

# The SHORT WAVE Magazine

VOL. XIX

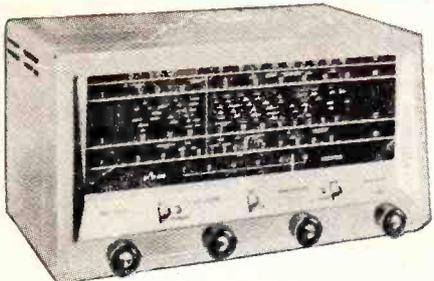
JUNE, 1961

NUMBER 4

## MORE GOOD NEWS from SCOTT'S

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- ★ THUNDERBIRD tribanders with SLIMTRAPS
- ★ MULTIBAND VERTICALS



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Longest element	26 ft.	26 ft.	32 ft.

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##### 12 AVS :

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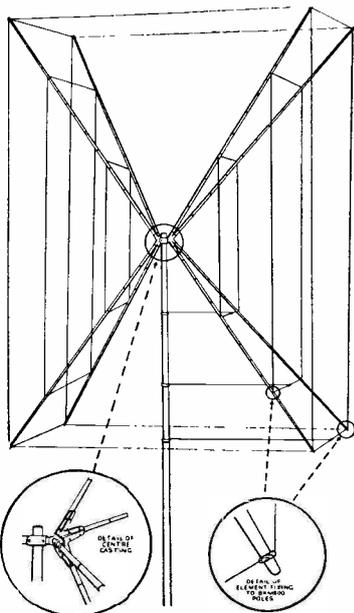
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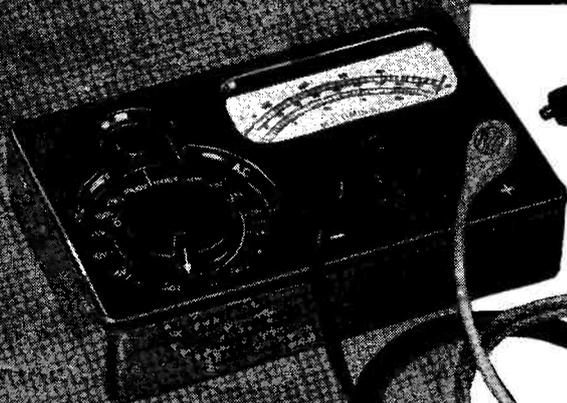
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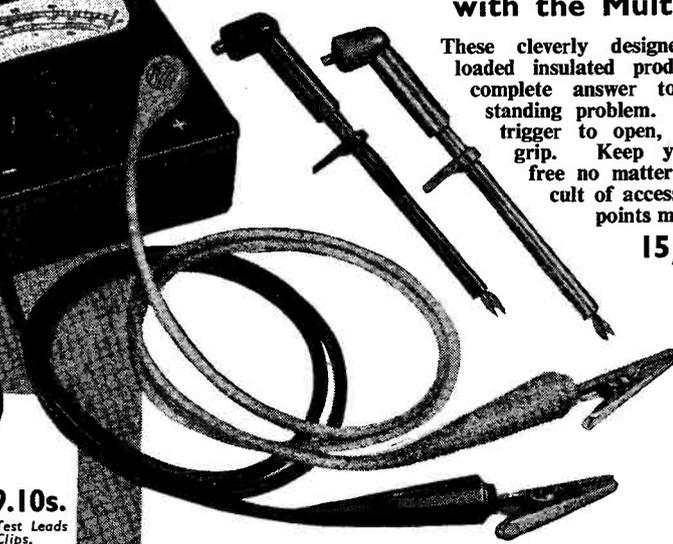
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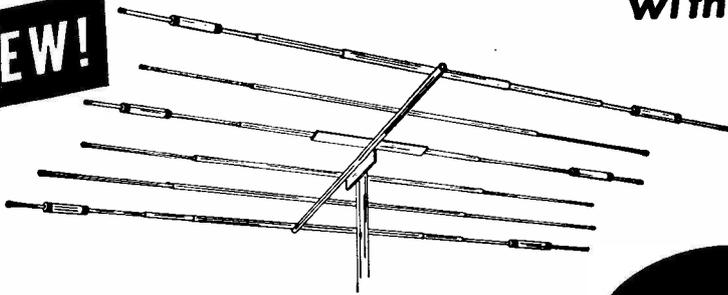
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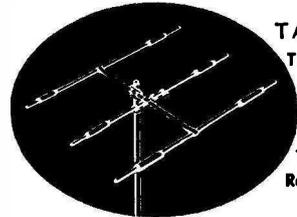
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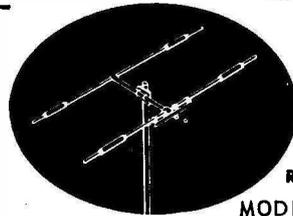
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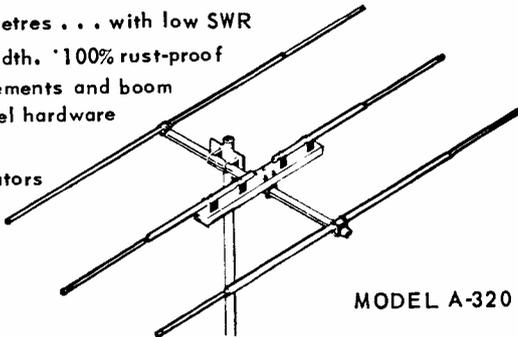
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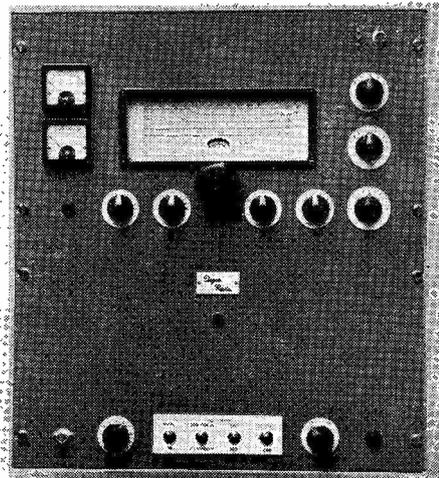
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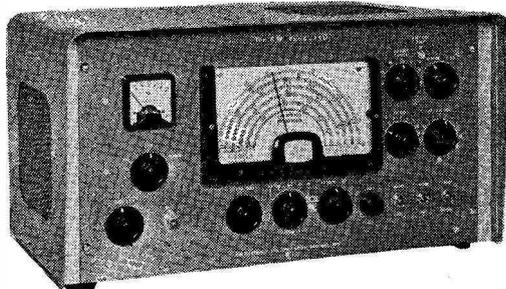
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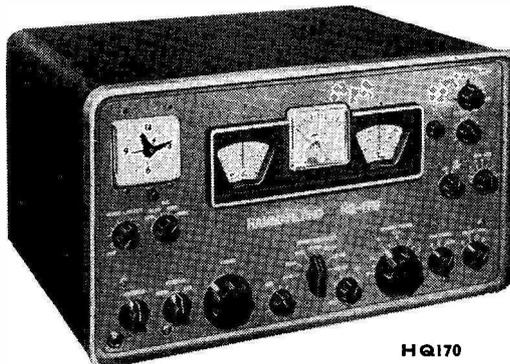


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# SHORT WAVE MAGAZINE

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AUTHORS' MSS

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# The SHORT-WAVE Magazine

## EDITORIAL

**QSL** *In the early days, the exchange of QSL cards was part of the radio amateur's code of procedure — you worked a station and as a matter of course you sent him your QSL card, knowing that he would be doing the same from his end. While the numbers involved up to about the mid-1930's were manageable — in terms of contacts made and the flow of QSL cards occasioned thereby — as the scope for Amateur Radio has widened, so the QSL position has become more difficult.*

*Most AT station operators new on the air naturally take to the idea of QSL'ing and for the first year or so are meticulous in their observance of the etiquette of card exchanging. Then it starts to pall a bit, especially when the long delays inevitable (and unavoidable, let it be said) through most bureaux organisations begin to be experienced. In the present context, the actual working of QSL bureaux as such is an entirely separate matter, though it can be stated that the delays in bureaux QSL traffic are due almost entirely to addressees failing to lodge envelopes for cards received for them; this is the ever-present difficulty of QSL bureau managers throughout the world, and is also the cause of much disappointment among those expecting a quick QSL response.*

*Additional to this traffic in transmitter QSL card exchanges, amounting to many millions of cards a year — it only needs 10,000 active stations to be sending 100 cards each in one year to make the total one million, so that the actual total of cards circulating through the world's bureaux is probably nearer 15 million! — is the great volume of SWL cards, mainly unsolicited and so, alas, largely unwanted. While this output does of course add to the load on the bureaux, it is not to quite the extent that might be expected, because in the main SWL's are careful to keep their bureau stocked with return envelopes.*

*The only way to diminish the flow of QSL cards — if, indeed, any diminution is desirable — is by individual operators who find them a nuisance letting it be known, over the air and otherwise, either that they are not interested in QSL cards at all, or will only QSL on receipt of a card. While it might seem that if followed to its logical conclusion this would stop the flow of cards altogether, in fact what it could mean is that if an operator specially wanted a particular station's card, he would originate the QSL process from his end, to which the recipient would be expected to respond promptly. This is actually what a number of amateurs are now doing, and what some have been doing for years, with entirely satisfactory results.*

*Austin Fobell  
G6FO.*

# The Natterbox—SSB Transmitter for the LF Bands

EASY TO BUILD—DESIGN,  
CONSTRUCTION AND  
SETTING UP

J. D. Heys (G3BDQ)

*This is a simplified, but nevertheless highly effective, Sideband transmitter for low power operation on the 80- and 160-metre amateur bands. From the constructional point of view it could well serve as an introduction to SSB for those who are not yet familiar with Sideband techniques. As the author explains, the general design can be adapted for HF band working, and a linear PA added for inputs up to 50 watts.—Editor.*

**M**ANY would-be SSB operators find themselves unable to purchase an expensive commercial transmitter and feel disinclined to "roll their own" when confronted with complicated all-band circuits involving a considerable cash outlay and even more considerable technical know-how. The Natterbox transmitter described here was designed with just such people in mind.

A few months ago the writer was approached by the local club group and asked to design a simple but effective SSB transmitter for the LF bands. It had to be compact, easy to build and capable of putting out an acceptable SSB signal. No crystal etching was to be involved and the necessary test equipment had to be reduced to the minimum. Bearing these points

in mind a circuit was developed and the prototype was constructed and put through its paces. Encouraged by the performance of the Natterbox on 80 and 160 metres, seven other club members began assembling their own versions of the basic design. (The local Top Band QSO party on Sunday mornings is known as the "Natter Net" so it is easy to see how the transmitter got its name!)

## Design Features

Only four valves are involved in the transmitter and it gives good results when used "barefoot," *i.e.*, without a PA stage, having a lower sideband peak output of around half a watt. The addition of a simple linear amplifier running at ten watts input adds greatly to the range and effectiveness of the transmitter and a suitable PA circuit is given.

By using high frequency crystals in the filter, an output on two bands is achieved by single conversion. The crystals are all surplus FT-243 types and are used as purchased without etching or grinding. This is possible because certain channels in this range of crystals are only separated by about 1.67 kc and so enable the easy construction of half-lattice filters having a bandwidth of 2.5 kc. Crystals other than the ones suggested may be used so long as they have the same frequency separation. In this case, of course, different frequencies will have to be used in the mixer-oscillator circuit to give final output in the two LF amateur bands.

The writer has found it no real hardship to be crystal controlled, having several frequencies in the two bands, but there is no reason why a VFO should not be used. A VXO has been tried and this gave about 4 kc shift around each spot frequency; enough to dodge QRM or to zero on to another station.

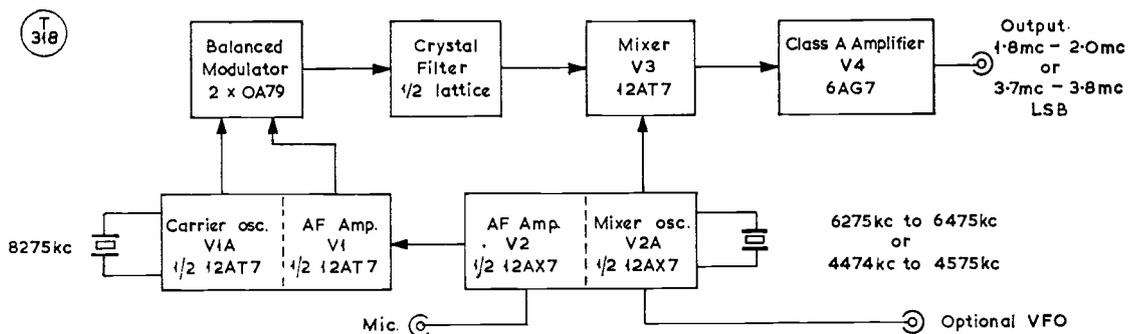
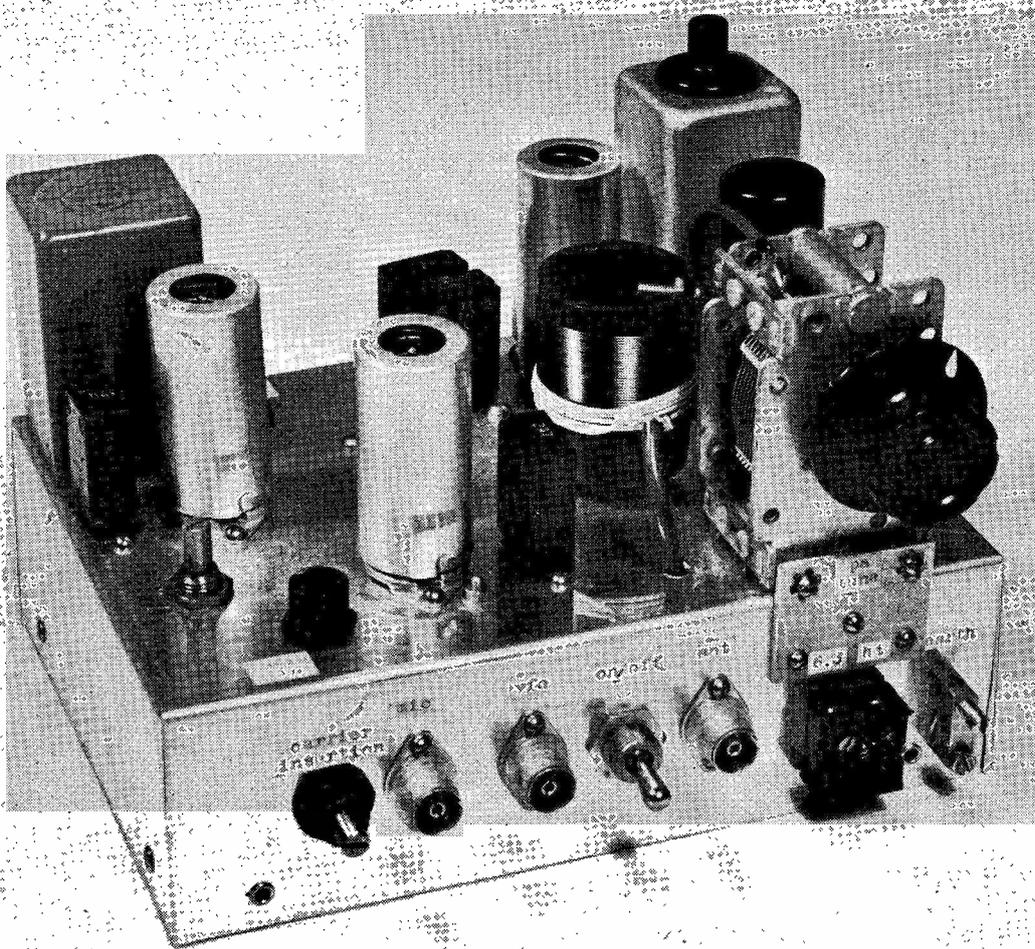


Fig. 1. Block diagram of the LF-band SSB transmitter designed and described by G3BDQ. The 6AG7 Class-A RF amplifier produces a half-watt of lower sideband power, which can go straight into the aerial for local working, or be used to drive a small linear amplifier — see Fig. 6.



General view of the Sideband transmitter described in the article. It is a simplified QRP design for the LF bands, 80-160 metres, requiring only four valves and two germanium diodes; it can be used either directly into an aerial for nattering on the local net, or as an exciter for a linear PA, about  $\frac{1}{2}$ -watt of LSB drive being available. This is a proven design and a very good introduction to Sideband techniques.

Most of the components are easily available as ex-Government surplus, the only special item being the ferrite ring for the toroidal transformer, which may be obtained from Standard Telephones and Cables, Ltd.

The writer made a bulk purchase of crystals, making up eight complete sets and with this number it was easy to sort out the correct frequencies for the respective carrier oscillators. For the individual it is recommended that two or three extra 8275 kc crystals be obtained, then there will be no need to resort to etching or grinding. In a batch of eighteen crystals with this marked frequency there were considerable variations in actual frequency;

the worst ones being 1 kc either side of 8275 kc.

Reference to the block diagram (Fig. 1) will explain the basic design of the Natterbox. Two stages of AF amplification are used, each stage being one section of a twin triode. By using halves of separate valves there is less likelihood of stray carrier voltage from V1A getting around the filter to the mixer V3. Although a simple series-fed balanced modulator is used, by employing a matched pair of Mullard OA79's a carrier suppression of the order of 35 dB or better can be realised. V3 is a cathode-coupled double-triode mixer using a 12AT7. The use of a balanced mixer

is normally only necessary when low-frequency SSB generation is employed. The purist could of course easily modify the V3 circuit and it would reduce the small amount of mixer-oscillator voltage which gets through when the transmitter is on 80m.

The Class-A output stage is a conventional one using a 6AG7 and does not call for comment.

### Construction

To reduce the amount of metal work to a minimum the transmitter is built upon a standard 16g. aluminium chassis measuring  $5\frac{1}{2}$  ins. x  $7\frac{1}{2}$  ins. x  $2\frac{1}{4}$  ins., obtainable from most radio shops. A suitable base-plate can be cut from expanded aluminium mesh.

Detailed drilling and cutting information is given in Fig. 3, although some of the measurements can be changed to suit the components available, especially with regard to the hole for the AF transformer, T. (It will be noticed that the measurements are given in millimetres, so conforming to modern engineering practice.) The filter compartment is L-shaped, made from 16g. aluminium sheet, and is 2 ins. deep ; its edges are turned under to form fixing lugs and a cut-out is made to clear the balance potentiometer, R7.

It is important that pin No. 1 on each of the valveholders (when viewed from above) is located as indicated in Fig. 3. This ensures short connections in the wiring and the proper disposition of the below-deck components. The two filter crystals plug into an octal holder with sockets 2, 4, 6 and 8 removed to reduce the capacity between the crystal pins. Details of L1 are given in a later paragraph, but they are plug-in units made from the IF transformers in the BC-454 receiver. The mica based socket to receive these coils is taken from the same receiver and some care must be exercised in its fitting, for it is secured by the fold-over-and-hammer-down technique.

Followers of the school addicted to the complete construction of a piece of gear, followed by a hopeful switching on and possibly hours of frustrating trouble hunting are advised to mend their ways and join the ranks of the test-as-you-go brigade. A step-by-step wiring and testing technique should be followed as outlined.

Mount the valveholders, AF transformer and major components to the chassis, including the sockets etc. on the front drop and fit the filter shield. Locate several tag strips in strategic positions near the valveholders and

### Table of Values

Fig. 2. Circuit of the Natterbox SSB Transmitter

C1, C4,	R28 = 220 ohms
C10, C12,	RFC1 = Midget transistor
C13, C16,	type about
C23, C24 = .0015 $\mu$ F tubular	100 $\mu$ H
ceramic	RFC2 = 2.5 mH 100 mA
C2 = 3/30 $\mu$ F Philips	low capacity
trimmer	SW1 = single pole rotary
C3 = .01 $\mu$ F disc cera-	mic
mic	SW2 = Single pole toggle
C5, C7 = 39 $\mu$ F silver mica	T = Command Re-
C6, C17,	ceiver output
C19 = .001 $\mu$ F disc cera-	transformer or
mic	similar (anode to
C8 = 65 $\mu$ F silver mica	500 ohm load)
C9 = air trimmer (see	TC = Toroid coil, bifilar
text)	windings on 1 in.
C11 = 680 $\mu$ F tubular	dia. ferrite ring
ceramic	type WP.3808 in
C14 = .006 $\mu$ F mica	SF6, S.T.C. Ltd.
C15 = 350 $\mu$ F variable,	(see text)
BC type	L1 = Modified plug-in
C18 = 8 $\mu$ F midget, 25v.	IF transformers
elect.	from BC-454
C20 = 16 $\mu$ F, 350v. elect.	Command re-
C21 = 25 $\mu$ F midget, 25v.	ceiver (see text)
elect.	L2 = 30 turns 24g.
C22 = 100 $\mu$ F silver	enam., close-
mica	wound on 1 $\frac{1}{2}$ in.
R1, R26 = 100,000 ohms	diameter alka-
R2 = 5,600 ohms	thene(water pipe)
R3, R7 = 1,000 ohm carbon	former
track pot., linear	L3 = 5 turn link winding
taper	at cold end of L2
R4 = 40,000 ohms 1	X1, X2 = 8275 kc FT-243
watt	crystals (see text)
R5 = 22,000 ohms	X3 = 8273.33 kc FT-243
R6, R8	crystal
R10, R25 = 1,000 ohms	X4 = Suitable FT-243
R9 = 3,300 ohms	crystal to give
R11, R18 = 4,700 ohms	transmitter out-
R12 = 680 ohms	put on 80m. or
R13 = 22,000 ohms 2	160m. bands (see
watt	Fig. 1)
R14 = 33,000 ohms	D1, D2 = Matched pair
R15 = 47 ohms	Mullard OA79
R16 = 150 ohms, 1-watt	germanium
R17, R21 = 2,200 ohms	diodes
R19 = 500,000 ohm pot.,	V1 = $\frac{1}{2}$ 12AT7 Brimar
carbon track	V1A = $\frac{1}{2}$ 12AT7 Brimar
R20 = 220,000 ohms	V2 = $\frac{1}{2}$ 12AX7 Brimar
R22 = 15,000 ohms	V2A = $\frac{1}{2}$ 12AX7 Brimar
R23 = 1 megohm	V3 = 12AT7 Brimar
R24 = 10,000 ohms	V4 = 6AG7
R27 = 47,000 ohms,	
1-watt	

run in the heater wiring. Use the chassis as one conductor and keep the live wiring close to the chassis. Wire up the AF stages V1 and V2, then test by connecting a pair of phones across the secondary of T. A fairly sensitive crystal microphone should be used ; there should be ample gain and very little hum. If all is well remove the valves and begin work on the oscillators V1A and V2A. Both are conventional Pierce type oscillators and C2 enables the carrier frequency to be "pulled" to an optimum point on the HF side of the filter response curve. SW1 is provided in conjunction with R2 and R3 to enable some carrier to get across the filter when required as an aid to tuning up, or to produce an AM signal acceptable by receivers without BFO's ! If a VFO is used it should have high impedance output and the crystal X4 must be removed from its socket.

