across the contacts permits a suitable monitoring level to be set up for the receiver.

The control switch S4 has three positions: *Off*: Where HT is removed from the driver/multipliers, PA, screen, control valve and the VOX amplifiers; *Stand-By*: Where the transmitter is ready for action; *VFO*: Where the bias is removed from the VFO to permit netting (with other stages inoperative).

Over

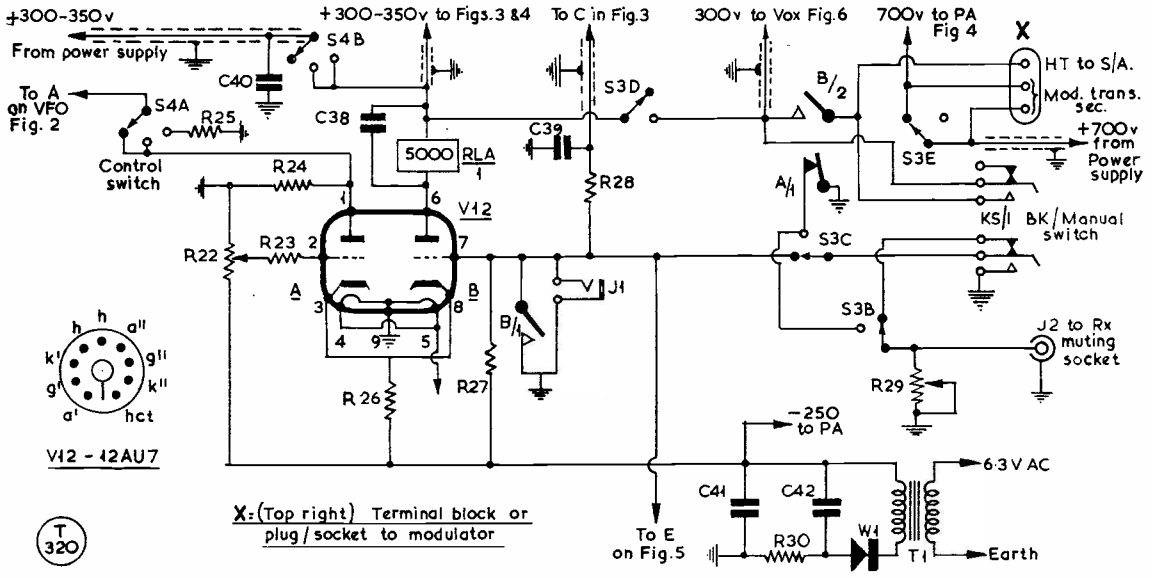


Fig. 5. Showing the circuit arrangement of the control unit for the five-band transmitter, fully explained in the text. The voice-control section is shown in Fig. 6. These circuits give fully automatic control of the transmitter. The key goes in at J1.

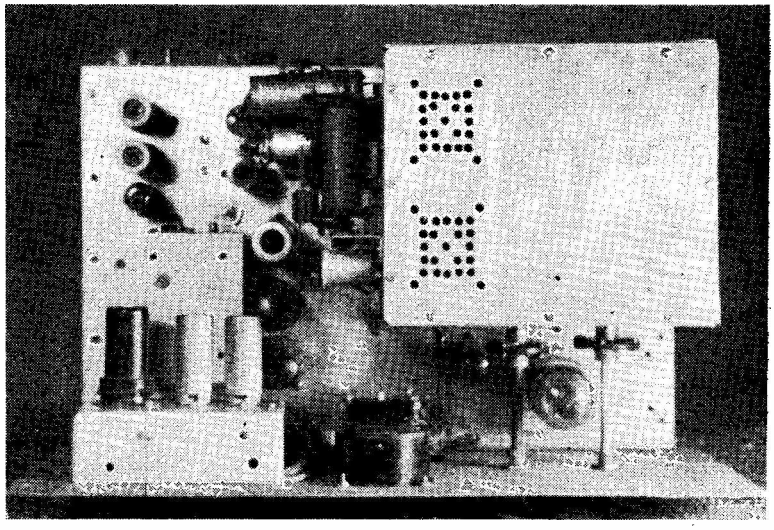
(Note : Legend "To E Fig. 5" above should read "To E on Fig. 4".)

The BK/Manual switch has two positions: *BK Operation* by depressing the key or by talking into the microphone, and *Manual*, when with the transmitter switched to CW, the receiver muting circuit is taken *via* this switch; thus, while this switch is depressed, the receiver is muted all the time while the transmitter is keyed. On telephony the receiver muting is effected by the relay Ry2 in Fig. 6. When the BK/Manual switch is depressed the transmitter is switched on, receiver muted and HT is fed to the modulator.

The Phone/CW switch also has two positions: (1) *CW*: HT disconnected from speech and VOX amplifiers, and modulation transformer secondary short - circuited; PA screen voltage regulated, and receiver muting circuit routed *via* the BK/Manual switch. (2) HT connected to VOX amplifiers and to VOX relay (Ry2, Fig. 6) contacts ready for connection to speech amplifier on operation of the BK/Manual switch, or on the operation of the VOX relay: modulation transformer secondary in circuit; receiver muting circuit routed *via* A1 relay contact. This is the Phone position.

The SSB-Input switch disconnects the PA from the driver section, to bring in an external SSB exciter. The operating bias is chosen to be about −45 volts instead of the cut-off bias which is used when the PA is run under Class-C conditions.

Voice Control Circuitry: The VOX unit is shown in Fig. 6. Audio signals coming from the microphone are amplified using three stages



General construction of the transmitter above chassis. The PA compartment is at top right, with the VFO section at bottom left.

Table of Values

Fig. 5. Circuitry of the Control Unit

C38, C41, C42 = 8 μF 300v.
C39 = .005 μF 400v. mica
C40 = .001 μF disc ceramic
R22 = 1 megohm miniature variable
R23 = 1 megohm ½w.
R24, R25 = 10,000 ohms ½w.
R26 = 18,000 ohms ½w.
R27 = 68,000 ohms ½w.
R28 = 33,000 ohms ½w.
R29 = 50,000 ohms wire wound potentiometer
R30 = 2,200 ohms, 2w.
S3b-S3e = 5-pole 2-way, section E ceramic. (For section S3a see Fig. 4)
S4A-S4B = 2-pole 3-way
RLA1 = 5,000-ohm relay with one set of "break" contacts, A/1
KS1 = 2-section changeover key switch
T1 = 6.3 volt filament xformer
W1 = 250v. 50 mA selenium rectifier
V12 = 12AU7

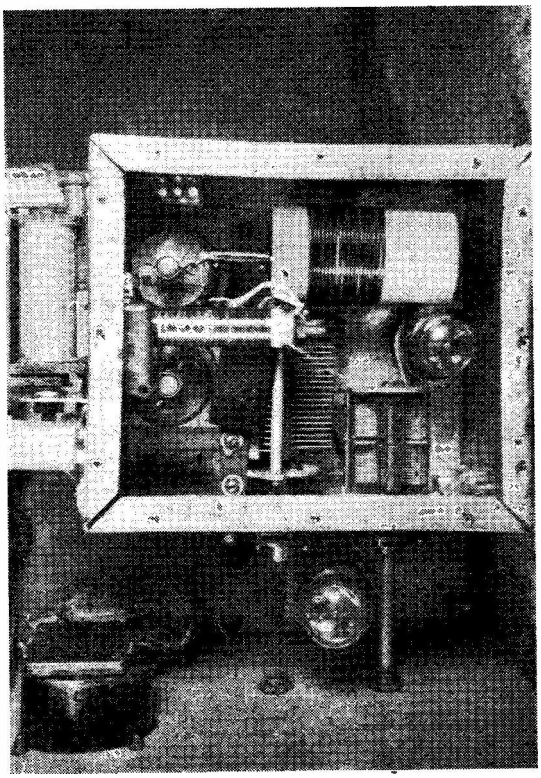
(6AM6, 6J6) and then rectified by V15. The rectified voltage, after being smoothed, is used to drive the relay valve V16 into current, thus operating the relay Ry2. The relay action can be critical in regard to the tension on the spring sets, so it is wise to try various tensions in order to obtain immediate following. A slight delay is used (about 1½ seconds) which is obtained by the condenser C51 and resistor R41; the delay can be made variable by lowering R41 to one megohm and connecting it in series with a 2-megohm potentiometer. The variable cathode resistor R44 is to enable the correct cut-off bias to be used on the relay valve V16, which is a 6C4.

Construction

To anyone intending to construct a similar transmitter the writer would suggest that a chassis of size 18 in. × 11 in. × 3 in. be used to avoid overcrowding of components. The VFO tuned circuit is contained in a 3½ in. × 2½ in. × 2 in. aluminium box. The VFO and isolating valves are mounted on a small sub-chassis, size 4½ in. × 3 in. × 1½ in., which is fitted on the rear of the front panel behind the tuning dial.

The driver and multipliers are mounted in line down the chassis and the band switch, consisting of five sections, is fitted underneath the chassis and coupled to the PA switch. The coupling is effected by means of two right-angled bevel gears. (The gearing for this purpose can be obtained from the switching mechanism of the R1155.)

The RF power amplifier is enclosed in an aluminium box measuring 7 in. × 6 in. × 6 in. This provides plenty of room in which to mount the components and to allow air circulation. In the writer's case, the tuning condenser C31 was obtained from a TA12 transmitter and the loading capacity C34 is a midget two-gang unit. The anode RF choke is wound on a ceramic former and is mounted centrally above



The PA section of G3JWZ's all-band transmitter, showing the receiver muting relay mounted on the screening box — Figs. 4 and 5 refer.

the valve holders. The T/R switch is enclosed in a corner at the front of the chassis.

The power-supply requirements are 150 volts stabilised at about 20 mA; 300-350 volts at 220 mA (180 mA for transmitter, 40 mA for control circuits); 600-700 volts at 250 mA or more; and 6·3 volts at 8A.

Adjustment

Apply heater and anode voltages to the VFO with the Phone/CW switch set to "CW." Set the control switch S4 to the Net position and adjust trimmer C3 until a signal is heard at 3·5 mc (with main tuning capacity C1 at maximum). The VFO should now cover from 3·5 to 3·8 mc with just a little to spare. When this has been done check the note and stability of the VFO.

Insert V2, V3, and V4. Temporarily disconnect V4 grid leak from the control unit and connect to earth. Connect a high resistance voltmeter across this grid leak (R28) and then, with the control switch set in the VFO position, apply 150 and 300 volts to the transmitter. A reading should appear on the meter (scale about

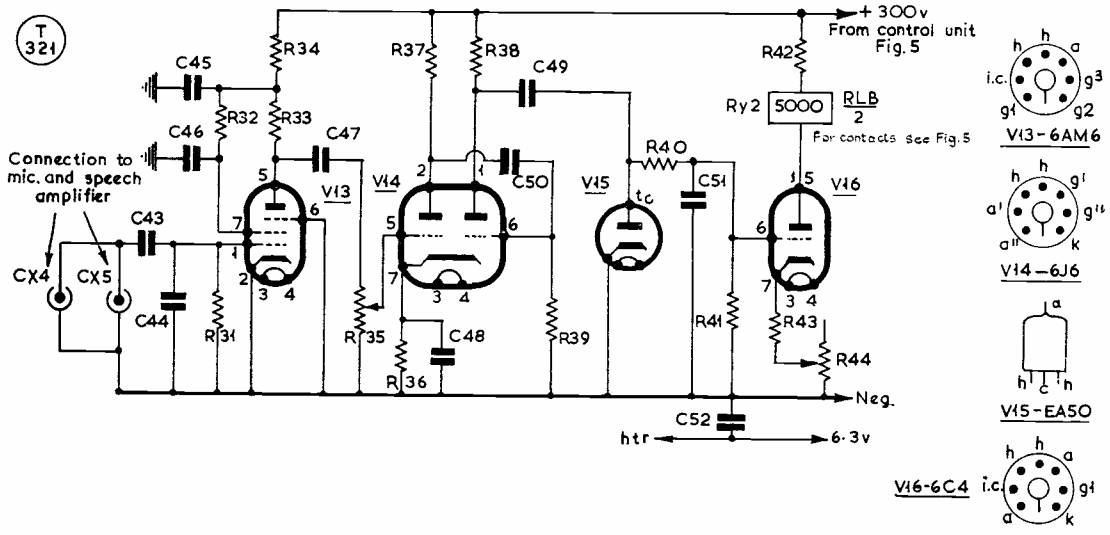


Fig. 6. The voice-control (VOX) unit. The modulator section proper is of conventional design, and is not shown in the circuitry here, which deals essentially with the general design and automatic control circuits.

50 volts). Adjust the slug in L2 until the reading is a maximum with the VFO set in the centre of its range.

Insert V5, V6, V7, V8 and V9. Disconnect the PA grid leak R14 from the control unit and take it to earth. Set the meter switch to read grid current. The WBC's can now be aligned following the usual methods.

The level of drive obtained with this transmitter was as follows: 3·5 mc, 15 mA max.; 7·0 mc, 13 mA max.; 14 mc, 10 mA; 21 mc, 8 mA; 28 mc, 10 mA. The actual drive under operating conditions should be between 6 and 8 mA.

When drive has been obtained on all bands, the PA can be tested by using reduced anode voltage until the settings of the tuning controls have been established. At this stage the PA can be checked for harmonics, parasitics and spurious noises, and any of these should be reduced or eliminated before continuing further.

The control unit can now be adjusted. Reconnect the grid leaks to the control unit, plug in the key and with 150 and 300 volts applied, switch S4 to the Stand-By position. Now adjust R22 until the VFO is heard to come on; then back off R22 a little until the VFO just turns off again.

Then press the key, and the following should happen: VFO comes on, the driver stage conducts and drive will appear on the grid current meter. Also the receiver muting relay A1 should operate. By listening very carefully to the signal it is possible to hear the VFO come on an instant before the rest of the transmitter and stay on for an instant longer after the key is lifted. (For the above adjustments the Phone/CW switch S3 must be in the CW position.)

Depress the BK/Manual switch and the receiver will be muted to a degree determined by varying R29. Now turn the VOX gain control R35 to minimum and connect a crystal microphone to the input socket. Turn Phone/CW switch to "Phone" position and depress the BK/Manual switch. The transmitter should switch on, the receiver be muted and HT should be available for the modulator/speech amplifier at the connection block at the rear of the chassis. Release the BK/Manual switch and turn up the VOX gain control R35 and whistle or talk into the microphone. The VOX relay Ry2 will operate B1, B2 in Fig. 5, with results as before. With the gain advanced

Table of Values

Fig. 6. The VOX Unit for the Five-Band Transmitter

C43, C47	= .01 μF paper	R37, R38	= 50,000 ohms ½w.
C44	= 100 μμF mica	R40	= 100,000 ohms ½w.
C45	= 2 μF 300v.	R42	= 20,000 ohms 5w.
C46	= 4 μF 300v.	R43	= 2,000 ohms ½w.
C48	= 8 μF 25v.	R44	= 5,000 ohms wire-wound pot.
C49	= 0.1 μF paper	CX4, CX5	= Coaxial sockets
C50, C52	= .001 μF, disc ceramic	Ry2	= 5,000 ohm relay, with two sets of "make" contacts, B1, B2
C51	= .01-0.2 μF paper	V13	= 6AM6
R31, R41	= 2.0 megohm ½w.	V14	= 6J6
R32, R39	= 250,000 ohms ½w.	V15	= EA50
R33	= 150,000 ohms ½w.	V16	= 6C4
R34	= 20,000 ohms ½w.		
R35	= 500,000 ohms carbon pot.		
R36	= 500 ohms ½w.		

sufficiently speak normally into the microphone and the relay will hold until a pause is made when it will release.

A few words concerning the receiver muting relay are necessary. To enable the relay to hold in on CW a condenser is connected across the relay, RLA1 in Fig. 5. This prevents the relay from having a fast operating action but is found to be satisfactory in practice. The value of this condenser, C38, can be adjusted for the required delay.

The adjustment of the T/R switch, V11 in Fig. 4, is fairly simple. Set the transmitter up on 3·5 mc and tune the receiver until a steady signal is found, then adjust the PA tuning control C31 for maximum strength. This position will be near-enough the same as that obtained when the PA is resonated. With an insulated screw-driver adjust the dust-core in L8 for maximum signal in the receiver. Follow this procedure through all bands. As an alternative method of setting up the T/R switch, a multi-band tank circuit could be used instead of the switched coils and links—or the October 1958 issue of *Short Wave Magazine* will suggest other circuits (*see* " SSB Topics ").

The transmitter can be loaded to 150 watts on all ranges and the break-in keying on CW has proved invaluable, especially in contest working. To make an exact duplicate of the transmitter would be perhaps difficult as some of the components are not standard but the general arrangement and circuitry will suggest ideas that can be followed.

RADIO INDUSTRY COUNCIL — NEW DIRECTOR

On retirement from the Royal Air Force, in which he was the last pilot from R.F.C. days, Air-Marshal Sir Raymund Hart, K.B.E., C.B., M.C., A.R.C.S., M.I.E.E., has been asked to become Director of the Radio Industry Council, a most important and influential appointment. The R.I.C. co-ordinates the activities of the British Radio Equipment Manufacturers' Association, the Radio and Electronic Component Manufacturers' Federation, and the British Radio Valve Manufacturers' Association. As W/Cdr. Hart of Fighter Command, Sir Raymund pioneered the operational application of the radar-R/T ground-air fighter control system which, more than any other single factor, ensured our victory in the Battle of Britain. Later in the war, he became Chief Signals Officer, Allied Expeditionary Air Force, and his last Service appointment before retiring was that of Controller of Engineering & Equipment, Air Ministry. He took up his duties for the Radio Industry Council on March 1st.

NAME AND ADDRESS, PLEASE!

Some weeks ago we received an article entitled " Two More Bands on the Collins TCS Transmitter," with diagrams. No covering letter was included, and the Ms. (typed on orange paper) bears no single clue as to who the sender might be. If he should see this note, we would be glad to hear from him.

FORMATION — " AMATEUR RADIO MOBILE SOCIETY "

On the initiative of G2CDN, an invitation meeting of interested mobile operators was held in London on February 22, at the " Rising Sun," Tottenham Court Road, W.1. Some 70 /M's were present (and about another 30 explained their inability to attend), a good many having travelled considerable distances to be at the meeting. For the occasion, the chair was taken by G8KW and an agenda—which had been drawn up in advance—was considered.

The outcome of the discussions was that it was decided to proceed with the formation of a self-supporting club covering /M interests in the U.K., to be known as The Amateur Radio Mobile Society ; that A.R.M.S. should be a national organisation ; that the mobiles who were present at, or had been invited to, the inaugural meeting should be founder-members ; that new members should be sponsored by founders; that a newsletter, possibly to be called *Stroke Emma*, should be started; that founder-members outside the London and Home Counties area be appointed to act as liaison for A.R.M.S. throughout the U.K.; and that the subscription should be at the rate of 5s. on joining, plus 10s. annually.

All these arrangements are subject to the final endorsement of a committee, to which the following were elected at the meeting: G2AHL, G2BCX, G3AGP, G3CIM, G3HLS, G3HTC, G3IIR, G3KVF, G4ZU and G8KW. With some others who were nominated, G2CDN himself declined office owing to lack of time and pressure of business.

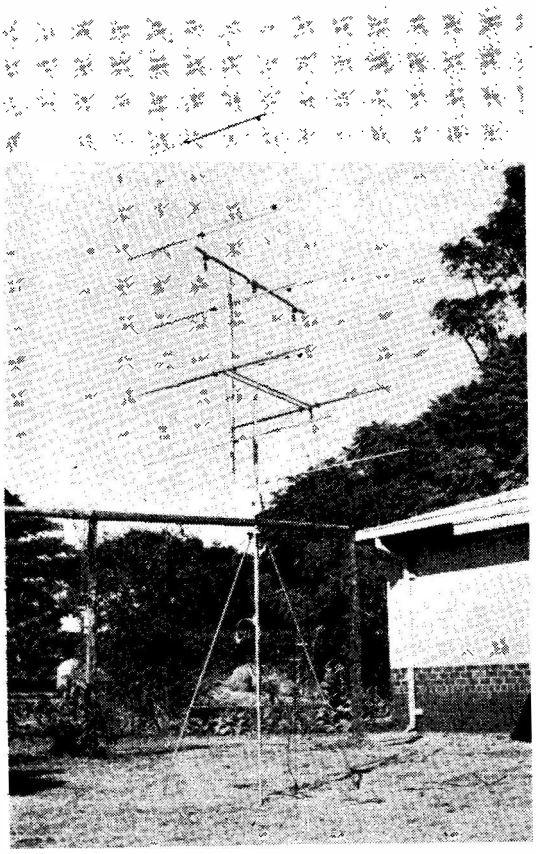
The first meeting of the committee is to be held on March 9, when a chairman and honorary secretary will be appointed and rules formulated.

G2CDN, who made the first move and took all the action to bring about this meeting, is to be congratulated on a very successful result. It is to be hoped that the Amateur Radio Mobile Society will be able to take its rightful place and play its full part in the pattern of amateur activity in this country.

MULLARD EDUCATIONAL FILMSTRIPS

A new series of filmstrips dealing with the history and basic principles of important scientific developments has been announced by the Mullard Educational Service. The first strip, entitled *The History of Radio* (35 frames, colour), is available now and reviews the progress made in telecommunications from the days of the first primitive telegraph and telephone systems. It outlines the discovery of electro-magnetic waves, illustrates Marconi's experimental work, including the historic Trans-Atlantic wireless transmission, and ends by describing modern radio communication techniques and showing examples of present-day broadcasting equipment. Wherever it is necessary to the development of the story, fundamental principles of electricity and magnetism are simply and concisely explained.

A comprehensive set of teaching notes is supplied with the strip, which is available from the distributors: Unicorn Head Visual Aids Ltd., 42 Westminster Palace Gardens, London, S.W.1, price 20/- a copy.



Double 6-element stacked Yagi array built by ZE5JJ, Salisbury, Southern Rhodesia, for reception of the American satellite signals on 108 mc. The beam has a gain of 14 dB, and is both tiltable (0-85°) and rotatable. Very good signals have been received in Southern Rhodesia from the 60-milliwatt transmitters carried by the American Explorers.

PRE-PAY POSTAGE, PLEASE!

We have again to remind readers who expect replies to editorial enquiries that return postage must be provided. While we do not run a technical enquiry or general information service in the accepted sense, we do attempt to deal, in due course, with all reasonable queries. Recently, much of this correspondence has been coming in without a stamp or an s.a.e. for the return postage.

RADIONICS — AND NOW AVIONICS

Back in October 1955, in the Editorial for that issue, we offered as (our own) newly-invented the word "radionics," which is sufficiently expressive as to require no further explanation. It is now beginning to come back to us — from across the Atlantic, and accompanied by the new word "avionics," used to cover the field of aviation electronics. It is pretty evident that both words will be in general use about five years from now.

"AMENDMENTS AND CORRECTIONS"

From time to time we are assailed by readers for having to correct errors made in technical articles—the correction note on p.637 of the February issue being a case in point. Our answers are that *(a)* It is the correction of such slight errors that may occasionally occur (in the great mass of technical material we publish month after month, year in and year out) that makes SHORT WAVE MAGAZINE accurate and reliable; and *(b)* If we did not draw attention to errors, the great majority of readers would never know they had been made! There are plenty of publishers who rely on this fact, and only give replies through the post when mistakes are pointed out to them. We cannot guarantee that we shall not go on making a few mistakes every now and again—what we undertake to do is to correct any such *in print*, for all to see. And, of course, we shall go on trying not to make mistakes, however trifling. As it is, everything is read and checked five times before being finally passed, but even at that something can be overlooked.

INDEX — VOLUME XVI

Every copy of this issue should have, as a free loose supplement, a complete Index to Vol. XVI. Anyone who may have missed his copy of the Index can have one on application with a large s.a.e. It should be noted that the only back-number issues now out of print for Vol. XVI (March '58-February '59) are for the months of March and October.

I.E.E. TRANSISTOR CONVENTION

This is to be held at Earl's Court during the period May 21-27, and will be a most important event, combining an exhibition with a series of technical meetings. The opening address will be delivered by Viscount Hailsham, Q.C., who, as Lord President of the Council, is the Minister responsible for the Department of Scientific and Industrial Research.

Signal Generator for the Audio Range

CIRCUITRY AND CALIBRATION

THE following details of a signal generator constructed for checking the audio frequency characteristics of amplifiers, modulators, receivers, filter networks and audio equipment in general may prove of interest to readers wishing to build up a useful item of test equipment for bench work.

In producing the design, the main requirements were as follows :

(a) Good frequency stability,
(b) Frequency coverage from 25 to 25,000 cycles, at least,
(c) Constant output over the whole range,
(d) Good output waveform,
(e) Logarithmic calibration characteristic, to facilitate plotting on linear/log. graph sheets,
(f) Output at low or high impedance,
(g) Means of checking and adjusting output level.

These objectives are met by the circuitry shown here, and the only practical difficulty that may face the potential constructor is in getting the instrument calibrated accurately.