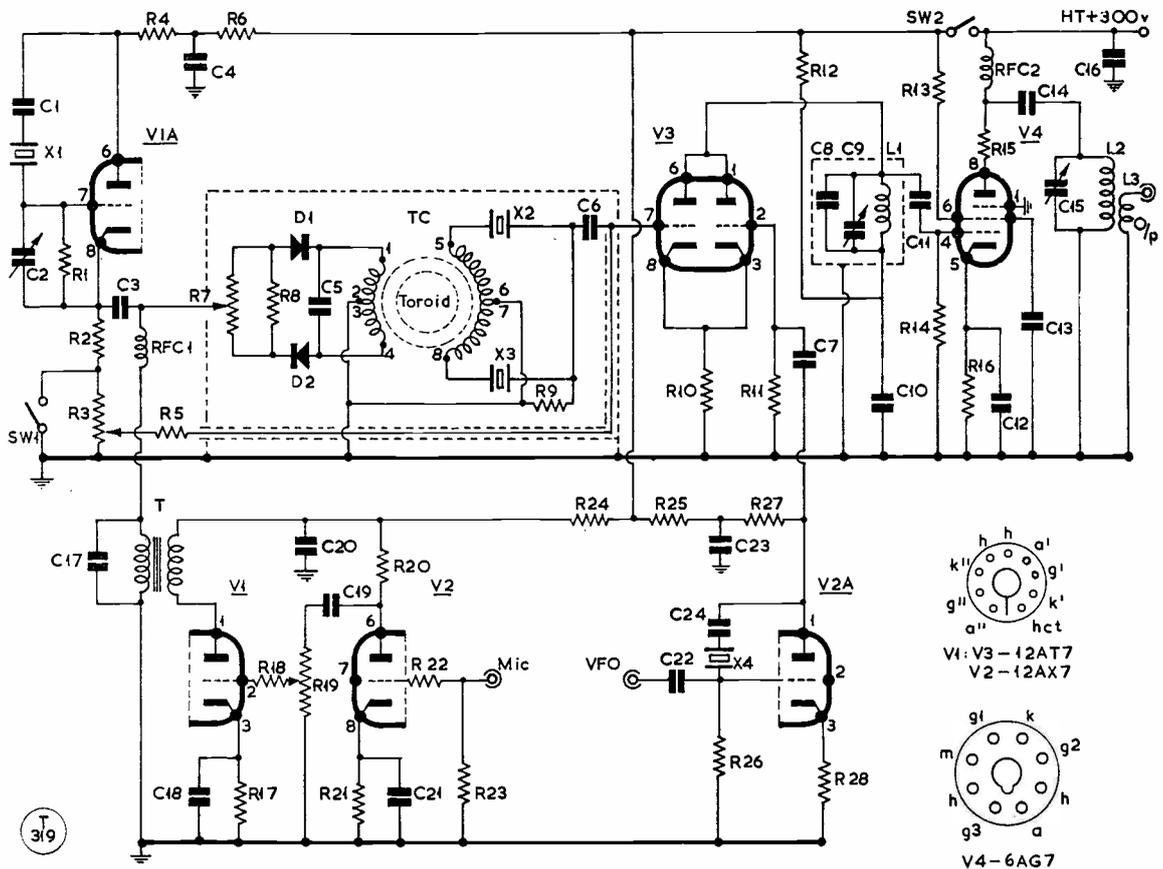


Fig. 2. Circuit complete of the "Natterbox" SSB transmitter/exciter, as described by G3BDQ in his article. Only four crystals are involved, and they do not require either etching or grinding — see text. Many of the components used can be surplus items.

Test each oscillator in turn by listening on the station receiver. Of the 32 crystals tested by the writer in the prototype Natterbox only one proved sticky and it was easily cured by washing in luke-warm water with a little household detergent added. Do not leave the HT on when the crystals are removed from their sockets or the sharp rise in anode currents can damage the load resistors R4 and R27.

**Balanced Modulator and Filter**

The only important point to remember when wiring the Balanced Modulator is the absolute electrical and mechanical symmetry which must be observed. The diodes D1 and D2 should be kept equidistant from the chassis and have their leads trimmed to equal length. If this is done there will be no need to use a balancing trimmer on the input side. A midget RF choke was used for RFC1 as it fitted conveniently between T and the slider

of R7.

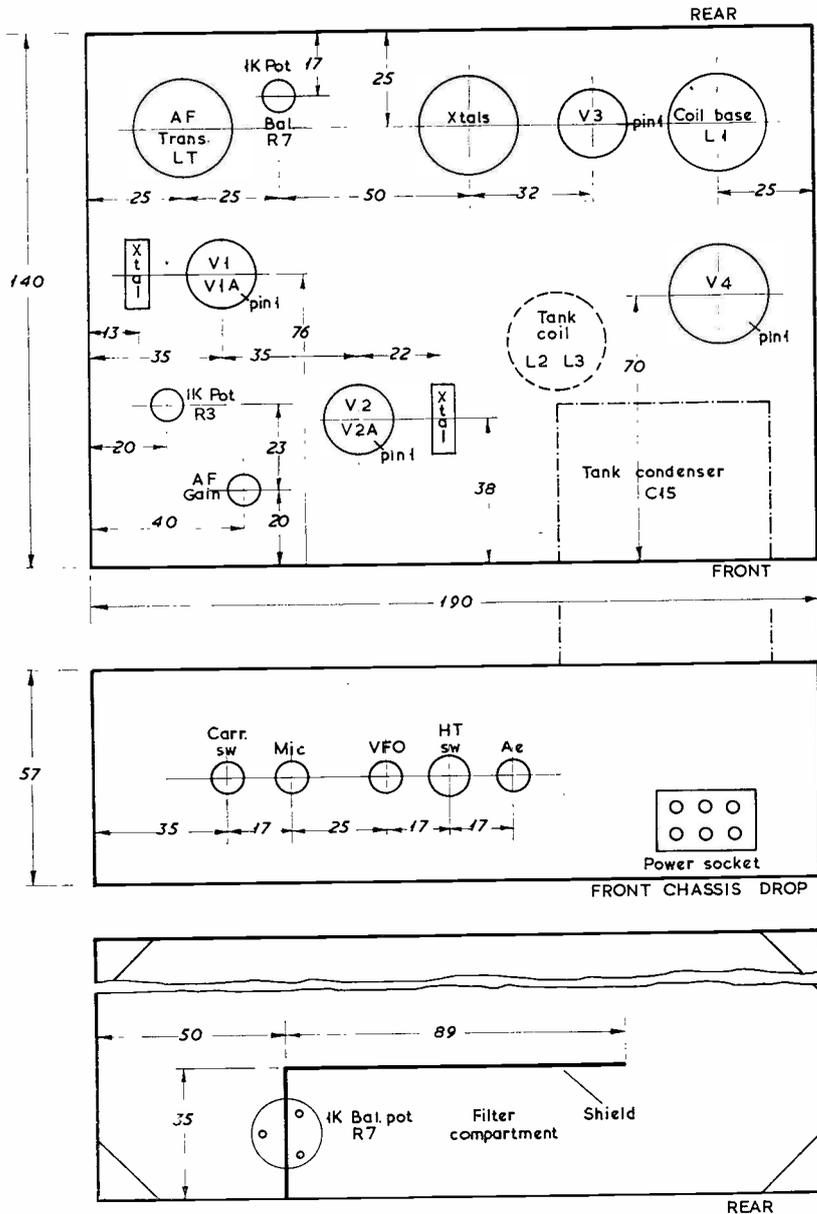
The heart of the filter is the toroidal coupling transformer. The necessary tight coupling between X2 and X3 is achieved by having the two halves of the toroid secondary bifilar wound. This winding has a total nominal inductance of 100  $\mu$ H, whilst the primary is much smaller and is tuned to the carrier frequency.

The ferrite ring specified can be obtained quite cheaply (see Fig. 2, Table of Values). Similar rings from other sources can be used but the winding data will not necessarily apply in these cases and some experiment may be necessary.

Before winding the toroid give the core a coat of polystyrene cement and allow to harden. To make the secondary, twist together two lengths of 32g. enam. silk covered wire about 4 ft. long and wind on 40 turns, spaced so that half an inch of core remains for the

primary winding. The latter is wound in the same manner for 8 turns. Reference to Fig. 4 will show the toroid winding plan and it should be noted that points 1 and 2 are ends of the same wire. This also applies in respect of points 3 and 4; 5 and 6; and 7 and 8. The completed toroid must be liberally coated

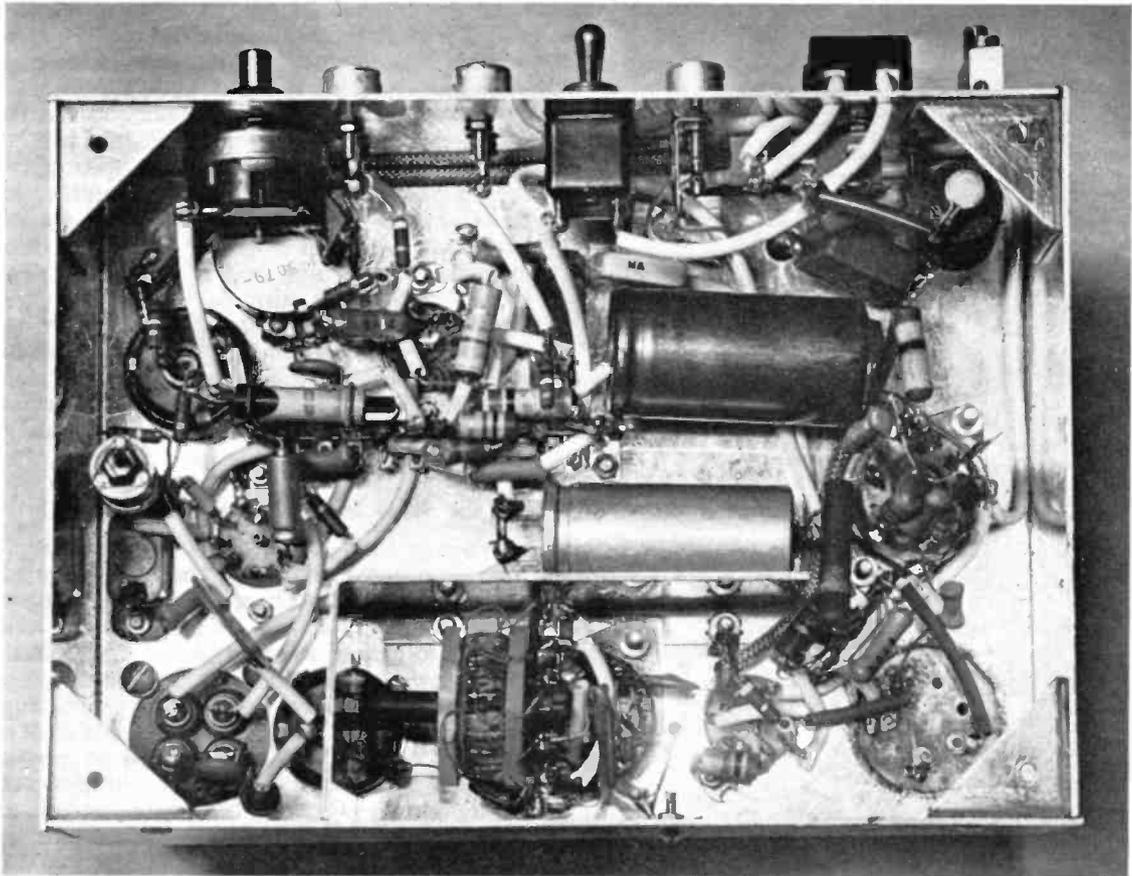
with polystyrene cement to set the inductance. Fig. 5 explains the method of mounting and supporting the finished toroid. The numbers on the six-point tag strip correspond with the numbered points in Figs. 2 and 4. The completed toroid is positioned in the filter compartment, as shown in the photograph opposite.



Note: All dimensions in mm.

Fig. 3. Chassis layout and drilling details — with dimensions given in millimetres — for the "Natterbox" SSB LF-band transmitter. A standard size of aluminium chassis is used.

T  
320



Underside view of the "Natterbox" SSB transmitter, as constructed by the author and designer, G3BDQ. The toroid (see Fig. 2) is visible in the filter screening compartment (foreground). The large electrolytic condenser is an addition which should not be necessary with a properly smoothed power supply.

### Testing the Filter

When construction has proceeded as far as C6 it is in order to test the filter and balanced modulator. A communications receiver having an S-meter and which tunes to the carrier frequency is all that is required for this purpose. Put the slider of R7 to one end of its track and loosely couple the receiver *via* coaxial cable to C6. Insert V1, V1A, V2 and V2A and adjust the coupling to give an S-meter reading of about S9 plus 20 dB when tuned to the carrier frequency. Carefully set R7 for minimum carrier (at least 30 dB down from the unbalanced condition), connect the microphone and speak. The S-meter will kick upwards on speech peaks. C5 tunes the toroid primary to the carrier frequency and with individual models of the transmitter some slight change in its value may be needed.

Determination of the correct capacity at C5 is not critical owing to the damping effect of the low impedance modulator diodes, and in practice plus or minus 15  $\mu\mu\text{F}$  from optimum capacity can be tolerated. If C5 is changed it will be necessary to re-set R7 for carrier balance. Switch off the receiver AVC and the S-meter; set the BFO for the reception of lower sideband signals and listen to your own voice when tuned to zero beat. When set up for lower sideband reception detuning the receiver will make the voice appear more bassy. The carrier will seem quite strong but do not worry about this for quite a lot of stray pick-up at this stage must be expected. C2 can be adjusted until the best speech quality is obtained, and different 8275 kc crystals may be tried in the carrier oscillator to achieve this end. When satisfied that all is correct check

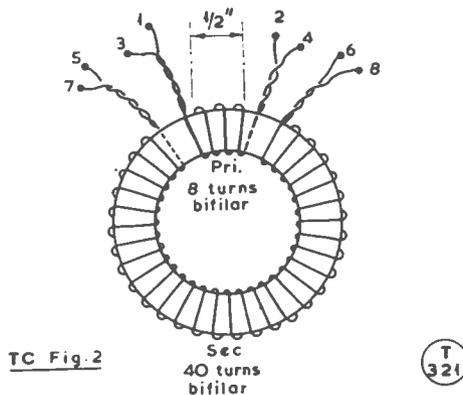


Fig. 4. Layout of windings for the toroidal transformer, as explained in the text.

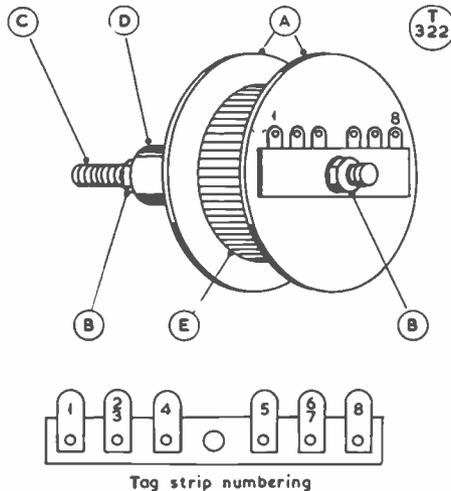


Fig. 5. Mounting details for the toroidal transformer. The references are: A, perspex discs; B, 6 BA nut and washer; C, 6 BA screwed rod; D, 3/4-in. stand-off insulator; E, toroid; and 6-point tag strip for connections as shown in Fig. 4.

the setting of R7. You should now have a satisfactory lower sideband signal on 8275 kc—so take a well earned rest in front of the telly before embarking upon the next stage of construction !

### The Mixer Stage

The only part of the mixer circuit needing some explanation is the design of the anode coil L1; this must be located above the chassis and completely screened to prevent instability in the following Class-A stage; and if operation on more than one band is envisaged plug-in units are to be preferred. The IF transformers

from the BC-454 "Command" receivers tune to 1415 kc as they stand and by removing one of the "wash tub" condensers from these units and replacing it with a  $65 \mu\mu\text{F}$  silver mica capacitor you have a ready made coil for Top Band tuned by the existing internal air trimmer (C9). (It is as well to open circuit the unused IF winding to prevent absorption loss.) For 80m. the existing IF windings and cores are removed together with the fixed capacities, and a new coil is constructed. This coil comprises 50 turns of 26g. enām. wire close-wound on a  $\frac{1}{2}$ -inch diameter former and has an  $85 \mu\mu\text{F}$  silver mica capacitor in parallel with it. Tuning adjustments can be made with the existing air trimmer. It is important that the screening cans be earthed *via* one of the unused coil base sockets.

### Output Stage and Final Adjustment

When a high-gain Class-A RF amplifier is built, unwanted feedback and instability are difficult to avoid. Careful screening between the input and anode circuitry is the only answer to this problem, and the 6AG7 has a thin brass screen soldered across its octal holder. This screen is about  $1\frac{1}{2}$ -inches high and to it are soldered the earthy ends of R14, R16, C12 and C13; R15 is used to prevent parasitic oscillation. L2 is mounted above the chassis close to C15 and is designed to tune the two required bands. The exact number of turns needed for the link winding L3 will depend upon the impedance of the output load and can be determined experimentally.

Before tuning up the finished Natterbox for the first time, connect a  $\frac{1}{4}$ -watt bicycle rear-lamp bulb to the output socket and tune the station receiver to the expected 160m. output frequency. Adjust C9 and C15 for maximum output from the receiver. No output should be observed from the bulb load until the microphone is spoken into; then it should light brilliantly on speech peaks. A steady glow from the bulb denotes instability in V4 which should be remedied before proceeding further. The same tuning procedure is adopted on 80m., but here greater care is needed when setting C9 and C15. This is because it may be possible to tune the mixer and output stages to the mixer injection frequency, which is only some 700 kc up from the desired output frequency. Even when the relevant circuits are set to 80m. there may be enough output on the unwanted frequency to light the test bulb dimly. This undesirable output will be largely removed by the ATU and will certainly

**Table of Values**

Fig. 6. Circuit of suggested linear amplifier

- |   |  |
|---|--|
| C1 = .01 $\mu$ F disc ceramic                     | L1 = 28 turns 24g. enam. close wound on 1 $\frac{1}{2}$ in. diameter alkathene (water pipe) former |
| C2 = .004 $\mu$ F mica                            | L2 = suitable link winding   |
| C3 = 350 $\mu$ F variable                         | M1 = 50 mA m/c meter   |
| C4 = .0015 $\mu$ F tubular ceramic                | V1, V2 = 5763 Brimar   |
| RFC1, RFC2 = 2.5 mH 100 mA                        |  |
| APC = 12 turns 24g. enam. on 33-ohm resistor body |  |

be greatly attenuated if a PA is used. The use of a balanced mixer stage or tuned transformer at the anode of the mixer is recommended if the Natterbox is to be used without a PA on 80m. Putting a screening can over X4 increases the output from the transmitter and probably prevents some degenerative capacitive feedback from L2, which is unshielded.

The power requirements for the Natterbox are not stringent ; total anode current is about 50 mA at 300 volts. The HT supply must be well smoothed and the smoothing capacity should not be smaller than 32  $\mu$ F if hum (which on SSB gives rise to unwanted carrier) is to be avoided.

**A Linear PA**

When used alone the Natterbox gives excellent results over local distances on 160m. and contacts have even been made with stations up to 70 miles away, but it was felt that for effectiveness over reasonable distances under average conditions some form of PA was required. A small tetrode in Class-AB1 was thought of at first but this idea was discarded in favour of one or two pentodes operating in the grounded-grid mode. The reason behind this decision was the "stiff" grid bias and screen grid supply needed for correct AB1 or AB2 operation. A fairly complicated power pack would be needed to fulfil these requirements, and it seemed hardly worth while to produce this expensive item for a PA running at such low power levels. The advantages of grounded grid operation are extreme simplicity, economy of components, stability without neutralisation, simple power requirements and the fact that the driving power reinforces the output of the amplifier.

Examination of Fig. 6 reveals that no tuned input circuit is used. The cathode impedance of the paralleled 5763 valves is low enough to afford a good match to the Natterbox output link. It was not possible to obtain official operating data for 5763's in a g.g. circuit, but they work very well in the circuit

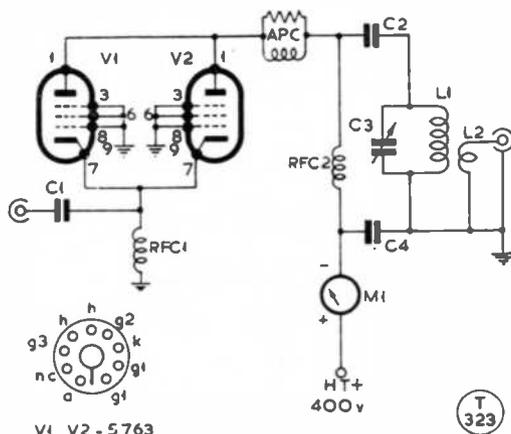


Fig. 6. Suitable linear amplifier for Top Band.

shown here and behave as a linear amplifier should. With 400 volts HT the standing anode current when on 160m. is 4 mA and this rises to 25mA or more on speech peaks. On 80m. the standing current is about 8 mA owing to the unwanted oscillator voltage from V2A getting through.

**Results and Suggestions**

On Top Band contacts have been made with stations as far away as the Orkneys, a distance of just under 600 miles from the writer's QTH ; and on 80m. S8 reports have been received from stations all over Europe. The aerial system has never been anything more elaborate than an end-fed 132 ft. wire with an additional tuned counterpoise for Top Band. The speech quality has always been reported as "good" or "excellent"; and both the carrier and the unwanted sideband are more than 35 dB down from the signal level. Simple design need not necessarily mean the radiation of a sloppy signal.

The basic Natterbox design is easily adaptable to upper sideband generation on the HF bands. For instance, by using a carrier crystal frequency of 8273.33 kc and a VFO tuning from 6000 kc to 6070 kc, excellent results should be obtained on 20 metres. For the amateur needing a little more power than ten watts, the Natterbox is capable of driving a 6146 in Class-AB1 to 50 watts input, providing some care is taken when matching in to the tuned grid circuit of the PA.

At the present time SSB activity on 160 metres is not great, and it is hoped that this article will stimulate many others to join the fraternity and derive all the advantages to be gained from Sideband working.

## MORE IDEAS ABOUT AERIALS

### Designs and Layouts Illustrated

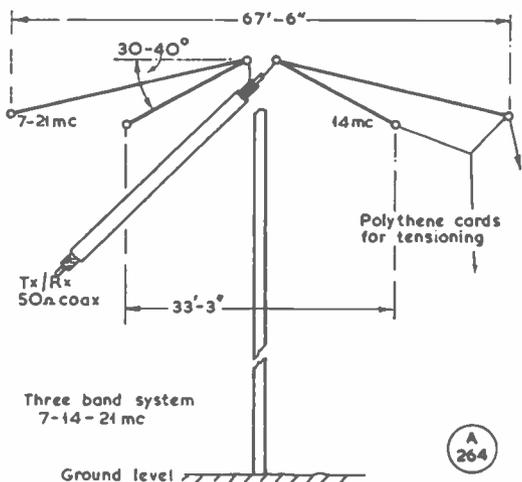


Fig. 1. A three-band system based on the principle of getting the current antinode as high as possible. The 67½ ft. dipole resonates on 7 and 21 mc, being virtually unaffected by the presence of the 33½ ft. dipole which — connected to the same feed-point — can resonate only on 14 mc. The object is to get the central connection up to about 35-40 ft., the arms of the dipoles then dropping away to any available anchorages. Thus, only one mast or support structure is required. The feed-point impedance can be taken as about 50 ohms, and the whole set-up will be found to be an effective 3-band system. The feeder can be plugged straight into the usual Tx pi-network, and to change bands it is only necessary to change the transmitter over.