Circuit Arrangement

With reference to Fig. 1, it will be seen that the Audio Frequency Oscillator, V1, is connected as a cathode coupled multivibrator, the positive feedback circuit being an RC network C1, R1-R5 and C2, R6-R10. C4 is purely a blocking condenser used for protection of V1 should C1 be inadvertently short-circuited. By virtue of the cathode coupling, the first triode of V1 has negative feedback applied to its grid circuit. This negative feedback alone was found to be insufficient to ensure good output waveform and, therefore, an additional NFB system was introduced by interconnecting the

Table of Values

Fig. 1. The Audio Frequency Signal Generator

C1, C2 = 500 $\mu\mu$F twin-ganged variable
C3 = 50 $\mu\mu$F preset trimmer
C4 = 0.1 μF 600v.
C5, C9 = 25 μF 25v.
C6, C7, C8 = 1 μF 600v.
C10 = 16 μF 450v.
C11 = 8 μF 450v.
R1, R6 = 10 megohms ½ watt 5 per cent
R2, R7 = 2 megohms ½ watt 5 per cent
R3, R8 = 370,000 ½ watt 5 per cent
R4, R9 = 47,000 ohms ½ watt 5 per cent
R5, R10 = 12,000 ohms ½ watt 5 per cent
R11, R16, R19 = 1,000 ohms 1 watt
R12 = 15,000 ohms ½ watt
R13 = 9,000 ohms ½ watt
R14 = 150,000 ohms ½ watt
R15 = 100,000 ohms potentiometer
R17 = 20,000 ohms 1 watt
R18, R20 = 100,000 ohms ½ watt
R21 = 10,000 ohms ½ watt
Ch = 20 Henry 50mA
T1 = Primary 230v. Secondaries 5v. 3a. CT 6.3v. 3a. CT 350-0-350v.50mA
M = 0-1 mA, 100 ohms
S1 = DPDT toggle
S2, S3 = SPDT toggle
S4 = DP 5-way ceramic (2 wafer)
V1 = 6SL7
V2 = 6J5
V3 = 6SQ7
V4 = 5Y3

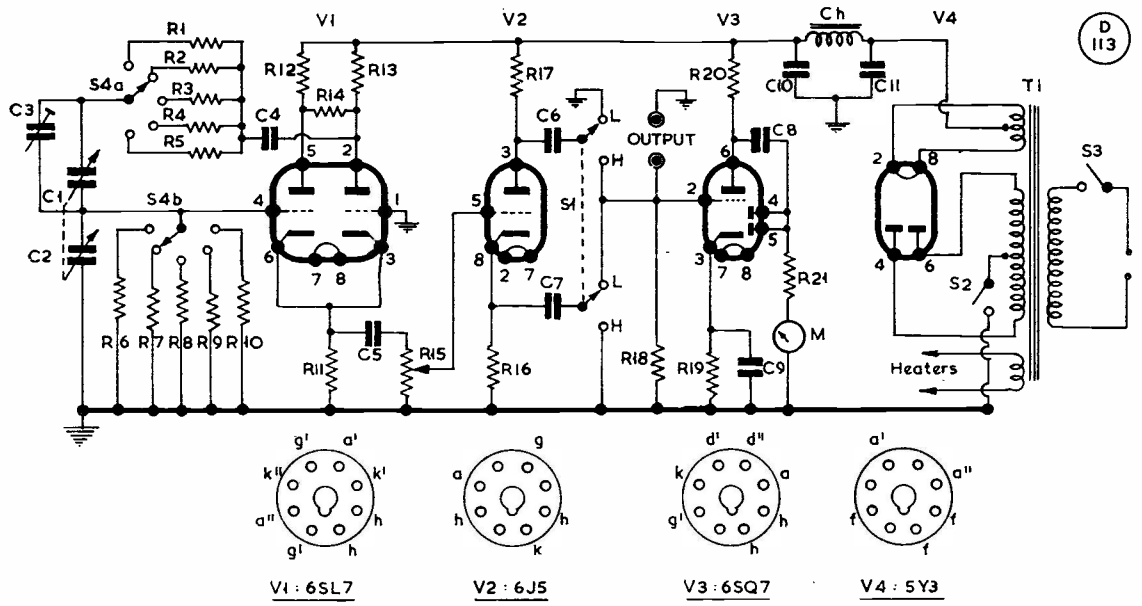


Fig. 1. Circuit of the Audio Frequency Signal Generator, which is designed to cover a wide range of useful frequencies ; with the network values as given, the lowest frequency is 25 cycles and the highest about 100 kc. Calibration can be against the 50-cycle mains using Lissajou's figures, if a calibrated audio frequency source is not available.

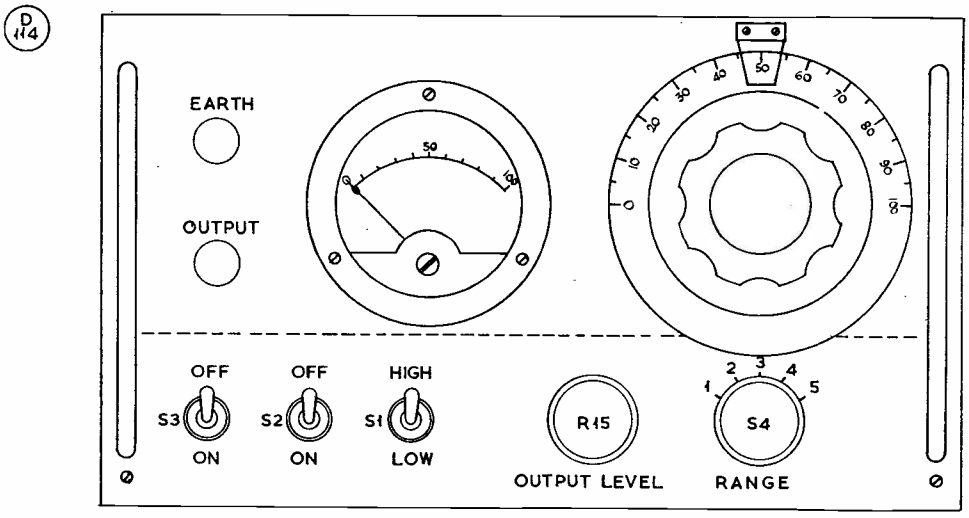


Fig. 2. Suggested front panel layout for the Audio Frequency Signal Generator. The main dial can be calibrated in terms of frequency against the five ranges given by S4.

anodes of V1 by R14, the value shown reducing the total gain of the circuit to an amount whereby oscillations were just maintained at a constant level, with the output waveform almost pure sinusoidal throughout the whole range of frequencies.

In view of the stray capacity which exists between the frame of C1/C2 and chassis it was found necessary to balance this by the inclusion of a small trimmer, C3, across C1 which was then adjusted so as to maintain constant output over the highest frequency range.

The frequencies of 25 to 25,000 c p s. are more than covered in five ranges by means of switching in suitable values of R1-R5 and R6-R10, the switch S4 being of the high grade ceramic wafer type.

The coverage of each range is as follows :

RANGE 1:	25-150 c.p.s.
RANGE 2:	150-800 c.p.s.
RANGE 3:	800-5,000 c.p.s.
RANGE 4:	5,000-30,000 c.p.s.
RANGE 5:	20,000-100,000 c.p.s.

The values of R1-R5 and R6-R10 are so chosen that there is a small overlap on each range. The output from the AFO is taken from the cathode resistor R11, *via* an output level control R15, to the grid of the output valve V2. The plate circuit of V2 is arranged to give either high or low impedance output by means of S1, which permits the output to be taken either from the anode load R17, or from the cathode load R16, the latter then functioning as a cathode follower.

V3 is arranged as a simple valve voltmeter which rectifies the amplified output voltage and applies it across R21 and meter M, R21 being necessary to prevent the virtual short-circuiting of the diodes of V3 to earth by the low resistance of the meter.

The power supply is of conventional design and no comment is necessary. It need not, of course, be integral with the unit; a separate supply of 300v. HT at 50 mA, with 6·3v. for the heaters, would do as well.

Constructional Details

It was found that a chassis 10 in. × 6 in. × 2 in. was ample to contain all the components without undue cramping. A front panel 10¼ in. × 6 in. allows ⅛ in. overlap at the sides to accommodate an instrument case if required. Material is 16 g. aluminium. Side brackets are not necessary as the panel handles support the front panel sufficiently.

The layout of the panel is shown in Fig. 2. The frame of the variable condenser C1/C2 must be isolated from chassis, this being achieved by mounting this component on four small ceramic pillars (such as may be found in the well-known TU5 units). The condenser shaft was shortened and then extended by an insulated coupling and a short length of ¼ in. dia. rod running through a ¼ in. dia. panel bush to the 4 in. dial. The cursor was made from a small piece of perspex with a backing piece of aluminium to project it sufficiently from the front panel to clear the dial, the whole being secured to the panel by two 8 BA screws and nuts.

Calibration

Calibration can be carried out using an oscilloscope portraying the familiar Lissajou's* figures, with reference to the 50 c.p.s. mains for frequencies from 25 to 1,000 c.p.s., and the known 1,000 c.p.s. for frequencies from 1,000 to 100,000 c.p.s. If an oscilloscope its not readily available, reasonable accuracy may be attained by calibrating aurally in musical octaves above 50 c.p.s., each octave doubling the frequency of the previous note—but difficulty will be experienced in pitching the higher audio frequencies above 5,000 c.p.s. accurately and the highest frequencies will be inaudible to the human ear. It would be advantageous to borrow an oscilloscope and so be able to check the output waveform at the same time as carrying out the calibration to one's personal satisfaction.

(Note: *The method of using Lissajou's figures is discussed in Chapter 21 of the 1958 *Radio Amateur's Handbook* (35th Edn.) and in Chapter 8 of the *Radio Handbook* (14th Edn.) This technique does, of course, involve the use of an oscilloscope).

TRIP TO ISRAEL

VISITING THE 4X4's

C. Levy (G2BBZ)

HAVING been in contact with the 4X4's for some time, the writer had felt the urge to visit Israel and to meet them—so, with his wife, a two months' holiday-*cum*-business trip was arranged, and from this visit he has recently returned.

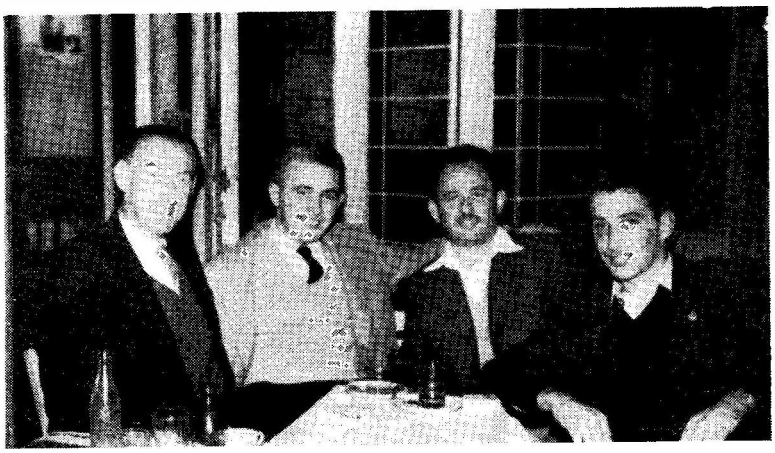
Israel is certainly one of the most interesting countries in the Middle East—new, progressive and full of enthusiasm. Every moment of the time available was taken up in visiting and sight-seeing, and even at that many engagements had regretfully to be refused.

On arrival at Haifa in one of Israel's luxury liners (and what luxury!), 4X4AC and 4X4FF were at the dockside, to conduct us to a magnificent hotel at the top of Mt. Carmel, bathed in continuous sunlight and with a glorious view of the whole bay of Haifa. Many messages were waiting, including one from 4X4IX, Tel-Aviv, which was to be the next call. At Tel-Aviv, a meeting of 4X4's had been arranged, at a café near the famous Boulevard Dissengorf, which is brilliantly lit from end to end. Here, the writer was introduced to many of the locals, including 4X4's GT, CL, CJ, JA, FN, II, JS and CA, for an evening of interesting talk about Amateur Radio. While in Tel-Aviv, 4X4CL (who is secretary of the Israel Radio Society) arranged a dinner party, during and after which the writer met nearly 40 Israeli amateurs.

After leaving Tel-Aviv, we travelled all over Israel, taking in such places as Acre, Tiberias, Jerusalem, Beersheba, Sodom on the Dead Sea and the lowest point below sea-level on the earth's surface, and passing through the remarkable development area of the Negev. Returning to Haifa, there was another meeting of 4X4's, organised by 4X4JP. From there we drove right up to the Egyptian border, to a point from which four countries—Egypt, Saudi-Arabia, Jordan and Israel—can be seen. Another visit of great interest was to the Kol-Zion BC transmitter location at Ashkelon; this was arranged by the Director of Communications, with 4X4GB (who issues the Israeli amateur licences) as guide.

Judged by U.K. standards, the cost of living in Israel is very high, most things being two or three times the price they are in this country. Israel is intensely cosmopolitan, every language being spoken, but a foreigner is received with great warmth and hospitality; the writer is deeply indebted to many 4X4's for the kindness shown him, and the trouble they took to make the trip pleasant and interesting.

The climate is hot and can be trying for a European, while the food and general living conditions take a little getting used to; the *tempo* of life is high, because Israel is a young country.



When G2BBZ (left) was in Israel recently, he had coffee with 4X4FF, 4X4GS and 4X4JC (right). They were among the many 4X4's G2BBZ met during his visit, which took him all over the country; some of his impressions and experiences are described in the article.

DX COMMENTARY

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

A VERY busy month, with plenty of DX, plenty of news, and the post-bag fairly bursting at the seams. Apart from the actual DX, the main talking-point seems to be last month's remarks about the long-windedness of phone QSO's, and your commentator was delighted (and surprised) to note the amount of support and agreement forthcoming. There was not one single protest (which may only mean that the long-winded types referred to don't read these columns).

The general outlook seems to be that it is difficult enough to cram all the QSO's into the available space these days, without making things worse by a lot of futile repetition of trivialities. And the man who spends unnecessary minutes repeating call-signs over and over again, with phonetics, despite S9 signals, comes under heavy fire.

At the two extremes of unreason are, on the one hand, the "CQ Dog X-ray" brigade, and on the other the DX-peditions who come back with a list of six stations calling them, with their RST's, and pass on without even waiting for their own reports. (These, to our mind, are not QSO's at all and should be disallowed for all scoring purposes.)

Thanks, also, to the correspondent who said he was grateful for our "efforts to maintain a degree of sanity in the DX world." That's what we're after, and we certainly need all the help we can get! Amateur Radio is (or used to be) a means of *communicating;* let us see that we have something worth-while to communicate.

DX Gossip

Sundry DX-peditions have been keeping the pile-ups going, but nothing phenomenal has shown up of late. CEØZA and ØZB, on CW and phone, seem to have been quite easy to work on 14 and 21 mc in particular. VS9OM, operating from Oman, complicated things on 14 mc by sitting for a while on the same frequency as CEØZA! He, by the way, although using only 8 watts, has been doing pretty well, and the same rig has been shared by ZB2A/VS9, who joined him early in February.

HZ1AB was very active for a time on 14 CW . . . XW8AL has been outstanding on 28 phone, although one morning we heard three XW8's all on the band together . . . ET2US expects to go to ET3 during March (slightly rarer!) . . . VK9LE may be back in VK6 by the time this appears.

AC4AX turns out to be the former operator of FN8AD (French India) and his QTH is D. S. Seal, Indian Consulate, Lhasa; in correspondence with W2-land he has explained that AC3SQ is now second operator at AC5PN; also that AC4NC is now in AC3.

ZK2AD is putting Niue on the air again, 14 CW . . . VE3MR plans to visit TI9 (Cocos) in April, and will possibly extend his visit into VP3, FY7 and PZ . . . The San Diego Club's long-awaited trip to XE4 (Socorro) is also promised for April.

Danny Weil's mishap (he hit a reef between St. Vincent and Grenada) is common knowledge by now, but we hear at the last moment that the port side of *Yasme II* was breaking up, and on February 14 it was decided to abandon her. All the gear was saved, and Danny himself sustained slight injuries to his foot—not the broken leg that was rumoured earlier on. He will be going to Grenada, where the gear will be set up, and will later go to Trinidad. Meanwhile, he is (again) looking for yet another boat!

DJØBM-G6LX

CALLS HEARD, WORKED and QSL'd

More rocks! W2NSD, of the "CQ" staff, has had calls KS4BA and KS4BB issued for a Caribbean expedition in late March or early April. The two calls will be used from Roncador Key and Serrana Bank respectively. The first is a small island and the second a shoal, both off the east coast of Nicaragua. Both are uninhabited but are expected to count as "countries" because of their distance from Swan Island, KS4. (Someone seems grimly determined to force that possible total up to 300!)

G3IOR, 3CQE, 3LDI and 3MPN are taking a rig to the Isle of Man, whence they hope to be on the air by April 12—all bands, CW and phone. For the benefit of chasers of the WPX award, they are going to ask for a GD8 prefix (there are no GD8's at present). GD seems to be quite rare outside Europe, so they expect a pretty busy time.

If you want Zone 18, UAØKAR (Dickson Island) is very active on 21 mc these mornings . . . AP5B is on 21 CW, afternoons, especially week-ends . . . CR5AR is another rarish one on CW, same band.

I1DFC plans to work SSB from M1 (San Marino), about the time you read this; 28650 kc and somewhere on 14 mc as well . . . KC4USW will be changing to an LU8 call—the base is being turned over to Argentina . . . VP8BK is on South Georgia.

A rare one on Forty will be 9G1CX, who promises some CW up there . . . KAØCG is on Iwo-Jima, whence the original KAØIJ is also still active . . . The oft-promised expedition to Tannu Tuva (by UAØOM) is now dated for March 19 . . . FB8CD has returned to the Comoros and is active again.

JT1AA and JT1YL were *not* pirated in late December, after all. Their departure was delayed and they were on the air occasionally until December 29. OK1JX is now fully occupied again with their QSL's, which are going out as fast as he can handle them. (*See* also "Late Flashes.")

ZD9SCA, despite the call, is on Tristan da Cunha and genuine . . . A character signing HL2BO and giving name as Hong is active on 21 CW; whether phoney or legit., we know not, as yet; if he says his surname is Kong . . . VEØNE and VEØNI have both been around again, mostly 14 CW. They are Canadian ship stations, but the prefix is a good one for WPX-hunters.

VR3T is said to be active from Fanning Island, mostly 14 CW . . . The brief FD8DZ expedition was a big success, and although it was publicised as an SSB venture, CW was used as well; QSL's to W2 bureau, or to W2KUW . . . VR2DG, now signing VR2DG/MM, plans to visit FK8 and VR4, but if he encounters any other islands he will try to slip a portable ashore and make a few contacts (14 and 21 CW). This is enterprise, and enthusiasm!

ZM6AS promises operation pretty soon after rebuilding . . . Nice ones lurking around 7 mc (if you can find them) include SM5WN/LA/P, F2CB/FC, TI2LA, DU7SV, FM7WU and KM6BK. They have all been worked by W's, anyway!

VK9LE will have left Cocos-Keeling by now, and his replacement is not interested, so that's another island off the air *pro tem* . . . W2SKE promises operation from HI8SKE during March, with SSB on the agenda . . . FG7XC and 7XE are the only active stations on Guadeloupe, the former on 14 and 7 CW only, the latter on 21 phone.

XZ2AD is said to be coming on the air with *one kilowatt* of SSB! The transmitter was shipped early in February . . . If you still want Swan Island, W4JRD/KS4 runs 600 watts of phone on 14 every night, 0100-0400 GMT . . . ZB2A/VS9 was definitely in Oman, at the same time as VS9OM.

"CQ" DX Contest, CW

A brief summary of results as compiled to date, but only a small percentage of the final tabulation. In the multi-operator, all-bands category, K2GL submitted a score of *just over two million!* This should be top score and an all-time record. Single-operator, all bands, shows CN8JX (996,916); SVØWP (878,000); KH6IJ (842,000); CE3AG (738,738); and

FIVE BAND DX TABLE
(POST-WAR)

Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries
DL7AA	921	113	171	249	203	185	267
G2DC	769	84	113	228	190	154	259
G5BZ	760	64	118	260	192	126	270
G3DO	674	24	47	244	183	176	270
GW3AHN	636	16	55	196	228	141	252
G3ABG	561	50	87	183	125	116	210
G3BHW	554	15	32	189	177	141	229
G3WL	545	41	92	176	129	107	206
W6AM	520	30	58	290	86	57	290
G2YS	514	73	92	164	111	74	180
G2HPF	469	42	80	167	90	90	189
G8KU	431	26	57	162	86	90	?
G6VC	423	36	54	153	108	72	178
G3HZL	402	41	74	117	96	74	144
G3JLB	379	43	51	101	90	94	168
G3IGW	374	44	69	107	66	88	141
W6AM (Phone) G3LET	372	13	52	267	39	21	267
	368	18	68	159	90	33	173
Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries
G3FPK	364	36	76	122	79	51	147
G3JZK	355	17	57	82	124	75	168
ZB1CR	343	1	5	97	114	126	159
MP4BBW (Phone) G6TC	309	1	5	112	118	73	155
	307	17	67	128	59	36	145
G8DI	289	30	59	79	68	53	120
UR2BU	286	12	22	98	92	62	126
G3DNR	264	10	21	87	72	74	121
VO2NA	240	18	30	106	63	23	115
G2DHV	236	21	27	126	46	16	137
G3MCN	235	4	6	55	110	60	139
G3JVU	215	26	38	79	34	38	95
UR2BU (Phone) G3NBE	185	1	7	58	68	51	97
	162	16	20	41	23	62	86
G3DNF	139	7	30	41	37	24	64
G3MJL	125	1	32	29	18	45	70
G3IDG	117	11	15	29	27	35	51
G3MMP	102	5	22	13	23	39	57

W8JIN, the highest W (583,000).

In the single-operator, single-band class, W2SUC scored 122,472 on 14 mc; VS9AS 69,000 on 28 mc; W3AYS 64,768 on 21 mc.

The phenomenal K2GL score came from 371 contacts on 28 mc, 392 on 21 mc, 459 on 14 mc, 261 on 7 mc, 50 on 3·5 mc and 3 on 1·8 mc. Six operators teamed to achieve this result, and they kept K2GL on the air without pause.

Late Flashes

CEØZA and ØZB have left Juan Fernandez, and there is a rumour that they may be on from Easter Island with other CEØ calls . . . SSB 'chasers are pushing their totals up, three moderately rare ones now active being VK9AD (Norfolk Is.), XZ2SY and OY7ML . . . VP2SL is on 21 mc phone from St. Vincent . . . ZD7SA is on 7015 kc CW, if you can find him . . .

Up-to-the-minute news about Mongolia, direct from OK1JX, the man with all the gen: JT1AA "closed down" after the *CQ* DX Contest, but found his stay prolonged, and came on for odd QSO's right up to January 4; Milada, JT1YL, went QRT on December 29; on February 3 they returned to Prague, where their calls are expected to be OK1KW and OK1KX respectively—so, if you work OK1KX, you can tell her you saw her photograph in January's "DX Commentary" heading! Meanwhile, a Club station, JT1KAA, is on the air from Ulan-Bator, on 3·5 and 7 mc only, and not in any way interested in DX. But one of the Czech personnel out there had a quick course from Ludvik and inherited the whole of his gear; he will be on 14 and 21 mc with the same crystals, signing JT1AB. His main interest will be in working OK's, but he will probably make a few DX contacts as well.

OK1JX hopes to be spending a short holiday with Ludvik and Milada and, after several days of talk, he thinks he might have some interesting stories to tell!

VQ8AD is reported active on 21 mc phone, and he has regular skeds with FR7ZC on 7030 kc CW . . . A station with a DL9 call-sign, suffixed /FE8, was heard describing himself as a "mobile in the Cameroons"—but sounded more like a local. No further details.

Ten Metres

The thing to do with Ten is to go on the band and take what you find there—and if you're a CW man that will be precious little other than W's. However, one never knows, and mornings (especially at week-ends) can produce some surprising DX. What a change, though, from the peak of 1948, when even the CW man could go on Ten and work such stuff as ZC2, KG6, KR6, C3, C9, VR2 and VR4, morning after morning.

DL7AA (Berlin) raised VS9MA and DL7AH/LX on CW; phone was better and produced HI8BE, VP3HAG, PYØNA, FS7RT, CEØZG and KAØIJ, giving Rudi a total of 185 on the band—the highest we have yet come across.

G3DNR (Broadstairs) raised XW8AL, CE3RC, ZB2A and UN1AB for new ones; also worked, on CW, were CX2BT, ZC4, ZD2, ZD6 and ZS. An unusual phone QSO was with FF8AP/M, in his car on the beach near Dakar—a good signal with 45 watts.

G3DNF (Wembley) found three new ones—ZD2GUP, ZC4 and ZS. G3HZL (Isleworth) raised two ZD2's, VS6 and VP7, all on CW. G2YS (Filey) collected OD5LX, CR7BN, FA9VN and ZS6R. G3IGW (Halifax) was disappointed with the band, and his only new one was ZD2, both phone and CW.

G3MMP (Pinner) stuck mainly to 10 metres and was rewarded with OD5BN, CR6CZ, CR7LU, LU7AAG, PY7XQ and KA2NY, plus plenty of ZS's, VE's and W6's.

G5BZ (Croydon) says he's losing interest in Ten, which seems to be "for the phone gang only," but admits to working 9G1BQ, VQ6LQ, ZD2, ZE, ZS, ZC4, VE4, W6 and the like.

G2HPF (Chelmsford) raised PJ2MC and VP1EE on phone, ZD7SA, FB8CJ and VK9DB on CW—all nice DX . . . G2DC (Ringwood) found things patchy, but scored with VP2SW and ZB2A for new ones; also MP4BBE, VQ3HD, VQ6LQ, VK9DB, VP6RG, VS6DS, 9G1BQ and a few more . . . G3LTH (Starcross) collected VP7BT, ZD7SA, OA4FA, OD5LX, HZ1HZ and 9G1BQ on CW; phone fetched in VP4LG and OD5CG.

GW3AHN (Cardiff) got his phone to CEØZD and YS1MM, and has a pleasantly long CW list which includes CEØZA, MP4BBE, VK9DB, VP7BT, VQ3HD and 3SS, VQ4AQ, VQ6LQ, VS6DS, ZD2GUP, ZD7SA and ZE3JO.

G3MJL (London, W.7) collected VQ2FC, OD5BN and HH2Z on one excursion on this band . . . G3NBE (Oxford) managed to find KZ5, VP7, MP4, VQ3 and 6, FQ8, OD5, TF, EA8, HK, 9K2 and such . . . G2CZU (Bath) made a few brief sallies on the band and came out with VE5AY and a bunch of Europeans.