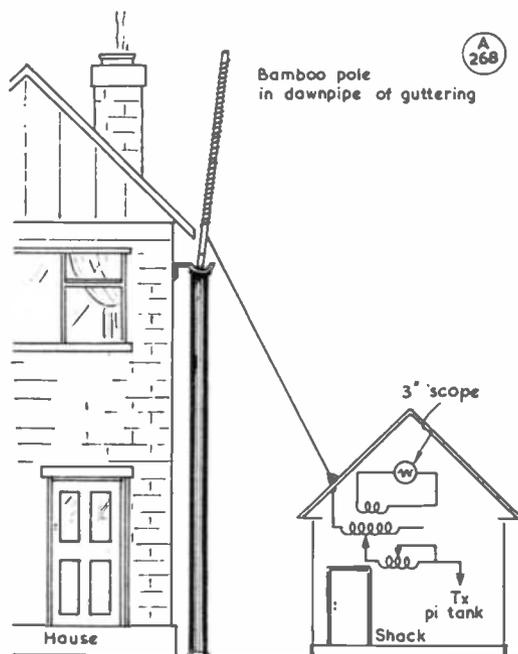
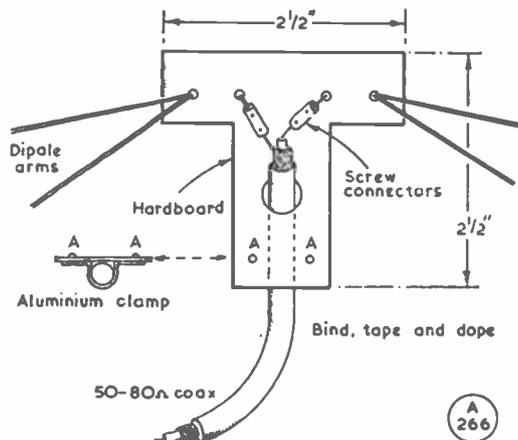


Fig. 3. We are indebted to G3LK (ex-EP3H, VS1JU) for this idea for a Top Band aerial where there is no space to run out wire. It is a form of loaded and tuned whip, and in his case consists of an 8-9 ft. bamboo wound over for most of its length with insulated wire. It is then mounted either on the side of the house or shack, or out of an upstairs window — or, as shown here by G3LK, has the butt end dropped into a rain-water downpipe. The coils shown resonate the whip to any part of Top Band; one normally tunes 80m. and is for coarse adjustment, and the other is a roller coaster (ex-Wilcox Gay or TU-unit type) for fine tuning. The whole set-up is very frequency conscious and must be re-resonated for even small frequency changes; a good earth system is also very desirable. With the aerial as sketched here, G3LK (Wolverton, Bucks.) can work reliable Top Band phone contacts over 50-60 miles in daylight, using no more than 9w. to a 1625. Notice the 'scope monitor coupled into the coarse-tuning coil.

Fig. 2. Home-made centre insulator for the assembly shown in Fig. 1. A piece of hardboard is shaped as shown and the feeder is bolted to the lower arm of the "T" by a strip of aluminium shaped to give a tight fit. The dipole arms are put through a few inches of insulating sleeving, in the holes, the "screw connectors" shown in the drawing being the brass inserts from porcelain twin connectors as used in ordinary electrical work. The insulator is bound, taped and well doped with Bostik. As this is a high-current low-voltage point, the insulation used is quite sufficient, and the doping will keep out any moisture. Of course, Chas. Young, Ltd., sell a very good centre-feed insulator for about 2s. 6d. which will save all this fabrication!

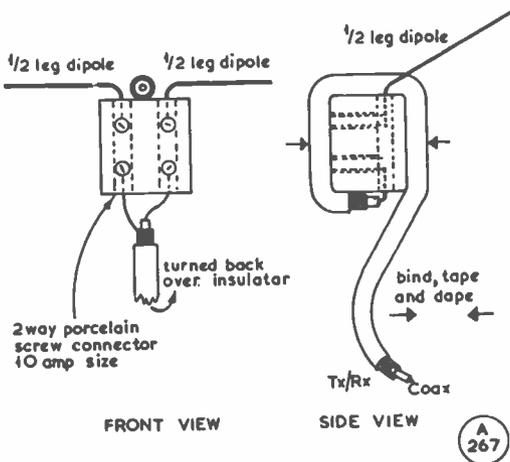


Fig. 4. For quick centre-feed assemblies, use ordinary porcelain twin-lead connectors (like the ones you took the inserts from for Fig. 2), simply bringing the dipole ends and feeder connections right into the brass sleeves. If the feeder line (coax, twin lead, or whatever) is then looped once round the porcelain connector and bound to it, the pull will be taken off the actual feeder connections. To finalise the job, tape and dope.

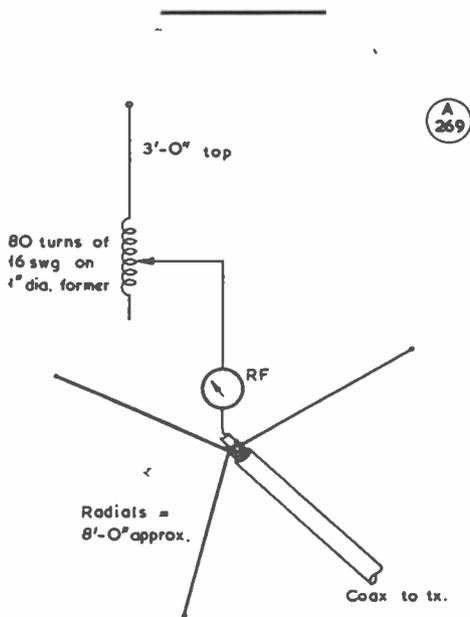


Fig. 5. Layout for an indoor (or outdoor) vertical transmitting aerial, which can be made to cover 10-15-20-40 metres. The coil should be close-wound on a 1-in. diam. paxolin or perspex former, tapped every few turns (or a roller coaster could be used); the coil should be suspended about 3 ft. above the RF ammeter, and the radials be wire or rod, laid on the floor. The adjustment is to resonate on the frequency required by tap variation, until the RF indication is a maximum (or a field-strength meter placed some distance away gives the fullest deflection). G2FRY (Nottingham) has suggested a very similar arrangement, except that his coil is 82 turns on a 3/4-in. diam. wood (dowel) former, with a 2 ft. 8 in. top and 3 ft. 8 in. bottom section. He reports very encouraging results with the whole thing indoors.

## G9BF Calling!

### Ironing Out Le QRM

SEVERAL cards now received from alleged SUSIE—regret some people may be pulling leg G9BF. Also unexpected QSL signed “fascinating Chinese fandancer Chinky Lee”; do not remember working this station but have filed card future reference.

Huge international success my new series proved by letters important Top People like QUIDX (working through Russian oblasts), DX1QU (done all UA call areas), UP3KC (guaranteed confuse beginners), es RU2BZ (zed as in American) signed “Seedublyer Maudie” asking real technical questions like How to keep cool pairs 813’s in parallel push-pull es Is ant really necessary if you’ve got enough volts on PA?

Last obviously trick question es will get crafty answer, but one about hot 813’s easy: Here at famous international DX station G9BF all spare heat from 813’s passed to heat-exchanger producing steam for small low-pressure turbine driving 10v. DC generator giving LT back into 813’s no trouble at all. Of course HT from mains using fairly hefty 3000-0-3000 xformer straight on to 813’s connected push-pull self-rectifying mode so producing real lovely note guaranteed flatten opposition when scouting rare DX like DM, LZ or anything else worth having behind Iron Curtain.

Answer to Maudie’s second question is depends what she means by enough volts on PA. Motto at G9BF is “Always use maximum pressure to achieve maximum result.” All beginners must remember this: No use fiddling round with watts when it’s kilowatts you need. Ant only important when you want impress visitors with jargon about feed impedance, resonant length, vertical radiation angle, I<sup>2</sup>R loss in feeder line due poor SWR, es such-like talk to baffle beginners—otherwise just tap on wire at few turns down PA coil and away-to-go for just-as-good results. If you have enough power at business end any piece of wire, answers from LZ klub stations your “CQ dx” guaranteed any time, any HF band; try it es see.

Delighted throw out real warm suggestion by one highly intelligent es discerning reader saying How’s abt forming G9BF Supporters Club, of course open only highly-qualified tech. bods. such as those prepared experiment continuously on getting max RF with greatest enthusiasm working real DX es finding the stuff. This column just not interested run-of-the-mill locals using licensed power in recognised bands observing regulations keeping proper log es all that tedious business. Trouble is this Magazine too full guff about keeping it clean es mind how you behave, etc. You just can’t do it if you want the real DX. Of course Editor furious my success but cannot deny space for more good gen about Bamboo Curtain boys next month.

*(It would be very much appreciated if readers would be good enough to refrain from writing in to encourage him.—Editor.)*

## RTTY Topics

### DESCRIBING THE CREED MODEL 7B

W. M. Brennan (G3CQE)

*This month's contribution in the series deals in some detail with a standard send-receive teleprinter which is becoming available on the surplus market. The Creed Model 7 is a well-known machine by a famous British manufacturer and it fulfils all the immediate requirements for amateur RTTY working. While a good deal can be gleaned from the printed word on the subject of the teleprinter as a machine, as our contributor points out it is really only by examination of the mechanism turned by hand that its working can be thoroughly understood.—Editor.*

THE writer wishes to thank those readers who have written in with suggestions for the particular aspects of RTTY they would like to see presented—also those who have included a photograph of their RTTY equipment. Such photographs are always welcome and (providing they are suitable for reproduction) will certainly be used.

It seems evident that the subject uppermost in the minds of those contemplating RTTY operation is the Teleprinter and How It Works. The T/P is not a common piece of household equipment (though some XYL's may disagree!) nor is it often encountered in the local radio junk shop. Not unnaturally, then, the task of finding out how the machine works and the prospect of having to make delicate adjustments to it may seem formidable obstacles to the newcomer to RTTY. However, whilst there's no denying that the T/P is a complex machine, it is really no more so than the modern car and most people have a pretty good idea of how that works. Moreover, they can if the necessity arises carry out at least some of the essential adjustments. The same rapidly becomes true of the T/P once it arrives in the shack. Half-an-hour spent in turning the motor with one hand whilst operating the armature of the electromagnet with the other will give the newcomer a good insight into the workings of the machine—often more so than several hours of reading about it. For those who do not have access to a T/P, and no illustrated manual to guide them, perhaps the notes following will help.

#### A Typical Machine

Illustrated here is the Creed Model 7B complete with a page-carriage attachment. This is the machine at present used in large numbers by the Post Office, the Services and various news agencies providing feeder service. It is gradually being replaced by an improved version, the Creed Model 54, and the Model 75, the latter being a machine of radically

different design. Because of this replacement programme, the 7B comes up on the surplus market from time to time, and is therefore a good buy by amateurs with an eye for label-reading and a nose for a bargain!

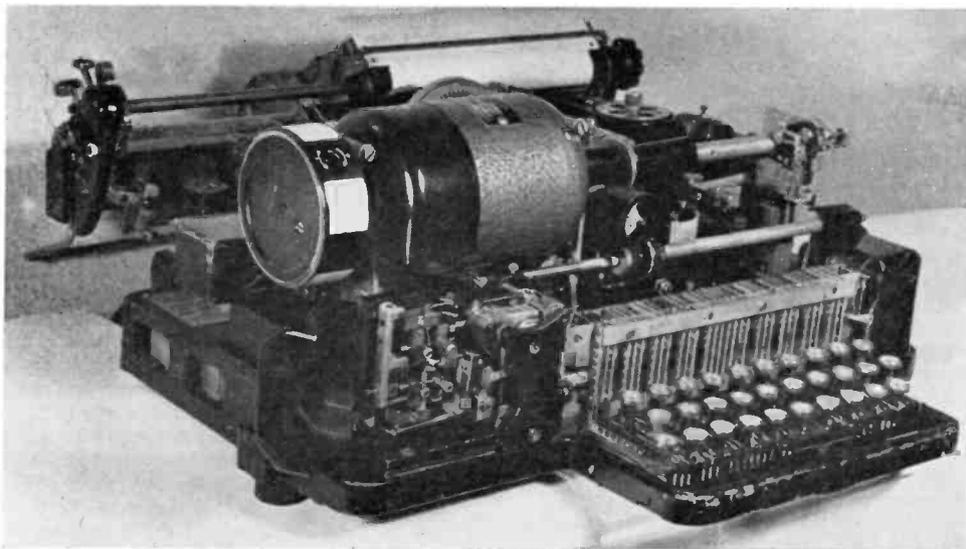
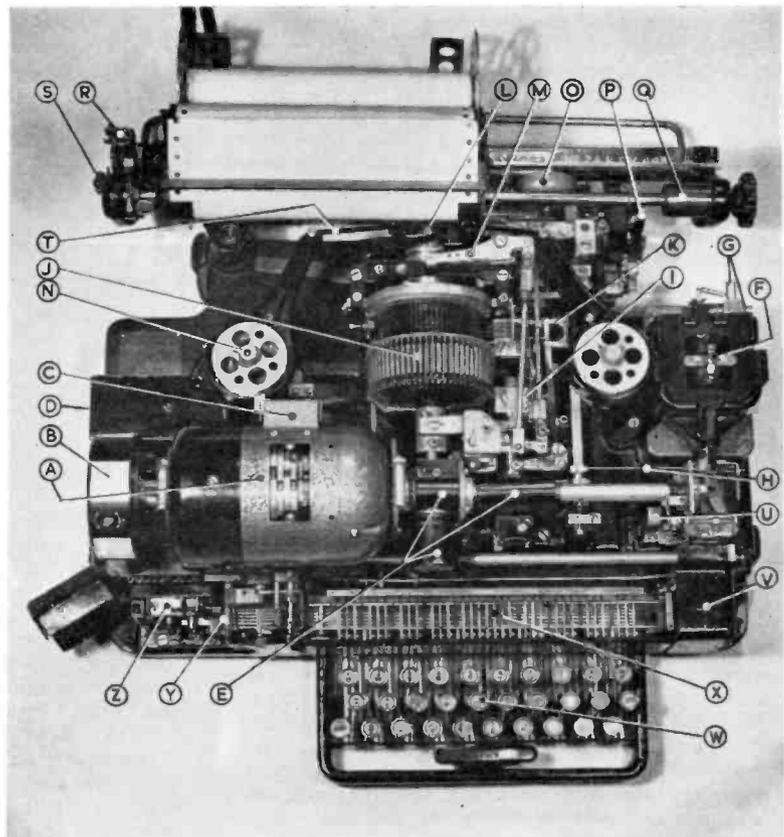
#### The Receiving Mechanism

Looking at the annotated photograph, (A) indicates the series-wound DC motor, this particular model being adjustable to work over the range 100-110 and 160-250 volts, merely by changing field connections located under the cover shown at (C). The governor (B) rotates with the motor shaft; it possesses two contacts which are held in the closed position by a spring; when the motor reaches its working speed, the contacts are thrown open by centrifugal force operating against the pull of the spring. This action brings into circuit a resistor which is in series with the motor and so causes it to reduce speed until the contacts close again. The whole process continues, resulting in small but rapid speed variations above and below the critical value. The power take-off from the motor for both the sending and receiving sections of the T/P is via worm gear arrangements under the protective covers shown at (E). A hash filter for the governor circuit is housed in the metal box indicated at (D).

The "Receiving Electromagnet" (F) is a large polarised relay and is the means by which the received signal impulses are translated into a controlling mechanical action, which finally results in a printed character; it is important that the force required to move the armature of this electromagnet from one side to the other should be the same for both directions of movement. An adjustment is provided at (G) to achieve this.

The "Cam Unit" derives its name from the cylindrical cam which is part of the unit; this cam has five tracks cut into it, each track being continuous around the circumference of the cylinder. The shape of these tracks controls the movement of five levers, each of which rides in a track; the levers perform such functions as the carriage movement, inking ribbon feed, type-hammer action and most of the movements required for setting up and (later) clearing a selection. The type-hammer (M) and its associated lever can be clearly seen in the photograph. The cam is rotated by the motor via a gear system and a clutch mechanism; the clutch is operated from the electromagnet through link (H); when there is no T/P signal incoming, the electromagnet armature is held to one side by the steady "mark" signal. In this state, the clutch disconnects the cam unit from the motor and the receiving mechanism is at rest. The first pulse of the T/P signal (the "start" pulse) is always a "space" signal, and this moves the electromagnet into the "space" position, operating the clutch and energising the receiving mechanism. The following five-code elements of the T/P signal may be any combination of "mark" or "space" (depending upon which character is being transmitted) and here the movements of the electromagnet are passed on to the striker blade (K); this action results

Full plan view of the Creed Model 7B teleprinter, which is a very interesting piece of work mechanically. The lettered references are covered in the text, which should be read with this photograph.



Side view of the Creed Model 7B standard teleprinter, in wide use in the Services, the Post Office and on commercial circuits, now appearing on the surplus market in increasing numbers. The Model 7B is being replaced by Creed machines of more advanced design. This photograph should be studied with that above, and with the general description given in the text.

in the appropriate selection being set up in the Combination Head (J); the typehead (L) rotates and is locked into position with the letter or figure corresponding to the selection in front of the type-hammer. During the period when the code elements are being received, the cam unit clutch cannot be operated by the electromagnet, but immediately after the final code element the clutch is once more in a position where it can be thrown out by the electromagnet moving to the "mark" condition. The final unit of a T/P signal (the "stop" signal) is always "mark," and this brings the receiving mechanism to rest once more.

The Type 7B machine always prints one character behind, *i.e.*, the actual printing of the character selected always takes place during the selection of the following character. In this respect, the Creed Models 7 and 3 are unlike most other makes.

#### Different Carriages

The carriage attachment shown is one of three different carriages that can be used with this machine. Two of these are page attachments, the main difference being in the manner in which the paper is fed upwards over the platen, and in the "chariot," or paper container. The third attachment is entirely different and converts the machine into a tape (or continuous strip) printer. These attachments are quickly interchangeable, being unlatched by the lever (P). A bell (O) gives warning of the approach of the end of a line, as in an ordinary typewriter. The cylinder (Q) is a pneumatic device which cushions the carriage when it returns to the right. (R) indicates a key for manually operating the carriage return when required. Single or double line spacing can be obtained by adjustment of the knob (S). (N) denotes one of the two ribbon spools and (T) the actual ribbon.

Just below the electromagnet and at the end of the main motor shaft is a device which is provided in order to avoid running the motor for long periods when no signals are being received. If the electromagnet has been held in the "mark" position for approximately 1½ minutes, a switch in the motor circuit is broken by a weight which is slowly pulled up by gear train driven off the motor shaft; upon receipt of a "space" signal, the electromagnet trips the connection between the gears and the weight, which then falls and knocks the switch into the "on" position. The motor starts up and the machine is ready for work again in something like a split second.

#### The Keyboard Unit

The keyboard lettering conforms with the International Telegraph Alphabet No. 2 and, as such, is



compatible with most other T/P's. Unlike a number of machines made by other manufacturers, the Creed Model 7 employs a single-pole change-over for transmitting; this contact is operated a maximum of six times per character. Other types of machine employ six pairs of contacts, each pair being operated once per character. The Model 7 also provides a send-receive switch which is automatically thrown into the "send" position when any key on the board is pressed. Both sets of contacts are located in the "Transmitter Unit" shown at (Z) in the photograph.

When one of the keys is depressed, a clutch connects the keyboard mechanism to the motor *via* a gear train. A cylindrical cam at (Y) starts to revolve. Each key operates one of the 31 vertical keybars shown just above the keyboard at (X). The keybars are positioned above six further bars which are shown running horizontally the length of the keyboard. Each of these bars, when free to move, will do so from left to right of the keyboard, being pulled in this direction by six springs. Five of the six bars are called "Combination Bars" and correspond to the five-code elements of the T/P signal. Each is specially shaped so that if the corresponding code-element for a given key is "space," the keybar for that key will prevent the combination bar from moving to the right. If it is "mark," it will be allowed to move to the right. To give an example: The code-element sequence for the letter R is *space-mark-space mark-space*. The first, third and fifth combination bars will each have a projection on them immediately to the left of the R-keybar. When this keybar is depressed, the projections will bear against the keybar and the combination bars for these three elements will not move to the right; the second and fourth combination bars will have no projections adjacent to the R-keybar and so will be free to move the short distance to the right. At the end of each selection all the combination bars are reset to the left and held there until the next time a key is pressed. The sixth bar mentioned is provided in order to prevent a second key from being depressed whilst the machine is still transmitting a

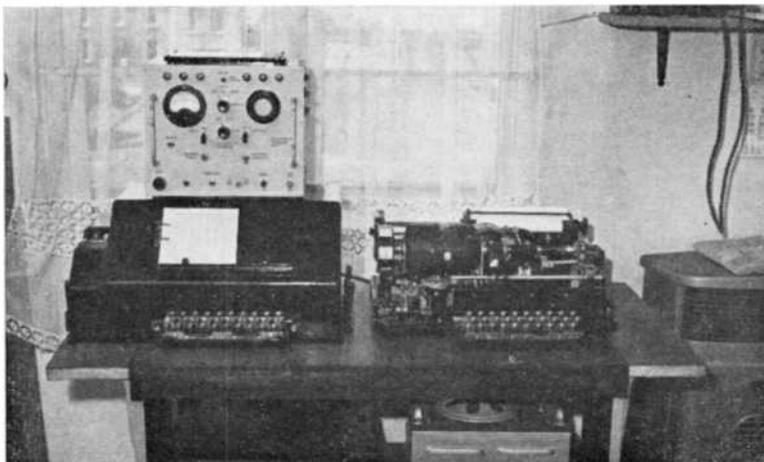
*RTTY operators and all interested in the subject are invited to write in for this feature, the next appearance of which is in the August issue. Address to "RTTY Topics," c/o The Editor, Short Wave Magazine, 55 Victoria Street, London, S.W.1., to arrive by June 30.*

previous selection. Also shown at (Y) are six control levers which ride on the cylindrical cam. The cam is slotted at intervals around its circumference and its length to coincide with the spacing of the six control levers. As the cam rotates, each of the levers will in turn ride down into a slot and, as the rotation continues, move out again. In fact, five of these levers are each associated with one of the combination bars. Any combination bar that has not moved to the right will stop its corresponding control lever from moving into the slot. Each control lever is permitted to operate the transmitting contacts in turn. If the lever is down in the slot, the contacts move to the "mark" position; if the lever has been prevented from moving, the contacts move to the "space" position. Briefly, then, the combination bar position decides whether a given codelement shall be "mark" or "space," the five bars are scanned by the cam, and the control levers and the resulting information is passed to the transmitting contacts. The sixth control lever supplies both the "start" and the "stop" pulse. As these are always "space" and "mark" respectively, no combination bar is required.

One other feature of the keyboard is the "Answer-Back Unit." The receipt by the machine of the signal for the upper case (capital) of letter D will cause it to switch over to "send" and then transmit a predetermined sequence of letters or figures up to a maximum of twenty characters. In normal line working, this enables the T/P operator to identify the machine at the other end of the line and check that it is working correctly. The answer-back unit is located under the cover at (V).

The Model 7 is a remarkable piece of machinery, and the above description can only give a brief outline of what happens in the "works." For instance, no mention has been made of the control unit which is responsible for directing the various carriage actions. Of course, the various manuals published by the makers of the Creed and those produced by H.M.S.O. for the Post Office are invaluable to anyone who wishes to make a serious study of the machine; moreover, they are essential to anyone who contemplates making adjustments to it.