G3ABG (Cannock) worked CW with VO2AA and 2NA, VP7BT, LZ1AH and MP4BBE; phone with OD5BN, OD5CF, LU9DAH, ZD6JL and 9K2AP. G3FPK (London, E.10) found four new ones—PA, SVØ, VE and VS6. Others worked were SVØWAF, ET2HM, CR6CA and a Commonwealth bunch comprising MP4, VK5NO, VQ3SS, VS6DS, ZC4's, ZD2's, ZE3JO and 5JE, ZB1, ZS and 9G1BQ. He finds the band very reluctant to open up for the Pacific, but he recently heard LU5DJV and other LU's at S9 plus, later than 2300 GMT.

Fifteen Metres

A disappointing month on Fifteen, although conditions have often been quite good. Too often, though, the band has been divided up between W's, Europeans and all the ghastly noises that seem to have made it their permanent home. There must be enough futile kilowatt-hours wasted around that band to melt the Polar ice-cap!

DL7AA boosted his score with 9G1CX on phone, and UN1AE, PYØNA and VK9AD on CW. G3DNR's new ones were OR4VN and OQ5HP, both phone. CW fetched in BV1USB, UF6, UN1, VQ4EV and ZD1FG. G3DNF managed to add MP4BBE and

OR4VN to his total.

G3HZL raised SVØWAE (Rhodes) on phone, and ZD2's, VK9XB, OQ5, 5A and VQ3 on CW. G2YS snagged 5A3TQ, and G3MCN (Liverpool) worked FB8BQ, ZS5RO/ZS7 and ZS5SM/ZS7, with FG7XE as a gotaway.

G5BZ's list includes VQ3 and 4, ZD2, VS1, KH6PM, CEØZA, West Coast W's and VE's . . . G2HPF raised VK9AD and VK9SB on phone, HR2EXP, OA4FA and VK9DB on CW . . . G2DC managed to find two brand-new ones in CEØZA and VP2SW, as well as ZD7SA, OA4FM, VQ2, 3 and 4, VQ6LQ, VP6RG, VP8CV, VK9DB, ZS and ZL.

G3LTH winkled out UAØKAR, MP4BBE, VK9DB, ZD2DCP, VE7's, VQ4's, JAØAQ and 9G1BQ . . . G3DO had FG7XE for a new one, and also raised VR2AZ, VR2DE, FU8AE and YJ1OM, all on phone . . . G3ABG, on CW, netted VO1DX and 2AA, VP2SW, CEØZA, 5A3TQ, UO5, UF6, VQ4, ZD2 and the like.

There's always a long list for this band from GW3AHN—still the reigning champion with 228 worked—and this month's includes the following on phone: FG7XE, FS7RT, FU8AD, HK, KP4, KR6, TG9HB, TI2PI, VK9SB, VP2AB, 2SL and 2SW, and ZD1EO. Nor did he neglect CW, as shown by BV1USB, CEØZA, MP4BBE, UL7HB, VK9DB, VP2SW, VP8CV, VQ3HD, VQ4's, VQ6LQ and ZD2's.

G3FPK added five new ones—GC, KZ5, OQ5, VQ4 and ZD2. Others worked were KH6PM, JA1ACB and 5FT, UAØKAR, 9K2AN, VQ3, 4 and 6, ZE, ZL, ZS and the usual VE, VK and so on. He thinks the amount of commercial QRM on the band has now reached "alarming" proportions, and at times, as he says, it's impossible to use the lowest 50 kc at all.

Twenty Metres

The snag here (every band has a snag, it seems!) has been short-skip, and quite phenomenal at times. At 1600 on the afternoon of writing these words, EI's, GW's and GM's were S9 in Sussex, although W6, FB8, VE8, OX and UAØ could be heard at the same time. Late at nights, though, the band has been pretty useful.

G3ANV (West Byfleet) has found it very changeable, but on CW he worked VU2DR, HK3TH and VS6DX, with HZ1AK and 9K2AN as gotaways, on February 7 and 8. He has now accounted for 99 countries since starting up again after ten years' QRT, but hasn't yet worked GC, GD, GI and GW!

DL7AA's additions on 20 metres were VQ1SSB on phone, and FF8AC/GN, VP2KFA and CEØAC on CW. G3HZL added ZK1AK, ZD2GUP and CEØZA, also CW. G2YS worked VK7UW and was "first G2" for KL7BZO. G3IGW was pleased to be "first in the queue" for CEØZA, working him straight after his CQ; other new ones were OX3RC and ZD2ARR. G3MJL has only just started activities on Twenty, and raised UN1, LZ, UO, OX3UD, EA9GC and IT1TAI.

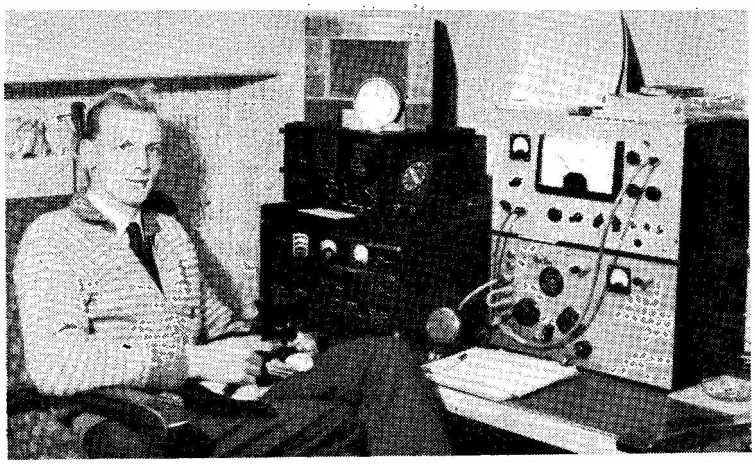
G5BZ still thinks 14 mc is the band for real DX, and proves it with a list including KH6's, KL7's, KM6BL, ZS7M, ZS9M, CR5AR, ZK1AK, VP2SW, VS1, VS6, CEØZA, UAØ, UH8, UI8, VS9MA, ZB2A/VS9, VQ8AQ, VR2DA and many lesser lights. He adds that 90 per cent. of this DX was worked between 1800 and 1900 GMT—almost the only time he can get on.

G2HPF worked VS9MA and CEØZA, both CW . . . New for G3DO, also CW, was VP2SW . . . GW3AHN raised the same station, plus VQ3HD and VE6, 7 and 8.

G3NBE (the first G3N... in our Five-Band Table) worked PJ2M, VQ4, ZD2, OX, OY and LZ. He wonders whether other "N's" are working the DX, as most stations seem to tell him he is the first one they have heard. G3MBL (London, N.12) runs only 25 watts to a dipole, and has worked VE, VK and 9M2DW.

G3FPK found four new ones—ZD2, VP6, VQ2 and CEØZA. Others were VK7JB, HC4IM, VP6RG, VQ2 and 4, ZC4 and ZS. He says ZS2CV gave his QTH as Uitenhage (as in the book)—*not* Marion Island as stated by G6QN last month. G3ABG's little bag includes MP4, ZD2, VQ2, 3 and 4, VQ6LQ, 9G1BQ, VP2SW, CEØZA, PZ1AP, ZP5AY, SM5WN/LA/P and VS9MA.

G2DC writes: "The big moan from me this month is not the quantity of short-skip QRM but the quality of same. There are some really *dreadful* signals to be heard—how they get away with it in their own countries stumps me.



G3GQK is one of the London stations, at Forest Hill, S.E.23. He runs a K.W. Vanguard transmitter and an AR88 receiver; the latter has been completely stripped and rebuilt using more modern valve types, low-loss RF components and high stability resistors; he says it was a big job but "has paid handsome dividends," with an improved signal-noise ratio and a gain of at least 6 dB in signal levels on 10 metres, the favourite band at G3GQK. The aerial is a 10/15 Minibeam at 53 ft., rotated by a cowl-gill motor; another aerial is a 270 ft. "long-wire" running N/S. In the last seven months or so 58 countries have been worked in 25 zones, DX being taken as it comes.

But there still appears to be nice DX under the rubbish, especially during the evenings, 1900-2300." To prove it, he quotes CEØZA, VP2SW, OA4FM, SM5WN/LA/P, VS9AC, VP7BK, VP9EP, ZK1AK, VK7, VE1-7, ZS1-6 and 9G1BQ.

Forty Metres

Conditions are right, and if the DX comes on it's workable. But, as G2DC remarks, the DX stations are probably exhausted after their struggle on the other bands, and so just don't give the LF bands a chance. G2DC finds the W6 and W7 stations "coming in like locals" between 0600 and 0700; he worked all districts W, VE1, 2, 5, 6, 7, CX, LU, PY, VP7, VP9, VQ2, 3 and 4.

G2HPF raised "the usual W's and VE's" plus ZD2GUP, MP4, PY and VO1 . . . G2YS reports ZD2GUP, VP7BT, SM8ER/MM, UO5, 4X4 and ZC4 . . . G3ABG worked PY's, SM2BJI (Arctic Circle), VP7BT and many W's . . . G3LTH bagged OHØNC, UF6, UR2, UC2, UQ2, UP2, UN1 and W's.

G3FPK says the "foul grindings continue," and he thinks they are even worse than last year. But heard through the din were HC4IM and TF3KG, and he managed to work VE1 and 2, VO, ZD2's and ZC4 . . . G2HPF raised VP7BT and ZD2DCP . . . G3MJL worked VE3BLU (0800), also UA9KCC, FA9VN and stacks of W's and Europeans. He thinks he is the only active station in London, W.7. For those who want the Grafton "WALT" Award, he will be on 7000/7030 kc, March 8, 1000-1100 GMT. LX1WK, on phone, got away—he was only working German-speaking stations.

OQ5CP promises to be on Forty once the static level in the Congo has diminished. G3LPS (Blackburn) worked VO, VE1, 2 3 and 8, and more recently W6 in the early morning.

Eighty Metres

Very little news of Eighty. VP7BT worked many stations up there, including G2HPF, G2YS, G2DC and G3HZL. G2DC also covered most W districts and VE1, 2 and 3 . . . Nice one for G2YS was ZS3AV, others worked being ZC4IP and some W's . . . G6VC raised LZ1KRU and 4X4KK.

Top Band Topics

ZC4IP has been on from Cyprus, as promised, usually coming up about midnight on Saturdays and staying on for two hours or so. We now hear that ZC4GS also will be on the band on Sunday mornings, 0200-0230 GMT, looking for G's with 100 watts and a half-wave wire. Presumably he works right up on the LF end, where ZC4IP lurks.

Two or three Top-Banders have reported some terrific "OK Parties," late at night—apparently contests—when upwards of thirty OK stations have been working each other and ignoring any other calls.

GM2UU (Stranraer), who has been putting a wonderful signal down into South-East England on phone, tells us that there are now three stations in Stranraer—GM3CEA, 3DZG and himself—active on Top Band. He wonders whether an expedition from their native Wigtownshire into Kirkcudbrightshire (only 25 miles away) would be popular, and says it could easily be arranged.

G3KOR (Liverpool) was delighted to work YU1FC at 0125 GMT, and to get a 599 report from him. On phone he was "5 & 7," and on both modes he was YU1FC's first G on the band. G3KOR has now worked ten countries on One-Sixty, having been one of the lucky ones who found HB1CM/HE in 1956. He and G3IQO spent a week-end in Caernarvonshire during January, and worked about 50 stations, best DX being OK1DB.

Grafton Radio Society announce that they will again be holding their annual Top-Band Contest for the G2AAN Cup—CW Section, 2230 on March 14 to 0100 March 15; and Phone Section same hours, *a week later*. This contest is for Grafton members, but they score points for all contacts, and the more the merrier.

G3IGW (Halifax) worked OK's and HB9LN, and also heard W1PPN on January 8. G3JEQ (Great Bookham) returns to the Counties Worked list with 96/97, having worked GM3LKF (Orkney). He now asks: "Any offers for Sark?"

TOP BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
G2NJ	98	98
G3JEQ	96	97
G6VC	96	96
G2FTK	91	94
G3FNV	91	92
G2AYG	88	88
G3KEP	85	85
G3KOR	82	86
G2CZU	80	81
G3DO	75	76
GM3COV	71	73
G2CZU (Phone)	63	65
G3LBQ	61	67
G3KQN	60	72
G3KEP (Phone)	60	62
G3APA	60	61
G3LHJ	56	66
G3JSN	49	62
G3MCY	47	54
G6QN	46	54
G3MCP	46	54
G3LNR	44	50
G3LNO	23	41

G2HPF had a QSO with UA9CM on 7 mc, and by mutual arrangement they both went up to 1800 kc, as conditions were good. G2HPF heard GW8PG calling the UA, and they both heard him (559), but called in vain. On returning to 7 mc they found that he had heard nothing on Top Band. Sad business, but there are still possibilities, one hopes.

G3LTH confirms that UA9CM is transmitting on 1790-1800 kc and listening on 1850; he is on from 2200 until midnight. G3LTH managed to work OK1AEH for a new one, and reports that DL2AH (G3LMT) is on 1825-1835 kc up to 2300 most nights.

G3ABG confirms that ZC4IP is on 1800 kc every Sunday morning, 0001-0200 GMT; for the two hours before this (2200-2359 Saturday night) he is on 3·5 mc and can be raised to fix Top-Band skeds. G3ABG also says that UO5AA has promised to be on

1825 kc at 2300, Saturdays.

G3LNR worked two more counties and heard YU2BAV, DL1LB, DL2AH and some OK's . . . G6VC worked HB9NL and DL2AH but is troubled with high noise-level . . .

G6QN (London, S.W.19) is still getting out with his 33 feet of bell-wire, and is well on the way to WABC with it. He has been amazed by the fact that everyone he has worked seems to have read last month's "Commentary" and been familiar with his doings. There's a lot of interest in the way he's getting out with that short wire! He recommends that the enquirers should read G5GQ's article on "Resonating a Wire"—p.601, January issue.

GM3COV (Caithness) finds a lot of people still wanting him for WABC, and is surprised how many CW stations ask him to listen for their phone. This he does, but his own modulator is out of action. (WABC's for "Phone-Only" are only legitimate on *two-way* phone, by the way.) GM3COV hears G's in daylight, but apparently they can't hear him, although after dark the reports are the same both ways. On January 17 he logged SP3WV at 559, calling CQ on 1870. The SP's don't seem to be licensed for Top Band, but in spite of that a few U.K. stations have worked them—*and* got QSL's to prove it!

G2CZU is now up to 65 counties on phone, thanks to G3IQO/A in Caernarvon and GM3CEA in Wigtown. He still wants a phone QSO with Northumberland. G2NJ (Peterborough) worked HB9NL, HB9QA and HB9T—the latter in daylight.

For the summer holiday period, G3KLZ/G3MGA are planning a 160-metre DX-pedition, to tour the rare counties of either Scotland or Wales. They would like to know who wants what, so that the tour can be arranged accordingly. Write G3KLZ at 86 Heaton Park Drive, Bradford, 9—and make it soon!

Late Flashes

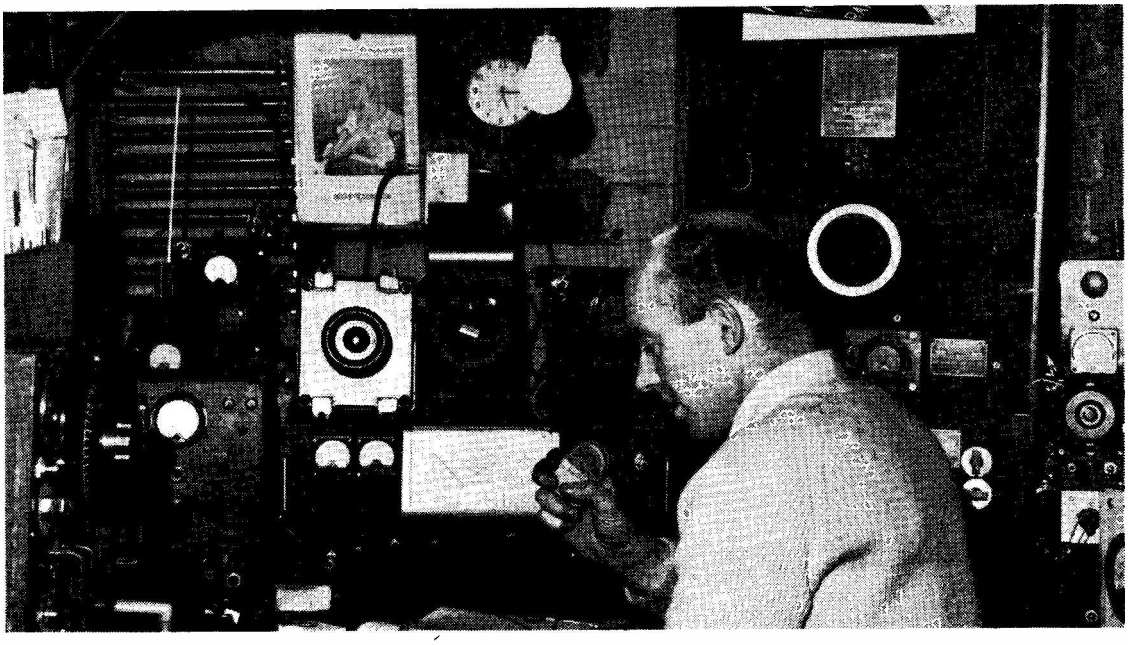
ZC4IP worked G3HVX, G3HQQ and other G's from 2330 onwards, February 14-15. He was also mixed up with a batch of OK's, who must have made things difficult for the G's. This was on 1825 kc, where he was about 449 on peaks.

January 18 and 25 were no good for Trans-Atlantic DX; February 1 was no better, though VP7BT and VP9DM were working many W's. On February 8, W1PPN heard G3PU; G3PU and G3LIQ heard W1BB; and finally we hear that G3PU worked VP3AD—nice going!

News from Overseas

VO2NA (Goose Bay) tells us that the Annual Goose Bay A.R.C. Party will begin at 0400 GMT on April 4 and end the same time on April 11. All bands, Phone and CW—exchanges of RST, Name and QTH. A "WAG" certificate will be awarded to W and VE stations working four members of the Club during that period; other stations can claim it for working three of them. SWL's, to qualify, must report on *five* members' signals during the period. Send the paper-work to Ted Harvey, VO2AB, Aeradio, Dept. of Transport, Goose Bay, Labrador.

VS1HU (Kranji), running a Vanguard and a Cubical Quad for Ten and Fifteen, have now worked a total of 192 countries. Conditions of late have been patchy, and they have found it difficult to



G3JHK, Stockport, Cheshire runs a home-built all-band transmitter incorporating a Geloso VFO driving a pair of 807's in parallel; these are plate-and-screen modulated by a pair of 807's in Class-B zero bias. The PA input is 140 watts, phone mainly, on 10 and 15 metres. The receiver is an HRO, and the aerial is a home-built tri-band beam, at a height of about 30 ft.

get DX outside Asia and Africa (but that includes such good ones as BV1US, JZØDA, VS5AT and 5JA, ZS5RP/7, ZD1GM, VS9MA and the like).

Other news from Singapore and Malaya, forwarded by VS1HU: VS1FW/2FW is now in the U.K. and will shortly be active as G3MRC . . . VS1JW is on from Serangoon; he hails from VK-land and runs 35 watts . . . VS1JT is ex-GI3DQE; he runs an LG-300, long-wire and Cubical Quad . . . VS1FJ (G3IDC) is now in Ceylon and, of course, suffering from the QRT there; he had hoped to make yet another DXCC before returning to England, but it now seems doubtful . . . 9M2DB will shortly be active on SSB. The W6UOU SSB rig is on its way from the Maldives to Ceylon and "awaits new sailing orders." Meanwhile, VS1HS, the only VS1 on SSB, will leave for the U.K. in July . . . VS1BB has been signing VS1BB/ZC5 on SSB . . . W2APF is expected in Singapore some time soon.

Finally, from Singapore, we have details of yet another sheepskin. It is called "Worked All Malayan Areas," and to qualify you must have ten stations confirmed in VS1, ten in VS2 (now 9M2), two in VS4/VS5 (they count as one area) and one in ZC5. All 23 cards to be forwarded; signed statement required; list of contacts with date, time and frequency; "the damage" is ten IRC'S; apply to Awards Manager, MARTS, Box 777, Kuala Lumpur, Malaya.

W6AM (Long Beach) is up to 267 on Phone, with UG6AN and VPØRT, and hits the 290 mark on CW/Phone with VPØRT.

ZC4QK had an unusual thrill the other day when he heard another station happily using his call. He called "ZC4QK de ZC4QK" but couldn't QSO himself! So the real '4QK had to be content with making the appropriate wishes of goodwill, and so on; he runs 70 watts on 14, 21 and 28 mc, but has a poor QTH; in any case, he will be returning home and becoming G3MUW before long.

OZ7FG (F. Gotschalk, 3 Engdraget, Grenaa, Denmark) tells us that he will be handling the QSL's for LA2JE/P, whose log has been received over the air. A backlog of 800 contacts has been cleared, QSL cards are ready (including 90 for the U.K) and all that is needed is an addressed envelope and an IRC. There is no boat to Hopen Island before next August, so OZ7FG's stout piece of work will help a lot.

VK9AD (Norfolk Is.) works CW, AM and SSB with a Viking, a 10A SSB adaptor and an SX-100. A tri-bander beam puts out that excellent signal.

One more from Singapore: VS1GC (ex-G3LMO) tells us that he had to move QTH at short notice, and so is QRT for the present. But he hopes to be back on the air early in March, with 150 watts of phone and a "ZL Special." He recently had to fly to 4S7-land (just before VS1FJ departed for the same place), and so VS1FJ's gear (not usable under the 4S7 prefix, unfortunately) arrived in Ceylon before the owner did.

ZC4PN (Nicosia) prefers CW, but now has a modulator going as well. He has been working 7 mc, where he has raised VQ4, VQ6, ZD2 and W's. New ones on 14 mc were OR4VN, VS9MI, ZK1AK, FB8XX. He says the ZC4 Sunday natter (on 40 metres) starts at 0900 and runs on until 1500 GMT, with stations dropping in and out! The 4X4's have a similar natter-net, and they sometimes join forces.

Miscellany

Every now and then we receive "first" letters from new recruits to this wicked world of DX, and here is one worth quoting, from G3HRU (Leeds). He says: "I run a modest 6L6 CO, 807 PA, with about 25 watts, CW only, 14 mc only. Due to lack of space, I experiment with various aerials in the roof space inside. Latest and most efficient is a dipole bent in the form of a Z." With this gear and this aerial, G3HRU has worked numerous W's and SM8YF/MM, near St. Helena. On a previous experimental indoor aerial he raised ZK1AK and had a listener report from VK. As he winds up: "All this gives me great faith in simple indoor aerials and low power." It does us, too!

G3ANV (West Byfleet) is ex-GM3ANV, and passes on the word that MP4BBE is right out of QSL's; it will be two months before the next batch arrives, so patience, please, all those who have forwarded s.a.e.'s! You'll get it all right.

SWL E. J. Boyle (London, S.E.19) tells us that a card to VS9AS has come back marked "Gone—no address—return to sender." He wonders whether the VS9AS he heard was a phoney.

G8DI (Liverpool) scored 58,995 in the *CQ* Contest; he has just received his WAS and his 100th card for DXCC, both CW only, and thinks that what was once the more usual method of communicating is now the *rarer* way of obtaining awards. Yes, he *has* a modulator!

G3MJL quotes some incredible clottery by a local, who, when asked quickly to QSY, turned the whole thing into a nice QSO with everything repeated five times—by which time the DX station underneath had disappeared!

G2DC marvels at the absence of pile-ups around CEØZA, who has been workable with the greatest of ease on both 14020 and 21020 kc. Someone else heard him on phone, practically *pleading* for a QSO!

G5BJ (Birmingham) is a very old-time DX-chaser who reports for the first time, and very welcome too. He has worked 267 to date and holds a whole batch of awards. Unfortunately, he doesn't split his DX list up into bands, but last month's bag includes CEØZA, PJ3AB, UAØ's, VR2DK, TG9HB, UM8AD, KA9MF and many others. He runs both CW and SSB, mostly on 14 and 21 mc.

G3LTH says VS9AQ is now back in the U.K. (G3MIR), and between them they are getting the QSL's moving. VS9AQ worked 106 countries in 31 days, and about 700 cards are needed!

G3DO has received his YLCC Certificate, and believes it to be the first in England. Any other claimants?

SWL Chat

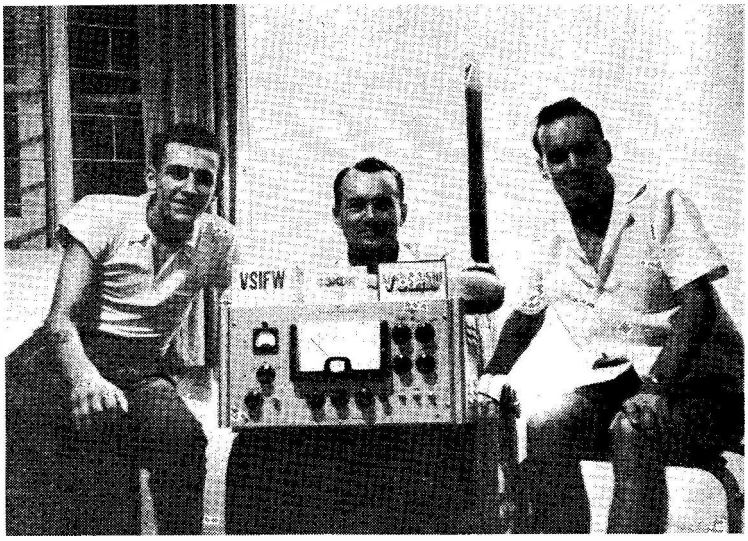
SWL's have their say in their

own feature this month, but here are a few comments purely concerning DX : P. G. Harris (Rotherham), covering 21 mc phone, heard OD5CG, FQ8AW, FU8AD (1130), XZ2SY, AP2AD, FB8ZZ and XW8AL. FO8AX was being worked by ZL's (0830).