Experience shows that the RTTY amateur buys a printer and then spends every available minute of his spare time with it—usually with his nose or necktie in dangerous proximity to the whirling machinery. After a week or so of this, he switches the machine off and, with a glint in his eyes, he reaches for a screwdriver and a set of B.A. spanners. . . . For a week or more the smell of cleaning fluid comes from the shack and perhaps an



G3NPF, 2 Edith Road, Prittlewell, Southend-on-Sea, Essex, has a Type 3X tape printer and a Creed Model 7A page printer (right), with the G3BST FSK receiving converter, as described in the March-April, 1960, issues of *Short Wave Magazine*; in G3NPF's version of this design, an oscilloscope tuning indicator and 12v. DC supply for local loop printing are incorporated. The radio receiver used with this equipment is an AR88LF, and the transmitter runs a pair of 6146's at 100 watts, all bands 10-80 metres, operation being mainly on the 3.5 mc band at week-ends.

urgent SOS for some vital small part. Finally, the machine has been cleaned, adjusted and oiled, and the newcomer settles down to the more serious business of using it.

In amateur service a T/P should run for hundreds of hours with no maintenance other than an occasional oiling being necessary.

That's "85" for this month — don't forget to change the oil for the summer!

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#### LATEST LICENCE COUNT

We are informed by the Post Office that on April 30 last there were 9,071 amateur transmitting licences in issue in the U.K. Of these, 974 carried the Mobile endorsement, and 78 were for ATV.

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#### ANOTHER SOURCE-OF-SUPPLY IDEA

If you want a microphone amplifier in a hurry, the back end of almost any old BC receiver or Rx chassis, with the audio side in working order, will give you enough output from a crystal microphone to drive a sub-amplifier; the microphone is, of course, connected across the pick-up terminals, making sure you select them the right way round. The driving voltage-output can be taken from the plate of the last valve, through a .01  $\mu$ F fixed condenser, with the speaker disconnected. For low impedance feed into a following amplifier, use coax from the speaker coil connections.

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#### AMATEUR RADIO ON HOLIDAY

As usual, we shall be glad to hear from readers who have holiday experiences of Amateur Radio interest suitable for publication, particularly while abroad. Photographs are also very useful to illustrate such items.

# DX COMMENTARY

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

CONDITIONS on the HF bands have most definitely taken a turn for the worse since last month, when they were unusually good for the whole period. We are now seeing what the bands are really going to be like for a long time to come. The DX is there all right—but one has to choose the right time (and the right day), and even then signals are down compared with the month of April.

Gear and, in particular, aerials being so much more efficient than was the case eleven years ago, the optimists consider that we shall not notice the trough of this sunspot cycle so much as we did the last. Unfortunately, however, it is likely to be a deeper and longer trough; and there seems every likelihood that the next peak will not merely fall short of the last one, but is likely to be very far short of it. Some expert opinions on this subject are summarised in a later paragraph.

In view of all these circumstances, this feature is likely to become much more of a true commentary and much less a catalogue of DX worked; and correspondents can help to make it even more interesting by writing their letters with this in mind.

If you haven't worked anything that you yourself would call super-DX, no matter . . . what you have done will be of interest to many others who, like yourself, have been finding the going difficult. So we would like to hear rather more about the gear and aerials in use, the general appurtenances of the station, the hours spent on the air, and so on, than the mere list of QSO's achieved



E16X

## CALLS HEARD, WORKED and QSL'd

during the month. Someone once said that DX was far more interesting in bad conditions than good, and he was probably right. When the sunspot number is up in the 150's or above, hardly anything is *really* DX. When it's down in the twenties and thirties, nearly everything is!

DX-peditions are somewhat scarce just now; rare ones are rarer than ever; but the solid core of DX 'chasers keeps working away, and one can hear nice stuff being raised even when the bands sound most unpromising. Short skip is always with us, it seems, but there are certain times of day when it shows a sign of abating. And, of course, there are always newcomers arriving on the air who don't realise what they have missed in the last two or three years, and *they* will be quite happy with the odd VK or ZL contact under poor conditions.

Of course, the whole thing is very patchy at present and, as likely as not, by the time these words appear in print we shall have had another period of brilliant conditions—but we can't

expect such periods to last very long, or to be as frequent as of late.

So keep plugging away—widen your interests and try working them on *Forty* and *Eighty*—these will be the bands giving the DX. Switch to Top Band and see what can be done in the way of GDX in daylight. Try *Ten* for medium-distance contacts, and your ears will pop when a totally unexpected piece of real DX turns up and calls you. There's going to be no lack of interest over the next few years, whatever conditions may be.

### Solar Predictions

The present sunspot cycle reached an unprecedented peak of 201. This was the monthly "smoothed sunspot number" and was recorded in March 1958; the peak of the previous cycle, in 1947, was about 158, and that was equal to the highest recorded figure since observations were started in the year A.D. 1750. (The peak of A.D. 1778 reached a similar figure, but the ionosphere was not so important in those days!)

Returning to this current cycle—from the spectacular 201 of March 1958 we have already fallen to a present figure of 80 or thereabouts, and inspired predictions are that this will drop to as low as 55 by the end of this year of A.D. 1961, and to 38 by the end of 1962. Remember that this is the 19th eleven-year cycle which has been under observation, so that predictions from a series of curves are pretty easy to make, and usually fairly accurate.

What is of interest to us as radio amateurs is this: That the *maxima* themselves can be shown to build up in a sawtooth pattern over a period of 50 to 70 years, and that it looks as though our last peak of 201 represented the maximum of that sawtooth waveform. Should this be so, the *peak* of the next cycle, expected to occur in March 1970, may be predicted to reach a figure of only 45-65 . . . a considerably lower figure than we have already reached on the downward slope of the present one.

Two independent propagation experts have predicted a similar figure (working from quite different premises) and both agree that solar activity may well remain phenomenally low for the rest of this century. Should this be so, it means that the majority of amateurs active today will never again experience DX conditions comparable with those of the last two or three years.

Pause for quiet thought . . .

The method employed to predict this future state of affairs was also used to forecast, with great accuracy, as it turns out, this last peak that we have recently passed. As early as 1956 it was stated that the figure attained in March-May 1958 would be the highest ever recorded.

Sorting out a mass of figures and curves, one hopeful sign emerges: 'Way back in A.D. 1778, when the highest peak of the eighteenth and nineteenth centuries was reached (159), the sawtooth theory would have given a very low maximum for the following cycle. *It didn't happen!* A peak of about 140 was attained in the year 1788, and *this* cycle

was followed by the lowest ever recorded, with a peak figure of about 45. It could be that we shall be reprieved in the same way, with just one more really high one before the rot sets in.

And yet again—who knows? It may be that solar activity is now increasing on a very long-term scale. There might be a cycle of such low periodicity that even the records so carefully kept since A.D. 1750 have not shown its existence; in which case even the existing "high" of 201 might be beaten in A.D. 1968-9. Time alone will tell . . .

It is in such circumstances that the LF bands come into their own . . .

#### Worldwide DX News

Enough of predictions and the prophecies of gloom—let's have a look at what is with us right now. It is a story of pretty intense activity on the part of the DX 'chasers (if not the sunspots), and a proof that know-how and enthusiasm can beat poor conditions.

Nothing like the excitement of the Malpelo and Laccadives DX-peditions has stirred things up this month, but good solid DX has been there—for those who have chosen their date, time and band correctly.

For instance—VR6AC, *Pitcairn*, is still very active on 14 mc SSB and CW; AC5PN, *Bhutan*, shows up on the same band, CW, usually around mid-day; VK9DJ is reported to be on from *Nauru* (CW and AM) with promise of another station, to use SSB.

FB8CE (*Comoro*) is expected to be there shortly, using the new prefix FH8; *Trucial Oman* will be represented by MP4TAN, who is ex-6O2AB; *Timor* (CR10) is expected (as always!); and the *Monaco* season is in full swing. From the latter spot, DL4FX and '4PI will be operating between June 20 and 30 with a KWM-1 on the HF ends of 14 and 21 mc. Several G's hold 3A2 calls, which are obtainable on application through the Monaco authorities.

The SSB types have been fairly wallowing in new countries—not rarities by any means, but just new ones from the SSB point of view—

such as UC2, UP2, UQ2, UH8, HB1, FC and the like. It all makes life more interesting for those who have amputated their carriers, even if it proves nothing and signifies nothing in the way of DX achievement . . . *but* the goal of an SSB Century attracts all the newcomers to Sideband and has been exceeded handsomely by the experienced warriors, some of whom have now passed the 200 mark.

#### DX Shorts

MP4BBW, whose signal has been missed on 20-metre SSB, is on a globe-trotting expedition, using up three months of leave (*via* VK, ZL, VK9, VS6, W6, W5, W4, W8, W2 and then Europe) . . . HB9TL will be signing 9K4A from June 3—QTH in the neutral zone between Kuwait and Saudi Arabia; SSB and, perhaps, CW . . . PK1SX has not yet appeared, but when he does the operator will be K3HVN—all officially approved; he hopes to be there in early June, operating for more than a year, so don't panic!

YK1AT is said to be on, spasmodically, 14 mc CW . . . PK2HT is an officially licensed station in

#### LF BANDS TABLE

(Countries Worked)

Station	3.5 mc	7 mc	1.8 mc
G2DC	94	128	12
G3FPQ	85	134	19
G2YS	73	93	20
G3IGW	51	95	19
G3HZL	44	80	8
G4JA	40	57	7
G2BLA	39	70	9
GW3CBY	28	46	14
G2DHV	25	33	5
G3NNO	22	24	10
G3IDG	16	20	9
G3DRN	13	42	9
G3NFV	12	27	15
G3NPB	8	21	9
G2FQW	4	33	1
G3NYQ	4	22	11
G3OQK	4	20	7

*This Table derives from Countries Worked. Order is based on band in first column, changed monthly.*

Java . . . There should be some activity by now from *Chagos*, where VQ9HB was due to make a stand in April; call could be either VQ8HBC or VQ9HBC; 14 mc CW only (and *QRS*) . . . UA1KED is now regularly on the air (*Franz Josef Land*)—usually about 14080-14100 kc CW; good signals with that tell-tale "North Pole flutter."

MP4MAH hopes to visit AC3 in the near future . . . F2 and F9 stations have shown up in Corsica; not all Corsican stations use the FC suffix, which is *quite* unofficial . . . URED (QTH given as Kazanx) sounds fairly home-made.

VS5WS has apparently joined VS5GS in Brunei . . . the former 9M2GW is now DL2GW . . . MP4QAI came up on SSB . . . *Americans* apparently show up with *VK* calls in *Antarctica*; VKØJB seems to be one—but in compensation VKØVK sometimes signs KC4AAC, a call-sign with a familiar long-time ring.

Last news on CR10AA before going to press was that he should have shown up on May 15. Maybe he did—we were too busy writing about him to look for him! Let's forget him—it's been going on too long!

#### Top People

The May issue of *QST* shows PY2CK heading the DXCC table, with a score of 307—for both "all-in" and Phone-Only. Leading G stations in the all-in category are G4CP (299) and G3AAM (298). Later news, however, shows that W6AM has put in a claim for 309 countries confirmed (all-in) and 295C on phone. At least nineteen W's are now over the 300C mark; the only non-W's to qualify in that category are PY2CK, KV4AA, CE3AG, LU6DJX—in that order.

An interesting table in W4KVX's *DX* shows, periodically, the leaders on each band, and some of the figures are very interesting. Top Band CW is led, of course, by W1BB with 57 countries; W9PNE scores 33 and W2EQS 20. Top Band Phone is led by W8GDQ with 13. *Eighty* is handsomely topped by W8BKP—117 on CW, 52 on Phone (and he also heads the Phone and the CW

columns for 14 and 21 mc!) *Forty* is headed by W8JIN (172 on CW) and W3PHL (109 on Phone).

A column for SSB only is led by TI2HP with a score of 240,

followed by WØQVZ and W4IYC, both 216. The only other station over the 200 mark on SSB is 4X4DK (203).

#### More New Prefixes

Note the following for your loose-leaf album! The FF and FQ affair is still sorting itself out, and we have these new ones: TL8, *Central African Republic*; TN8, *Congo Republic*; TT8, *Tchad Republic*; TU2, *Ivory Coast*; TR8, *Gabon Republic*; 5T5, *Mauritania*; 5U7, *Niger Republic*.

#### "CQ" Worldwide Contest

Last month we were able to give a preview of the results of the *CQ DX Contest* (Phone Section); and we now have the figures for the CW half of the event. This time we regret to have to report that there is only *one* U.K. call in the Roll of Honour—that of G4CP, who scored third place on 28 mc with his score of 35,760.

Taking first the Single-Operator category, we note that G3FPQ led the all-band G scores with the fine figure of 410,176, followed by G3FXB (328,656) and G2DC (168,432). The winner of the all-band, single-operator section was UA9DN with a score of 1,114,695; second was 7G1A with 1,041,755; and the remainder of the Top Ten were KH6IJ, ST2AR, VQ4DT, ZD2JKO, 4 X 4 M B, UB5FJ, W4YHD and UB5WF, with scores, in that order, ranging from 900,000 down to 463,556.

The Multi-Operator (single transmitter) group was headed by UB5KAB, with LZ1KBA second and W6GHM third. The Multi-Operator (multi-transmitter) category was won by W3AOH, with W3MSK second and UB5KBB third. Highest G's in these two categories were G3OHM and G3JUL respectively—the only entries in each case!

The organisers comment that there was unusually high activity from the USSR and Japan. By way of direct comparison, there were, in the single-operator section, 81 entries from JA compared with 19 only from G! Europe was quite well represented, with 55 OK's, 51 SM's, 37 OH's, and

#### TOP BAND COUNTRIES LADDER

Station	Confirmed	Worked
	CW and Phone	
G2NJ	98	98
GM3OM	97	98
G6VC	96	97
G3APA	89	90
G2CZU	83	85
GM3AVA	80	80
G3NFV	79	79
G2DF	77	79
G3MXJ	76	80
GM2HIK	75	76
G3NNO	73	86
G3NVO	73	82
G3NPB	73	77
G3LWQ	71	80
G3OCA	71	74
G3OHX	63	64
G3OAG	61	64
G3NXQ	61	63
G3NJQ	60	61
G3OGY	59	67
G3NNF	57	61
G3LZF	51	64
G3OGI	46	55
G3IDG	42	48
GW3CBY	40	52
G4JA	30	40
Phone only		
GM2UU	80	81
GM3OM	75	79
G3FS	74	76
G3ISG	72	74
G2CZU	69	69
G3NBT	65	68
G3NMZ	55	58
G3NAA	52	60
G3NPB	52	58
G3NNF	49	51
G3NNO	39	60
G3NOW	39	42
G3OIK	27	41

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

62 from DL/DJ/DM. Band-leaders among the G's were G4CP on 28 mc, G3EYN on 21 mc, G2AJB on 14 mc and G3LET on 7 mc.

The European countries showing surprisingly small entries, apart from the U.K., were Belgium, Denmark, France and Norway. GI and GW were represented by one station each (GI3AXI and GW3JI); GC, GD and GM not at all. So once again it is obvious that there is no great enthusiasm for this contest in the U.K.—which seems surprising in view of the strong vocal group that comes out in favour of contests whenever anyone criticises them.

One final, and very interesting, summary: On the Roll of Honour, which comprises the Top Ten in the single-operator group, the Top Five in each of the multi-operator groups, and the Continental leaders for each band, we find the following: Seven W stations, 7 from the USSR (or 13 if the satellite countries are included), three from KH6, three from 4X4, and the rest spread fairly evenly over the world.

Last surprising fact: The Canadian entry was even smaller than the British! Only fourteen VE's appear in the single-operator list, and just one in the multi-operator.

#### News from Overseas

From *Malaya*: The MARTS operated a station in a Models Exhibition organised by the Rotary Club of Singapore, and VS1MRA was built up with equipment from several VS1's. Great interest was aroused and many inquiries received, but poor conditions prevented the working of much DX . . . VS1AP is a new station, the op. being G2AVP, who has also been active at various times from HZ, SU, VQ4 and VS9. Life in Malaya on the 7 mc band is a bit trying: they have APK, Pakistan, on 7008 kc; HMF21, Korea, on 7009; BZP57, Chinese Teletype, on 7025; HLA86, Korea, on 7039; and Chinese broadcast stations on 7019, 7054, 7060 and 7081 kc. If it weren't for all this, *Forty* would probably be their best band—for



A well-known member of the Radio Amateur Invalid and Bedfast Club is Peter Odell, G3MUM, Ryedale, 20 St. John's Grove, Redcar, Yorkshire. He is a spastic and his mother having helped him get through the R.A.E. and the Morse test, he has had the willing help of many amateurs in getting his station modified for operation in the manner shown here — with his toes. G3MUM is active on all bands and has had more than 7,000 QSO's with some 2,000 different stations, and is regularly active.

the next few years, at any rate.

From *Canada*: A group of VE3's have formed the Ontario DX Association, with VE3UC president, VE3BWY vice-president, and VE3BQP secretary. They will be holding regular fortnightly meetings, and one of their aims and objects is to popularise the 14100-14140 kc section of the 14 mc band for DX Sideband stations — many of the VE's already operate there, having been pretty well squeezed out of the 14300-14350 kc section by the sheer weight of numbers of W's. So the cry now is "See you on the lower 40," and the "top 50" is being forsaken.

From *Australia*: VK6AJ (Perth) writes that he was driven by the lack of anything interesting on 14 mc to try 21 mc phone — and walked straight into PK2SPT, who said QTH was Java, but as there was no QSL bureau, he would send a card direct; he also said that his full QTH was known to 9M2DQ, so it may be that he is genuine. Other DX for VK6AJ was KW6DF, CR6LY and "5V4GT," who didn't immediately register for what he was — another phoney.

From *Japan*: The second All-Asian DX Contest is fixed for the thirty hours between August 26, 1000 GMT, and August 27, 1600

GMT. Entrants call "CQ AA," CW only; categories are Single-Band, single operator; and Multi-Band, single operator. OM's sign five figures — RST report and their age; YL's use 00 (zero zero) for the latter! For non-Asian stations, each contact with an Asian station counts one point, with a multiplier of one for each Asian country on each band. Logs, not later than September 30, to JARL, Box 377, Tokio Central. Last year's leading G's were G4CP and G3AAE, both with over 1000 points (the outright winner, multi-band, was 4X4JU with 55,000!)

#### Contests Galore

Just to give an advance clue to the distribution of week-ends this autumn, note the following:

August 26-27	JARL DX Contest
September 2-3	LABRE, CW
September 9-10	LABRE, Phone
	Peruano, CW
September 16-17	SSBARA, WAS
	Peruano, Phone
September 23-24	SAC, CW
	SAC, Phone
Sept. 30-Oct. 1	MARC, VE/JW
October 7-8	VK/ZL Phone
October 14-15	VK/ZL CW
October 21-22	Possibly ARRL CD
October 28-29	Possibly ARRL CD
November 11-13	ARRL SS
November 18-19	ARRL SS
November 25-26	CQ Worldwide, CW
December 2-3	OK DX CW

Some of these are provisional (and we may not even have them

all), but the list is shown at this early date as a reply to the occasional correspondent who wants not only all the dates but all the rules published *in full*! They will now realise why the latter is impossible!

### Miscellany

G3APA (Coventry) suggests that the NATO phonetic alphabet "has a distinct political flavour" and that amateurs should continue to use the Able-Baker-Charlie affair. He also has a rude word to say about "those nits who, having worked something rare, keep others out by starting a local QSO on the same frequency." Finally, he agrees with the recent criticisms of the "MC" procedure, and goes further, suggesting that a deliberate sked for a wanted QSL is a bad thing.

On the MC theme, GM3BCL (Aberdeen) feels pretty strongly, saying that there is a lot to be said for the system *if* it is done properly. For instance, UA3CR's handling of the queues for UM8KAA, on 14 mc SSB, was admirable and enabled many stations to work a new country. But in other cases the system has often produced a shambles because of the inefficient operating of the MC. '3BCL recently heard a self-appointed European MC ramble on for 45 minutes with his rare DX friend, discussing the unmannerly tactics of the horde. If there *has* to be an MC, his efforts should be directed to allowing the DX station to get as many QSO's as possible . . . let him get on with this job and cut out time-wasting chit-chat.

Another pet hate of GM3BCL's is "this final-final business." When the DX station says he is off and clear he *means* that (or should!), and not that he is waiting for another basinful of 73 and things. It's worse on phone than CW, and the advice is: "after the DX station's final, a quick 'Roger' is all that is required, and then—get off the frequency!"

Condolences to G3LKJ (Torquay), horizontally polarized in a hospital bed, where he has his log books as some slight consolation, and thus is able to write with latest news. He worked some

surprisingly good DX on *Ten*, which appears in the lists. On *Fifteen*, despite having lost the reflector of his Quad, he was still getting excellent DX reports. This should encourage many who would have no trouble in putting up a driven element only. Back to *Ten*—'3LKJ reports, as ever, a sad lack of CW; very often a complete absence of it.

G2VV (Sunbury) is a fellow-sufferer with a new QTH, where he now has earthing problems and no space for an outside aerial; so he has a 68-ft. wire in the roof, bent into the shape of a letter Z! But it works pretty well—even on Top Band.

The Ex-G Net in the USA continues to flourish, with more than 50 members now enrolled. W8YHO (Akron, Ohio) is especially keen to make contact with U.S. or Canadian amateurs who originally hailed from G-land, and asks them to get in touch (1368 Roslyn Avenue, Akron 20, Ohio). The Ex-G Radio Club now publishes a monthly bulletin, No. 4 of which we acknowledge, with thanks. WA6GLF, an ex-G, has been touring this country and making many personal contacts.

### Around the DX Bands

We can still report "all bands open," with the reservation that *Ten* is "only just and not very often." All 'chasers report conditions well down on last month, but there is no despondency evident. Short-skip is beginning to show up on *Ten* and *Fifteen*, but seems to be less of a nuisance on *Twenty*—at certain times of day.

*Forty* and *Eighty* still give up some DX to those who know the technique, and Top Band is—well, just Top Band. Almost a hobby in itself; and a surprising number of people work One-Sixty *and no other band*, being thoroughly satisfied with the enjoyment they get out of it.

General comments, apart from the actual DX worked, which appears in the usual tabulated form, are as interesting as ever. GW3AHN (Cardiff) says there is no shortage of "bread and butter DX," even if the rare ones are

almost non-existent. He worked TT8AD and TU2AH on 21 mc AM phone, using his "pidgin French"; TL8AB and 8AC, also 5U7AH and 7AC are to be found by the same means.

New stunt heard by G3BHI (Norwich): a W station, "Air Mobile" off the Azores, running phone-patch on SSB for the crew members to talk "back home"!

G2DC (Ringwood) thinks he will now have to fall into the usual dull routine of summer working, although he admits that 14 mc has been, and will continue to be, pretty interesting. But he has some black words for the RTTY commercial that wipes out everything between 14010 and 14015 kc. Regarding 21 mc, he shares our opinion that it is pretty wide open on many occasions: just plain lack of activity makes it sound dead. (Sometimes you can hear only two or three stations on the band, but they are all good DX.)