P. Day (Sheffield) covered all bands as usual. On Top Band he logged W1BB and a batch of OK's; 3.5 CW, VP7BT; 4 mc phone, many VE's and W's at S9 plus; 7 mc CW, VP7BT and PJ2MF (0315); 14 mc CW, FU8AC (2135), VP2SW and VQ8AQ (1735); 14 mc phone, VK9AD/SSB, FB8XX, XZ2SY, CR9AH; 21 mc phone, VQ8AD; 28 mc phone, CEØZB, XW8AL (daily, 1245) and VQ8AD.

J. Baxter (Hull) reports LX's, PY and W's on 7 mc; ET3XY and OX3KW on 21 mc; plenty of "routine" DX on 14 and 28 mc. C. N. Rafarel (Birmingham) heard the following phones on 28 mc—FQ8AT, ZS3E, VP2LS, FF8AP/M, CEØZD and DL9AF/M/FE8; and on 21 mc — FU8AE, FG7XE, FS7RT, FM7WN, KW6CB, VP1NW, ZL1ABZ (Kermadecs) and W6FXZ/MM off Hawaii. He also overheard that YJ1OM will be leaving New Hebrides, and that VR2AZ will shortly be departing from Fiji. VR2AZ was heard to say that there is one VR4 operating on 14 mc—no VR5's or 6's that he knows of.

J. E. Paterson (Hatch End) thinks SWL's should take more note of the *consistency* of DX stations, rather than the occasional S9 signal, and awards high marks to PY3AMC (21 mc), ZB1DC, W7WDM and a few others. He wonders whether any Tunisian stations are active on phone—and on what band?



The chaps at Kranji, Singapore, now bave a K.W. Vanguard and a Cubical Quad for 10-15 metres, with which they are going great guns. Only since December, when this new equipment was installed, 96 countries have been worked on CW and phone. In the photograph are: left VS1FW (who is also G3MRC); G3KDK at centre; and VS1HU (G3JFF) on right. They look as if they are enjoying life!

For all the news in this instalment, we make our usual grateful acknowledgments to W4KVX's *DX*, the West Gulf DX Club's *Bulletin*, W1BB's Top-Band bulletins and to all our correspondents at home and abroad, through the post and over the air, who supply all the little items that make a comprehensive monthly survey possible, all round the world. Thanks, OM's all!

Deadline for the April issue is first post on **Friday, March 13.** This is another tough one, thanks to the inflexibility of the calendar, so get down to it *now* and don't miss the post. Address everything to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Meanwhile, as always, we wish you Good Hunting, and 73. BCNU!

THE MOBILE RALLY CALENDAR

Further to the note on p.660 of the February issue of SHORT WAVE MAGAZINE, the Mobile Rally meetings now scheduled are as follows:

April 26: North Midland Mobile Rally, Trentham Gardens, Stoke-on-Trent.

May 3: Cornish Mobile Rally, Hamfest and Exhibition at Penryn, Cornwall.

May 10: Cheltenham Mobile Rally.

August 16: South Shields Mobile Rally at Bents Park Recreation Ground, South Shields, Co. Durham, in conjunction with the local Annual Flower Show, a big event in the North-East.

August 16: Derby & District Amateur Radio Society Mobile Rally.

August 30: South Manchester and Stockport Radio Societies' joint Mobile Rally.

September 6: London Mobile Rally, Festival Gardens, Battersea Park.

September 13: Woburn Abbey Mobile Rally.

September 20: Hamfest and Mobile Rally, Lincoln.

In addition to the lists already published, the following /M operators have forwarded details for the Mobile Register: G2ATS, Grimsby *(160m., Land Rover JEE-726);* G2BDQ, Stocksfield-on-Tyne *(10-80m., Vauxhall Victor 747-CVK);* G2CBS, Loughborough *(160m., Ford Anglia PNR-136);* G2CIW, Cambridge *(2m., Austin Countryman PCE-128;* G3BID, London, N.W.3 *(10-80m., Morris Isis Traveller 991-JMM);* G3BMQ, Mitcham *(10-160m., Vanguard LVB-10);* G3FPV, Bournemouth *(40-160m., Vauxhall Victor 707-AKL);* G3GVN, Solihull *(160m., Jaguar HOE-105);* G3LBR, Stockton-on-Tees *(160m., Morris Ten MM-35);* G3LXE, London, N.8 *(160m., Lambretta Scooter ULE-437);* G3MVI, Shepperton, Middx. *(160m., Hillman Minx HDA-978);* and DJØBM-G6LX, Munich / Croydon *(10-20m., Mercedes 190 M-MV242/D)* — making in all 110 notified so far.

Compressed ZL-Special

DESIGN FOR TEN METRES

J. F. VAUX (G3KWH)

THE writer first became interested in the design known as the "ZL-Special" after reading the article on it in the August, 1956, issue of SHORT WAVE MAGAZINE—"What is the ZL-Special?" The version made up of 300-ohm twin feeder, as described in that article, was constructed and hung up in the loft with string supports. This worked quite well in the "beamed" direction, but the fact that it could not be moved was, of course, a serious disadvantage.

In the Summer of 1958 it was decided that a rotary beam should be constructed for the approaching 10-metre season. A couple of local stations were doing quite well with two-element parasitic arrays, built up of *compressed* elements, so the idea came to try to go one better by attempting a "Compressed ZL-Special." The Technical Department of SHORT WAVE MAGAZINE was consulted, and agreed it would be worth trying, as there was no other known experience with this modification of the design.

It should be explained, in passing, that the essential point about the "ZL-Special" is that both elements are driven. This makes it an inherently high-gain beam of comparatively simple construction mechanically. Compressed beams are those in which the elements are loaded with inductance (meaning a coil at the centre of each element section) to reduce the overall physical size, or over-hang. Thus, a Compressed ZL-Special is (or should be !) a high-gain beam with a reduced over-hang. While from this it might appear that inductance could be substituted for element length to bring down size still further, in fact, this is not possible beyond certain limits because more inductance means sharper tuning, *i.e.*, reduced band-width.

General Arrangement

This is based on the conventional "ZL-Special," using tubing elements as described in the December, 1956, issue of the *Magazine*. The layout and dimensions for the 10-metre band are shown in the sketch opposite. Elements are of ½-in. dural tube. Link coupling could have been used for the phasing line, but direct coupling was tried to avoid the complication of having two link adjustments at the feed point. It is important to use semi-airspaced coax of good quality for the phasing line in order to obtain the correct velocity factor; in fact, any such coax with a V/F better than about 0·75 is suitable. Feeder connection is simply a matter of using a 3-turn link to couple direct into 72-ohm twin feeder.

Construction

The mechanical arrangement of beam systems is always a matter of individual preference. However, some details of the writer's own design may be helpful. As a "ZL-Special" can be of very light construction, it is mounted on a wooden framework shaped like an "H," with narrow cross-pieces at each end to eliminate any tendency to whip. The arms of the "H," on which the elements are mounted, are four feet long; thus, each element is supported for about one-third of its length. The main cross-piece is mounted on the mast, at the point of balance.

Insulation of the elements is by using short lengths of ½-in. dia. i.d. polythene tubing, slid on to the elements as a force-fit and clamped to the wooden supports. This method of mounting facilitates matters if the elements have to be adjusted. All electrical points should, of course, be mechanically sound, extra well soldered, and coated with polystyrene cement, followed by a liberal application of Bostik for water-proofing.

Adjustment

For best results, some adjustment is necessary because the inductance of the loading coils is quite critical. Sliding the elements in or out from the ends of these coils alters the resonance point, and a calibrated GDO will be found very useful in getting the adjustment just right. However, by taking the dimensions as given here, this variable should be largely eliminated. For the final setting-up, an SWR indicator can be used on the feeder line, the beam then being "tuned" for minimum attainable standing-wave ratio over the area of the band to be covered.

Band-width can be increased by altering the inductance values of the loading coils, in such a way that the difference between them is increased. This can only be done up to a point, beyond which the whole system becomes mismatched. A typical weakness of compressed beams (on any band) is that the use of too much inductance makes them more frequency-conscious. However, a band-width of anything

up to 800 kc should be attainable at 28 mc; outside this limit, the efficiency begins to fall off quite steeply — which, incidentally, is the proof that the system is working the way it should. If it appeared flat over a very wide frequency area, it would be a sure sign that it was non-resonant, and therefore not in any way "gainy."

As shown here, the beam should cover about 28,100-28,900 kc and with the dimensions given, can be set up in this range, which is quite sufficient for normal use of the 10-metre band from the U.K.

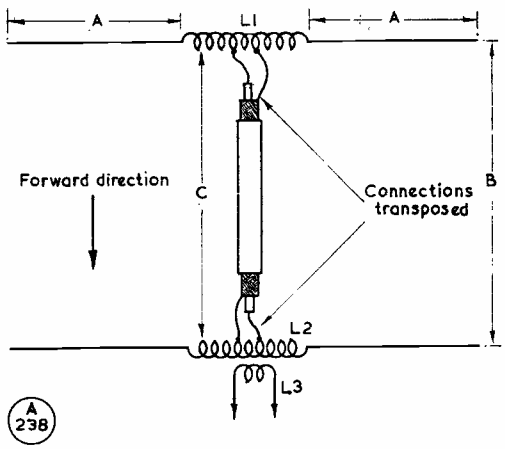
Results

The writer's set-up is by no means a perfect example of a beam installation! To avoid any possibility of conflict with the local authority (amenities, and so forth), it is discreetly situated between his house and the neighbour's, at a height of only 20 feet. It is too near guttering and other earthed surfaces, and the get-away is only partially clear.

Nevertheless, running a mere 30 watts input and operating almost entirely in competition with the weekend QRM, very satisfactory and consistent DX results have been obtained. During a recent phone contest some 40 contacts were made with Europe, Africa and North America in only a few hours' operating. Analysis of the reports in to G3KWH showed 21 at S9, ten at S8, three at S7, one at S6 and five at S5. Naturally, results would be very much better if full power could be used, with the beam well up and in the clear all round.

The general design could, of course, be scaled up for the 21 or 14 mc bands. An interesting thought is that a 21 mc version would have a *physical* size about that of a normal 28 mc beam (a span of 16 feet or so) and yet should, and almost certainly would, have a performance considerably better than a full-sized two-element parasitic array for 15 metres!

Finally, the writer would not only be glad to answer any queries (return postage, please!), but also to hear about results obtained by those who may construct a beam similar to this one.



Layout of the beam described by G3KWH. For the 10-metre band, dimensions are: A, 66 ins. for both arms in each section; spacing distance B, 42 ins.; C, length of phasing line, 44½ ins. The loading coils L1 and L2 are each 10 turns of 16g., 1½ ins. in diameter, with a three-turn feeder coupling winding L3 on L2. The length of L1 is 2 ins. and of L2, 3 ins., these being finally adjusted (by squeezing in or pulling out) as explained in the text. The phasing line, which must be transposed as indicated, is tapped on one turn either side of centre for each coil L1, L2.

SAUCE FOR THE GOOSE . . .

One of the BBC's External Service transmitting points is at Woofferton, on the Shropshire-Hereford border. People living in the neighbourhood suffer considerable TVI, which has been the subject of a Question in the House. The Asst. PMG's reply was to the effect that though the BBC had done all that was possible to minimise the interference, it could not be entirely prevented. It is also very difficult for some amateurs to eliminate TVI—but in their case they cannot just tell the neighbours they will have to put up with it! (G3ESY, Hereford, sent us the notes.)

NEWS FROM OLD TIMERS

We are always glad to hear from Old Timers about their results and experiences in the early days, and to see photographs that may be suitable for reproduction; these should be clear and sharp, but need not necessarily be "bright"; the test is to be able to read the call-signs on any cards that may be visible. We have had interesting letters recently from GM3BN (Glasgow), who was licensed AA in 1922 when living in Rochdale, Lancs.; and from G2TX, licensed as 2TX in 1921, now of Lightwater, Surrey, who was on the air in the pre-1914 era, under call-sign JXX.

"SIMPLE TVI FILTER"

With reference to this article in our February issue, the author G3BDH explains that the capacity C1 is intentionally made rather higher than usual in order to make the circuit less "touchy" to tune; a smaller capacity would give sharper tuning and better rejection, but would be very much more difficult to set up. The essential point about this design is its simplicity.

SCR-522 MOD. TRANSFORMER

G3NHX (Epsom) suggests that experience is showing that this item is not suitable for applications where a high primary current is involved, as in some audio driver circuits; this is because, in the original, the SCR-522 modulation transformer was designed for parallel feed.

Variable Bias Pack

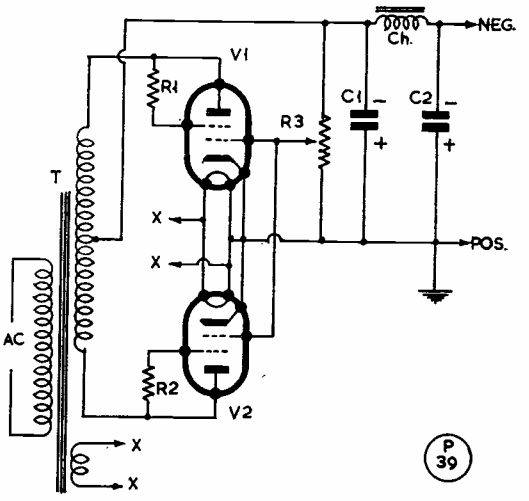
USING SCREEN-CONTROLLED TETRODES

A BIAS pack capable of giving a variable bias voltage is a useful piece of gear for experimental work. Any ordinary pack can, of course, be fitted with a potentiometer and used for this purpose, but if the current drain is at all heavy the potentiometer must be large, and correspondingly expensive. The obvious solution is a stabilised variable supply, but for those who wish to avoid this complication the circuit shown here is suggested.

It will be seen to consist of a normal full-wave rectifier arrangement, but using two tetrodes instead of a double-diode. The valves are used as combination rectifiers and voltage droppers, their impedance being controlled simply by the potential at their grids. In this way, it is possible to control a fairly heavy current, which is desirable for stability of supply, with a 1-watt potentiometer.

Practically any type of power valve will do, the requirements being simply ample cathode emission and adequate anode dissipation. If tetrodes are used it is advisable to connect the screens to the anodes through small resistors, as shown, to prevent the screens overheating. In the test case the valves used were KT63's, as two of these were available, and were unlikely to find any other use! The KT63 is rated at 8·5 watts anode dissipation: when run at 300 volts 50 mA, *i.e.* 15 watts for the pair, the anodes gave no indication of overheating.

Equally, the transformer requirements are not critical. Practically any transformer with two LT windings will give 2 amps. comfortably:



Circuit of the bias pack, in which the low-wattage potentiometer R3 controls the output voltage. Almost any type of tetrode or power pentode can be used in the rectifier position.

Table of Values

Variable Bias Pack

C1	= 8 μF	T	= Transformer
C2	= 16 μF	V1, V2	= KT61, KT63, KT66, 6V6, 6L6, 807, or others of similar type.
R1, R2	= 100 ohms, 1 watt		
R3	= 50-100,000-ohm potentiometer		
Ch	= Smoothing choke		

provided, therefore, that one of the windings is centre-tapped, it will be possible to use 6L6's or 807's in this circuit. The transformer can be the usual receiver type, giving 300 volts on load. (This is, in fact, rather more than necessary.) The minimum voltage obtainable under various loads should be plotted, and from this curve the load required for any range can be found. The bleeder current is usually kept at 50 mA, which is enough to swamp small changes in the external load, due to grid current.

THE RF HAZARD AT VHF

G2TA (Bushey Heath, Herts.) draws attention to an article in *Nature* for December 27 last, in which it is stated that the maximum steady flux tolerated by the body is 30 milliwatts per sq. centimetre for frequencies lower than 500 mc (for frequencies of 1,000-3,000 mc the safe limit is only 10 mW per sq. cm.). A calculation is made showing that a transmitter of 20 kW input, with a high-gain beam array as normally used at these frequencies, can produce an RF field in excess of these values for a distance up to about *half-a-mile* along the line-of-shoot; ground reflection may increase the danger zone by another half-mile. A second calculation shows that 100 watts at 10 cm. into a parabolic aerial 3 ft. in diameter will give a dangerous field up to about 15 feet from the dish. Those using full power on VHF, into high-gain beams, should remember all this, and keep out of the way.

BAILEY'S OF MALTA

Many years ago, in the early 1920's, a well-known South Wales station active on 440-metre phone was 2WU, of Chepstow, Mon., operated by one Charlie Bailey. He was a principal in the firm of C. H. Bailey, Ltd., marine engineers and ship repairers, with a dry-dock on the Usk at Newport, Mon., large enough for such ships as could navigate the river above the old Transporter Bridge. It it this firm that has now taken over the Admiralty dockyards at Malta, an undertaking involving a capital of £4 millions.

SWL • • • • • •

LISTENERS AND THEIR EQUIPMENT — AERIAL MATCHING — SOME OLD TIMER SWL's — STATION DESCRIPTION

THE response to the first appearance of this feature, in the *January* issue of SHORT WAVE MAGAZINE, was so immediate and so great that we were taken somewhat by surprise. Letters from SWL's flowed in by every post, all telling us *(a)* What they thought of the new feature ; *(b)* What they most wanted to see in it ; and *(c)* What sort of gear they were using.

So numerous were the replies (and so voluminous were some of them) that drastic compression has been necessary. Right away, therefore, it is proposed to let as many of our readers as possible introduce themselves and their gear, in the first " SWL Forum," as it could be called, of this new series.

W. H. Brown (Preston) has an 840A and a Geloso converter and listens to amateurs, shipping and aircraft, with a preference for 14 mc and CW. *R. W. Hilton (Cobham)* uses an R.1475 (ex-Tank Set) covering 1·8 - 20 mc ; he sends QSL's to commercial stations but *not* to amateurs!

E. S. Simmonds (Chorley Wood) listens on an Eddystone 840A with an indoor aerial, mostly to amateurs, but is keen on the aircraft control towers at Shannon, Gander and Idlewild ; he apeals to amateurs to enunciate their calls more clearly and not to give out expressions like " G Number Three elladdoo to G 3 emarra " ! *J. A. Share (Penryn)* is a junior SWL with a CR.100, noise limiter, S-meter and 100 kc calibrator ; he says he is in a " perfect spot " for Top Band and Two Metres, and has a 150-ft. aerial, but is puzzled by the small number of 160-metre stations he hears.

F. S. Crease (Hayes, Middx.) runs an R.107 and an R.208, and his ambition is to have a rotary beam for the higher frequencies. *C. J. F. Ward (Maidenhead)* has just the same pair of receivers, but on the HF bands he takes the signal out of the R.208 after the first IF, and feeds it through the R.107 at 2 mc. (Then he takes the audio back to the 208 again!) He would like a design for a transistor receiver covering Forty, Eighty and One-Sixty.

J. W. Bluff (Birmingham) has a home-built job on an old " 19-set " chassis ; RF, oscillator, mixer, two IF's, detector-AVC-noise limiter (from the circuit on p.133 of the May 1958 issue of SHORT WAVE MAGAZINE) and audio. For the HF bands he uses a modified RF-24, and for 50 mc, an RF-26. Aerials are a 67-ft. Windom and an indoor dipole (for 50 mc).

G. S. Hutchinson (Wigan) has an R.208 and a ten-metre dipole, but aspires to an Eddystone 840A. *C. Bell (Tring)* is at present in the R.A.F., but when at home he has a location 500 feet a.s.l., from which he collects them with an R.107 and an RF-24 ; his main interest is aerials, and he has tried several types.

W. E. Wilkinson (Bromley) feeds an RF-26 into a BC-348R at an IF of 3.7 mc for the 21 and 28 mc bands ; other bands are covered by the BC-348 " unaided "; a 67-ft. Windom is used, with ribbon feeder. The RF-26 also figures in the layout of *D. Stanton (Rushden)*, who feeds his into an R.1155A, at an IF of 7·5 mc.

E. Wicks (Bournemouth) goes mainly for the VHF bands, with a Labgear converter and 6J6 push-pull converter for two metres, and RF-26 units for four and six metres (feeding an Eddystone 740) ; he has a 3-element beam for Two, a dipole for Four and Six, and a 66-ft. wire for the HF bands.

E. Willox (Aberdeen) has an R.1155 and an R.208, with a ten-metre dipole, and another ten-metre wire, for aerials. *G. Curtis (South Harrow)* is a keen DX'er (265 countries in 40 Zones!), and his main interest is " super-DX " on CW — and getting the QSL's. For hearing the stuff he has an Eddystone 740 with a Radiocraft pre-selector, and a special type of Windom aerial with two feeders ; an audio filter and headphones are also in the specification, but he doesn't say how he gets the cards!

Yet another R.107 is used by *J. M. Nisbet (South Croydon)*, who aspires to a CR.100 ; he, too, has a Windom aerial (we didn't realise they were so popular among SWL's!) *M. M. Bibby (Deganwy)* already has a CR.100, with no add-on units or mods. *J. Baxter (Hull)* uses a Philips communications receiver and a 75-ft. wire.

S. E. Howard (London, W.4) has an R.1155A " much converted " as main receiver ; also a broad-

When SWL Paterson, G-L018, was in Italy during the war, he operated the Army's own medium-wave BC station in Milan — this was in his disc-jockey days !

cast receiver converted to cover Top Band. *R. Williams (Lincoln)* has an AR-77E and listens to everything—shipping, aircraft, commercial and the lot—as, indeed, he could do on such an Rx. *J. G. Johnston (York)* has a home-built IF and output strip into which he feeds a modified R.107 front end; also a converted BC-355B and a converted RF-26, to say nothing of a two-metre crystal converter.

C. Bennett (London, W.3) has a humble 0-V-1 using 1T4's—his first set. *R. Baines (Gillingham)* covers the HF bands with an R.208 and two RF-24 units; also in use are an R.1155A, a Canadian Type 52, a BC-455 and a two-metre converter; aerials comprise a 14 mc dipole, a 66-ft. wire and a Cubical Quad for 28 mc.

Summary

So much for a cross-section of some of our readers and their gear. A few letters of more than usual interest have been kept back for separate comment further on, but the foregoing serves to introduce some of our SWL's to each other and to build up a picture of what they mostly use. It is obvious that the popular pieces of gear are the R.1155, R.107, R.208 and the RF converters; whether on account of price or availability, they have certainly got around! There are relatively few true commercial receivers, and extremely few home-made ones—which has surprised us a little.

While the gear our listeners are using was what we wanted to know—for the information of all concerned—the other important question was what *they* wanted to see in this feature. Here the answer was very plain. First and foremost was the problem of what aerial to use and (especially) how to couple it to the receiver. For the quick answer to this, read the next four columns!

Second to this subject comes a demand for articles on converters suitable for use with various receivers; and third, articles on how to QSL and, more particularly, how to get QSL's back! This we will cope with in the next instalment of *SWL*.

Meanwhile, please note that all letters for the May instalment should reach us by March 28 at the latest—as it is, some 15 or so letters came in too late for mention this month. The dead-line date is very important. While we want to cover everyone and everything, it is essential to be on time! In particular, we should welcome details of unusual home-built equipment, unusual modifications to ex-Service gear and, of course, any Bright Ideas—of which there must be plenty buzzing around. Purely DX results will, as usual, be dealt with in the SWL Corner of "DX Commentary each month, and *not* in this feature.

MATCHING THE AERIAL TO THE RECEIVER

Our SWL readers were not slow to reply to the query about the type of article they would most like to see in this feature, and there was not the slightest doubt about where their interests lie. Well above every other subject came the important one of "Aerials—and how to use them." Now we are

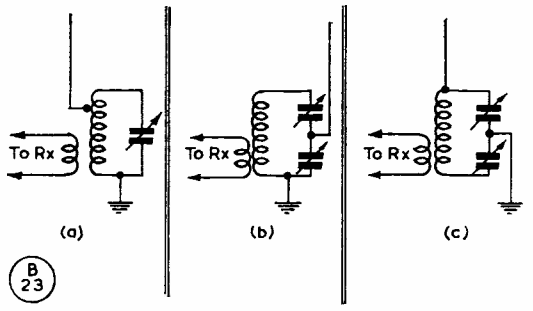


Fig. 1. At (A) is the very simplest form of Aerial Tuning Unit, with the aerial tapped directly on the coil; (B) shows the method of using two condensers to give electrical control of the tapping point; and (C) is the preferable arrangement, whereby it is in effect the earth that is moved up and down the coil.

really on two subjects here . . . for a start, one could fill several pages with descriptions of ideal aerial systems. And then it would still be possible for almost any reader to take almost any of those aerials, connect it to his receiver, and obtain practically nothing in the way of results! (That's how it is with aerials!)

Here and now, therefore, we are starting at the receiver end and describing an arrangement which should make it possible to do well with practically *any* piece of wire strung outside—and we do mean *outside*. We are not at the moment catering for the curtain-rail fraternity, because theirs is the hard way of doing things; they could improve results in an hour or so by drilling a little hole in the window-frame and dangling a piece of wire through it!

The Receiver Input

All modern receivers, and most of the ex-Service types, are designed to operate with a low-impedance input—usually something between 70 and 200 ohms. One can therefore expect results to be, well, below standard, if one just connects a random piece of wire on to one aerial terminal, an earth lead on the other, and hopes for the best. Yet how often this is done!

Such an arrangement will doubtless work quite well on one or two odd frequencies, on which the said piece of wire does happen to present a low impedance to the receiver; on other bands there will be a serious mismatch, resulting in low sensitivity and poor signal/noise ratio.

Without going into aerial theory at this stage, it can be said, as elementary fact, that a length of wire which is somewhere near half a wavelength long (*or* any multiple of half a wavelength) will present a highish impedance at its ends—one of which, of course, we are now about to connect to the receiver. Should the wire be roughly a quarter-wave long (or any *odd* multiple of a quarter-wave) its impedance at the home end will be low. (That of the far end must *always* be high.) Even multiples of a quarter-wave obviously bring it into the half-wave category. When thinking of the amateur bands, you can take it that 132 ft. is ½-wave on 80 metres,

66 ft. ½-wave on 40 metres, 33 ft. ½-wave on 20 metres, and 16 ft. ½-wave on 10 metres. Going further, 132 ft. is full-wave on 40 metres and 66 ft. double-wave (or two full waves) on 10 metres. You can work the rest out for yourself!