### Top Band Topics

A cynical acquaintance recently described One-Sixty as "the last resort of the TVI sufferer," and, as it happens, two of our regular reporters fall right in that category. G3OFS (Aldershot) has an agreement with a neighbour which keeps him off Twenty between 1830 and 2200, and as a result is sampling the joys of Top Band. We expect to find him on the Ladder by next month . . . G6VC (Northfleet) got his long-awaited contact with Perth (GM3NXA) and goes up to a score of 97 as a result thereof.

G3FS (Sidcup) has managed to work a Fife station (his second) who QSL's, so he is up to 74 on phone, thanks to GM3OBC . . . G3NVO (Middlesbrough) was delighted to work GC3LXQ/A in Alderney—and to get his card; he himself hopes to be going portable in Roxburgh, together with G3OHX, 3NVN and 3NVV. This will probably take place around July 21. An interesting contact was DL2BL (on phone), who was using a 600-ft. wire and causing quite a stir; the operator was GI3NKO.

G3NNO (Leeds), too, raised GC3LXQ/A, and also worked the

AM PHONE DX WORKED

- 28 mc Band  
**G3LJK:** CR7ES, CX4CS, KP4A00, VP6HR, VQ4ASC, VS9APH, ZB1FA, ZE2JA, 5A3TY.  
**G3NOF:** CX2AZ, EL8D, LU, PY, VQ2, ZE, ZS, ZS3B, ZS7L, 6W8CK.  
 21 mc Band  
**G3NOF:** CE3SO, CR4AX, EA8, KR6ID, MP4BDC, OD5CS, 5CU, SV0WT, TU2AH, VP3EFG, 3MC, 3YG, VS1DN, IKX, VS5GS, VS9APH, 5N2AMS/J, 9K2AD, 9M2DW, 2GV, 2HC.  
**G3BHJ:** EPIAD, FA2TW, KP4AOD, OD5CO, OX3DL, SV0WO, 0WT, TT8AD, VP6HR, 6ZX, VP9G, VS9APH, VS9MB, 3V8CA, 6W8CU, 9G1CC.  
**G3NWT:** PK2SPT, 6W8CU, OX3DL, VQ5IB, 5N2RJC, VS5GS, 5WS, 9M2GV, 2HC, FR7ZD, VU2XG, KG6AIY, VP3RW, KR6ID, EPIAD, OA4GR, AP2MR, YV8AS, VS9MB, VK9PJ, ZS8O.  
**GW3AHN:** TT8AD, TU2AH.

SSB DX WORKED

- 14 mc Band  
**G3NOF:** LA1LGP, UJ8AG, VK2ALR, VP2AB, VQ4RF, ZD1ES, 3V8CA, 4X4LC, 9K2AM.  
**G3NWT:** OH0RJ, HV1CN, TF2WFF, UJ8AG, VP2AB, OA4BR, KL7DKG, DU7SV.  
**GM3JDR:** CR6CA, DU7SV, EL2G, EP2BB, HC1KA, HV1CN, KG1's, KG6AJB, KL7's, KR6KV, LX1SI, MP4BCC, 4QAI, OA4J, OD5CL, 5CT, 5CV, OX3FN, PJ2AA, PZ1AP, IAX, IAY, TG9AD, UJ8AG, VU2RX, VK's, VQ2-3-4-5, YN1CK, ZD1ES, ZD3P, ZS3UP, ZS7P, 3A2CM, 3V8CA, 5A5TA, 6O1DRS, 6W8BP, 9K2AM.  
**GW3AHN:** KH6DEL, 6GF, PZ1AX, UJ8AG, VK, ZL.  
 21 mc Band  
**GW3AHN:** EL6E, FQ8HW, KR6DO, SV1AE, VQ2AB, VS9APH, ZD3P, 6O1DRS, 9G1CC.

CW DX WORKED

- 14 mc Band  
**G2DC:** DU7SV, HC1IE, JA0MK, KG6AIG, MP4MAH, TT8AG, T N 8 A U, U A I K E D, VP5BH/MM, VS6EC, 6EP, 6DH, VK7ZZ.  
**GW3AHN:** 5U7AC.  
**G2VY:** YV4BE, 5ACL, KL7AL, W9KLD/KL7, URED, VO1BT, VO2DP.  
**G3OFS:** U M 8 K A A, K V 4 A A, H B 1 D X / F L, V S 9 A C, HK3AH, HH2JV, UL7LE, LA1NG/P, UA0KAE, OY8RJ, VS6EC, KG1FD, VS1FH.  
**G6VC:** VQ8BC.  
 21 mc Band  
**G2VY:** 9M2VS, VS1FW, ZS6BBK.  
**GW3AHN:** FQ8HK, 8HW, JA's, PY7LJ, TN8AG, 8AT, UI8AG, UJ8KAA, UL7GL, VR1B, VS1FZ, VS9MB, VU2XG, ZD3P, ZS3D, 6W8BF, 7G1A, 9M2MA, 9U5DS.

- G2DC:** CE4EC, IS1FIC, HH7NO, HK7AN, HC1IU, KZ3MD, OA4RM, TN8AG, TI2WA, VS9MB, VS9AAC.  
 28 mc Band  
**G3LJK:** LU5DFF, PZ1BX, SV0WZ, 9Q5EH, ZS.

same DL; and he heard VE1ZZ on April 23 at 0327 GMT, 459/559 . . . SWL Peter Day (Sheffield) also logged VE1ZZ the same morning (peaking at 589 with him) and working a G3. SWL Day will, with luck, not be an SWL much longer, having taken the R.A.E. in May. With a certain amount of faith he has started building a rig—Top Band, of course!

Grafton Radio Society's Top Band Contest went off well, with a bigger entry than before. In the members' section the first three were G3KRH (106), G3RX (81) and G3KQZ (70); in the open section the leaders were G3MXJ (133), G3NFV (127) and G3ERN (123). The event necessitated working both CW and Phone for any chance of a winning score. A total of 262 call-signs appeared in the logs, compared with 187 last year.

Fair Comment

W6AM has suggested to the ARRL that before a place is described as a "country" it should be established that it has *people* in it! The present qualifications of separate government, physical separation of 250 miles (if an island) and so on could stand, but at least the population should consist of more than snakes or seagulls, we think.

GW3AHN, on the subject of SSB, says that the recent standard of operating in this mode has left much to be desired. He thinks the "breaker" is going to be the curse of Sideband operating (and we agree). Nothing is worse than having a QSO perpetually interrupted by these types—unless it is the fact that when the DX station clearly says "GW3AHN, go ahead," at least half a dozen stations whose calls bear no resemblance will start up again on the frequency. This does nothing but delay what could be a tidy series of snappy contacts.

G3NWT (Sandiacre) comments

on the use of "Go ahead" instead of a call-sign, which causes one to spend twice as long listening to a QSO on SSB as one would on AM. (SSB is the slickest mode, they say!) But he thinks that when really rare DX uses "Go ahead" as a defence against a pile-up of "breakers," he may be justified. One whiff of the call-sign and there is a bird-chorus of "break-break-break" which means nothing, gets nowhere, and drives the contacting stations up the wall.

The answer is, of course, for *everyone* to get tough with breakers; we have already seen encouraging signs of this, with two stations in QSO saying: "Think there's a breaker there—shall we let him in or not?" For goodness' sake, let us not get into the habit of feeling that it is discourteous to ignore a breaker, if one is in the middle of a two-way and wants to keep it so.

More Details, Please

Readers are still rather reticent about the gear and the aerials they are using; we would like to know more about them, and so would other readers.

You will doubtless notice, this month, a terrific list of 14 mc SSB DX credited to GM3JDR (Sutherland). All stations in his list were worked between April 17 and May 10—and the gear used was a home-made transmitter with a TT21 final; an East-West dipole and a ground-plane; and an HRO. We mention this case in particular because lots of people, on spotting a good list of DX, murmur "Ah, he's got the complete Collins S-line" or something similar. Congrats to GM3JDR, who has accounted for 112 countries in 36 Zones during eight weeks of SSB operation—and he says that he works a 50-hour week for his living, at that.

Eighty and Forty have hardly got a mention this month, but two SWL's come to the rescue. Peter Day logged ZS6AJH on Eighty SSB (0420 GMT on 3690) and VP5AR on CW (0550). Neville Bethune (London, N.14) stuck to CW and heard HCISM (2315), KV4CI (2130) and VP9ME (0615) on Eighty; SV0WF, VQ4HT, HZ1AB, CE1AD and YN1JB on

Forty (times between 2140 and 0130).

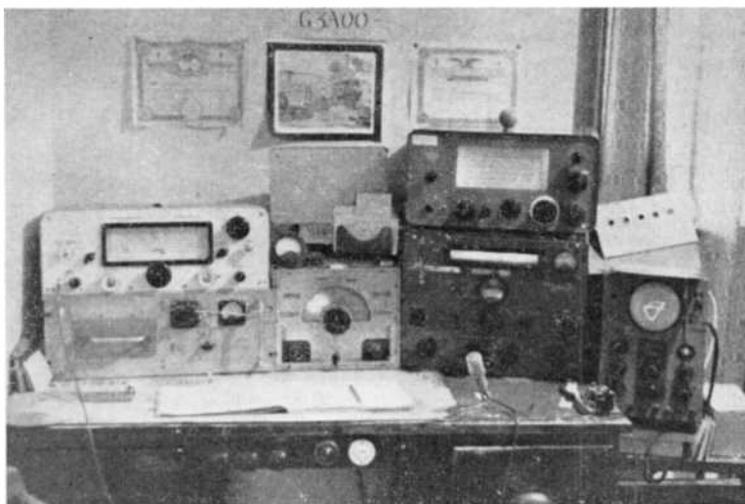
### Variety Department

Various forms of humour are heard on the air all the time, some of which few of us appreciate. The Thing that swoops around Eighty, jamming phone nets, doubtless has a good laugh over his own pranks, but no one else seems to have found it funny . . . they are waiting until the inevitable swoop by the GPO for the last laugh which is really worth while.

Some "sick humour" finds its way across from the States now

### P & Z TABLE

STATION	PREFIXES WORKED	ZONES WORKED
	<i>CW Only</i>	
G2DC	445	40
G13NPP	394	40
G3WP	369	36
G3HZL	366	40
G3ABG	336	40
G2BLA	325	39
GW3CBY	270	23
G3LZF	238	34
G3IDG	232	28
G2BP	220	30
VK6AJ	199	36
ZC4CT	194	28
GW3MLU	190	31
G3OQK	105	32
	<i>Phone Only</i>	
G3DO	630	40
MP4BBW	439	40
G3GHE	386	39
GB2SM	370	37
G3LKJ	347	38
G3NWT	337	39
G3MCN	324	38
G3BHJ	320	37
G3NFV	292	37
G3ABG	261	32
G3HZL	138	26
GW3MLU	122	22
G2BLA	110	21
G2FQW	99	6
G3WP	80	25



G3AOO, operated by D. J. Birch at 108 Nasmyth Street, Denton, Manchester, is a well-known SSB station. The all-band SSB exciter (extreme left) uses a combination of crystal and mechanical filter, and its 6146 o/p stage gives output on all bands 10-160m., with 250v. HT; it drives a linear PA taking an 813 in Class-AB1. The receiver for SSB is a Minimitter MR44 which has been "substantially modified" to a crystal controlled front end for all bands and tunable IF, with a CC BFO and an IF filter of two half-lattice crystal sections. The CR-100 is a stand-by receiver for general monitoring, sideband checking being by oscilloscope exclusively. G3AOO has been 100% Sideband ever since 1954.

and then; we recently overheard a QSO between a W and a G who had last worked fifteen years previously. The W said "Let's not wait fifteen years for the next . . . I shan't want them to dig me up!"

G3NWT is always good for an anecdote . . . he seems to have an uncanny attraction for the funny ones; he tells us that KG6AIY implanted his Quad in a young coconut tree, not expecting to stay long in Guam; but he likes the Island so much that he has signed on for another two years and now has to stop in the middle of a QSO, sometimes, to splice in an extra length of coax . . . Also, that VS5GS mentioned the uncanny feeling when you see the home end of your feeder snaking out through the hole in the shack wall . . . you don't always hear a typhoon when wearing phones.

Finally (still with G3NWT), another quote from a W: "Our phone-patch system confers immense social benefit and is known to be a major source of goodwill . . . at least, that's what it says here in the handbook." Just reflect on that one, next time you find a sizeable chunk of the

band occupied by non-stop natter.

### Personal Column

G6VC, operated by Vic Curling of Northfleet, Kent, works on most of the bands with two transmitters, a Vanguard and a push-pull 807 job, together with an HRO (bandspread coils for all bands) and DB-20 preselector. The aerials are a two-element rotary about 40 feet up, remote controlled, and dipoles for 3.5, 14 and 7 mc, all coax fed. Refinements are relay muting of the receiver, and "touch key to transmit." As Vic is on shift work, he suits the band to the time available. Main interests are finding new ones and "having a dabble" in any contest that's going.

G13NPP (Dungannon) doesn't send very much detail, but is of more than usual interest on account of having two rhombics! In addition he has a home-built Quad, a ground-plane and dipoles. With 100 watts to this aerial farm he has worked (in fifteen months) 232 countries, 40 Zones, 50 States—rather more than some old-timers have done after many years of chasing.

And so to the final signing-off after quite an interesting month,

despite the steady slipping of the ionosphere. Acknowledgments and thanks, as ever, to many sources of information, particularly the West Gulf DX Club's *Bulletins*, W4KVX's *DX*, the *Western Radio Amateur* and our own regular correspondents who so faithfully supply gossip both over the air and through the month's mail.

Next month's deadline is first post on Friday, June 16, which should give you plenty of time to sort out those logs and send along all the gen. Address everything to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Don't forget the station descriptions and the aerial details . . . and, until then, Good Hunting, 73 and—BCNU.



When the Hong-Kong Amateur Radio Transmitting Society celebrated their 30th anniversary recently, one of the presentations was that of the President's Trophy to its first winners, GR9AH and VS6AE jointly. The trophy itself, given by VS6DS, is particularly handsome—it consists of a gold-plated Post Office type Morse key mounted on a polished hardwood base, and is to be awarded annually. Chief guests at this H-K.A.R.T.S. dinner were the acting P.M.G. for Hong-Kong, and the senior wireless inspector, H-K.P.O.

#### SWL'S TO QSL — THE HINWICK HOME

We all know that SWL reports are not always wanted and are occasionally even unwelcome—but if you should get a report-card from Hinwick Hall School, Wellingborough, Northants., slip them a QSL, as this is a home run by The Shaftesbury Society for crippled boys up to the age of 16. After that, they go on to another Home—if they are lucky, to one of those run by Gp/Capt. Leonard Cheshire, V.C., D.S.O., D.F.C., where Amateur Radio is understood and encouraged. We are glad to publish these details at the request of G3MLP (*QTHR*) who has undertaken the responsibility—which he describes as "a wonderful pleasure," incidentally—of introducing the Hinwick Hall boys to Amateur Radio, his group there consisting of 10 keen members.

#### "THE OTHER MAN'S STATION"

This has been a regular feature of *SHORT WAVE MAGAZINE* ever since its beginning, and some 200 radio amateur stations have now been covered in the series. These station descriptions are of interest not only to those who know or have worked the station depicted, but also to the general reader and, more particularly, to those who are looking forward eagerly to building up an amateur station of their own—it is through "The Other Man's Station" in the *Magazine* that many an idea has been propagated and much inspiration derived. To make the story, all that we require is a good, clear photograph and comprehensive notes (which can be "in own words") covering the station, with such personal details as the writer cares to give. All descriptions used are paid for at article rate on publication.

#### RUSSIAN SPACE FREQUENCIES

Arising from the note on p.122 of the May issue of *SHORT WAVE MAGAZINE* referring to Yuri Gagarin, it now transpires that Budapest Radio, in an evening broadcast on April 18, gave the following as the frequencies used by the Russians: 9·019 mc, 20·006 mc and 143·625 mc. These might well be the frequencies to watch on any future occasion. We are obliged to SWL M. P. Moulton, of Okehampton, Devon, and several other readers, for the basis of this comment—SWL Moulton reports hearing, from Budapest Radio, a recording made by some of the local HA's who heard the space-vehicle on its orbit.

#### THE "NEW QTH" PAGE

In their own interests, and particularly if they are active operators, readers who achieve an amateur transmitting licence should notify us immediately so that the callsign/address can appear in "New QTH's" and also in the *Radio Amateur Call Book*, the world directory, for which we are U.K. agents. The same also applies, of course, where changes of address are involved.

#### WE ALWAYS WANT . . .

Good photographs of Amateur Radio interest, with station descriptions; also articles suitable for publication within the scope of *SHORT WAVE MAGAZINE*, which is devoted entirely to Amateur Radio. This covers such a wide field that the scope for intelligent authors who are active AT station operators is virtually unlimited! And we pay money for it, too. . . .

*Short Wave Magazine is an Independent Publication with a World-Wide Circulation and has more than 80% of licensed U.K. amateurs as Regular Readers*

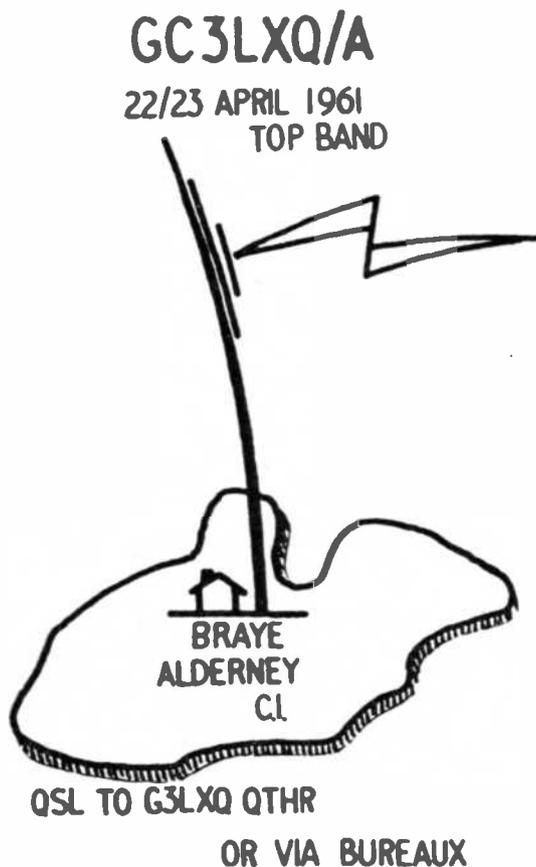
## WITH GC3LXQ/A ON ALDERNEY, C.I.

TOP BAND EXPEDITION  
APRIL 22-23, 1961

D. L. GALLOP (G3LXQ)

OWING to unsettled weather conditions during the previous week, it was not known for certain until the last minute whether a Top Band expedition to the Channel Island of Alderney would be possible. However, at about 2000 GMT on Saturday, 22 April, the first "CQ de GC3LXQ/A" went out. The transmitter—a conventional VFO-BA-PA arrangement—ran 8 watts input, with a loaded vertical aerial for radiation. Results were encouraging from the start, because the first report was RST-589 from G3MCY at Topcliffe in Yorkshire.

By the time GM3COV was netted, it was evident that the grapevine had done its job because the



The home-produced QSL card circulated by G3LXQ to the 22 stations worked from GC3LXQ/A during a short visit to Alderney in the Channel Islands in April. The DX included HB9, OK1 and VE1, with an SWL report from Sweden—GC3LXQ/A was certainly getting out all right.

frequency was alive with CW stations; only those signals better than about S6 could be separated from the mass by the Command receiver. A little later, GC3LPV (who is resident on Alderney) formally welcomed GC3LXQ/A to the Island, and a personal QSO was arranged for the following morning.

### EDX Worked

Soon after midnight a 589 report was again obtained from OK1ADX; four hours later, HB9QA was brought in. At 0347 GMT on the Sunday, 23rd, VE1ZZ was heard at about 459 on 1825 kc calling "CQ DX." Crosspond working procedure had not been swotted up previously so it was decided to await a call from another G station and then follow suit; nothing happened from this side until twenty minutes later when G3KFT popped up. A further twenty minutes and G3NEO was on the frequency, by which time VE1ZZ's signal was reaching S6 on peaks. When the second QSO was completed, a long call from an unfamiliar GC callsign arrangement brought a QRZ from the VE1; a second call clinched the deal and contact was made, a report of RST-559 being received.

After a CQ call had been made in vain further up the band, it was decided to snatch a short rest before returning to the mainland. The first post on Monday morning brought in the first QSL card; it had not been anticipated that any real DX would be worked, so it was originally intended simply to over-stamp G3LXQ cards where necessary. This plan was changed and a little later, a special QSL card had been designed for the occasion. An "Indian-ink on Bristol board" copy was made and a short run produced photographically—see reproduction herewith.

During the nine hours of operation on 160 metres, signing GC3LXQ/A from Alderney, six prefixes from two continents were worked and the success of the short stay had exceeded all hopes. At the farewell ceremony, GC3LPV expressed his surprise at the results and hoped a further invasion could be arranged for the not-too-distant future.

### R.E.C.M.F. PROGRESS

It is reported that the membership of the Radio and Electronic Component Manufacturers' Federation—of which this year's president is Mr. A. F. Bulgin, of the well-known firm bearing his name—are now producing at the rate of 7 million parts a day, to a total value for 1960 of £130 million; the count does not include valves, transistors or CR tubes. Exports have increased by 36%, to a total value of just over £13 million, with the U.S.A. the most important buyer. During 1960, China bought test-gear, manufactured by R.E.C.M.F. members, to the tune of £186,000. The Federation, which holds its exhibition in Olympia from May 30 to June 2, has 218 members, and sponsors no less than 24 technical panels dealing with standards and the components and materials produced by member-firms.

*Power On — Hands Off*

# SIDEBAND FROM THE START

## Part IV

### LINEAR AMPLIFIERS — CRYSTAL FREQUENCIES — OPERATING NOTES

By "VOX"

*Previous articles in this series appeared in the December, February and April issues, covering Sideband transmitter design and circuitry up to the linear PA stage, dealt with here.—Editor.*

IT has already been made clear that only linear amplification of an SSB signal can be tolerated or even considered. Rather strangely, if we go back many years in the history of Amateur Radio, we find a great preponderance of linear amplifiers in the days when only amplitude modulation was even thought of by amateurs, and only Class-A was good enough! Massive all-triode amplifiers and modulators were in universal use before the ubiquitous 6L6 and 807 were even dreamed of.

Even today the extreme purist can only think in terms of Class-A amplification when the word "linear" reaches his ears, but of course it is common knowledge that linear amplifiers in Class-AB1, AB2 and even Class-B can be effectively designed and used. At this stage it is not proposed to dilate on the highly controversial "Linear Class-C" circuits—but they will be mentioned later.

The pedants who proclaim that there can be "no such thing as Linear Class-B" may be interested in this quotation from a respected text book of *ten years* ago: "Class-B amplifiers used at radio frequencies are known as linear amplifiers because they are adjusted to operate in such a way that the output is proportional to the square of the RF exciting voltage. This permits amplification of a modulated RF signal without distortion." A correspondent who wrote to say that "Linear Class-B" was pure contradiction in terms might care to note.

Receivers and audio equipment for low levels make great use of Class-A amplification, but while its linearity is undoubtedly good, its efficiency is very low; theoretically, the maximum is 50 per cent, but in practice figures of more like 25 to 35 per cent are obtained. At high power levels this is hardly to be tolerated, making as it does for unwieldy transformers and power supplies.