Now, a half-wave aerial strung up with both ends free, and a feeder dangling from the centre (in other words, a dipole) *will* confront the receiver terminals with a low impedance, and in many cases will be an ideal match. But this holds good for *one frequency only*. Make your dipole 33 feet long and feed it with co-ax or twin-lead, and your results on Twenty will probably be fine; bu. on Forty, Fifteen or Ten they will be hopeless.

End-Fed Aerials

If you want to use a dipole, then you must erect one for each band that you wish to cover! Quite an undertaking . . . This is why practically everyone prefers some form of end-fed aerial. And here is the major snag: It is easy to design an end-fed aerial that presents a *high* impedance to the receiver on every amateur band (67 feet will do it on all bands 10 - 40 metres, and 134 feet on all bands up to Eighty), but it is impossible to devise a length that gives a *low* impedance on every band. Yet that is what your Rx wants.

The reason? Simple arithmetic . . . if you put up an aerial that looks like a quarter-wave on Forty, then it becomes a half-wave on Twenty, and changes over from low impedance on one band to high on the other. The lengths of wire that give you a high impedance (½-wave, full-wave, three ½-waves, two full-waves, and so on) are in the simple ratio of 2:1 and fit the bands (Ten, Twenty, Forty, Eighty); the lengths that give a low impedance (¼-wave, ¾-wave, 5 quarter-waves, 7 quarter-waves, and so on) have no such convenient relationship.

Therefore it is the obvious thing to settle on a length of wire that gives a more or less similar, *but high*, impedance on every band covered, and to transform that impedance down so as to match the receiver input. A suitable length is 67 feet or thereabouts, which starts as a half-wave on 7 mc and is, as already indicated, two, three and four half-waves on 14, 21 and 28 mc.

Tuning the Aerial

The transformation is effected by an Aerial Tuning Unit—and transformation it is, in more senses than one. The correct use of such a matching device is capable of altering your receiver performance beyond all recognition. It can give you a gain of several S-points over anything previously used in the way of a "piece of wire."

The requirements are two variable condensers, preferably not smaller than about 150 $\mu\mu$F, a few plug-in coil formers and some wire. One coil can usually be devised which will cover 28, 21 and 14 mc; another, if you strike lucky, will cover both 7 and 3·5 mc, but if your condensers are on the small side you will need two for those bands.

Fig. 1 *(a)* shows the basic arrangement. The aerial terminals of the receiver are taken through

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continued

twin flex, or flat lead, or co-ax, to a link winding coupled to the main tuning coil. This link should consist of two or three turns for the HF-band coil, and probably four or five for the others; it is coupled fairly tightly to the bottom or "earthy" end of the tuning coil; the latter is tuned by a variable condenser; and the aerial is tapped down the coil until a spot is found at which sensitivity is highest, and signal/noise ratio best. Such an arrangement will probably work quite well with the aerial right on the top end of the coil, provided that the wire is accurately cut to a half-wave, or a multiple thereof.

Tapping up and down a coil is a fiddly business, so we proceed to the next stage, as in Fig. 1 *(b)*. We now have two variable condensers in series across the coil, and by altering their relative capacities we do, in effect, tap the aerial up and down the coil. (If the upper condenser is set at maximum capacity and the lower at minimum, then the aerial is virtually tapped on the top of the coil. Reverse the condenser positions, and it is at the bottom.)

Now, such an arrangement is all very well, but can be rather prone to hand-capacity effects when tuning up; so we finally come to Fig. 1 *(c)*, in which the aerial is left at the top end of the coil and the *earth* is made to "slide up and down" by means of the two condensers. The moving plates of each condenser should be connected together and to earth; the fixed plates to the ends of the coil. There will be no more trouble with hand-capacity when tuning. This arrangement is also very effective in the transmitting context, as explained in an article on p.568 of the January 1957 issue of SHORT WAVE MAGAZINE.

Coil Windings

If the coils are wound on the conventional formers of about 1¼ in. diameter, using wire of 18 or 20 gauge, try a winding of 6 turns for the HF coil. This should cover 28 mc with both condensers near their minimum—21 mc near the halfway mark, and 14 mc with both well in. There is plenty of scope for a little patient experiment here, with all the following variables: Number of turns on the main coil; number of turns on the link winding; degree of coupling between the two; relative settings

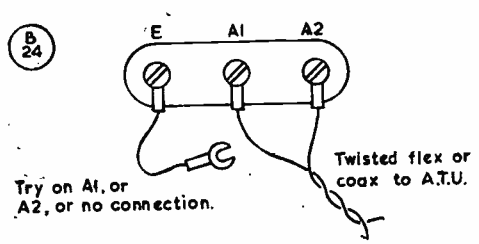

Fig. 2. What you find on the rear chassis drop of most receivers; the A1 and A2 terminals, though intended for a symmetrical feeder system (such as a dipole) can be used for the link winding connection to almost any form of ATU.

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continued

of the two condensers ; and method of coupling into the receiver.

If your receiver has the fairly common back-panel arrangement shown in Fig. 2, further variables appear —try the link winding each way round ; connect the " Earth " terminal to one or the other of the aerial terminals, or just leave it free ; and try the receiver with and without a direct earth connection (to the " E " terminal, of course).

If you cannot cover all three HF bands with the one coil, then it is better to use four or five turns for 28 mc, and ten or twelve turns for 14 mc. You will probably find that the 21 mc band can then also be tuned in on either of them. For 7 and 3.5 mc you will need twenty turns or more.

About the tuning-up operation there is little to be said. Find a fairly strong station on the receiver, without attempting to tune the ATU ; then set the lower variable condenser to full capacity and swing the other until the signal peaks. (If there is no peak, even when you shift the lower condenser, then your turn numbers need altering!) Having found the resonance setting, find a weaker signal and try other positions of the two condensers in the ATU. Once set, it should not need altering unless you go from one extreme end of the band to the other ; but the odd touch as you tune up and down the band will not come amiss.

The improvement you will notice depends entirely on how bad a mismatch you have hitherto been putting up with. If you have had a high-impedance aerial hitched on to a terminal intended for 72 ohms, the difference should be little short of spectacular. If, on the other hand, you have not had too bad a mismatch, it will be only moderate.

For the time being we recommend the use of a wire that is either 67 or 134 feet long—from the far end to the connection on the ATU. With such a wire you can probably short-out the lower variable condenser and do all the tuning on the upper one. Incidentally, it is a useful hint to bend the tip of one vane on the lower condenser so that it automatically shorts-out when set to the full-capacity position.

The coils need not be wound on formers, of course—they may be self-supporting and of heavy-gauge wire, with variable coupling between the link and the tuned circuit. There is a lot of scope for improvisation — but don't be satisfied until you get a really *sharp* indication of resonance, with an unmistakable peak in signal-strength. Too wide and flat a peak indicates that the aerial is too tightly coupled ; a very sharp one that is difficult to find at all means the converse.

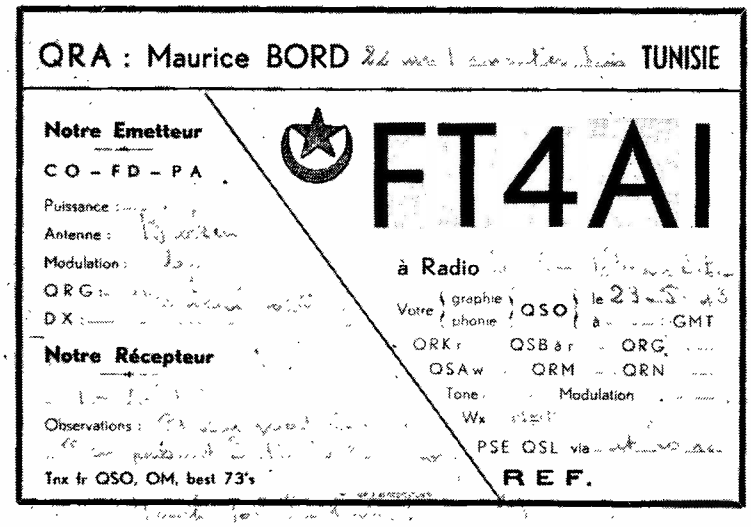
One final note: If your receiver input is *via* a co-ax socket, simply take a short piece of co-ax or flex from this to your link coil, but do try it both ways round. Similarly, if you have only two terminals, one " A " and one " E," try your link connection each way, with and without an actual earth connection.

FOUR OLD TIMERS

For this month, four letters came in of quite unusual interest, their common point being that their writers are all " Old Timers " with a great number of years of experience behind them. As variety is to be the key-note of this feature, we are devoting some space to their achievements and reminiscences.

The oldest Old Timer of the four is *E. J. Boyle (G-L017), of London, S.E.19.* Listen to this: " I have been a listener since 1913, when I commenced to make my first receiving set. This consisted of an aerial inductance six inches in diameter and two feet long with three sliding contacts on it. The tuning condenser for this I cut out of one-sixteenth inch thick zinc sheet with a cold chisel and hammer, filing the plates circular afterwards . . . " Before finishing this monster, E.J.B. finished the kitchen sink, on the corner of which it was being hacked out!

All that was wanted after this was a home-made coherer, a pair of head-phones and the P.M.G.'s permission to listen for Poldhu and Eiffel Tower. Alas — the 1914 war broke out, and the Wireless Section of the Royal Flying Corps took charge of



For reasons explained in the text, this war-time QSL card from the collection of G-L018 (Hatch End, Middlesex) is of particular interest. The description-of-gear section of the card reads " Broken by German soldiers."

this SWL and soon promoted him to a crystal detector in the famous Mark III receiver. He never did find out how his first receiver would have performed!

After 1919 he got going again, working up from a crystal set to a 1-V-2 and numerous other receivers and remaining keen until the War of 1939, when civilian radio service intervened. And now he is still "on the bands" with the rest of us, with an ex-Service HRO. Main interest these days is trying out various types of aerial, and converting sundry ex-Service receivers.

A point of unusual interest is that in 1939 E.J.B. offered his current receiver (an all-mains 1-V-1) to the authorities, for whom it performed a useful service for 21 months and was then returned with thanks, in full working order.

J. Edgar Paterson (G-L018), of Hatch End, doesn't go back nearly so far but has an interesting story. He started in the 30's with his father's Cossor "Melody Maker," which tuned to 160 metres and introduced him to amateurs and their ways. By 1938 he had really settled down as an SWL with a growing collection of QSL's from all parts, but after three enjoyable years the Royal Air Force claimed him.

Finding himself in Algiers during the war, he remembered FA3JY, but couldn't recollect the QTH; but in Tunis he made personal contact with FT4AI, who offered hospitality of a quite abnormal kind. Although FT4AI's Tx had been smashed by the Germans *(see* his QSL, reproduced opposite), he was busy obtaining valves for the receiver so that he could locate the BBC. FT4AI's wallpaper included a QSL from G3FS, a neighbour and friend of J.E.P.'s at Pinner! FT4AH was also met in a personal contact.

Wanderings in Italy did not yield any QSO's with II's, but he became the op. of the Army Broadcasting station in Milan, the signal from which went out on 565 kc for Allied Troops. The war over, the enthusiasm for short-wave listening was missing, largely owing to the use of a commercial receiver which was very difficult to tune on the amateur bands, but now things have turned the full cycle and J.E.P. is on the bands again. This is largely due to a little casual listening on his wife's receiver (1934 model!) and also to some pressure from G6RF. The outfit will be a small 5-valve battery receiver covering 7, 14 and 21 mc.

C. H. Whitaker (Hemsworth) is a pre-BBC type, who used to hear the Eiffel Tower time signals in 1921; he had his own first short-wave set in 1927-28. when PCJJ was one of the favourite signals. Since then he has used such varied gear as an R.107, R.109, R.1116, R.1124, BC-348, BC-342, R.1132, Eddystone S.640 and a National HRO receiver.

He is now building up a new station with an R.1124, R.1155 and R.208, with an eye to better things still. QSL cards are arriving from many parts of the world, and the old enthusiasm is back, even after a span of 30 years! C.H.W. mentions, in passing, how helpful some of the local amateurs are towards SWL's . . . but he also records that there are *some* who regard them as "nothing but pests," forgetting that they, too, were most probably SWL's some time in the past.

Finally, we have *W. Wright (Wraysbury),* who has been a reader of SHORT WAVE MAGAZINE since the first (pre-war) issue (March, 1937), and wonders how many present followers can claim that record. His letter is especially interesting because of the range of equipment that he has in use at the moment. Here is the catalogue: Eddystone 840A; AR88D; two Philips Vox mobile 10/15-watt amplifiers; Sound Mirror recorder; RGD Model 3611 (excellent coverage over 16.5 - 145 metres); R.1481 (66 - 86 mc); R.1132A (100 - 124 mc); R.1392E (100 - 150 mc); R.1132A modified to receive FM broadcasting, with home-built 10-watt amplifier; and an R.1155 with a similar amplifier, used mostly in conjunction with the tape recorder.

W.W. adds that he has several home-built converters and pre-selectors, to say nothing of a great quantity of new components awaiting use when he has time to get down to solid constructional work. One of his pleas is for an article on the extraction of QSL cards, which, to him, is no easier than picking winners, at present!

If any other SWL Old Timers have been inspired by the foregoing, we shall naturally be delighted to hear from them and to record their stories.

Short Points from Letters

Listeners' gen, on commercial W/T stations operating regularly within the amateur bands, with frequencies and locations, would be most useful *(GM3COV, Thurso)*; Articles on "Procedure" and on "How to Extract QSL Cards" would be welcome, also the circuit of a converter to cover the two missing bands on the R.1155 *(D. A. Granger, Thornton, Leics.);* An article explaining "Amateur Jargon" would clear up a lot of confusion *(J. A. Sheffield, Baginton, Coventry).*

Details of receivers using modern valves and coils, also a good receiver aerial coupler and tuner wanted *(J. Langford, Parkstone).* Impedance matching of aerials to Tx and Rx, both theoretical and practical, is a very important subject to which insufficient attention has been given.

(The requests for aerial-matching details are briefly covered herewith, on p.33, but there will be more to say about this subject in later issues.)

STATION OF THE MONTH

(Every two months we hope to present a short description of the station of one of our SWL readers. Photographs and descriptions of the gear used will be welcomed.)

The SWL station chosen for presentation in this instalment is that of Peter Day (28 Oxford Street, Sheffield), who has been very consistently reporting his results to "DX Commentary" for a long time.

He is unusual among SWL's for the number of bands covered by his gear. The six bands from One-Sixty down to Ten are explored by many

SWL Day of Sheffield is an experienced DX listener with a useful range of gear — in view are an Eddystone S.358 with RF-24 and RF-26 converters, the former for 10-15-20 metres and the latter for 6 metres; a power unit for the receiver and converter; an aerial tuning unit for all amateur bands; a Morse practice oscillator; and a tape recorder.

listeners these days, but Peter continues downwards from there and covers Six Metres (on which band he has logged many W's and other DX), and is now equipped for the Four-Metre (70-72 mc) band as well.

The main receiver is an Eddystone 358, used with an RF-24 for Ten, Fifteen and Twenty, and an RF-26 for Six (and doubtless Four). Tape recordings of DX, especially on six metres, are made on a Brennell Mk. IV recorder. Home-built equipment includes 0-V-0 receivers, a three-channel mixer unit for the tape recorder, crystal microphones, and aerial tuning units.

The aerial farm comprises a long-wire for the LF bands, and separate dipoles for Six, Ten, Fifteen and Twenty, the first three being indoors. Projected, shortly, is a six-metre Quad or a "ZL Special." All aerials are tuned by simple ATU's.

Apart from the wide range of short-wave bands he covers, Peter Day is also interested in DX medium-wave broadcasting; he has recently been hearing the USA stations at S9-plus, between 0300 and 0500 GMT, and on one occasion WMEX was as strong as that by 0100.

His station is certainly a good example of versatility in short-wave reception as a hobby; and since real enthusiasts are never content, we foresee many more alterations and additions in the future.

Correspondence from short wave listeners is welcomed for this feature, the next appearance of which is in the May issue. The closing date is March 28 and all mail should be addressed: "SWL," c/o The Editor, Short Wave Magazine, 55 Victoria Street, London, S.W.1

AMERICA'S WEATHER SATELLITE

On February 18, the Americans launched the first of their four proposed "met. balloon" satellites; it went successfully into orbit, and is circling the earth to cover some 35 degrees of latitude about the equator. It is a sphere 20 ins. in diameter, weighing 21¼ lbs., and is fitted with photo-electric cells for scanning, with tape-recorder storage; the recorder is triggered by ground control, and it was expected that the battery power supply would last about a fortnight from the time of launching. The object of this particular exercise is to get an impression of the cloud formation over the quarter of the earth's surface covered, from which long-term weather forecasts could be built up. Future versions of these Wx probes will be fitted with solar batteries, which will give much longer effective life. In view of this, we hope to be able to arrange for the notification of frequencies as soon as a launch is in prospect.

FRED — MERCHANT VENTURER

GETTING INTO THE SURPLUS BUSINESS

By G3COI

FRED had a sensitive nose for junk and prided himself that a new load had only to be delivered to any dealer in his district and he would know about it within the hour. Once so informed, he would be off in a trice to inspect it, in order that he could give the boys on 160 the low-down as soon as possible. Anyway, it was this instinct which prompted him to stop one day when returning from a visit to an aged relative. It was out in the country, and he had diverted from the main road in order to try a short cut, when he spotted an old Army searchlight which had been abandoned in a field. Further on, he saw a dismembered bomber fuselage and a few grey wooden crates. Fred's nose twitched and his pulse quickened—unles he was very much mistaken, junk, loads of it, was in the offing!

Very soon, he came to a little cottage behind which appeared to be a set-piece depicting D-Day on the Normandy beaches. He quickly pulled his car into the shallow ditch, leaped out and advanced upon this veritable bonanza of junk.

It was a truly fascinating place and Fred spent an absorbed hour picking his way through the discarded material of war. There were many wooden boxes and crates of all shapes and condition, some empty, some filled with canvas pads. There were mysterious radar units which very successfully defied Fred's pocket screwdriver to open them. Coil upon coil of telephone wire lay awaiting the day it would be put to good use "in garden and home" as the bargain Ads. say. Suddenly, Fred came across a pile of metal boxes, each about the size of a petrol tin, and each bearing the label, "UNITS—TYPE SN1P." They opened very easily and inside appeared to have a good selection of parts-that-would-come-in-useful.

A steady squelch, squelch in the mud behind him awoke Fred from his speculative reverie. He turned and beheld a strange figure, attired in an old R.A.F. flying jacket and inflated Mae-West, camouflaged cotton trousers and gumboots. His thin, pinched countenance regarded Fred dully. "Wodger want?" His voice had the flat quality of one accustomed to dealing in vast quantities. "I was wondering how much you wanted for one of these," said Fred, indicating the SN1P units. For a moment, the stranger's eyes flashed. "Only *one*?" he almost snarled, "I don't sell in ones, but you can take the lot at a tanner each."

Fred made a few rapid calculations. "Done!" he said. "Have them delivered to this address." He handed the man a QSL card and strode off about three feet in the air. He was in business! At last *he* would be able to join in the activities of the Government surplus boys. By the time he had arrived home, his plans were complete and forthwith he dispatched an advertisement to the *Magazine*. "THE UNIT YOU'VE BEEN LOOKING FOR!! THE SN1P—CHOCK FULL OF VALUABLE PARTS: Only 5s. (please add 27s. for carriage). No C.O.D. Terms—Cash with order. Offered subject to being unsold," etc., etc.

Fred sat back and waited for the flood of orders. But people were a bit suspicious of that "SN1P," and wanted to know what was in the box. Fred couldn't tell them, because he didn't know—so all he got was one order (returned) and a lot of enquiries. Then one day G9XY, his nearest local, happened to call on his regular visit, trying to recover a test meter he had loaned to Fred about three years before.

"How's business, Fred?" he enquired, by way of an opening gambit. "Oh! still have a few SN1P's left for personal friends," said Fred craftily. "Well, let's have a look at one," said G9XY aggressively, "and see just what good parts can be extracted."

They went up to the shack and started work. The first things they tried to remove were the knobs on the front panel. These were held by Allen screws, and by good fortune, Fred had a full set of Allen keys with which to undo them. But the screws were stubborn and resisted all the old and new methods the two junk surgeons could contrive.

They tried dabbing petrol, paraffin, carbon-tet, and the XYL's nail-varnish remover, with little visible result except two badly chewed Allen keys. The blow-lamp was then called upon, to the detriment of many of the smaller components. The knobs, now hardly recognisable as such, remained firmly attached to their spindles.

Fred and G9XY sat down, moist and breathless, the former avoiding the latter's eye. "There's one thing we haven't tried," panted Fred, "the electric drill." They were more successful, and in two hours had managed to blast off three of the knobs. Needless to say, most of the variable condensers and coils were also secured by Allen screws, and being inside the unit, proved even more difficult to remove . . . . .

G9XY is a decent chap. He helped Fred draft out a new advertisement which was posted immediately—"MISCELLANEOUS UNITS, bankrupt stock, 6d. each to clear while they last."

All this happened quite a long time ago, and if you ever call round to see Fred, have a look at his rock garden—it's rather unique.

"ENGLISH ELECTRIC" VALVE EXHIBITION

We are asked to announce that the English Electric Valve Co., Ltd. will be holding a private exhibition at the Kensington Palace Hotel, De Vere Gardens, London, W.8, during March 17-21. The display will consist of all that is modern in valve design technique in the fields of radar, telecommunication, radio transmission and broadcast engineering and instrumentation. Readers of SHORT WAVE MAGAZINE are invited to visit this Exhibition, to which admission is free.

VHF BANDS

A. J. DEVON

Conditions Good, but Activity Low—

Meteor Pings, Aurora Appearances and Moon Reflections—

Notes, News and The Tables—

THOUGH conditions have been fairly good, with some nice EDX openings since our last appearance in the January issue—the lapse in February was not entirely due to idleness on the part of your A.J.D.! — there has not been a great deal doing in the way of amateur VHF activity. However, it was pleasing to have a good many routine reports, with claims for the Tables, which are shown up-to-date this month (with the exception of the All-Time, as there is hardly room for it).

A study of the barometric trace since January 24 shows the glass to have been uniformly high and fairly steady for the whole four weeks' period following, with a highest-ever recording (on A.J.D.'s dial) of 30·92 on February 17. Conditions were good during that week, with the OZ's and more distant DL's coming through to the southern part of the country on February 18, when G3BDQ (St. Leonards) worked OZ7BR for a very nice 600-mile QSO. Earlier in the period, GDX was good over the week-end February 7-8, while G3HBW (Bushey Heath) gives January 28 as a very interesting evening; with him, Continentals were audible almost every night that week.

On the other hand, general reports indicate that activity has been low, as the calls h/w lists this month suggest! It is hoped that we shall see many more of these as the season goes on, and as a rule they will all be published. The point here is that the reporting of even local stations helps to build up the general picture of activity.

Meteor Pings

G3HBW is persevering with his work on this subject, and during the Quadrantids appearance of January 1-4 kept an early-morning schedule with HB9RG; short bursts were heard from him on all four occasions, and on the morning of January 3, when GM3EGW happened to be listening, he identified the letters "RG" in the c/s, the distance being about 800 miles.

Interesting DX Results

According to GM3EGW (Dunfermline), there were auroral effects on January 5, 9, 10 and 11; in the course of these manifestations, GM3EGW heard LA3AA and LA9T and worked G3IRS, at 2330 on the 9th. After having maintained schedules with G2NY, G3FZL and G3HBW for a long period, GM3EGW is able to report them as having been "amazingly successful." G2NY was 100% throughout, while G3HBW and G3FZL were audible nearly every time.

These results merely go to show that, given adequate power and consistent schedule-keeping, with proper receivers and good beams at both ends, a regular communication path can be maintained over hundreds of miles even on a frequency as high as 145 mc. The PE1PL results have been proving it over a long period, and now we see that the same sort of thing is possible across G/GM distances, even over what used to be called "the barrier of the Cheviots." Of course, a different mode of propagation is involved, analogous to forward-scatter, and it is this that calls for plenty of RF into a high-gain beam. For the majority of operators, working the U.K. is only possible when tropospheric or auroral conditions obtain.

That the professional VHF-propagation boys are very interested in these problems is shown by the recent announcement, by the Ministry of Supply, that a new station devoted to auroral investigation is to be established at Hillhead, near Fraserburgh in Aberdeenshire. The work will be part of the research programme being undertaken jointly by the Stanford Institute of America and R.R.E., Malvern. The aerial is to be a large parabolic reflector about 140 ft. in diameter, and the experiments are expected to take up to two years.

Moon Reflection Results

Still on the theme of unusual propagation modes, we have a very interesting letter from PE1PL, describing their results when, during January 27-29, the U.S. Army Signal Engineering Laboratory at Fort Monmouth, New Jersey, aimed signals at the moon, on a frequency of 151·11 mc, using an input of 50 kW and a paraboloid dish 45 feet in diameter; these signals were successfully received at PE1PL

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1958

Starting Figure, 14

From Home QTH Only

Worked	Station
49	G5MA
41	G3HBW
38	G3JWQ
37	G3MED
32	G3KPT
27	G3GSO, G3KQF, G3LTF
25	G3DVK
22	G2CIW, G3MAX
21	G3LTF/A
20	GW3MFY

This Annual Counties Worked Table opened on September 1st, 1958, and will run till August 31st, 1959. All operators who work 14 or more Counties on Two Metres are eligible for entry in the Table. The first claim should be a list of counties with the stations worked for them. The list can be added to as additional counties accrue.

at a maximum of about S3. Their beam was a 22 ft. paraboloid, with a low-noise triple-conversion receiver; the moon-reflected signals arrived with marked variations in polarisation, sometimes with the horizontal component dominant and at others the vertical, with regular slow fading in both planes.

From the communication point of view, this is, of course, an extraordinarily interesting and significant result; while the power being used is far outside the amateur range, it is not excessive by commercial standards. This is probably the first actual communication test on VHF with the moon used as a reflector.

Flash Back

Those who have been regular readers of this piece over many years may by now have had their memories triggered back to May, 1953, when we reported what at the time was thought to be an amateur QSO on two metres across the Atlantic by moon reflection. It turned out to be "moonshine," a hoax perpetrated by some ass of a DL. Because the story reached us just on the dead-line, giving no time for a thorough check back, and also because from first principles it seemed both reasonable and credible, we accepted it as fact, and went into some detail on the practical problems involved in getting set up for a moon bounce (these are actually rather more complicated than might be thought).

However, as soon as it was known that the supposed QSO was a hoax, certain self-styled "experts" (who until then had remained remarkably quiet) burst into print with all sorts of comic allusions and wise advice; one even went so far as to prove by mathematical argument that to use the moon as a VHF reflector was virtually impossible! (This precious piece of work has been carefully preserved in the A.J.D. archives.)

Well, five years afterwards we see that the moon *is* being used as a VHF reflector, and very successfully, too—and *see* p.607, January last. Your A.J.D. was only wrong in being about five years before his time — though one cannot always afford to wait so long for the laugh! Never mind . . . and those seriously interested in moon aiming will find an article in our August 1953 issue which explains how to work out its angular height and true bearing at any time and from any place.

VHF Century Club

Returning from outer space to amateur activities on VHF, we are often being asked what the rules are for the VHF Century Club, founded in this column more than ten years ago. They are simple: You must have, and show, cards proving two-way contact from the same QTH with not less than 100 different amateur stations on VHF, the bands being reckoned as any from inclusive 50 mc upwards. Claims, with the cards, a check list by call-signs, bands and prefixes *(this is essential)* and return postage, should be sent by registered post to A.J.D. at the office address. If accepted, a rather nice certificate is issued, and its award is published in this space.

Those who have satisfied these conditions recently are: Karl Fritsch, DL1EG, Selb/Ofr., awarded VHFCC Certificate No. 235; P. K. Blair, G3LTF, London, N.W.7, VHFCC No. 236; and Lennart Berg, SM6BTT, Gothenburg, No. 237. It is interesting to note than many of SM6BTT's cards are for 6-metre phone contacts with W's. G3LTF's lot include QSL's from 29 counties and seven countries. DL1EG has worked no U.K. stations at all, but shows 20 OK's and five stations in OE.

[*Over*

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
32	G2XV
27	G3HBW, G3KEQ, G5YV
26	G3JWQ, G6NF, GW2ADZ
23	G3BKQ, G6NB
20	G3HAZ
19	G2CIW
18	G3IOO
16	G3MED
15	G4RO
14	G2DDD, G2HDZ
13	G3MPS
12	*G5BD*
10	G2OI, G3IRW
9	G3KPT, G3LHA, G5DS
7	G2HDY, G3JHM, G3LTF
6	G3FAN, G3JMA, G3KHA, G3WW
5	G3FUL, G3IRA, G3IUD, 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

TWO-METRE ACTIVITY REPORT

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

SWL Tomlin, Chepstow, Mon.
HEARD: G2AIW, 2FQP, 2HCG, 2HDJ, 2JF, 2XV, 3BA, 3FAN, 3FIH, 3HBW, 3HXN, 3HXS, 3ICO, 3IER, 3JZG, 3KEQ, 3KHA, 3KPT, 3LAY, 3LHA, 3YZ, 4DC, 5BM, 5DW, 5MA, 5WW, 6NB, 6OX, 8DA, 8VZ, GW3HAW, 3MFY, 8UH.

G3DLU, Sheffield.
HEARD: G2LG, 2FNW, 2XV, 3BA, 3APY, 3AYC, 3CCH, 3DVV, 3ENS, 3FCY, 3FGT, 3FZL, 3GFD, 3GSO, 3HA, 3HBW, 3IIT, 3JMA, 3JMA/P (Hull), 3JWQ, 3KQF, 3LTF, 3MNQ, 3US, 5CP, 5MA, 5YV, 6LI, 6XM, 6XX, 6YP, 8CB, 8MW, GB3IGY. (*To February* 16, *indoor dipole only*).

G3HBW, Bushey, Herts.
WORKED: G3APY, 3CCH, 3EKX, 3ENS, 3FCY, 3GZM, 3HA, 3HAN, 3ICO, 3IOO, 3IRS, 3JGJ, 3JGY, 3JWQ, 3JZG, 3KHA, 3KKB, 3LAY, 3MAX, 3MED, 3NAS, 3US, 5DW, 5LL, 5YV, 6GN, 6JY, 6LI, 6XM, 6XX, 8DA, 8MW, GC2FZC, GM3EGW, GW2HIY, 3MFY, 8SU, PAØEZ, ØJJ, ØLQ, ØMZ, ØQC, ØTP, ØWAR, ØWU.
HEARD: DJ3HX, F3LP, G2FNW, 3EJO, 3FGT, 3FIH, 3GGR, 3HAZ, 3IKV, 3IWJ, 3LZH, 3LZN, 5BM, 5CP, 8VN, GW3HAW, 8UH, ON4HN. (*January* 1 *to February* 16; *All over* 100 *miles*).
HEARD: HB9RG. (*January* 1, 2, 3 *and* 4; *during Quadrantids*).

SWL Winters, Melton Mowbray.
PHONE: G2FNW, 3DVK, 3EKX, 3GHI, 3IAI, 3IKV, 3IRA, 3JWQ, 3JMA, 3KPT, 3MPS, 4MK, 5MA, 5YV, 6XM, 6XX, 8AL, 8VN, GB2RS (Yorks and Surrey).
C.W.: G2FNW, 3ENS, GB3IGY. (*To February* 17).

STOP PRESS—Because of aircraft interference, changes in the Zone Plan have been agreed with the authorities and will be discussed next month.

Some Station Reports

G3BDQ (St. Leonards) had a good round-up on February 18, when he knocked off four F's, GC2FZC, ON4HN and OZ7BR.

G3MPS (Aldershot) has been on the VHF bands since May last year, with 231 stations worked on two metres (but 14 cards still wanted for VHFCC!). He has a 4X150A in the PA, with a YU1AD - type converter, as described in our December '56 issue, and the beam is a 12-ele stack at 30 ft. "handraulic operated." On Seventycems, freq. 434·7 mc, G3MPS has a QQVO3-20 tripler, with a QQVO6-40 PA coming along, into a 24-ele stack ; his receiver for this band is a trough-line converter with a CV2154 xtal mixer, 6AK5 head amplifier at IF, and 6AM4 trough-line multiplier. In hand is a crystal-controlled converter for 1296-1300 mc, with a DET24 tripler and a corner-reflector type of beam array. This sounds a very interesting programme, and we wish G3MPS all success on VHF.

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

18	G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OK, ON, OZ, PA, SM, SP)
17	ON4BZ (DL, EI, F, G, GC, GI, GM, GW, HB, LA, LX, ON, OZ, PA, SM, SP, 9S4)
16	G3GHO, G3HBW, G5MA, G6NB
15	G4MW, G6XM
14	G2FJR, G2HDZ, G2XV, G3IOO, G3JWQ, G3KEQ, G3WS, *G5BD*, G6LI, G8OU
13	G3BLP, G3CCH, G3DMU, G3DVK, *G3GPT*, G5DS, G6XX, GM3EGW, PAØFB
12	F8MX, G2HIF, G3FAN, G3GFD, G3GHI, G3HAZ, G3WW, G6RH
11	EI2W, G2AJ, G2CZS, G3ABA, G3JZN, *G3KUH*, G3LHA, G4RO, G4SA, G5UD
10	G2AHP, G2FQP, G2HOP, G3BK, G3BNC, G3DLU, G3EHY, G3GSE, G3KQF, G3MED, G5MR, G8IC, GW5MQ
9	G2DVD, G2FCL, G3DKF, G3FIJ, G3FUR, G3GSO, G3IUD, G5ML, GC3EBK, GM3DIQ
8	G2CIW, G2DDD, G2XC, G3AEP, G3AGS, G3BDQ, G3BOC, G3GBO, G3HCU, G3HWJ, G3KHA, G3MPS, G3VM, G5BM, G5BY, G8SB, G8VZ, GC2FZC

When G8SC and GW8NQ (standing left) were /P near Monmouth, the two-metre transmitter ran an 832 at 8-10 watts, and the receiver was a cascode-type converter into a Command receiver, with the beam mounted on a hollow, sectional mast. The site was 800 ft. a.s.l.

A new station to report is G3ICO (Yeovil), who sends a claim for the bottom rung of Counties and says he found conditions good on February 8, with F3LP worked and several GDX stations well received. G2CIW (Cambridge) says that he has raised no GDX since November, and now only gets on at week-ends. G3DLU (Sheffield) is keeping the fire in on the receiving side, and hopes to get going again soon. G6NF (Shirley, Sy.) goes up four in 70 cm. Counties, and G3JZN one in the Countries table, having collected GC2FZC on February 17. GM3EGW now has 232 stations worked in 61 counties, while G3KPT has 38C from his West Bromwich QTH.

Dead-line ——

This must be **Wednesday, March 18,** when we hope to have a large mail addressed to: A. J. Devon, "VHF Bands," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. Easter will have passed before we meet again, so, if you are out /M, go carefully.

Audio Driver Unit with Speech Clipping

TO RAISE AVERAGE MODULATION LEVEL

A POWERFUL carrier is of no use unless it conveys intelligence, and in telephony the intelligence lies in the modulation. Thus, any means which serves to increase the effective level of the modulation improves the value of the signal and, at the receiving end, enables a weaker transmission to be copied than would otherwise be possible. On the other hand, overmodulation and distortion must be avoided if any advantage is to be gained by increasing modulation level.

The amplitude of a speech wave varies over wide limits and with 100 per cent. modulation on peaks, the *average* level of modulation is something very much less than this. These peaks convey little intelligence and if they can be cut off at some predetermined level the amplitude variation in the speech waveform is greatly reduced and the average level of modulation can be increased without causing overmodulation. The diagram (Fig. 2) showing the effect of limiting amplitude variation on waveform will make this clear.

A further increase in the average level of modulation may be obtained by restricting the frequency response such that the lower frequencies (which contribute little to the intelligibility but require considerable power) are attenuated. Nor need frequencies much above 3,400-4,000 cycles be retained ; they are greatly attenuated by the modern communications receiver and furthermore they increase the width of the channel taken up by the transmission.

The audio peaks may readily be cut off at the desired level by using limiting diodes shunted opposite ways across the audio path. The diodes are biased and conduct when the applied voltage exceeds the bias, thereby placing a low impedance across the supply and preventing the output voltage from rising. However, since the audio peaks are squared off by the clipping, high frequency harmonics will be generated and these must be removed. It is therefore necessary to put the signal through a low-pass filter and at the same time to ensure that the following stages are reasonably linear to avoid distortion. It is a good thing to put filter condensers across the modulation transformer to resonate with its leakage inductance and remove any high frequencies generated in the modulator proper.

Since the general effect of clipping is to increase the amplitude of the weak audio signals with respect to the stronger ones, any small hum or ripple introduced in the early stages will be accentuated. Every precaution must be taken therefore to minimise hum pick-up. The system is also sensitive to small noises picked up by the microphone, and if a quiet background is to be obtained then noisy transformers and chokes must be silenced. Care must also be taken to avoid acoustic feedback from the modulation transformer or monitor phones.

Clipper Circuit

The preamplifier shown over is intended to operate from a crystal microphone. The output from the microphone is fed through an RF filter R1, C1, to an EF37 low-noise pentode which is resistance-capacity coupled to half a 6SL7, V2A, *via* gain control R8. The signal is then passed to a 6J5 cathode follower V3, which acts as a low impedance driver for the clipping diodes, V4. If the diodes are driven directly by the 6SL7 then distortion will be caused when they conduct and reduce the load impedance of the stage. A bias of two volts is applied to each diode and the diodes are arranged to clip both positive and negative peaks. The bias voltage is derived from a potentiometer between HT and earth (network R18, R19, R21) and the by-pass condensers C13, C14, at the lower end of the potentiometer serve to eliminate ripple and also keep down the impedances in series with the diodes. If these impedances are high, then the output tends to rise as the input increases, thereby causing overmodulation when clipping heavily. The 50,000-ohm resistor R16 in series with the diodes forms the upper arm of a potentiometer with the diodes as the lower arm, such that the output voltage cannot exceed the voltage required to cause the diodes to conduct.

The output from the clipper is amplified by the second half of the 6SL7, V2B, and a resistance-capacity low-pass filter follows this stage. This filter was used in preference to a tuned filter since the impedance of the latter falls at frequencies higher than the resonant frequency, and this may allow audio harmonics to pass with only little attenuation. The filter coils are also liable to pick-up hum and RF

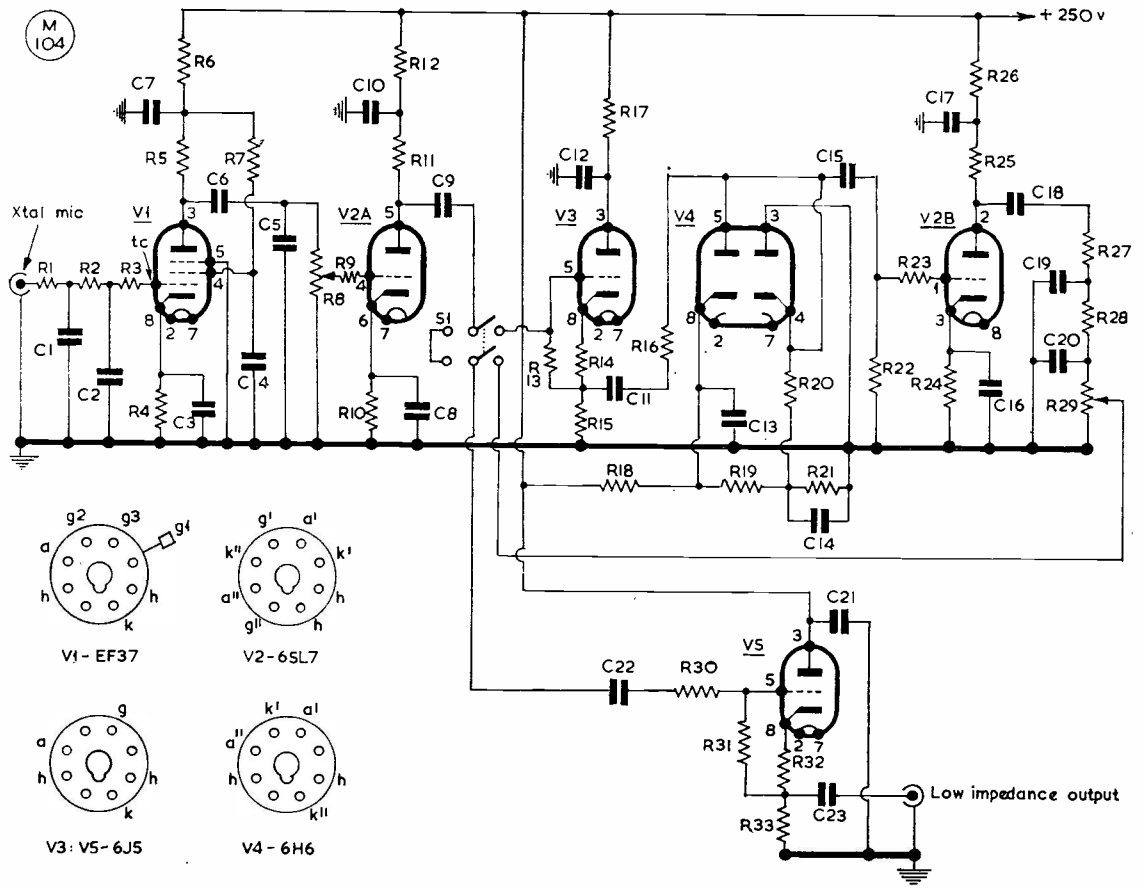


Fig. 1. This speech amplifier will give either normal audio drive or clipped speech output by throwing S1 ; in either case, output is at low impedance from the cathode of V5. The audio gain control is R8, and the clipping control is at R29. A high degree of clipping is possible with acceptable quality, and by the use of an amplifier of this type, modulation capability is increased considerably, in the sense that the average modulation level can be well advanced.

voltages and so cause trouble in the modulator.

A triode cathode-follower using a 6J5 handles the output from the filter and gives audio drive at low impedance (into coax) enabling the main modulator to be placed 20-30 feet away. If desired this cathode follower stage could be omitted when the preamplifier and modulator are situated close together. A switch S1 can be fitted to by-pass the clipper, allowing the pre-amplifier to function in the normal way.

Power at 250 volts 40 mA and 6·3 volts 2 amps is required and should be obtained from a separate power supply.

Construction

The construction of the unit is straightforward, and the only precautions necessary are those required to minimise hum. A 7in. × 9in. chassis can be used with a front panel and the unit enclosed in a metal box. The leads to the grids of the first two stages must be carefully screened and a screened top cap fitted to the EF37. The RF filter in the micro-

Table of Values

Fig. 1. The Speech-Clip Preamplifier Unit

C1, C2, C5	= 80 μμF	R8	= 500,000 ohms, audio gain
C3, C8, C13, C14, C16	= 50 μF, 25v.	R10	= 3,000 ohms
C4, C23	= 0.5 μF, 350v.	R11	= 200,000 ohms
C6, C9	= .006 μF, mica	R9, R12, R17, R26	= 30,000 ohms
C7, C10, C12, C17, C21	= 8 μF, 350v.	R13, R20, R22, R31	= 250,000 ohms
C11	= 0.1 μF	R14, R32	= 1,000 ohms
C15	= .003 μF, mica	R15	= 10,000 ohms
C18, C22	= .01 μF	R18	= 75,000 ohms
C19, C20	= .001 μF.	R19, R21	= 500 ohms
R1, R2, R3, R6, R16, R23, R27, R28, R30	= 50,000 ohms	R24	= 2,000 ohms
R4	= 3,500 ohms	R33	= 15,000 ohms
R5, R25	= 100,000 ohms	R29	= 250,000 ohms, post-clipper gain
R7	= 750,000 ohms	S1	= DPDT toggle switch
		V1	= EF37
		V2A, V2B	= 6SL7
		V3, V5	= 6J5
		V4	= 6H6

(All resistors rated ½-watt)

phone lead is mounted behind the input socket on the panel and enclosed in a valve shield. Heater leads are twisted and kept in the corners of the chassis away from grid connections. (Any hum from the heaters can be balanced out by using a potentiometer across them with the slider earthed; the potentiometer is then adjusted for minimum hum.)

Hum loops in the wiring and earth returns must be avoided on the first stage and it is best to use single point earthing, keeping earth wires close to the chassis.

Operation

After checking wiring and operating voltages the preamplifier can be connected to the modulator and tried on the transmitter. Some form of modulation measuring or indicating device (preferably of the CR type) is almost essential if the system is to be set up properly. The unit described on p. 637 of the February, 1959, issue of SHORT WAVE MAGAZINE would do admirably if a 'scope is not available.

The audio gain control R8 is almost fully advanced and the post-clipper gain R29 adjusted to give as nearly as possible 100% modulation when speaking normally into the microphone. Under these conditions and using the simple trapezium type of pattern on the CRO, the figure should be a complete triangle for most of the time—or, in the meter indicating device already mentioned, the needle should keep near the 100% mark. Once the R29 control has been set, it should not be touched, unless the carrier power is greatly altered. In other words, the setting-up adjustments are for the normal transmitter input used.

The audio gain R8 can now be varied to find the right degree of clipping; this can be determined by listening on the station audio monitor, while watching the modulation level indicator. The apparent audio level will be found to increase as R8 is advanced until the optimum point is reached. It is this that will give the best readability ("quality") without apparent distortion. If the gain is advanced too far, the distortion will increase rapidly as the clipping becomes more severe. It is thus a matter of watching the modulation level while listening on side-tone until the right balance between clip level and depth of modulation is obtained, the aim being to use as much clipping as possible (maximum average modulation) with the minimum distortion (good readable speech). These adjustments are best made by internal monitoring, the effect then being

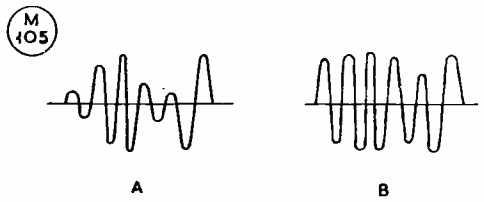


Fig. 2. The "before and after" of speech clipping, showing how fuller average depth of control (B) is obtained by controlled clipping — see text.

tried on a local station for an on-the-air report. In most cases, it will be found that a listening operator locally will advise less clipping and more modulation than the instrument checks suggest as the optimum.

It is important to note that with the preliminary adjustment properly carried out, it is impossible to over-modulate, whatever the noise-input to the microphone may be. Hence, get set up for a comfortable speaking voice, fairly close to the microphone.

Under practical conditions, it will be found that DX stations will report a great improvement in readability and perfectly satisfactory communication quality when the clipper is in use. If better quality is required (as for working critical locals!), the switch S1 can be thrown, putting the clipper out of circuit; but then it will be found necessary to go back a long way on R8 to prevent over-modulation.

"SEND IT AIR MAIL"

We are constantly being asked by readers overseas to send them this-or-that "by air mail" and enclosing about 5s. for the purpose. In fact, air mail charges for items like books and magazines are very heavy, and the cost is seldom justified! For instance, *QST* costs 5s. *per copy* to most parts of the world, which is more than its cover price. At the generally prevailing air mail rate of 6d. per half-ounce, which is the charge for periodicals such as SHORT WAVE MAGAZINE, the cost is 4s. 6d., since an average copy of the *Magazine* weighs not less than 4½ ozs. The rates quoted here are for second-class air mail, varying between 5d. and 7d. the ½-oz., depending on destination. The first-class rate is 2½ times this, and makes the thing quite prohibitive! Yet readers often enclose merely an extra 10s. or so with their subscription, and ask for delivery by air mail, whereas the cheapest we could do it is at about twice the cover-price, per copy! If readers in distant parts, who really do want air mail delivery would check on the charges first, it would save a great deal of time, disappointment and (expensive air mail) correspondence all round. For SHORT WAVE MAGAZINE, what it comes to for most countries is 30s. for the subscription *plus* another 54s. for the postage.

Measuring Earth Resistance

PRACTICAL METHOD OF CALCULATION

W. E. THOMPSON (G3MQT)

IT is sometimes necessary, and is of some interest, to know the resistance of the station earthing system. If the resistance of the earth point rises, loss of radiated power can result. The earth is usually taken for granted, and until one measures its resistance it is often assumed to be a much lower value than it is in practice.

If a low-reading ohmmeter or a bridge megger is available a simple test can be made to find the resistance of an earthing system to a fair degree of accuracy. A bridge megger is to be preferred since it is possible to measure down to 0·01 ohm with it. Values of this order can be read off a meter arranged for shunt-type resistance measurements, provided that a sensitive instrument is used with a low-value shunt and a relatively high voltage. In such circumstances, however, some difficulty may be encountered in obtaining a steady reading. The same condition can arise with a bridge megger if the handle is turned quickly, so it is best to keep the generator turning slowly, that is, well below the clutch slip-speed.

Referring to Fig. 1, Ra is the resistance of the earthing system E it is desired to measure. Two other earth resistances Rb and Rc are necessary for the test, and are provided temporarily by suitable earth spikes driven in the ground. If three measurements are made between pairs of resistances, the three relationships below can be written down :—

$$R1 = Ra + Rb \quad \ldots \quad (1)$$
$$R2 = Ra + Rc \quad \ldots \quad (2)$$
$$R3 = Rb + Rc \quad \ldots \quad (3)$$

Adding (1) and (2),

$$R1 + R2 = 2Ra + Rb + Rc \quad \ldots \quad (4)$$

Subtracting (3) from (4),

$$R1 + R2 - R3 = 2Ra$$

$$\text{therefore, } Ra = \frac{R1 + R2 - R3}{2} \quad \ldots \quad (5)$$

However, this formula does not take into account the resistance of the leads used to connect the measuring instrument to the earth points. An inaccurate result will be obtained if the resistance of the leads is not *very small* compared with the lowest earth resistance in the triangle. So, if the test leads have an appreciable value of resistance, which can be denoted by Rt, this value will be added to those measured for R1, R2 and R3. To obtain a more accurate idea of the resistance of the earth system E, the resistance of the test leads Rt should be measured before taking any other measurements. The value for Rt can then be included in the relationships, as below :—

$$R1 = Ra + Rb + Rt \quad \ldots \quad (6)$$
$$R2 = Ra + Rc + Rt \quad \ldots \quad (7)$$
$$R3 = Rb + Rc + Rt \quad \ldots \quad (8)$$

Adding (6) and (7),

$$R1 + R2 = 2Ra + Rb + Rc + 2Rt \quad \ldots \quad (9)$$

Subtracting (8) from (9),

$$R1 + R2 - R3 = 2Ra + Rt$$

$$\text{therefore, } Ra = \frac{R1 + R2 - R3 - Rt}{2} \quad (10)$$

Some examples will show the effect of the lead resistance Rt.

Example 1. Resistances R1, R2 and R3 measure 8, 7 and 11 ohms respectively. The resistance of the test leads is very small, and is ignored. Formula (5) can be safely used, so,

$$Ra = \frac{R1 + R2 - R3}{2}$$

$$= \frac{8 + 7 - 11}{2} = 2 \text{ ohms}$$

Example 2. The same earth system is measured with test leads having a resistance of 2 ohms, thus giving readings for R1, R2 and R3 of 10, 9 and 13 ohms respectively. Formula (5) is applied, with the following result :—

$$Ra = \frac{10 + 9 - 13}{2} = 3 \text{ ohms, which is wrong.}$$

Example 3. The same readings are obtained as in Example 2, but this time the correct formula (10) is used :—

$$Ra = \frac{10 + 9 - 13 - 2}{2} = 2 \text{ ohms.}$$

When it is required to make a measurement of earth resistance by the method described here, the temporary earth spikes should be so sited that a large triangle is formed, and if possible with sides of roughly equal length.