Class-B audio amplifiers have a theoretical limit of 78.5 per cent efficiency and can be made to run very near that figure. Valves designed for audio Class-B work—provided that they are capable of operation at RF—will run at the same inputs and the same efficiency at radio frequencies. The circuitry, basically, will remain the same except for the substitution of tuned circuits for audio transformers; and it is in the design of these tuned circuits that the crux of the matter lies.

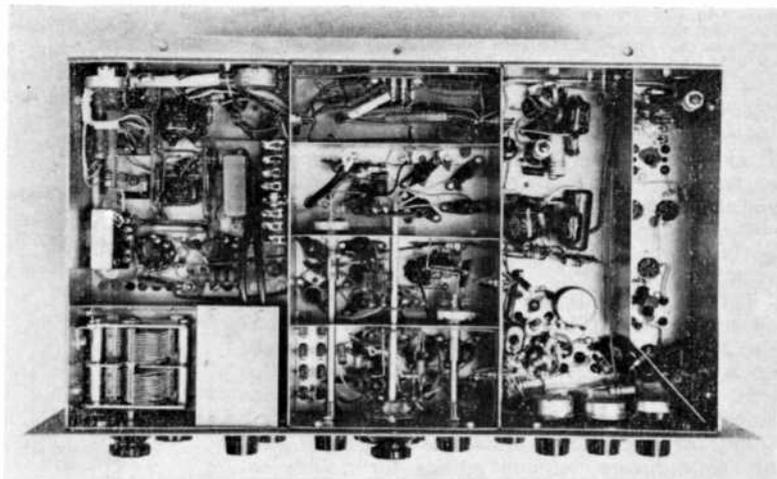
#### Watch These Points

Summing up many different articles on Linear Amplifiers, all from experienced and reliable sources, the following points are found to be quite unanimously agreed upon:—

- (a) Power supplies for grid bias and screen voltages *must* be "stiff"—i.e., exceedingly well regulated,
- (b) The anode tank circuit must have a loaded Q of at least 12, which implies the use of more C and less L than in the usual Class-C stage,
- (c) The load presented by the grid circuit of the Linear PA to the driver stage must be constant,
- (d) Obviously, all traces of regeneration and parasitic instability must be absent from the stage.
- (e) Overloading in any form must be avoided like the plague.

Since the basic circuitry of a linear amplifier could hardly be more simple, the problems left to the designer settle themselves into (1) correct choice of valve for power output required; (2) use of correct voltages throughout, and (3) correct design of grid and anode tuned circuits.

[over]



Under-chassis view of the K.W. Electronics "Viceroy" Sideband Transmitter, showing the careful screening called for by the layout. The central switch-line is the exciter band-change control, and alongside (right) is the mixer anode tuning condenser, that on the other side (condenser in third compartment from front) being the driver anode tuning. The PA sub-chassis section is at upper left, with the output tuning condenser at lower left; alongside it, in the screened box, is the mixer input control. The "Viceroy" is well wired and neatly assembled.

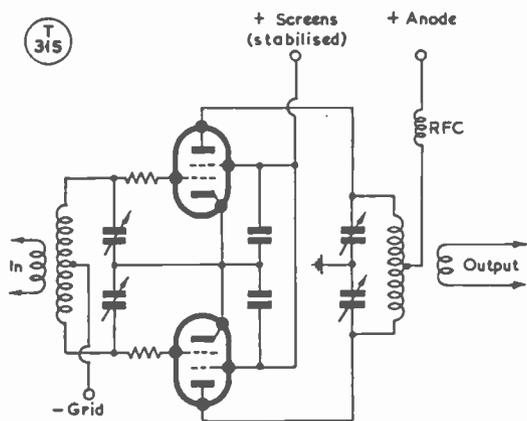


Fig. 1(a)

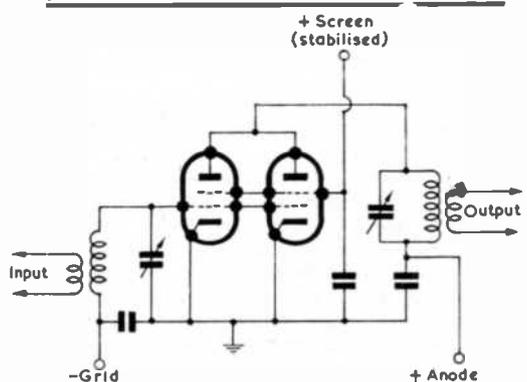


Fig. 1(b)

Fig. 1. (A) The normal audio Class-B circuit is adapted for RF use by the mere substitution of tuned circuits for the transformers. Parasitic stoppers are generally desirable in both grid and plate leads. (B) Push-pull is not necessary for RF working, and two tetrodes in parallel are often used.

Circuitry can be dismissed very quickly. Fig. 1 (A) shows the conventional push-pull arrangement of two tetrodes; Fig. 1 (B) the same two tetrodes in parallel. (Perhaps it should be mentioned here that push-pull is not necessary at RF for Class-B operation because of the "fly-wheel" effect of the tank circuit.)

The stage may also be designed in the grounded-grid configuration (Fig. 2) or as a cathode follower (Fig. 3); of these two arrangements, the grounded-grid is more popular, but the cathode follower is a useful arrangement in certain circumstances, particularly for small low-powered gear.

Anti-parasitic resistors should be used in all grid and anode circuits, without waiting for trouble to show up, since parasitic instability can be much more difficult to detect in SSB work than in cases where you have a carrier wave to deal with. (Parasitics which are merely transient give rise to many of the undesirable effects encountered in SSB operation, and the man at the transmitting end is too often

blissfully unaware of them—not so the sufferer at the receiving end!)

Returning to the essential features of Linear Amplifier design, and dealing with them one by one, it is safe to say that if any single point is neglected, the signal will suffer in quality. Obviously if the value of grid bias is wrong for the chosen valve or valves, operation on the non-linear portion of the curve will make it a "non-linear" amplifier, whatever mode it is operating in.

It will generally be found that the bias can be correctly set by arranging that the anode dissipation, under no-signal conditions, is between 33 and 50 per cent of the maximum rating. Then the "stiffness" of the supply must be checked—and obviously if there are to be no variations in grid voltage, there must be no stray resistances in the grid circuit, including the internal resistance of the power-pack or battery. (The easy way out of this one is to use zero-bias valves.)

If the stage never draws any grid current, obviously the loading of the preceding driver stage will never vary. But this condition will hold good only when Class-A or Class-AB1 operation is involved. Hence the current practice, when using Class-AB2 or Class-B, of "swamping" the driver stage's anode circuit with a parallel resistor. This seems a basically bad thing to do, but since it is usually a low-powered stage there is no difficulty in producing an excess of drive and "swamping" it down to the necessary amount. Over-driving of the linear stage can cause non-linearity, of course, so, in such cases, trouble may be said to originate in the exciter rather than in the final.

The point in insisting on a high Q for the anode circuit of the linear stage is that it is necessary to provide good harmonic attenuation; but here a compromise must be reached, so that anode circuit efficiency does not suffer. Hence the generally accepted value—a Q of about 12. Here, again, another point arises—if the stage is loaded too lightly (aerial under-coupled) saturation will occur, which means flattening of peaks and the dire effects resulting therefrom. Too heavy a degree of aerial loading will result in a falling-off of output.

### Distortion Products

There is one important point that the newcomer to SSB will probably not appreciate: That the

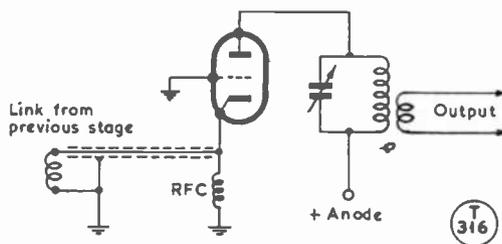


Fig. 2. Basic arrangement of a tetrode in the grounded-grid mode, fed at low impedance by link coupling from the previous stage. This in itself contributes towards stability.

distortion arising from non-linearity, whatever the cause, will show up in a most undesirable form. Whereas a slight amount of distortion on an AM transmission may only result in slightly unfaithful reproduction of the audio input, distortion in an SSB linear will result in the generation of spurious frequencies which will cause "splatter" extending far outside the channel which should normally be occupied by the signal. Remember that the band of speech frequencies being transmitted is highly complex and that only linear amplification (and that really means linear) will reproduce these frequencies without all sorts of sum and difference combinations.

Take any two frequencies in a side-band (and this means radio frequencies) and call them  $x$  and  $y$ . With truly linear amplification these two frequencies and no others will appear in the output; with any deviation from that condition, although the inherent selectivity of the tank circuit will filter out such obvious intruders as  $x + y$  and  $x - y$ , there will be many other spurious frequencies generated which lie very close to the original  $x$  and  $y$ . These are the so-called "odd order" products, including  $2x - y$ ,  $2y - x$ ;  $3x - 2y$ ,  $3y - 2x$  . . . and so on. A little arithmetic will show that these spurious emanations are spaced out in frequency by the same amount as the frequency difference between the original tones. When a linear stage is overloaded these spurious effects can extend far on either side of the desired channel and will affect the supposedly suppressed sideband to practically the same extent as the transmitted one.

**Onus on Operators**

Basically, then, the problem could hardly be more simple. It is almost ridiculous to state it in these words, but it boils down to this: The only real trouble in a linear amplifier can be non-linearity. Whether caused by instability, over-driving, insufficient anode loading, poor regulation of grid, screen or anode voltages, it will always result in a poor quality signal and consequent annoyance to other users of the band. (Bear in mind that in the world of SSB "poor quality" means something much more serious than slightly unfaithful reproduction . . . it will invariably involve spurious radiations of some kind or other.)

The various text-books available all publish many excellent designs for linears which will avoid all the pitfalls mentioned above; having built one of these proven designs, the onus remains on the operator. And, in passing, it should be mentioned once more (every article ever written about linears must have stressed this) that a milliammeter will *not* give a worth-while indication of the amplitude of speech peaks. Nothing but an oscilloscope will do that; but intelligent use of a meter will often prevent an operator from making a nuisance of himself.

A commonly-used rule is this: If the stage is set up and loaded, under CW conditions, so that the anode current is 200 mA, it is advisable to make sure that speech peaks do not cause the meter to rise above 120-150 mA. But this is a very loose rule, since everything depends upon the degree of damping

TABLE I

FT-241 CHANNEL/FREQUENCY RELATIONSHIP

Channel Number	Fundamental Frequency	Channel Number	Fundamental Frequency
320	444.4 kc	40	444.4 kc
321	445.8	41	446.3
322	447.2	42	448.1
323	448.6	43	450.0
324	450.0	44	451.9
325	451.4	45	453.7
326	452.8	46	455.6
327	454.2	47	457.4
328	455.6		

of the meter. To produce the reading under CW conditions, a sine-wave audio tone may be used, and habitual "whistlers" are asked to note that the average human whistle is about as far removed from a sine-wave as is chalk from cheese.

Finally, since it is impossible to ignore the challenge behind the conception of a "Class-C Linear" (purists please walk out!), the circuit of the well-known G2MA Linear is reproduced herewith. Although this and similar circuits are in use—very successfully—all over the world, the general reaction still seems to be that of the old lady who saw her first giraffe and said "I don't believe it!"

This amplifier uses a tetrode such as an 813 in the grounded-cathode mode, together with a "clamp" type control valve in its screen circuit, and rectifies part of the driving signal to control the clamp valve.

Referring to Fig. 4 the following is the mode of operation: When the SSB drive is applied to the grid of V1, the voltage developed is applied, through the condenser C4, to the cathode of the diode V2. The diode rectifies this voltage and passes it through an RF filter (C6, RFC3, C7) to the grid of the control valve V3—as negative-going DC. This voltage is fluctuating at audio frequency in a negative direction and therefore varies the DC flow through V3 and R1, which is the screen dropping resistor for the RF amplifier, V1. Reduction in current flow through R1 reduces the voltage drop across it and increases the positive voltage at the anode of V3 and therefore the screen of V1.

Under no-drive conditions this screen voltage is held to a very low figure and the anode current of

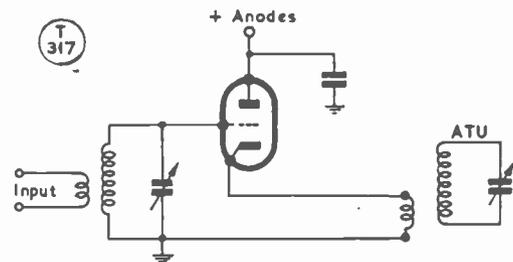


Fig. 3. A cathode follower can be used as a linear RF amplifier particularly with low-power equipment, e.g. Top Band. In this case output is at low impedance,

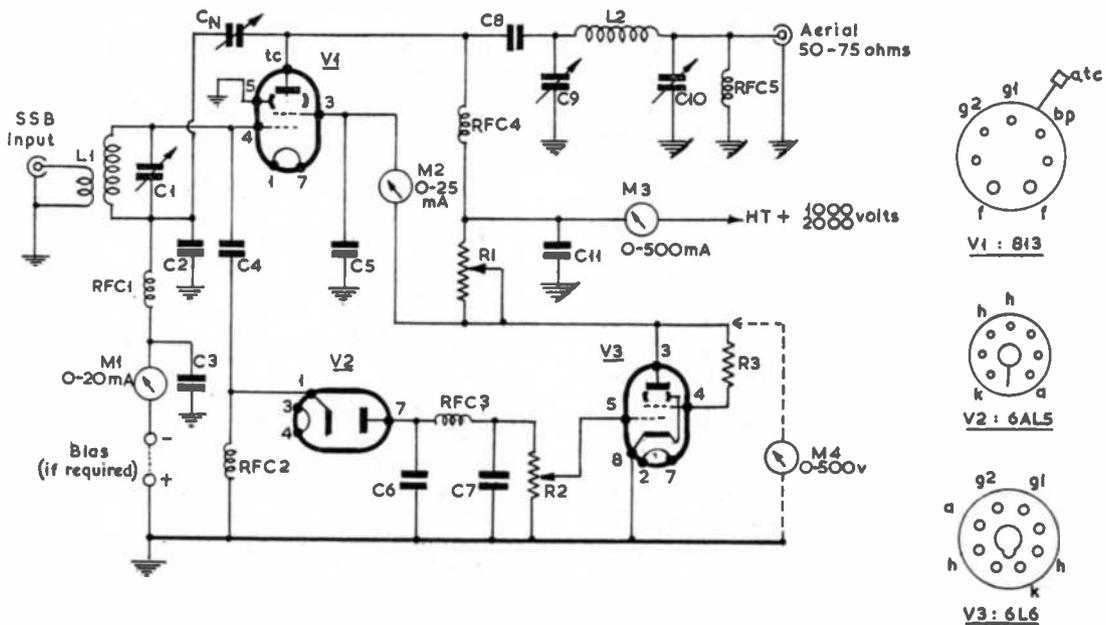


Fig. 4. One form of the well-known "G2MA Linear," now widely used, in which the screen voltage of an 813 is controlled by a clamp which, in turn, is controlled by diode rectification of the driving voltage. The size and rating of screen-dropper R1 is determined by the HT voltage in use; during the setting-up process M4 is used to check the screen voltage.

V1 is therefore also low. With drive applied, the clamp is opened, the screen voltage rises and the anode current likewise increases—in proportion to the grid drive being applied to V1.

With this circuit and the many similar circuits that have been developed, correct initial adjustment is all-important. Some of the variants are more complex in design but probably more simple to adjust—but they are outside the scope of this article, the purpose of which is merely to show that ingenuity can produce linearity in what may seem, to some, a most unlikely manner.

It is a significant fact that if one listens round the SSB portions of the bands, observing the quality of signals rather than the strength, it is difficult to distinguish the higher-powered transmissions from the others. This is probably because one instinctively fixes on an SSB transmission which is *easy to tune in*—and that means one which is free from distortion. Certain professionally-built transmitters appear to be well-nigh faultless in this respect; but one occasionally comes across examples of the same transmitters in conjunction with a home-brewed linear (or not-quite-linear), which then produce signals *less* readable than the same gear running "barefoot," as the saying is.

On the other hand the owner of a fairly low-powered outfit capable of putting out a signal of beautiful quality can equally easily ruin it by mere maladjustment (which may merely be a matter of squeezing the audio gain control too far).

Fortunately the SSB fraternity, up to the present, have a reputation for outspokenness, and the owner of a really nasty emanation will usually be told

### Table of Values

Fig. 4. The G2MA Linear Amplifier

C1, L1 = Normal high-Q grid tank	R3 = 100 ohm, 1-watt
C2 = 400 $\mu$ F	M1 = Grid meter, 0-20 mA
C3, C5 = .002 $\mu$ F	M2 = Screen meter, 0-25 or 0-50 mA
C11 = .001 $\mu$ F	M3 = Anode meter, 0-500 mA
C4 = 500 $\mu$ F	M4 = Screen voltmeter, 0-500 volts
C6, C7 = 500 $\mu$ F to .002 $\mu$ F, high voltage	RFC1, 2, 3, 5 = R F chokes, 2.5 mH
C9, C10, L2 = Normal pi-output network	RFC4 = As normally used for this position
R1 = Screen dropper (see caption)	V1 = 813
R2 = 250,000 ohm potentiometer, 2-watt	V2 = 6AL5, EA50
	V3 = 6Y6, 6L6 or parallel 6L6's

about it very promptly. (Surprisingly, such people generally seem to appreciate the criticism and to be anxious to do something about it, which is an excellent sign).

### Crystal Frequencies

We have been asked by several readers to state the fundamental frequencies corresponding to the various "service channel" numbers of the popular FT-241 crystals. Dealers often quote only the harmonic frequencies at which these are supposed to operate, so that the information given in Table I may be of assistance to those who have not come across these figures before. (Those in the first column, with three-figure channel numbers, are usually marked at 72 times the fundamental frequency, and those in the second column, with two-figure numbers, at 54 times).

THOUGH not noticed by many at the time, a new EDX star burst upon the VHF firmament on Sunday, 7th May, making a brief appearance during 1340-1400 GMT on that day (when most people, even if out /P, would have been having their after-lunch *siesta*).

Not so G3GOP/P, who was able to get in a quick and pretty solid QSO with YU1CW, the propagation mode being, of course, sporadic-E—meaning a densely-ionised patch, in the lower part of the E-layer, which happened to form in the right place, and to last long enough, to make two-metre contact possible between the city of Belgrade in Yugoslavia and a hillside near Ludlow in Shropshire.

By a good deal of urgent chasing, over the air both on the HF bands and two metres, the QSO has been duly confirmed, largely through the painstaking efforts of G3OSS (Finchley, N.3), who was also out /P near Princes Risborough, Bucks., and heard YU1CW. G3OSS was later able to raise YU1AD on 20-metre SSB to obtain confirmation from the YU end.

So a resounding new "First" goes into the record, with congratulations to both G3GOP and YU1CW, making it a total of 21 countries now worked by English stations. It is also a new distance record for Europe, by a handsome margin; without having been able to plot exact positions yet, the distance must be around 1,200 miles, or a good 200 miles further than the earlier Region I record made by G5NF/11KDB on 14th June, '59, and also achieved by sporadic-E—see "VHF Bands," p.262, September 1959 issue, SHORT WAVE MAGAZINE.

As will be suggested by these dates (and also by what has been happening these last few weeks), this is the season of the year for sporadic-E conditions, well understood by all who have had long experience on the VHF bands; it is the mode of propagation by which much EDX was worked on the old 5-metre band in pre-war days. The appearance of sporadic-E—the exact mechanism of which is not really at all clear,

# VHF BANDS

A. J. DEVON

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G3GOP/P Works YU1CW by  
Sporadic-E, 7th May—

Good GDX Openings—

More Activity on Four Metres—

News, Views and Comments—

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even after all these years of knowing about it—cannot be forecast with any certainty, except to say that in our latitudes it appears to be associated with auroral manifestations, and when it does occur, to be effective at VHF, it is always within an hour or two of mid-day during the mid-summer period. And, of course, as radio amateurs, we always find sporadic-E happening on a Sunday, that being the only day of the week when there are enough stations on to notice it! In fact, both aurora and sporadic-E occur at all sorts of times, effective over a wide frequency area (but not often as high as 145 mc), as the forward-scatter boys, working with frequencies of the order of 30-50 mc, would confirm.

Reverting for a moment to the G3GOP/P-YU1CW contact, the gear used by G3GOP for /P work consists essentially, on the Rx side, of a single-conversion superhet with a tunable SEO, using valves like 6AK5's, 9003's, and a 12AT7 for the oscillator-doubler; for the 4-stage Tx, the PA is a QVO4-7, modulated by a pair of 6V6's in push-pull, driven by a 12AX7,

with a carbon microphone for simplicity in the speech circuit. The whole of this layout is accommodated on one chassis in a single cabinet, all-same transceiver.

## Region I VHF Contest

This was played off on May 7, under conditions which were no more than average, in weather that was generally poor; in the main, it was a portable occasion, with best scores in the upper 70's (G3MAR/P) and high 80's (G2HIF/P). An interesting newcomer to the VHF/P scene was Angus McKenzie, G3OSS/P (one of our sightless operators) who had knocked up 56 stations worked by near closing time from a site not far from G8VZ's home QTH; two stations, G3FD/P and G3KBS/P, had elected to pitch near Dunstable; and we must mention that at G3JZW/P they had a steak-and-kidney pie lunch, from a pressurised cooker; G6TA was calling GW3HYH at 1240 clock time; and one of the stations worked near the finish by G2HIF/P was G5KK, Newport, Mon.

From the shape of the barograph trace for the Contest period, it is evident that not much can have been expected in the way of tropospheric DX. Notice, however, the marked improvement later in the period, fully reflected by the operating reports.

## EDX Possibilities

If we get a few good Aurora or sporadic-E chances—or, more probably, a sustained spell of good tropospheric conditions—it will be worth looking for EA and OH stations. EA4EO says that there are many active VHF operators in Madrid and Barcelona, and that the BBC is frequently heard on Band II (VHF/FM, 88-95 mc); EA3IT has a 4-125A PA, EA4DT a beam described as a "double rhombic," and EA4EO himself, in Madrid, has a 3-element beam. From him, we gather that this feature is regular reading, and his object in writing is to assure U.K. stations that the EA's are on the ball.

Much the same spirit animates OHØNC (Mariehamn, Aaland Is.),

## TWO METRES

## ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Home QTH Only

Worked	Station
79	G5YV (787)
77	G6NB
76	G3CCH
74	EI2W
72	G6XM
70	G3HBW, G5MA
68	G3BW, G3GHO
67	G3BLP (908), G3KEQ
66	G3IUD (302), G5BD
65	G3EHY, GM3EGW (276)
63	G2FJR (542)
62	G3FAN (760)
61	G2CIW (290), G3HAZ
60	G2OI (402), G3IOO, G3DMU
59	G4SA
58	G8OU
57	G6XA, G8SB
56	G3WW (770), G5DS (654), G8VZ
55	G2HDZ (495), G2HIF, G3JWQ (534), G5BM, GW5MQ
53	G2AJ (519), G3LHA (387), G4CI
52	G2NH, G3FZL, G6RH, G6XX, GW2ADZ
51	G5ML
50	G3ABA, G3GSE (518)
49	G3KPT*
48	G3FIH, G6TA (487)
47	G3DKF, G5WP
46	G4HT (476), G5BY, G6YU
45	G2AHP (647), G2DVD (362), G2XC, G3BJQ, G3GFD, G5JU, G6GN
44	G3BK, G3DVK (282), G3NBQ (218), G8DA
43	G2DDD, G2FCL (322), G3BA, G3NC, G3COJ, G3DLU*, G3HWJ, G3KHA (262), G3KQF, G3KUH, G3NNG, G3WS, G4RO, G5DF
42	G2HOP, G3CO (422), G3DO, G3IER, G6CI (220)
41	G2CZS (282), G2FQP, G3GSO
40	G3AYC, G3CGQ, G3MPS, G5MR (366), G8KL, GW3ATM

Worked	Station
39	G2IQ, G3GBO (434), G3LTF, G3MTI, G3VM, G8IL (325), GW3MFY
38	G3APY, G3CKQ, G3HTY, G8VN (190)
37	G3FNW, G2FZU (180), G3DLU, G3LAR (435), G3MAX, GC3EBK (260)
36	G2DCI (155), G3CXD, G3DLU*, G3IIT, G6CB (312), G8DR (354), G8IP
35	G3FYY (235), G3HCU (224), G3LTN, G4LX
34	G3AEP, G3JAM (376), G5UM (703), G8IC, GM3DIQ
33	G2BHN (128), G3FUR, G3HHY (125), G3HWR (368), G3IOE
32	G3HIL, G8QY, G8VR, GC2FZC
31	G3HXO, G3ICO (118), G3KPT (180), G3OJY, G5RP
30	G2AHY, G3FRY, G3GOP (208), G3GVF (129), G3IRA, G3KEF (110), G3OBD, G5NF, GW8UH
29	G2CVV, G3AGS, G3AKU, G3FIJ (194)
28	G3ITF, G4JJ/A, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160), G3JGY, G3LTF/A, G3OBB, G6GR, G8NM, G1JGQ, GW3GWA
26	G2BRR, G3CFR (125), G3MED, G3SM (211), G3YH, G4MR (189)
25	G3JHM, G3JMA, G3JXN (220), G5SK, G6PJ
24	G3FD, G3FEX (226), G3FXG, G3FXR
23	G2DHV, G3CWW (260), G3HSD, G3NKK, (168), G5PY, G8VN (125)*
22	G2DRA, G3AGR (135), G3ASG (150), G3BPM, G5AM
21	G2AOL (110), G3BDQ, G3DVQ, G3IWJ, G6XY
20	G3EYV
19	G2HDR, G3GCX, G5LQ (176)
18	G2AXI, G3DBP, GC2CNC
17	G3EGG, G3MHD (195)
16	G3FRE, G3MLS
15	G3IWA
14	G3CYY

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

\* New QTH

who quotes the following as active on VHF: OHØ's, 'AZ, 'NB, 'NC, 'NF, 'NI and 'RJ. OHØNC has a 4X150A push-pull final on two metres (but needs a suitable blower) and is building for 430 mc; he plans eventually to have another 4X150A on the 70-cm. band. From the Aaland Island QTH, OHØNC is working the OH and SM mainland stations and, noticing the favourable weather appearance during May 10-11 (see barograph trace), was looking for EDX, too.

## Station Reports

G3MTI (Gt. Malvern) climbs in both Counties Tables, having worked G3ARS/M for Rutland, also GW3BA/M and GW4LU/M for Montgomery. G3HAZ (Northfield, B'ham.) is building new gear for /A and /P working, and mentions hearing YUICW as a getaway on 7th May. G3HAZ is against any change in the Zone Plan (as are all other correspondents who mention it), and is strongly anti-VFO, though (again like others) he accepts the idea of rubber-crystal VXO's giving a 10-20 kc shift within the Zone area. He also reports that the Midlands stations on 70 centimetres have gone into the 433.1-433.5 mc area.

G6XA (Leamington Spa) claims for the Tables, and is now at 11C in the Seventycem. GW3MFY (Bridgend) goes up three in the Annual, and reports working F2ZD (nr. Paris) on 12th May, with a 589 report—see barograph trace for correlation. G3CO (Dartford) remarks that he heard this QSO, and was himself delighted to receive a station so far into France itself, he being poorly placed for that direction; earlier in the period, G3CO had some good EU contacts, and he is one of those who mention contest conditions on 7th May as unexciting; with him, the patch of best conditions was during May 11-13 (see trace).

G3KPT (West Bromwich) agrees with G3HAZ about VXO's, and also feels that the present Zone Plan is "as good as we shall ever have." He is now running a 6CW4 RF pre-amp. and finds it pretty good—and he confirms that

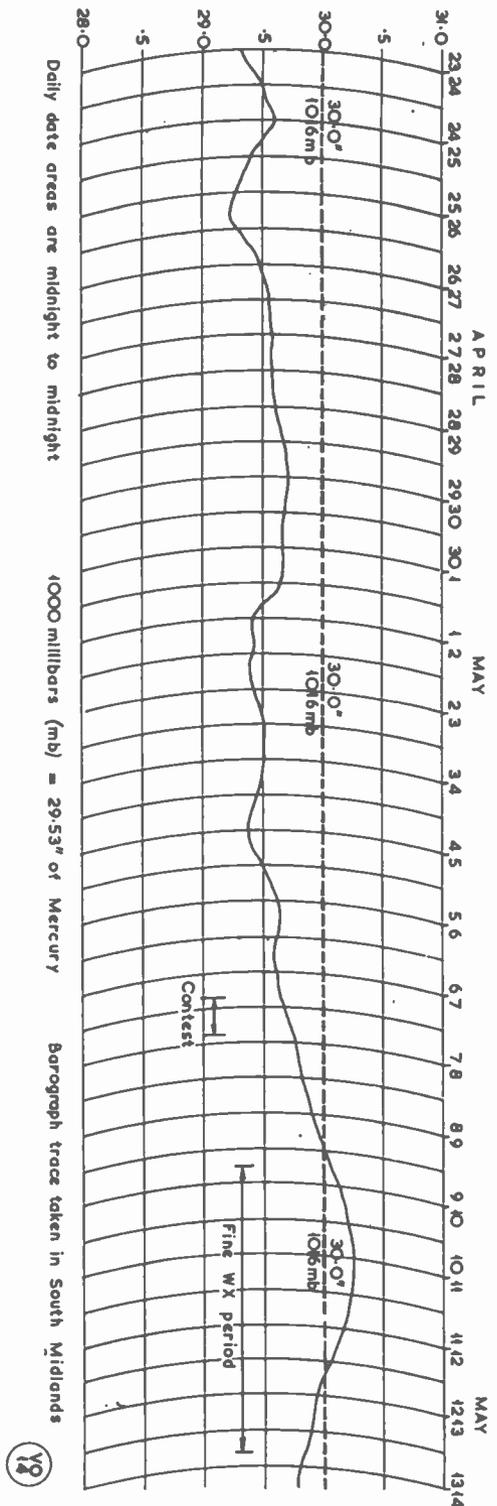
GDX conditions were well up during May 11-13, though even better around 0800 BST the mornings following, when there was no activity. This reminds us to say that always in previous years, in the summer-time, it has been found well worth while making GDX schedules for the early mornings. From G3KPT, about 17 stations active on 70 cm. in the Midlands have been worked, with G2XV and G6GN heard and called.

G3JWQ (Ripley, Derbys.) writes in with claims, and shows a total of no less than 534 different stations now worked on two metres, with 47C for the Annual. G4KO (Thorpe, Norwich) asks if anyone knows of the East Anglian area, in which there are about ten stations active on two metres, always looking for contacts but feeling largely neglected; many Midlands and Home Counties stations are heard with their beams "in the other direction"—they do not seem to hear G2CPL, G3HUL, G3IAO, G3NMY, G4KO and the others calling them . . .

G3OUT (London, E.18) writes in to report himself active on two metres, running 20w. to an 832 PA modulated by a pair of 807's. into a 10-ele Yagi at 30 ft., with a CC converter tuning 2-4 mc on the IF, using a Marconi No. 9 receiver as IF/AF amplifier; about 80S have been worked in nearly 6 months, in 12C, with two F's also booked in. G3NNG (Harwell) has a beam assembly consisting of a wide-spaced 7/7 for two metres and a slot-fed 6/6 for 70 cm, and runs a 10w. PA, series-gate modulated, with 20w. input on CW; the receiver is CC, with an E88CC in cascode. G3NNG is also there on 70 cm, on which band he has worked 15C using only 5 watts, shortly to be pushed up to 50w.

G5ZT (Plymouth) says: "I'm now on 70 cm. I must be mad"! He has had a hard time down there finding two-metre stations to work, so he is going out /M every Wednesday evening. LF end, 8.00 p.m. clock time onwards, from Haytor on Dartmoor, and would be glad to have some attention; recent contacts from the home QTH have included GC, GI and

The barometer movement in the South Midlands for the period April 23-May 14. The interesting occurrences were the VHF contest on May 7 (also coinciding with a manifestation of sporadic-E), and the spell of fine weather during May 9-13, clearly reflected in the shape of the trace. From this, the evenings of May 10-12 (and possibly May 8) should have shown markedly improved conditions on two metres, as the weather conditions otherwise were also suitable. Now compare with the reader reports covered in these pages.



F, all on May 12, when conditions were so good in the southern part of the country. And, on May 7, he heard ?OZ3NH, which would have been by spor-E again. G5ZT/G3CZZ are co-operating on 430 mc and may by now have made a start on that band.

G2AXI (Basingstoke) moves up two in the Tables, and has now worked 114S; during the period April 16 to May 13, G2AXI was on every evening; of the 28 evenings involved, on only three occasions did he fail to have any contacts at all; every other evening session yielded something, varying from one or two QSO's some evenings, up to 10 or more contacts at week-ends.

Another of the Midlands boys hot about VFO's and monkeying with the Zone Plan is G2CIW (Birmingham), who would prefer that things be left as they are. Jack is yet another to confirm the good spell over May 10-12, with G3ILX (Barrow-in-Furness) worked on 70 cm, and G13FJA on two metres; on May 11 he had G3BW and G3JYP in Cumberland, and G13FJA again, all on phone, also G13CDF in Armagh as a new county; May 12 produced a 70 cm QSO with G3KBS/P for Oxfordshire, with the G1's heard on two metres. The YU1CW call was heard at 1345 GMT on May 7, S9-4 in quick QSB, and gone before there was a chance to catch him.

Those wanting Hunts, for the two-metre tables might like to note that G3JLA/P will be in those parts over July 1-2, on 144.72 mc, and willing to make schedules for the Saturday evening (*QTHR*); and if you should hear or work GB3SAD on June 10, same frequency, it will be the Stevenage Annual Day, probably with G3JLA operating.

#### Four Metres

There are distinct signs of awakening interest and more activity on this band—anyway, we have a few more reports this month. G5CP (Wingerworth, Derbys.) is on 70.35 mc running 50w. into a Bi-Square and getting out well. G8RO (Tangmere) has worked three new stations during the month, and reports that G3KI

(Farnham, Sy.) heard 11MOR for a few minutes on the morning of May 14; this would be by sporadic-E. G8RO himself has worked G3CLW again, and G3EHY is heard, on CW and phone, every Sunday morning, but not yet (at the moment of writing) worked.

G3OUT (London, E.18) is running 12w. to a 6BW6 on four metres, with a CC converter and a 3-ele Yagi. G3LZN (Warwick) sends a very full report on 4-metre activity, listing nine stations heard or worked, with a particularly good signal from G3EHY (Banwell, Som.), one of the stalwarts regularly on this band.

To spread the 4-metre word still further afield, and to bring more stations on, it would help a lot if, when writing in, those interested in the band would mention the equipment they use, the frequency they are on, and the call-signs of stations worked or heard on 70 mc. Remember, too, that 4 metres counts for VHFCC.

#### VHFCC Elections

The latest claims to be accepted are: W. R. Hawthorne, G3MCS, Cheshunt, Herts., who gains VHFCC Certificate No. 290, and got his QSO's, in seven countries and 34 counties, in just 39 days' actual operating! He is on a good site 320 a.s.l., with a 5-ele Yagi, and the PA takes a pair of HK24's running 60w., the converter being an E88CC cascode. Plans for the summer include a better beam and activity on 4 metres.

Certificate No. 291 is awarded to W. J. McInnes, G3CLW, of Bromley, Kent, whose claim is particularly interesting because he shows cards from 23 stations worked on 70 mc, one of which is FA3JR, for a nice piece of DX! On 4 metres, the G3CLW Tx has an 829 PA taking 50w. and the aerial is a 5-ele Yagi; the converter works into an S.640.

P. D. Lucas, G3JDN, of Reigate, Surrey, claims VHFCC Certificate No. 292, his lot being all-G on two metres; his Tx runs 85w. to a QQVO6-40A, modulated by 6146's, and the aerial is a slot-fed 8/8, with an E88CC cascode CC converter into an AR77 tuning 4-6 mc. Certificate No. 293 goes to W. Browning, G2AOX, of Hen-

don, London, also on 4 metres, for which he showed cards from five stations, the rest being mainly two-metre G's.

One of the most recently-licensed operators to gain VHFCC is A. M. Laidler, G3OJY, of Churt, Sy., who has earned Certificate No. 294 in very quick time—well done! His receiver is a 15-valve d/s/het for VHF only, fitted with S-meter, noise-limiter and all the *etceteras*. Starting with a much-modified SCR-522 Tx section, G3OJY now runs a Heathkit "Seneca" VHF-1, which has four channels crystal controlled, and can be VFO as well, the PA taking 120w. His beam is a slot-fed 8/8, on a motorised mast. He came up on two metres on September 6, 1960, the day he got his licence, and since then has worked nearly 200 stations.

To gain VHFCC Certificate No. 295, L. Hunton, G3ILD, of Darlington, Co. Durham, had to work at least 90 stations at distances over 50 miles. As is well known, G3ILD puts out a very potent Sideband signal on 145.5 mc, the frequency for AM phone/CW being 145.875 mc; the PA is a QQVO6-40A set up as a linear amplifier and taking 150w. input on CW, and 100 watts peak indicated on SSB. The aerial is a slot-fed 6/6 and the receiver is a cascode E88CC with A.2521 RF pre-amplifier.

#### The Tabular Matter

The total of movements taken in this month is just 40, and we hope the All-Time shows everyone where they expect to find themselves. There have been quite a number of movements in the Annual Counties, too, but there is no room for it this time.

#### In Conclusion—

It has been a tight squeeze on space again this month, but we hope you agree that it is all there. Deadline for July must be **Wednesday, June 21**, which gives us time to catch our breath. Address it all to: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Till July 7, then —73 de A.J.D.

## • • • *The Mobile Scene* • • •

*TRENTHAM GARDENS, CHELTENHAM AND THANET MOBILE RALLIES—  
MORE THAN 10% ALL U.K. AMATEURS NOW LICENSED MOBILE*

**T**HE latest Post Office count (as at 30 April) shows that at that date there were 974 /M licences in issue, an increase of about 50 in the last few months. As the total of amateur licences for the whole of the U.K. at the same date was 9,071, it means that mobile operating now forms a sizeable minority interest among radio amateurs.

This was abundantly shown by the fact that no less than 220 vehicles actually fitted /M came in for the *Trentham Gardens Rally* on Sunday, 30 April. Organised jointly by the Stoke-on-Trent and Midland Amateur Radio Societies, with G3BA of M.A.R.S. and G3COY of Stoke as co-ordinators, the Rally was opened, in fine weather, by the Lord Mayor of Stoke-on-Trent. In the course of the afternoon, it is estimated that something like 2,500-3,000 people passed through the exhibition held in conjunction with the event—it is likely, of course, that a great many of these happened to be in the Gardens for the afternoon and looked in to see what was going on. The total of cars in the Rally parks was around 350, making it probably about 1,200 people who had come in for the Rally proper.

One of the main competitions was an inspection of cars by representatives of A.R.M.S. and the Midland and Stoke societies, who awarded 12 certificates to those /M's whose installations showed a sense of safety, combined with ingenious design and good construction. The adjudicators were of the

general opinion that there is a long way to go before the majority of mobiles can be considered either safe or properly fitted—there are still far too many rats'-nest installations about! Also on the competitive side, a CW copying contest was won by G3ABG (Cannock) at 25 w.p.m. with no errors.

Two car parks were reserved for fitted mobiles, a separate section being provided for VHF types to get together—a good idea, this. The talk-in stations were G3MAR/A on two metres with some 30 /M's worked, and G3GBU/A on Top Band with about 100S; out-station talk-in assistance was given by G2AMN, G3HVI and G3OGD. Taking the mobile attendance as a whole, about 10% were on two metres, and the rest on the LF bands, mainly, of course, 160 metres.

Other noteworthy features of this important and well-attended Rally included amateur closed-circuit television, by the B.A.T.C. and M.A.R.S. TV groups, with two live cameras operating and a demonstration of slowscan TV on tape; a small trade exhibition; a number of stands manned by Midlands radio societies; and the avoidance of a complex public-address system by the use of transistorised loud-hailers, which were found to be particularly effective.

The organisers express themselves as very well satisfied with the support and attendance at Trentham this year, though it was expensive and something of a strain on the Clubs' resources.

[over



For the Trentham Gardens Mobile Rally, the Stoke-on-Trent group provided G3GBU/A as the Top Band talk-in station and control; about 100 mobiles were worked by G3GBU/A.



General view of one of the Rally car parks at Trentham Gardens, near Stoke-on-Trent. Some 350 cars came in for the event, of which about 220 were actually fitted mobile.

The report for the *Cheltenham* Mobile Rally, held in fine weather on Sunday, 7th May, shows that they had 100 cars fitted /M. an increase on last year; of these, about 90% were found to function on Top Band (with a few all-band rigs), and the rest on two metres. G5BK/A talked-in 40 mobiles on 160m., and G3IER/A worked ten /M's on two metres, meaning that in all about half the visiting mobileers were made contact with over the air. The local organisers were G2DUG, G3GMN, G3KFT and G3JFH (secretary). From their point of view, with 100 cars in the park and 400 people on the ground, the meeting was rated as "highly successful again." The competition involved a two-hour run through the Cotswolds, during which check points had to be found, where log books and licences were inspected (!); contestants had also to work Control on CW (this may have baffled a few of them!) using a random length of wire. The winner of this exacting contest was G3JUC/M. in a Hillman Minx, scoring 425 points; second was G3NXV/M, a member of the South Birmingham Club, in a Ford Anglia, with 353 pts.; and the runner-up was G2CDN/M, in an Austin Cambridge, with 309 pts.—both G3JUC/M and G2CDN/M are members of the Whips Mobile Club.

\* \* \*

On the same day, May 7, the *Thanet* group held their annual event, in fine but rather cold weather, at Hugin Site, near Ramsgate. They had 26 cars fitted mobile, and again the proportions were two or three on VHF and all the rest on Top Band. The control stations were G3DOE/A on 160 metres (17 mobiles worked) and G3BAC/A on two metres. There were several competitive events: The prize for the best home-constructed mobile Tx went to G3FRV/M, and for the best receiver to G3IIO/M; the safest installation was judged to be that of G3HCK/M, and the prize for the best aerial system was given to G3IIO/M. Prizes for the longest distance travelled and the greatest distances over which contact was made with the control stations went to G3MGY/M, G3MMN/M and G3FRV/M. Among the visitors present was SM7XY, with his xyl.

The organisers for the Thanet Radio Society were G3BAC and G3BKT, with an SWL helper, and they felt that, having regard to location and competing events on the same day, their Rally was a success from the Club's point of view.

\* \* \*

Next on the Mobile Rally calendar are the following events, some notes on most of which have appeared in previous issues:

**June 11:** Harlow & District Radio Society Mobile Rally at Magdalen Laver, near Harlow, Essex, with



Seen at the Trentham Gardens Mobile Rally, left to right: G5YY of Braunstone, Leics.; G8TL, Theydon Bois, Essex; and G3WW of Wimblington, Cambs., who is active on RTTY and SSB.

G3ERN (Top Band) and G3JMA (two metres) open for talk-in from 10.00 a.m. onwards; local roads will be sign-posted. A full programme of events is being prepared to interest not only the visiting mobileer, but also the members of his family. There will be a raffle, for which the draw will take place early, and refreshments at reasonable prices will be available on site. The hon. secretary is: B. H. Wynn, Black Cat, Abbess Roding, Ongar, Essex.

**June 11:** Mobile Rally organised by Chiltern Amateur Radio Club in collaboration with A.R.M.S., starting at 2.00 p.m. from near High Wycombe, Bucks., and involving a Chilterns tour for those who wish to enter. Tea will be available along the route if booked in advance. For bookings and full details, apply: C. Simpson, G3OOZ, 2 Mead Street, High Wycombe, or N. A. S. Fitch, G3FPK, 79 Murchison Road, Leyton, London, E.10.

**June 18:** Amateur Radio Mobile Society's Rally at Barford St. John U.S. Base, near Deddington, Oxon., within the area of the A.41, A.423, B.4031 and A.361. Stations open from 10.30 a.m. for talk-in will be G3NMS/A on 160m. and G3HGE/A on two metres, with G8KW/A using SSB on the HF bands as conditions permit. As last year, visitors will be able to visit the transmitter hall (Barford St. John is a main communications centre), and during 2.00-4.00 p.m. the U.S. 3rd Air Force Band will perform, by permission of the Commanding General, 3rd U.S. Air Force. Other attractions will be baseball, various competitions with prizes, including the A.R.M.S. mobile measurement contest, and there will be American refreshments from a mobile canteen. Those who will be attending

*Safety First — Safety Last — Safety Always*

what should be, as last year, a very successful event, are urged to arrive early in the day. Any further information from: V. A. Frisbee, G3KVF/M, A.R.M.S., 17 Delacourt Road, Blackheath, London, S.E.3.

**June 25:** West of England Mobile Rally, at Longleat House, nr. Warminster, Wilts. Grounds open 10.0 a.m. to 6.0 p.m., admission 1s. per head; unlimited accommodation for cars in reserved Rally car park, in delightful surroundings on the Marquis of Bath's estate; ample catering facilities on site. There will be various displays, and a free prize draw, with prizes also for the longest distance travelled to the Rally, and the longest distance over which the control stations are worked; the /M station recording the highest field strength and the best entrant for the *concours d'elegance* will also receive prizes, all of which are to be presented by Lord Bath in person. The talk-in stations, opening at 10.0 a.m. will be G3CHW/A on 1900 kc. and G3GYQ/A on 144.15 mc. Further details from: C. N. Chapman, G2HDR, Yeovil, Stoke Hill, Stoke Bishop, Bristol, 9.

**July 8/9:** South Birmingham Mobile Rally, taking place late evening as a tour under competitive /M conditions, using Top Band to find best /M rig. Assembly at Park Hill School, Alcester Road, Moseley, Birmingham, from 7.30 p.m., with G3OHM/A open on 1900 kc from 6.0 p.m. for talk-in. Ample parking facilities at the school, running buffet 8.0 p.m. to midnight, and care of children arranged. All interested in taking part, either as visitors or competitors, are asked to write: T. Legg, Flat 3, 80 Alcester Road, Birmingham, 13 (South 2572.)

**July 9:** South Shields & District Amateur Radio Club Mobile Rally at Bents Park Recreation Ground, Coast Road, South Shields, and adjacent to beach. Rally competition events will commence at 2.00 p.m., and will include judging of equipment, reception test and driving contest. The control stations, open for talk-in from 10.30 a.m., will be G3KZZ/A on 1980 kc and G3DDI on 3600 kc. While light refreshments will be available on site, those wanting lunch (or any other information) are asked to

write: D. Forster, G3KZZ, 41 Marlborough Street, South Shields, Co. Durham.