The three earth points should be widely spaced out to reduce the effect of overlapping resistance areas around them.

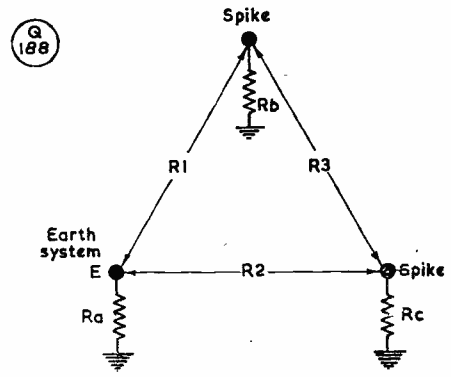
It is possible to find the resistance of the other earth points by re-arranging the formulæ to solve for either Rb or Rc. Thus, re-arranging formula (10),

$$Rb = \frac{R1 + R3 - R2 - Rt}{2} \text{ ohms.}$$

$$\text{or } Rc = \frac{R2 + R3 - R1 - Rt}{2} \text{ ohms.}$$

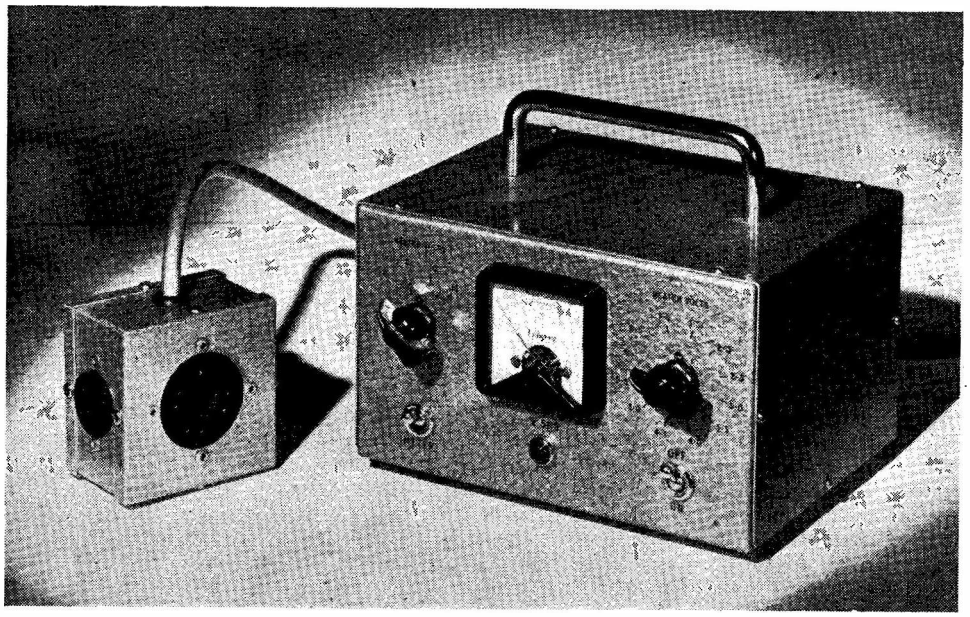
If these formulæ are now considered in conjunction with Fig. 1, a simple rule for solving any one of the three earth resistances becomes apparent. It is, to find the resistance of one electrode, *add the resistances of the two sides enclosing the angle at that point, subtract the resistance of the side opposite the angle, and divide the result by 2.*

This also suggests a possible means of finding the point of lowest resistance in an area, thus locating the best place to sink a good earth system. Exploratory measurements with three



Method of measuring the resistance of an earth system E, using temporary earth spikes set out in a triangle. The resistances R1, R2 and R3 between pairs of points are measured; the resistance of E can then be calculated as described in the text. Other uses of the tests and the simple formulae derived are also explained.

spikes should result in an optimum point being found, and may well be worth the time spent in making them. And when a good low-resistance earth has been made, use a really heavy conductor to connect to it !



The Labgear Cathode-Ray Tube Rejuvenator is a new product designed to restore cathode emission, the most usual cause of failure in CR tubes. It is now well known that in such cases a new lease of life can be obtained by running the cathode for a controlled period at excess temperature; this has the effect of "boiling out" fresh active material to the surface of the cathode element. The Labgear Rejuvenator provides a calibrated excess-heater supply, and a positive bias on the control grid of the tube under treatment; in many cases, such as in a TV receiver, the set need not be removed from the cabinet, as a universal adaptor is provided to fit the usual types of CRT. Any failing tube is worth trying on the Rejuvenator, which in a number of instances has been proved to prolong tube life by anything up to six months. The nett trade price of the Labgear CRT Rejuvenator is £13 10s., and it is thus a sound proposition for the TV service bench.

BEAM TOWERS—AND THE PLANNING AUTHORITY

FROM time to time, we hear of readers who find themselves in difficulty with their local planning authority about the erection of a lattice tower or a beam array. Refusal to grant permission, or an order to remove an existing assembly for which planning permission has not been obtained, is almost always on the grounds of "amenities" or "complaints from neighbours"—with a complete disregard for the unsightly mass of TV aerials which nowadays disfigure built-up areas, and the lines of pylons which can be seen in country districts.

On these grounds alone, any refusal to give permission should be vigorously contested, if necessary to the extent of an appeal to the Ministry of Housing and Local Government. This will involve an Inquiry, conducted by the representative of the Minister, who will be neutral; if the case is a reasonable one, he will more often than not allow the appeal and reverse the decision of the local authority.

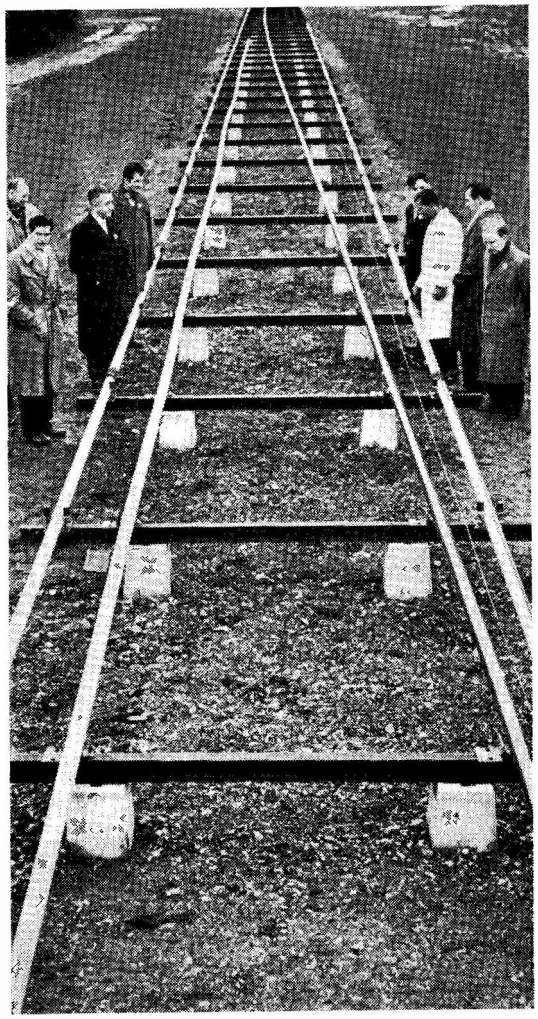
It is impossible here to cover all contingencies that may arise, as no two cases are the same, but the following are the main points to be borne in mind where conflict with the local authority does arise: They are entitled to demand that the proposed structure should be a sound engineering job, and safe; you should have a properly drawn plan of the site, showing shape and full dimensions of the assembly, and materials used; give its height in relation to neighbouring structures and a few photographs with its position marked in to scale; make sure that nobody locally is complaining about TVI (it is advisable to ask the G.P.O. to give the transmitter a TVI check); obtain the agreement in writing of a few well-disposed neighbours; support the application with a statement that you are a licensed radio operator doing, as a hobby, technical work which is recognised as being of value and importance to the nation.

If the local authority refuses the application, give notice of appeal and consult a solicitor. There is little use in your conducting your own case at the Inquiry unless you are well acquainted with the relevant Acts and are accustomed to giving evidence and cross-examining hostile witnesses. Your solicitor will represent you at the Inquiry, and it will help him to have the support of willing neighbours with, if possible, one or two local amateurs of standing who can give technical evidence. It is wise to be able to make some concession at the Inquiry—such as agreeing to reduce the height of the tower or beam by 10 feet, or undertaking to fit suppressors in neighbouring receivers if TVI is caused.

After hearing both sides, the Ministry's inspector will probably want to visit the site and see for himself exactly what is involved. His decision and recommendations will be made to the Minister, and the findings will be communicated to your solicitor.

The whole process may take anything from six to nine months. And if you already have your beam up *before* the local authority says it must be removed because planning permission has not been obtained, you can make formal application for permission; if this is refused, and you give notice of appeal, it can stay up until the Inquiry is held and the Minister's decision is made known.

Generally speaking, under present-day conditions there is hardly any reason why a local authority, urban or rural, should refuse to allow the erection of a reasonable beam structure, or radio masts of moderate height—in any event, they are usually a good deal more elegant and sightly than the TV erections to be seen in residential areas, and much less obvious than the lines of pylons disfiguring the countryside.



On January 31, the Institution of Electrical Engineers held a convention on Long-Distance Transmission by Waveguide, a method by which a very wide band of frequencies can be accommodated. In the system developed by Standard Telephones & Cables Ltd. at their Enfield laboratories, the waveguide is a hollow copper tube of circular cross-section, which must be laid optically straight. Using P.C.M. (Pulse Code Modulation) the actual capacity of the waveguide system, as sbown here for demonstration at the convention, is some 400 separate television channels. This marks a very considerable advance in wide-band transmission systems and makes a Trans-Atlantic TV pipe a feasible proposition.

The Other Man's Station

G4LS

THE subject of our story this month is G4LS—L. W. Skipper, 148 Boston Manor Road, Brentford, Middlesex, who was first licensed AA in 1938, the full call coming through in 1939, shortly before the outbreak of war.

Nowadays, the shack is in the garden, surrounding which is quite an extensive aerial layout: A three-band 3-element beam, motor driven; a 4-band vertical system, coax fed; and another three-band aerial coupled through open-wire feeders.

Looking at the photograph above, we see, left to right: Aerial test equipment; immediately beneath, signal generator, "Antennamatch" on the ATU, low-pass Tx filter unit, a second ATU underneath the electric clock, an oscilloscope, and a matching speaker for the AR88 receiver. On the operating table are the BC-221, a speech clipper unit, crystal microphone, R.C.A. AR88 and Hallicrafters 5-10 receivers, and the switchery for operating the beam.

The transmitter is home-built in an "AR88 type" cabinet and runs a Clapp VFO, with doublers, into a pair of paralleled 807's as PA, which is screen modulated; FM is also used. The VFO incorporates a 100 kc bar for calibration checking and giving accurate beat frequencies for external purposes. The PA tank coil is a rotary inductance, of the type found on certain "surplus" items, and the control knob is calibrated in terms of frequency; the transmitter band coverage is 7-28 mc inclusive. Change-over is by relay, operated by a single switch, with an over-ride control for VFO netting. The Tx cabinet also accommodates all power supplies, making the whole transmitter self-contained.

Harmonic suppression is pretty complete. The low-pass filter in use has virtually no insertion loss and shows an attenuation factor of 80 dB above 30 mc. Another one just completed is even better—it attenuates 100 dB above 30 mc, and incorporates a special "suck" network for 21 mc.

Main interest at G4LS is experimenting with aerials, and on any band being worked the aerial to be used is first set up with the Antennamatch, before going on the air. With the exception of the receivers and frequency-meter, the whole of the equipment is home-built, including the beam assembly and its turning gear. Constructional work of one sort or another is always in hand, current interest being in a new signal generator and a panadaptor. Unusually among our contributors for this feature, G4LS mentions his age, which is 67. The rather striking ornament visible in the photograph ("Goddess of the Sun") was made in metal by his son, killed in the last war. G4LS is one of the band of Old Timers who derive much solace and satisfaction from Amateur Radio—long may it be continued.

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 quarterly issue 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.

G3EVT, R. J. Mutton, 113 Studley Road, Redditch, Worcs. *(Re-issue.)*

G3GEW, H. Jordan, c/o Officers' Mess, R.A.F. Station, Norton, Sheffield, 8.

G3JHE, H. E. Johnson, 257 Bordesley Green, Birmingham. 9. *(Tel.: Victoria 0975.)*

G3KPE, G. J. Lambert, 8 Valentine Grove, Aintree Village, Liverpool, 10.

G3LZN, G. J. R. Ellison, Spinney Close, Chessetts Wood Road, Lapworth, Solihull, Warks. *(Tel.: Lapworth 319.)*

G3MIS, E. W. Shackle, Three Chimneys, Staples Barn Lane, Henfield, Sussex.

GI3MOO, J. L. Franklin, 8 Andover Avenue, A.M.Q., R.A.F. Station, Aldergrove, nr. Crumlin, Co. Antrim, N.I.

G3MOW, E. W. Wardrop, 16 Florence Road, Bromley, Kent. *(Tel.: RAVensbourne 4015.)*

G3MQU, R. M. W. Rash, Grey Gables, Wortham, Diss, Norfolk.

G3MVW, A. Barker, 35 Broadwalk, Westhoughton, nr. Bolton, Lancs.

G3MWJ, W. O. Jackson, 41 Wilton Avenue, The Polygon, Southampton, Hants.

GM3NCO, A. Mustard, c/o 39 Dudley Gardens, Edinburgh, 6.

G3NDV, A. Audsley, 15 Farne Avenue, Alverthorpe Road, Wakefield, Yorkshire.

G3NDY, J. Anthony, Cemetery Lodge, Palmerston Road, Chatham, Kent.

G3NFO, J. H. Welsh, 18 Lichfield Drive, Bury, Lancs.

GI3NFU, G. M. Irvine, 31 Finvoy Street, Upper Newtownards Road, Belfast, N.I.

G3NGF, Rev. A. W. Shepherd, 75 Park Road, Mansfield Woodhouse, Notts. *(Tel.: Mansfield 779.)*

G3NGG, J. Wolfenden, 9 Fraser Road, Springvale, Winchester, Hants.

G3NGJ, W. J. Epton, The Grange, Canwick, Lincoln.

G3NGK, D. C. Chapman, 99 Masons Hill, Bromley, Kent. *(Tel.: RAVensbourne 7774.)*

GI3NGO, W. A. McGladdery, 15 Laurelbank Avenue, Newtownards, Co. Down, N.I.

G3NGS, G. D. Roe, 16 Dorchester Drive, Herne Hill, London, S.E.24. *(Tel.: BRIxton 6522.)*

G3NGV, S. Swindell, 12 Ingleby Avenue, Derby.

G3NGX, H. M. Hogg, 124 Stenson Road, Derby.

G3NHH, R. T. Heywood, 383 Whitton Dene, Isleworth, Middlesex.

G3NHL, C. D. H. Lewis, Down House, Clanfield, Portsmouth, Hants. *(Tel.: Horndean 2221.)*

G3NHU, A. D. Besford, 2 Hamilton Road, Great Yarmouth, Norfolk.

G3NHV, D. Hare, Ketch *Polaris*, Fishers Quay, North Quay, Great Yarmouth, Norfolk.

CHANGE OF ADDRESS

EI3AE, R. Williams *(via Bureau only).*

EI7AF, R. Williams *(via Bureau only).*

G2FKS, G. D. N. Wilcock *(ex-ZD4BB),* 46 Oak Tree Close, Virginia Water, Surrey.

G3AO, S. Levings, Broadhatch, Andrew Lane, High Lane, Stockport, Cheshire.

G3BHC, R. T. R. Cocks *(ex-VS1BH/VS7BH),* Trelyon, Treneglos Terrace, Gulval, Penzance, Cornwall. *(Tel.: Penzance 2586.)*

G3HAG, R. P. Hughes, 50 Hillside Close, Billinge, nr. Wigan, Lancs.

GI3HXV, R. R. Parsons, 45 Erinvale Avenue, Finaghy, Belfast, N.I.

G3IHB, J. Russell, 29 Grays Lane, Hitchin, Herts.

GW3ITD, R/E/A M. R. Davies, 2 Mess, H.M.S. *Collingwood,* Fareham, Hants.

G3JHI, R. L. S. Hathaway, c/o Officers' Mess, R.A.F. Station, Dishforth, nr. Thirsk, Yorkshire.

GM3JQL, J. S. Haggart, 12 Glendevon Road, Perth.

G3JXU, D. G. Chatfield, 55 Bush Hill, Weston Favell, Northampton.

G3KAG, A. Parker, 339 Baker Street, Alvaston, Derby.

G3KIM, E. Dungworth, 17 Branston Close, Lincoln, Lincs. *(Tel.: Lincoln 20480.)*

G3KTL, M. K. Dunn, 193 Dickenson Road, Longsight, Manchester, 13, Lancs.

G3KUT, D. C. Mills, 48 Woolmead Avenue, West Hendon, London, N.W.9.

G3KWW, Dr. R. W. Wilkinson, 21 Armour Hill, Reading, Berks. *(Tel.: Reading 67329.)*

G3LRV, L. Harking, 36 Etherstone Avenue, Cochrane Park, Newcastle-on-Tyne, 7.

G3LYK, F/Lt. W. McLardy, 53 Butts Lane, Stanford-le-Hope, Essex.

G3MJN, L. A. Harvey, 355 Westborough Road, Westcliff, Essex.

G4JK, G. R. Whiteside, 161 Preston New Road, Blackburn, Lancs. *(Tel.: Blackburn 5818.)*

G4PM, H. Axon, 77 Park Road, St. Annes, Lytham St. Annes, Lancs.

G5GJ, F. W. Benson, M.B.E., A.M.Brit.I.R.E., Far View, Bledlow Ridge, nr. High Wycombe, Bucks.

CORRECTION

G3NDI, C. R. Fry, 60 Bills Lane, Shirley, Solihull, Warks.

GI3NDP, E. F. McCauley, 35 Linsfort Drive, Londonderry, N.I.

THE MONTH WITH THE CLUBS

By *"Club Secretary"*

(Deadline for April issue : MARCH 13)

LETTERS are still reaching us about plans for this year's *Magazine Club Contest*—letters written in the light of experience during last November's "MCC."

It is an undoubted fact that the present rules are rather hard on Club stations in the North, where the "Club-density," as we might term it, is so much lower than in the Midlands and the Home Counties. One suggestion emanating from more than one northerly-situated Club is that a "counties-multiplier" should be introduced in future contests.

We have considered this scheme very carefully, and do not feel that it would materially alter the position. The northern stations find that they can work fewer Clubs, and therefore would have fewer counties for their multiplier—it might even make the relative positions worse! (This is over-simplifying, since the "Clubs-per-County" ratio is higher in the South than the North.)

The other scheme under consideration is to award two points for contacts of over 200 miles—very difficult to control and check. It has also been suggested that three "Zones" should be defined: Zone A, Home Counties and South Coast; Zone B, Midlands; Zone C, North (including GM and GI). Then A-B and B-C contacts would count one point, but A-C contacts two. This would penalise the Midlands, since no two-point contacts would be available to them.

The debate continues! And so to this month's reports . . .

Barnet have scheduled March 31 for G6CJ's well-known lecture-demonstration on Aerials, with models. There will doubtless be a record attendance. **Bradford** have a Junk Sale on March 10, and the 24th is the date of their AGM. **Flintshire** held theirs on February 2, the chairman reporting a successful year but regretting that more of the members did not turn up regularly to meetings. Mr. F. G. Southworth was invited to become the Society's first president.

Cornish send advance information on their 1959 Hamfest and Mobile Rally, which will be held at Penryn on May 3. The King's Hotel will be the venue, assembly being at 2 p.m. G6LV will talk in the mobiles, on Eighty or One-Sixty, and ample parking space is available. Tickets, 10s. each, from N. Elliot, 11 Belmont Road, Falmouth, or from the hon. sec. Hotel brochures can be forwarded and accommodation arranged if desired.

Halifax have as their subject for the March meeting Hi-Fi Reproduction, with a demonstration by Mr. Falkus, of Fane Acoustics Ltd. In February G3IGW gave a talk on "DX-peditions." **Hull** meet on the second and last Tuesdays of the month, over the Royal Oak Hotel, Ferensway, Hull, at 7.30 p.m.; the committee are planning the development of club-room facilities, from which it is hoped to put a Club Tx on the air before long.

Newbury forward their *Nadars Newsletter*, from which we learn that the meeting on March 27 will be a Technical Forum. **Norwich** (*News Letter* also received) held their dinner at the Grosvenor Rooms on February 28; for future meetings (dates not given) the subjects are to be Colour TV, Radio Servicing, SWL Tips, TV Links, Hints and Tips.

Plymouth continue to meet in Virginia House Settlement every Tuesday at 7.30 p.m., where recent events have included a Junk Sale, a talk on Radio-active Isotopes and Counting Methods, and there has also been a visit to the BBC Studios. The Ernie Hillyard Trophy and G5ZT Trophy contests will be

Clifton Amateur Radio Society were 12th in the November "MCC," with 414 points. When this photograph was taken G3IGZ was on the key, with G3FVG (foreground) keeping the log. Clifton is one of the most active and well organised of the London Clubs, with its own premises at New Cross, S.E.14, where their station G3GHN is maintained and operated.

held on March 17 and April 28 respectively, and the awards will be made at the AGM on May 5.

Purley held their Club Social on February 20, and at their next meeting (March 20) will be running a Junk Sale. **Rotherham** had their AGM in January and elected G2LG (who is sightless) as chairman, G3LBO as vice-chairman and SWL J. Barnes as secretary; they meet on the first three Wednesdays of the month at The Crofts, Rotherham, 7.30 p.m., and their proposed programme includes instruction for the R.A.E. Club net is on 80-metre phone, Sundays at noon.

Slade have arranged a special Mullard Film Show for March 6, at the YMCA, Snow Hill, Birmingham; on March 13 they have a lecture on VHF Business Radio, also with a sound film, and on March 27 G3HHD and G3HKC will be talking on The Construction and Use of Test Equipment.

Spen Valley will be hearing some recorded lectures on March 18, and on April 1 G3AHV will be lecturing on the very interesting subject of The Electron Microscope, this meeting being at Leeds University.

Wellingborough have a Film Night on March 12, when the two subjects will be The Construction of Calder Hall and The Dounreay Sphere. **Torbay** are still working hard on the Hawkmoor Hospital equipment, with help from the Radio Hobbies Group at the Royal Signals Barracks nearby. A recent meeting was devoted to a discussion on the running of a useful local emergency network; members' work for the Construction Cup was also judged at this meeting.

Bury, meeting at the George Hotel, Kay Gardens, at 8 p.m. on the second Tuesday, will hear about Jodrell Bank from a member of the staff on March 10. On April 14 G2HW will be giving a talk—subject to be announced later. **Derby,** fresh from their AGM, report a flourishing condition and a record membership of 120, with a sizable balance in hand at the bank. They will be holding their 48th Annual Dinner on March 6, for which the seating limit is 80. Meanwhile, the weekly meetings continue, the first Wednesday being devoted to a Surplus Sale, the second to a lecture and the last reserved for an experiment and practical demonstration of some kind, for the benefit of beginners. Their *Newsletter* is an informative monthly publication.

Enfield forward a copy of their Club Letter, *The Lea Valley Reflector*, which is now ten years old, having been born in February 1949. Throughout that time it has been a valuable medium for the interchange of news and problems, although from the current issue we note that no "Band Reports" have been received, causing the editor to remark that apparently nobody either listens to, or operates on, any bands these days! We hope that this healthy ten-year-old will not starve and die from sheer lack of support by members, whose own contributions are always needed.

The **International Ham-Hop Club** have now formed a British and Irish Division, under the secretaryship of G3DTB (*see* panel for QTH). This has been necessary owing to the rapid expansion of the Club, and a publicity campaign is being organised urging members to plan their holidays to include some Ham-Hops. Membership is open to all transmitting amateurs and SWL's, full members paying 2s. 6d. entrance fee. *Ham-Hop News* is published every two months and costs 5s. per year.

Luton, despite not having been mentioned in this feature for a long time, still meet every Monday night at 8 p.m., at Surrey Street School. The committee are hoping to arrange a monthly lecture in future, and it is hoped to attract new membership.

Portsmouth now meet every Tuesday, 7.30 p.m., above Scarrs (Drapers) in Albert Road, Southsea. On March 10 there is a lecture by Mr. S. Howard; on the 17th a discussion on the R.A.E.; and on the 24th a Construction Night and Junk Sale. Morse lessons precede the regular meetings, by arrangement.

South Manchester tell us that they will be holding

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE:

BARNET: E. W. Brett, G3LUY, 28 Edward House, Edward Grove, New Barnet.
BOURNEMOUTH: F. G. Hamshere, 55 Maclean Road, West Howe, Bournemouth.
BRADFORD: D. M. Pratt, G3KEP, Glenluce, Lyndale Road, Eldwick, Bingley.
BURY: Mrs. Jean Hodgkins, G3JZP, 24 Beryl Avenue, Tottington, near Bury.
CAMBRIDGE: A. H. G. Waton, G3GGJ, New Road, Barton, Cambridge.
CORNISH: J. Brown, G3LPB, Marlborough Farm, Falmouth.
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
EAST KENT: D. Williams, G3MDO, Llandogo, Bridge, near Canterbury.
ENFIELD: V. Croucher, G3AFY, 15 Nelson Road, London, N.15.
FLINTSHIRE: J. Thornton Lawrence, GW3JGA, 9 East Avenue, Bryn Newydd, Prestatyn.
GRAFTON: A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middx.
GRAVESEND: D. Andrews, G3MXJ, 42 The Fairway, Gravesend.
HALIFAX: A. Robinson, G3MDW, 7 Upper Brockholes, Ogden, Halifax.
HULL: G. G. Wray, G3MVO, 93 Wolfreton Lane, Willerby, Hull.
INTERNATIONAL HAM-HOP CLUB: R. W. Sawyer, G3DTB, Honeywood, The Beacon, Ilminster, Somerset.
LUTON: D. Bavister, 70 Crawley Green Road, Luton.
NEWBURY: J. A. Gale, G3LLK, Wild Hedges, Crookham Common, near Newbury.
NORTH-EAST (Newcastle): T. W. Brown, G4QA, 28 Kingsway Avenue, Gosforth.
NORTH KENT: D. W. Wooderson, G3HKX, 39 Woolwich Road, Bexleyheath.
NORWICH: O. F. Simkin, G3HYJ, 15 Hillside Road, Thorpe, Norwich.
NOTTINGHAM: E. C. Weatherall, 16 Avebury Close, Clifton, Nottingham.
PLYMOUTH: A. W. Phillips, G3NBX, 8 Merrifield Terrace, Torpoint.
PORTSMOUTH: A. C. Cake, G3CNO, 7 Wheatstone Road, Southsea.
PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
ROMFORD: L. Owen, G3MDP, 53 Applegarth Drive, Newbury Park, Ilford, Essex.
ROTHERHAM: J. Barnes, 2 Mappins Road, Catcliffe, Rotherham.
SHEFFORD: G. R. Cobb, G3IXG, Western House, Ampthill Road, Shefford, Beds.
SLADE: C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTHGATE: A. G. Edwards, G3MBL, 244 Ballards Lane, London, N.12.
SOUTH MANCHESTER: C. M. Denny, G6DN, 18 Willoughby Avenue, Manchester 20.
SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, near Leeds.
STOCKPORT: G. Phillips, G3FYE, 7 Germans Buildings, Buxton Road, Stockport.
SURREY (Croydon): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
TEES-SIDE: A. L. Taylor, G3JMO, 12 Endsleigh Drive, Middlesbrough.
WELLINGBOROUGH: P. E. B. Butler, 88 Wellingborough Road, Rushden.

a joint Radio Rally with Stockport on August 30. Please, also, note change of secretary (QTH in panel). **Tees-Side** recently heard a talk from a member of the West Hartlepool Club on Oscilloscopes, complete with demonstration of a Cossor kit-built 'scope. Meetings are arranged for March 6 and 20, both at Settlement House, Newport Road, Middlesbrough, but the programme is not yet fixed.

Bournemouth ran their tenth Hamfest in February — a most suicessful event, attended by 40 amateurs from the district. Features were a colour film of the Mobile Rally, games, competitions and "The Draw," in which valuable prizes were included. At the February meeting the Club's plans for 1959 were discussed.

Officers, for 1959, of the Bournemouth and District Amateur Radio Society. Front row, left to right: G3LSC, SWL J. Glass, G3HLW (chairman), Major W. H. Inchbold-Stevens (president), and SWL F. G. Hamshere (secretary). Back row: SWL C. Norman, G3JLH and G3JAU (social secretary).

Cambridge have their AGM fixed for March 20, 7.45 p.m., at The Jolly Waterman, Chesterton Road. **East Kent** recently held a successful Junk Sale, and they are running an R.A.E. course every Tuesday at 7.30 p.m.

Grafton presented R.A.E. certificates to 17 out of their successful 26 candidates, after which there was a talk by G6CL. Other meetings have featured talks by G2MQ on Valve Manufacture, G2BCX on Stereo, G3JEA on Measurements in the Shack, as well as Junk Sales and a Quiz. The Annual Top-Band Contest is on March 14 and 21 (*see* "DX Commentary" for full details).

Gravesend held their AGM and elected G6VC president, G3HLF chairman, G3MXJ secretary and G3JVU treasurer; they also had a dinner and dance on February 28. It is hoped to arrange visits to places of interest in the near future, and a good programme of talks has been fixed. Meetings are every Thursday, 7.30 p.m., at The Old Sun, Crete Hall Road, Northfleet.

Southgate, Finchley & District continue to attract about 60 members to their meetings, a figure which is the sign of a healthy organisation. On March 12 G6LL will be talking to them about TVI. Quite a few members are mobile, with more coming along. Meetings are at Arnos School, Wilmer Way, N.14.

Surrey (Croydon) meet on March 10 for a Sale of Members' Gear, and on April 14 for the AGM. At a recent meeting G2PL gave a talk on the Redifon GR-400 SSB "Third Method" equipment, with demonstration. Meetings are at the Blacksmith's Arms, South End, Croydon, 7.30 p.m.

Stockport have had a lecture on Protective Circuits and a demonstration of amateur TV (by G3LEE/T). On March 11 there will be a lecture on Video Tape; on March 25 the AGM; and on April 8 a talk by G3AYT on UHF. They will have a station operating on March 21 from the Spring Fair at Southwood Road School, Buxton Road, and also hope to have closed-circuit TV on show. Over 70 members and friends attended their Dinner Dance and Social on January 24. **North Kent** have been doing well with Film Shows, and have another booked for April 9—a repeat performance of The Principles of the Transistor, chosen by popular vote.

Another group of whom we do not often hear is the **North-East** Amateur Transmitters' Society, of Newcastle-on-Tyne, meeting on the first Tuesday of every month, 7.30 p.m., at the Liberal Club, Pilgrim Street, Newcastle. **Romford** have their meetings every Tuesday, 8.15 p.m., at R.A.F.A. House, 15 Carlton Road, Romford, at which visitors are always welcome; they have an interesting programme scheduled for the next few months, including demonstrations and lectures and, on March 10, something called "Operation Shack."

The **Shefford** and District A.R.S. are together every Friday, from 7.45 p.m., at Digswell House, starting with Morse instruction, followed by a lecture and demonstration—on March 20 this is to be by G2DUS/T. Refreshments are obtainable and new members and visitors are assured of a welcome.

The Amateur Radio Club of **Nottingham** run their own station, G3EKW, at Woodthorpe House, Mansfield Road, where they meet every Tuesday at 7.15 p.m. There are constructional facilities for members, and Morse practice is given regularly. The hon. secretary will be very glad to hear from prospective new members.

All Club Secretaries are invited to make use of this space, which is free, for the publication of their notices and reports covering Club activities. It is essential that all correspondence for this feature — addressed "Club Secretary," Short Wave Magazine, 55 Victoria Street, London, S.W.1 — should reach us by the date given every month at the head of the article. Photographs, for which payment is made if used, are always wanted, and should be fully and accurately described on a separate slip.

SMALL ADVERTISEMENTS

("SITUATIONS" AND "TRADE")

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

SITUATIONS VACANT

BROADCASTING ASSISTANTS, GRADE V TECHNICAL (Temporary) required by War Department in Cyprus, Tripoli, Germany and East Africa (for 3 years initially) and London. Duties include operation and maintenance of medium-power MF and HF transmitters and studio and recording equipment. Qualification: Radio II of C. and G or equivalent normally required. Salary, £510-£770 per annum. Starting point according to age and experience. For overseas posts, tax-free Foreign Service and Outfit Allowance also payable.—Apply to any Employment Exchange quoting reference 2/OS.269/58 Sheet No. 16/59.

TRADE

CRYSTAL MICROPHONE INSERTS with exceptionally high output (Cosmocord Mic.6). Guaranteed newly-made and boxed; 15/6, post free.—Radio-Aids, Ltd., Dept. S, 29 Market Street, Watford, Herts.

AERIAL WIRE — 14g. toughened aluminium *(details February issue)*; just the job for Field Day. Order early.—A. E. White (G3HCU), 408 High Road, London, S.W.16.

BEAM ROTATORS, mains operated, 1 r.p.m., totally enclosed, £22 10s. 0d. Telescopic steel mast, 13ft. to 35ft. extended, £9 15s. 0d. Ball-bearing staying unit, with stays and fittings, £3 15s. 0d. VHF Head Unit, £4 15s. 0d. Special telescopic mast, 8ft. to 33ft. extended, with tripod support, £19 4s. 4d. Geared 1 r.p.m. motor unit only, £9 17s. 6d.—For details of these and other soundly engineered productions, write now to: Simmons Equipments, 32 London Road, Romford, Essex.

70 mc BI-SQUARE BEAMS, 10 dB gain. A few in stock, £4 each to clear. — Labgear, Ltd., Willow Place, Cambridge.

BRAND-NEW RF Units: RF27 or RF26, 19/6; RF24, 16/6; RF25, 11/6; postage 3/6. Bendix Receivers RA-10, four-band superhet, 150 kc-10 mc, complete with valves, second-hand, but in good general condition, £4 5s. 0d., carriage 10/-.—R. Jay, 69 Church Road, Moseley, Birmingham, 13.

TRANSMITTERS T1131, £7; Marconi AD67B, 270 kc - 550 kc, and 1500 kc - 3600 kc, £9 10s. 0d. Walkie-Talkie WS58, £10. SCR-828, 27 mc - 38·9 mc, £24. Power Units RA-62, £9 10s. 0d. Midlands.—Box No. 2078, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: BC610 Hallicrafters, ET-4336 Transmitters, BC-312 Receivers, BC-221 Frequency Meters and spare parts for all above. Best cash prices.—P.C.A. Radio, Beavor Lane, Hammersmith, W.6.

QSL's and Logs by Minerva. The best there are.—Samples from Minerva Press, 2 New Road, Brentwood, Essex.

SMALL ADVERTISEMENTS, TRADE—*continued*

WANTED FOR CASH: Good clean Communication Receivers and SSB Equipment.—Short Wave (Hull) Radio, 30/32 Princes Avenue, Hull. *(Telephone No. 18953.)*

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

TRANSISTORS: Red spot, 7/-; White spot, 10/-; Yell./Green, 7/3; Yell./Red, 15/-; OC71, 24/-; OC72, 30/-; OC45, 35/-; OC44, 40/-. Ediswan XA102 (8 mc), 40/-; XA104 (4-6 mc), 18/-; XA103 (2-4 mc), 15/-; V15/20P, 39/-; V15/30P, 48/-; V15/20IP, 25/-. Add postage. — MORCO EXPERIMENTAL SUPPLIES, 8/10 Granville Street, Sheffield, 2.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

BC-348, internal p/pack, Med. wave converter, £15. WANTED: Good Rx covering 160-10m.—G3KZC, CTS. Block D, Bletchley Park, Bucks.

MCR-1 with power pack and four coils (150 kc-1500 kc), in new condition, handbook and circuit, £7 10s. 0d., post paid.—R. Jolly, Mill House, Durngate Place, Winchester, Hants.

LG.300 Mk. II, immaculate, 30 hours' use only, 100w. modulator in matching cabinet, all power supplies. Sacrifice, £65 cash; no offers.—Box No. 2093, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: BC-906 frequency meter, 140-250 mc; BC-733D Rx, 108-122 mc, xtals, control box; R4/ARR-2 Rx, 234-258 mc, control box; BC-1066 test Rx, 180-420 mc; Type 81 oscilloscope, partially stripped; oscilloscope, new, 4 in. CRT; dynamotor, 12v.-250-volt, Command Rx type; dynamotor, 12v.-300v. 120 mA. All above 10/- each. RU-19 Rx, 200 kc-14 mc; dynamotor, 28v.; 5/- each. R-2/ARR-3 Rx FM; TBS-7 Rx, 60-80 mc; BC-929 oscilloscope; signal generator, 90 kc-30 mc; 40/- each. I-96 signal generator, 100-156 mc, £6. One 177-B valve-tester, £10. TS-509/UR frequency meter, new, 90-400 mc, £10. All Rx's, etc., fully valved. Postage extra. — E. K. Laskari, 79a Woodstock Avenue, London, N.W.11. *(Tel.: SPE 7536,* after 7 p.m.)

FOR SALE: Panda Cub, hardly used, netting switch; delivered Southern England; £39.—Hill, 13 Staffordshire Street, Peckham, London, S.E.15.

TRANSFORMER, 1000v.-750v.-0-750v.-1000v. at 200 mA, simultaneous, £2 10s. 0d. Hallicrafters S20R, good condition, £12 0s. 0d. HRO GC coils, most ranges, £1 5s. 0d. 8P 4w. 4-bank ceramic switches (polythene sealed), 5s. 15H 250 mA Admiralty chokes (3 kV insulation), 7/6. All carriage extra, please. — G. E. Johnson, Tomhay, Elmhurst, Nr. Lichfield, Staffs.

120W. PHONE Tx; parallel 807's PA, 100w., Mod-p/p 807's-UM3 trans., all bands 160 to 10m., bandswitched, metered, relay controlled power packs, TVI-proof, in handsome 4ft. rack. Exchange for Panda Cub or similar low-power rig in new condition. UM4 wanted. — Please write or call: G3MAP, 22 David Road, Rugby, Warks.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE (all ex-brand-new equipment and guaranteed): Used oscilloscope cases, 11½ ins. x 10½ ins. x 19 ins. and 13½ ins. x 8¼ ins. x 18 ins. fronts, chassis, 12/6 each. 3½ in. CRT, VCR138a holder, mounting brackets, escutcheon, 25/-. R1132A cabinet, rack mounting, 19 in. x 10½ in., with slow-motion drive, chassis and valve-holders, 22/6. Heavy-duty transformer, input 110v.-250v. AC, output 585v. 70 mA, 2·05v.-0-2·05v., 2·5A, 3·25v.-0-3·25v. 2·5A, 47/6. Heavy-duty transformer, input 110v.-250v. AC, output 2·1v.-0-2·1v. 1A, 3 kV test, 15 mA 1000v., 47/6. Chokes 10 Hy. 60 mA, 8/6 each. Sen-Ter-Cel rectifiers, H25/32/IWZ and H18/37/IWZ, 6/6 each. Westinghouse-type M3 rectifiers, 6/6 each. Condensers 2 μF 400v., DC working, 1/9 each. Nitrogol capacitors, 0·25 μF 2500v. DC working, 1/6 each. Single-pole toggle switches, 1/9 each. R107 relay, 12/6. 2¾ in. flush voltmeter 0-300v., 25-100 cycles, 12/6. Moving-coil mA meter 0-5 mA, res. 7 ohms, 2/6. Mighty Midget electric motor, 6/-. Microdensers, 1/9 each. Four MO valve-holders, 2/- the four. Valves: SP61, W147, 1/6 each ; VGT121, 2/- each ; 6J5GT/G, 4/- each ; EF39, P61, 6X5GT, 5/- each.—Call after 730 p.m., or write: G. Davies, 74 Rosebery Avenue, Manor Park, London, E.12.

FOR SALE: Complete station, mint condition ; CR-100, Set Type 36, p/pack, modulator, in oak case ; 80-watt Tx (Geloso VFO, two 807's), crackle cabinet/panel, £32. Carriage extra. — G3HTU, 92 Zealand Road, Canterbury, Kent.

12 AT7 VALVES: Four for 10/- ; Z66, 8/6 each ; KT44, QVO4-7, 10/- each ; SP61, 1/9 each. Add 6d. postage per valve. — Carey, 89 Pevensey Road, Bognor Regis, Sussex.

SALE: *Short Wave Magazine, Bulletins* 1953/1958, both complete ; 26 *Monitors ;* Arnine short-wave aerial. Offers? Minimitter Multi-Q, £5 (o.n.o.).—Stephenson, 17 Park View, Morden, Surrey.

BC-348, p/pack, speaker, £12 10s. 0d.; 2½in. 'scope, £10 ; sig. gen., £3.—L. Pradier, 21 Churchill Road, N.W.5. *(Gul. 4261.)*

SALE: R.1155, new ; internal power supply, output stage. Service Data Sheets, Monitor 61A, new modification instructions, signal generator SG50. —Mills, 129 Amity Road, Reading, Berkshire.

WANTED: Labgear LG.300 ; condition not important.—Box No. 2094, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED (mint condition or brand-new, unused) latest current model U.S.A. Communications Receiver, also Tx and Mobile Tx/Rx ; fullest details and price, etc. Please, only first-class gear, factory-new and guaranteed. Wanted for personal use.—Box No. 2095, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Panda Cub, only used 8 months, in excellent condition, £45. CR100 with speaker, £14.—GM3MDX, Shandwick, Bentinck Crescent, Troon, Ayrshire.

WANTED, buy or borrow, manual or circuit for Marconi RG42C receiver. Please help.—Lewis, 1 Eugene Close, Gidea Park, Essex.

WANTED: Labgear LG.300 Transmitter, with or without power/modulator unit.—Box No. 2096, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

ARMY 12 SET wanted; will pay up to £11, according to condition.—Taylor, School House, Aldenham School, Elstree, Herts.

PANDA CUB, August '58, mint, £45.—G3COI, 43 Mount Road, Penn, Wolverhampton, Staffs.

WANTED: Article on S-meter published in March 1957 edition *Short Wave Magazine*.—D. Lane, 60 Greenland Crescent, Southall, Middlesex.

PANDA CUB, 1958, latest model, unmarked, only used a few hours; reason for sale, change of plans—£44 carriage paid. Hallicrafters S40, in new condition, with manual, £20 carriage paid. Variac 200-260 volts at 7·5 amps., £5 carriage paid. New Eddystone S-meter, £3. Large stock of spares, power units, etc., cheap; send your requirements.—GM3BQA, 19 Edinburgh Road, Cockenzie, East Lothian.

75-WATT Tx, £40, A1, 2, 3; Geloso VFO and tank; two units, fully screened; adequate drive all bands; fully metered; easily modified 120 watts.—G3NAC, R.A.F. Yatesbury, Calne, Wilts.

19 SET, complete with PU variometer, control boxes, etc., £8. PU-234, £3. Radar Tx, Type 3C, blower-cooled 8011's, £3. PU 500v. 250 mA + 300v. 100 mA + 2 x 6·3v. AC, £4 10s. PU 120v., double smoothed, neon stabiliser, £1. R.3645 with RF-24 and 5246, etc., £1. R107, £10. All in very good condition. Carriage extra. — D. Spence, 11 Brookfield Street, Cornholme, Todmorden, Lancs.

BC-221, charts, manual, main supply AC, voltage stabilised, near-mint condition, £30. Grayshaw Sig. Gen., 220 kc-80 mc, mint, £6 10s. 0d.—Box No. 2097, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

UNIQUE? Complete run *Short Wave Magazine*, March 1938 to date; 175 copies, four volumes bound; clean; all indexes.—Offers to: G2HNO, 52 Seafield Road, Southbourne, Bournemouth.

WANTED: S-meter for AR88D; also R.C.A. badge for front escutcheon. 813 and 811's wanted. (Prices and details to address below.) For disposal: R1294 Rx, 500 to 3000 mc, £15; two 815B's, £1 10s. 0d. each.—GM3GSC, 154 Bank Street, Irvine, Ayrshire.

SALE: Minimitter MR37 Receiver; mint condition, £45. B2 Tx/Rx, manual, coils, p/packs, cases, £12. Pye Car Radio PE59CR, Med./SW (4 ranges), bandspread, perfect, £16. Valradio converter, input 12v. DC, output 230v. AC, 150w., unused, £12. WANTED: AR88D or SX28 in thoroughly sound condition. Advertiser willing consider any suitable exchange arrangement. — G3MIN, 2 Mill Lane, Shoreham-by-Sea, Sussex. *(Shoreham 3428.)*

ALL-BAND 813 PA stage, standard chassis and panel, tuned grid, all-band tank, fitted with plate and grid meters, filament trans., KT66 Clamper, £7. Heavy-duty Variac, £5.—S. Levings, G3AO, Broadhatch, Andrew Lane, High Lane, Stockport, Cheshire. *(MARPLE 2616.)*

WHY QRT? Single accommodation, with DX station and workshop facilities, Sloane Square area, offered amateur QRL, London.—Box No. 2098, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

MIN. SPY Tx, MIN SPY Rx, both with manuals, built-in 250v. p/pack, ant.'s, etc., easy fit pocket. Two-metre Tx, professionally built, 829 PA, TVI, 2m. converter by Air Charter Radio, with manual, as new. Ekco Car Radio, RF26, RF27, on 2 metres; new RF27 on Police. Walkie-Talkie, complete, on 7 mc band. Taylor 75A Multimeter. Bessa 66 3·5 Voightlander and light meter, both leather cased. No reasonable offer refused.—Box No. 2099, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FEW ONLY: Brand-new, guaranteed, 813, 35/-; 807, 7/-; 6V6, 5/-; 6K8, 5/-; ECH35, 10/-; TT11, 7/6.—Write Box No. 2100, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

NEW: Panda ATU 150, £10 (o.n.o.). Buyer collects. London area.—Box No. 2101, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

TOP BAND phone mobile requires 12-volt supply, converted Command equipment, £15. 19 Set p/pack, contains two generators, 30/-.—R. H. Hill, G3CBE, 23 Dene Path, South Ockendon, Essex.

BC221-AH; range 125-20,000 kc; AC mains model, condition as new, £25. Prefer buyer collects, if possible.—G6GK, 4 Lullingstone Crescent, St. Paul's Cray, Orpington, Kent.

750 — £46, carriage paid. Six new Mullard ECC35, 25/-; S53A manual, 12/-.—Box No. 2102, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: BC-221T frequency meter, calibration book, power pack; perfect condition internally. Offers? — F. M. Skinner, 13 Clement Street, Gloucester.

WANTED: Command Rx BC-455, preferably new. Please state condition and price.—Barnes, 238 Victoria Road, Southend, Essex.

B2 Tx/Rx, no p/pack, £8; 1155A, £4; Mk. III Power Unit, £2; R1224, £3; signal generator 1-72-J, 100 kc-32 mc, £5.—R. Howard, 12 Connaught Street, London, W.2. *(PAD. 3600.)*

WANTED: Eddystone Bug Key in good condition.—Walker, 100 Buckingham Avenue, Scunthorpe, Lincolnshire.

FOR SALE: Genuine RCA AR88 S-meter, brand-new, boxed, £3; S.27 Rx, FM/AM, 27-143 mc, in mint condition, completely overhauled and re-aligned, £30. Manuals: R107, BC640A/B, BC224-A, 17/6 each; SX25, 10/-; Eddystone S640, 7/6; W.S. No. 17, 5/-. WANTED: AR88 front panel.—A. J. Reynolds, 149 Waller Road, New Cross, London, S.E.14. *(Phone: New Cross 1443, after 7 p.m.).*

WANTED: Commercial Table Topper, TVI-proofed. Cash, or exchange, Ferrograph, Type D.—Box No. 2103, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

AMATEUR has components, units, camera and periodicals for sale, cheap, to clear quickly; s.a.e. for list.—Box No. 2104, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: CR-100, rebuilt by Webbs, £15; Minimitter five-band converter, £15; multiband aerial with traps, unused, £5. — Chris Lovell, 17 Albion Mews, London, W.2.

SMALL ADVERTISEMENTS, READERS—*continued*

MODERN American Communication Receiver, two-metre superhet and all amateur-band mobile outfit, Elmac, etc.—Box No. 2105, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

ACCOMMODATION REQUIRED by Licensed Amateur, permanent, preferably in the Paignton district.—Cousins, G3NCC, c/o 37 York Road, Paignton, S. Devon.

HALLICRAFTER S20, £9 (o.n.o.); Air Ministry Oscillator 37, 20 watts, £5.—Walker, 50 Brookhouse Road, Barnt Green, Birmingham. *(Hillside 2006.)*

FOR SALE: One Teletron "Companion," £4. Valves: Two 20LI, 16/- each; two 10FI, 10/- each, tested.—Jones, Cross Keys, Selattyn, Nr. Oswestry, Shropshire.

VALVES: QQV06-40, 50/-; QQV07-40, 40/-; QQV03-20, 55/-; CV172, 10/-; pair 866's, 20/-. AVO Valve Tester, new, £6; TCS6 Transmitter, £4; Marconi Communication Rx, 15 kc to 31 mc, £10; 300-ohm aerial relay, 15/-; VHF Trans/Rcvr., 12v., £5; 70 mc Cascode convtr., £3. Complete *Short Wave Magazine,* 1947-1959, 35/-. Many mains transformers, chokes, meters, condensers, misc. valves; xtals, 1835, 1981 kc, at 5/- each. WANTED: 14-30 mc BS HRO coil and HRO supply unit. Add postage, etc.—Box No. 2106, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COMPLETE 36 Sender, very good condition, £8 (offers?) WANTED: Good 2-metre converter, xtal controlled. — G3MUV, Greengarth, Holmrook, Cumberland.

WANTED: Collins TCS 12 Rx. FOR SALE: Taylor 81c 20,000 o.p.v. Test Meter, £6 (o.n.o.); would exchange TCS 12 Rx. — GM3KLW, 44 Lammerview, Tranent, East Lothian.

LABGEAR Bi-Square Beam, 10 metres, £5 (carriage forward). — Mason, 390 Kingspark Avenue, Rutherglen, Glasgow.

BATTERY PORTABLE, £8, as new; Rees-Mace Marine Receiver, AC/DC, £9; EMI Grid Dipper, new, £3 10s. 0d. Faulty: Two-RF Hallicrafter (offers?) Buyer collects.—Hardy, 7 Queen's Park Terrace, Brighton.

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MULTI-WAY CABLE ⅜" diameter. 7 coded wires. Ideal for inter-chassis connections or beam control. **1/3** per yard. Ditto, 10-way (5 pairs). Screened and plastic covered. **2**/- per yard. P. & P. min. 1/6.

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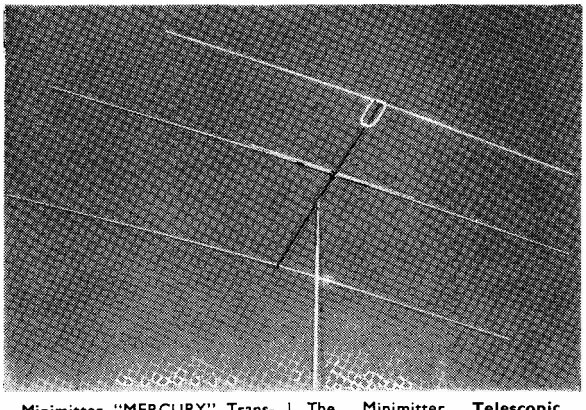

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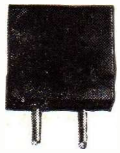

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