**August 12/13:** Mobile Rally and Hamfest to celebrate golden jubilee of the Derby Wireless Club (1911). Events will include assembly on the Saturday, visit to an exhibition covering "50 Years of Radio," an outdoor dance and a barbecue. On the Sunday, there will be a mobile treasure hunt, a really good junk sale, children's sports, various radio displays, and a band concert. Full details from: T. Darn, G3FGY, 44 Laurel Avenue, Ripley, Derbyshire.

**September 17:** Annual Mobile Rally and Hamfest held by the Lincoln Short Wave Club. (*Details later.*)

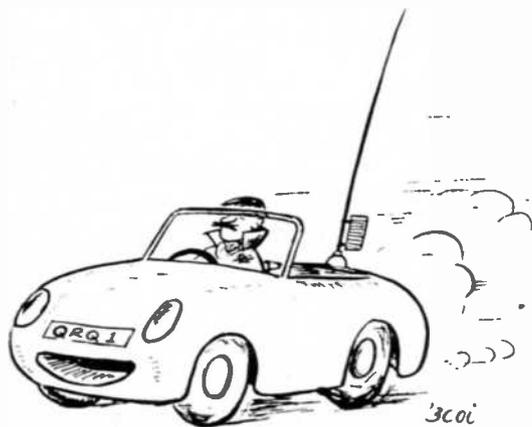
### SPY TRIAL RADIO

The Lonsdale-Kroger-Houghton espionage case, which has now been concluded by the rejection of their appeals, had a number of interesting features from the purely radio aspect. The fact that a transmitter, said to be capable of 150w. output, could be used to work Moscow on an indoor (invisible) aerial may have astonished the Court, but few AT station operators would think that at all remarkable—on the HF bands, as we all know, the difficulty is to avoid the UA3's, whatever rig one may be using! The house at 45 Cranley Drive, Ruislip, Middlesex, also had a radiogram modified for headphone reception of CW. Transmission was by high-speed auto keying at up to 240 w.p.m., and reception on a tape recorder. No actual operating knowledge of Morse was required to work the system, as the transmitting tapes were punched out on a piece of mechanism like a typewriter keyboard, and could be prepared at leisure; similarly, the Morse signals received on tape were made visible by a special process, and could be decoded merely by inspection. The frequencies favoured for these activities were 6340, 8888, 14775 and 17080 kc and, according to the evidence, transmissions on these frequencies, using the signals procedures found in the possession of the accused, D/F'd into the area of Moscow.

### MULLARD EDUCATIONAL FILMSTRIP

#### *The History of Television*

A new filmstrip *The History of Television* has been added to the range of colour filmstrips introduced by the Mullard Educational Service. It is complementary to an earlier release *The History of Radio*, and deals with picture transmission from the mid-19th century to the present time, explaining fundamental principles to show the significance of technical developments. Its simple approach makes it suitable for use in school lower forms and in senior classes where science is taught as a general-knowledge subject, rather than one for examination. The filmstrip comprises 28 frames and is immediately available from the distributors, Unicorn Head Visual Aids Ltd., 42 Westminster Palace Gardens, Victoria Street, London, S.W.1, price 25s. a copy including comprehensive teaching notes.



# THE OTHER MAN'S STATION

G3NAC



THE station shown this month is that of G3NAC, F/O J. M. Hern, R.A.F., who at present operates from Bourton-on-the-Water in Gloucester, right in the heart of the Cotswolds. The actual location is in a valley, or saucer, completely surrounded by hills about two miles away.

In the photograph from left to right at the top can be seen: On the speaker a small Variac auto-transformer giving a regulated 110v. for the receiver; under the speaker is a Z-Match tuning unit incorporating a switch to change aeriels, also a dummy lamp load and a non-inductive 75-ohm resistor load, with an earthing point for all aeriels not in use. The feeder line visible is for a 130ft. Zepp.

Underneath the Z-Match is a power unit taking 4/5R4GY's in full-wave bridge to give 1200 volts at 500 mA—just the 600w. This PSU is designed primarily for an SSB project at present in hand, and the output is switchable from 75 to 1200 volts. Next is the main switch controlling all supplies. Then comes a small Heathkit 'scope which is used to monitor incoming and outgoing transmissions.

In front of the K.W. Electronics CDR aerial rotator control is a modified bug key; the Geloso G209R receiver is the second one in use at this station—the first was sold through the *Magazine* Small Advertisement section a short time ago. Resting on the station control unit, the receiver is tilted for operating convenience.

The control unit itself is divided into three compartments, internally RF-tight: On the right is a matching unit, with change-over relay and transmitter c/o control; the central compartment contains the 12v. DC relay supply, an electronic key, and a VOX

unit; in the left-hand compartment is a multi-switch which gives "tune," "receive" or "transmit" for the whole station.

At the right can be seen the modified Heathkit DX-40U transmitter (as described in *SHORT WAVE MAGAZINE* for July, 1960). It is relay-controlled and is operated at exactly 50 watts input, with high-level plate/screen modulation; the modulator itself is out of view at right, built into a DX-40U cabinet, and is to a basic *Magazine* design; this modulator takes 2/TT21's in Class-AB1, and could give 200w. output. Incorporated in the modulator are Woden UMØ and UM3 output transformers, to give either full audio or 10w. for Top Band and DSB working. A Heathkit VFO is available. The Lustraphone dynamic microphone in front is connected into the modulator through a two-transistor voltage amplifier. The gear as shown here is fully TVI-proof in very much a fringe area, with a TV aerial about 4ft. from the beam.

Aeriels in use include a Mosley "Powermaster" 3-element beam, 75ft. high, and a 130ft. Zepp. A 10-metre dipole is also available, but is not used very much. Operation from G3NAC is on all bands 3.5 to 28 mc. with a distinct preference for the 15-metre band, using either AM, CW or SSB. A daily schedule is kept with VS9APH, and certain other R.A.F. amateur stations, as G3NAC looks after publicity for the Royal Air Force Amateur Radio Society; he is therefore very interested in reliable long-term long-distance communication. DX working is also of very great interest, as is just nattering with other AT station operators on subjects of technical interest. The DX score at G3NAC stands at about

# NEW QTH's

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

**G2AXI**, S. J. Harden, 33 White-down Road, Tadley, Basingstoke, Hants.

**G3OUO/T**, D. Mann, 60 Deanscroft Avenue, Kingsbury, London, N.W.9.

**G3OUT**, A. H. Walker, 33 Eastwood Road, South Woodford, London, E.18.

**G3OUV**, P. J. Perkins, Fair Acre, 47-49 Priory Avenue, High Wycombe, Bucks.

**G3OVI**, D. A. Jordan, 17 Colenutts Road, Ryde, Isle of Wight.

**G3OVZ**, A. C. Woodroffe, 9 Spring Road, Riddings, Derbyshire.

**GM3OXA**, A. S. Foster, 12 Norval Place, Rosyth, Fife.

**G3OXD**, Amateur Radio Society, c/o Recreation Club, Albright & Wilson (Mfg.) Ltd., P.O. Box 3, Oldbury, Birmingham.

**G3OXM**, M. Hirst, 128 Goldington Avenue, Oakes, Huddersfield, Yorkshire. (Tel.: *Milnsbridge 2568.*)

**GW3OXU**, J. Wright, 50 Lansbury Road, Brynmawr, Breconshire.

**GM3OXX**, G. Burt, 30 Lothian Street, Edinburgh, 8.

**G3OXY**, N. V. L. Thompson, 21 Raymond Avenue, South Woodford, London, E.18.

**G3OYB**, W. Waters, 4 Lighthouse Road, Pendeen, Penzance, Cornwall.

**G3OYP**, J. K. Fidler, 4 St. Lawrence Drive, Eastcote, Pinner, Middlesex. (Tel.: *PINner 2965.*)

**G3OYW**, I. Sykes, The Vicarage, Lostwithiel, Cornwall. (Tel.: *Lostwithiel 94.*)

## CHANGE OF ADDRESS

**G3CJG**, J. R. Farr, Piles Peek, Bittaford, Ivybridge, S. Devon.

**G3DHO**, H. W. Cooper, 74 Coroners Lane, Widnes, Lancs. (Tel.: *Widnes 3772.*)

**G3DSV**, R. W. P. Wilson, 14 Edgcombe Park Drive, Crowthorne, Berks.

**G3GEJ**, L. M. Airey, 14 Brandles Road, Letchworth, Herts.

**G3IJB**, W. J. Barker, Milestone Cottage, London Road, Wickford, Essex.

**G3ITW**, S. F. Berridge, 1 Fuller Road, Moulton, Northampton, Northants.

**G3JYB**, C. Teale, Longcross, Lansallos, Looe, Cornwall.

**G3LCR**, D. Garlick, 3 Canford Road, Allerton, Bradford, Yorkshire.

**G3LGX**, C. A. Gledhill, 113 Oak Road, Fareham, Hants.

**GW3LNZ**, G. J. Ralph, Bryn Ogwen, Llanfair Road, Abergele, Denbighshire.

**G3LXJ**, F. J. Fisher, 4 Dawes Avenue, Hornchurch, Essex.

**G3MBM**, J. D. Masters, 125 Whittington Road, Bounds Green, London, N.22. (Tel.: *BOW 7727.*)

**G3MEH**, R. E. Piper, Woodacre, Rydon's Lane, Old Coulsdon, Surrey.

**G3NCL**, R. Ray, BM/DDI, London, W.C.1.

**G3NOO**, B. R. Jessop, 2 Pinfold Lane, Riccall, York.

**GM3NOU**, W. S. Dunning, 17 Victoria Street, Dyce, Aberdeenshire.

**G6PJ**, B. Pashley, 15 Annesley Road, Greenhill, Sheffield, 8.

**G8JK**, R. Chadbone, Alresford Road Stores, 101 Alresford, Winchester, Hants.

155C worked, of which nearly 130 countries have been on the 21 mc band. In addition, 39 Zones have been accounted for on 50w. of AM phone. An SSB transmitter, built from data in the manuals and incorporating two  $\frac{1}{2}$ -lattice filters with 2/TT21's in the PA, is now under test.

G3NAC has never been an SWL. He first became interested in Amateur Radio early in 1957 on posting to No. 2 Radio School, R.A.F. Yatesbury—for duties having nothing whatever to do with Signals, incidentally. The R.A.E. was taken in May '57, and since then the goal has always been to make the station as efficient as possible. G3NAC himself also operates from the Club station at R.A.F. Central Flying School, Little Rissington, Glos.

The QSL policy at G3NAC is 100% response on receipt of transmitter cards, and all helpful SWL reports are also acknowledged; unfortunately, however, G3NAC finds that about 90% of SWL cards do not give reports or details that are of any use at all.

As the operator of G3NAC is a serving officer in the R.A.F., he is liable to be moved around the

world—sometimes, perhaps, to desirable DX locations. Therefore, the station equipment is kept as transportable as possible; the necessary items of gear go into two small packing cases. With overseas postings in prospect, an even smaller crystal-controlled SSB transceiver is being worked up on the drawing board for use from distant parts.

## EMBARRASSING MOMENT

A reader with a very new call sign in the G3P-series signed in at reception for the Trentham Gardens Rally, and was told there was someone else present with this same call. In due course, the inevitable encounter took place, and our correspondent found himself facing a very flustered individual wearing his call sign on his lapel badge. The rather lame explanation offered was that the receptionist had made a mistake when writing the call sign on the badge; however, when next seen he was no longer wearing any badge, and a check with reception showed that our reader's was the only G3P—call sign in the list.

# THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for July issue : June 16)

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

LAST month we made a brief comment on the problem of poor attendance which besets many Clubs, and related it to the absence of a well-organised and publicised programme for their meetings. This has brought forth several comments from secretaries and publicity officers of Clubs—mostly those that have succeeded in overcoming this trouble.

They are unanimously of the opinion that as soon as they have got some sort of a newsletter going, in which the forthcoming programme can be put before members, attendance has improved. In many cases members living at a greater distance than the average, who have not been seen for months or even years, have been fetched back to meetings by some particular event, and have then become regular attendants once more.

Regarding the difficulty of finding subjects and lectures: The secretary of *Rotherham* writes, "We can usually obtain sufficient volunteers from the membership to give lectures on a very wide range of topics, and one very well received evening is that devoted to 'Any Questions?'—and—boy—can the younger element think them up!" This particular Club *does* send out a well-planned circular (just one quarto sheet) with details of forthcoming meetings for about ten weeks ahead.

## Club Publications

It is only natural that there should be a tremendous variation in the size and ambitiousness of club publications—of which we now see a good many—for the clubs themselves vary from a handful of twelve or fifteen "locals" who get together informally, right up to the highly organised and well-established Radio Society with a permanent meeting-place of its own.

Those Clubs who never meet (*as Clubs*)—such as the A.R.M.S., the I.H.H.C. and the R.A.I.B.C.—are naturally those whose publications contain the greatest amount of information, and it is probably of general interest if a brief review is made of one such publication from time to time. This month's choice is the A.R.M.S., whose *Mobile News*, Vol. 2, No. 6, runs to twelve duplicated pages, about quarto size.

Subjects covered in this issue include a report on a Mobile Rally, technical notes on Interference Suppression, Auto Electrics and Loaded Aerials; Dates for the Diary; short paragraphs on DX worked; and some small humorous offerings which, we are delighted to admit, really are funny! (There is an excellent variation on an old one, offering a

reward for the capture of Hopalong Capacity, who escaped from a primary cell and had gone to earth after stealing some joules . . .)

Such publications obviously do a very valuable job in keeping a link between widely separated members who do not often meet much, even over the air.

*Barnet* hold their June meeting on the 27th, when G3HGE will be talking about VHF Equipment; at the May meeting, on the 30th, they heard G3KVF on Mobiles. *Bradford* have a talk on Model Aircraft, by G3OGV, on June 13, and on the 27th they visit the Leeds and Bradford Airport at Yeeden.

*Bridlington* held their first AGM recently, and re-elected most of their officers and committee members; from now on their meetings will be held at the headquarters of the R.N. Cadets, Applegarth Lane, Bridlington—7.30 every Wednesday, and they hope eventually to get a Club station on the air.

*British Timken* report membership increasing, and the Club Tx now active with 100 watts on Ten, Twenty and Eighty; on May 13 they visited the GPO station at Rugby, and on the 21st the U.S. Base at Barford St. John. They re-visit the same site for the A.R.M.S. Rally on June 18; note new secretary's QTH—in panel.

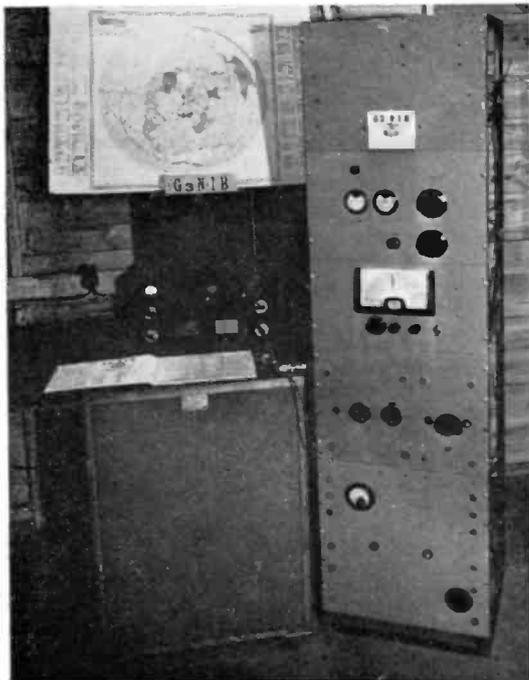
*Crystal Palace* hold their Morse class and so on, at G3IIR's QTH, on June 6; and the Saturday meeting on June 17 takes the form of a Junk Sale; this will be at Windermere House Annexe, Westow Street.

*Halifax* have acquired new meeting rooms in the Beehive and Crosskeys Inn, and meetings to be held there include a talk on Model Aircraft on June 6, an informal one on June 20 and a Junk Sale on July 4. The club is "under new management" and hopes to attract a much larger membership.

The I.H.H.C. will reach their peak of ham-hop activity this year, with a number of Trans-Atlantic tours already in the planning stage and that of VK5BP now half completed (he toured ZL, then on to VK6AJ, thence to ZS, where a programme has been arranged before he comes to the U.K.).

*Leeds*, disdaining the usual appellation of "junk," announced a Bring-and-Buy Sale for one of their May meetings; it certainly sounds more attractive. June 7 is the date for their AGM.

On April 19 a new Club, known as the *Northern Heights* Amateur Radio Society was inaugurated in Halifax; they will meet on alternate Wednesdays, 7.45 p.m. at the Sportsman Inn, Ogden; chairman is



The station of G3NIB, the British Timken Amateur Radio Club call sign, is accommodated in its own hut and is well equipped; founded by G3JJW and G3JXU, the Club now has about 20 members, seven of them with tickets, and is very active on all bands. In the transmitter shown here, and built by members, the PA is an 813, modulated by a pair of DA41's (hefty audio valves, in the TZ-40 category), and multiple power supplies giving up to 1,000v. at 500 mA are provided. After bad luck with Quads, the aeriels are now a dipole and a long-wire, with a ground-plane projected. During the winter session, the Club was very busy preparing candidates for the recent R.A.E.

G2DYY and secretary G3MDW. Future meetings are on June 14 and 28, July 12 and 26.

**Plymouth** held their AGM and elected G5ZT president, E. Fallon chairman and R. Hooper secretary; John Fallon, the treasurer, was presented with the G5ZT Trophy for the second successive year. G3JYB, chairman for the past three years, is moving out of the area to Cornwall, and will be much missed, but still with them on the Sunday morning net.

**Reading** recently had a very interesting talk by two representatives of the GPO on the subject of Licensing Conditions for the Radio Amateur; many questions were asked and very satisfactory answers received. On June 24 G3NNF will be talking on LF-band aeriels for confined spaces.

**Slade** meet on June 16 for a talk on Transistors

by N. B. Simmonds, and on the 30th, when the subject will be Portable Electric Tools; on June 11 they hold their Harcourt Trophy Test.

**Southgate** have had authoritative lectures on SSB and RTTY; their June lecture will be on R.A.E.N. by G8TL and in July there will be a talk on Crystal Filters, by S.T.C.—both meetings at Arnos School, Wilmer Way, N.14.

**Spen Valley** meet at Batley Park Lake for a demonstration of radio-controlled boats on June 7; June 21 is the date for their open and final meeting of the 1961 session, and July 5 their AGM for 1961-62.

**Sutton Coldfield** will discuss Transistors on June 8; there is no meeting on the 22nd, but on June 30 members will visit the G.P.O. station at Rugby (details from G3IGI); on July 13 Vernon Sutton will talk on Civil Defence Radio. **Wolverhampton** have a meeting "to be arranged" on June 12, and on June 17-18 they hold a private 70 mc contest.

The **British Two-Call Club** (membership open to British subjects with at least one overseas call-sign) have elected Major D. W. J. Haylock, G3ADZ, as president for 1961; G2DHV remains as secretary.

**Acton, Brentford and Chiswick** hold their regular meeting on June 20, and their CW practice session, on the first Tuesday of the month, continues to be well supported; all meetings are at the A.E.U. Club, 66 High Road, Chiswick, 7.30 p.m. **Clifton** held a successful Junk Sale in May; they have not arranged any lectures for the summer, but "Constructional and Ragchew Evenings" will continue, and there will also be portable field days and D/F tests. Note new secretary's QTH, in panel.

#### NOTICE TO ALL HONORARY SECRETARIES

Appearance in this space is free to those Clubs who care to make use of it for publicity and the reporting of their activities. Hon. secretaries are asked to ensure that their reports, addressed "Club Secretary," Short Wave Magazine, 55 Victoria Street, London, S.W.1, reach us by the date given each month at the head of the "Clubs" article. It is impossible to write in late reports, received after we close for press. All reports must include the name and QTH of the hon. secretary, for publication in the address panel. Photographs to illustrate the feature are welcomed, and payment is made for those we can use.

**Cheltenham**, recovering from their exertions in connection with the recent very successful Mobile Rally, are settling down to their regular programme, with meetings every Wednesday at 7.30 p.m. at St. Mark's Community Centre, Brooklyn Road. Field Days and D/F Tests predominate in their programme and the G5BK Cup is awarded to the Club member who puts up the highest score in the latter.

**Cornish** held their May meeting in Falmouth, when 9G1DN gave a talk on Life in Ghana. G3OCB followed up on the subject of Building a Receiver. Next meeting, on June 7, is also at Falmouth, in the Y.M.C.A., at 7.30 p.m.

**Crawley** meet on June 28, at the West Green Centre, and members are bringing along pieces of their own equipment for discussion. The Club hope to enter for the Two-Metre Field Day in July, and plans are being made for an outdoor meeting in August.

**Midland** report a highly successful part in the Trentham Mobile Rally in co-operation with the Stoke-on-Trent Club, which is reported separately in

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

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, W.3.  
 A.R.M.S.: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10.  
 BARNET: E. W. Brett, G3LUY, 28 Edward House, Edward Grove, New Barnet.  
 BRADFORD: M. Powell, G3NNO, 28 Gledhow Avenue, Roundhay, Leeds 8.  
 BRIDLINGTON: H. H. Mills, G3AJB, c/o 28 East Road, Bridlington.  
 BRITISH TIMKEN: J. B. Johnson, G3JJW, 44 Castle Avenue, Duston, Northampton.  
 BRITISH TWO-CALL CLUB: G. V. Haylock, G2DHV, 28 Longlands Road, Sidcup, Kent.  
 CHELTENHAM: J. H. Moxey, G3MOE, 11 Westbury Road, Leckhampton, Cheltenham.  
 CLIFTON: E. Godsmark, G31WL, 211 Manwood Road, London, S.E.4.  
 CORNISH: W. J. Gilbert, 7 Poltair Road, Penryn.  
 CRAWLEY: R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley.  
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23. (FOR 6940).  
 ENFIELD: V. Croucher, G3AFY, 15 Nelson Road, London, N.15.  
 HALIFAX: A. Robinson, G3MDW, The Candy Cabin, Ogden, Halifax.  
 I.H.H.C.: M. Allenden, G3LTZ, 16 Grovefields Avenue, Frimley, Aldershot.  
 LEEDS: D. Dinsdale, 69 Spen Lane, Leeds 16.  
 MIDLAND: C. J. Haycock, 29a Wellington Road, Birmingham 20.  
 MITCHAM: M. Pharaoh, G3LCH, 1 Madeira Road, Mitcham.  
 NORTHERN HEIGHTS: A. Robinson, G3MDW, The Candy Cabin, Ogden, Halifax.  
 NOTTINGHAM: R. Coulson, G3OBJ, 106 Salterford Road, Hucknall.  
 PLYMOUTH: R. Hooper, 2 Chestnut Road, Peverell, Plymouth.  
 R.A.I.B.C.: W. E. Harris, 4 Glanville Place, Kesgrave, Ipswich.  
 READING: R. G. Nash, G3EJA, 9 Holybrook Road, Reading.  
 REIGATE: F. D. Thom, G3NKS, 12 Willow Road, Redhill. (Reigate 5033).  
 ROTHERHAM: S. J. Scarbrough, 25 Crawshaw Avenue, Sheffield 8.  
 SLADE: C. N. Smart, 110 Woolmore Road, Birmingham 23.  
 SOUTHGATE: R. Pedder, G3NEE, 6 Greenall Close, Cheshunt, Herts.  
 SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.  
 SUTTON & CHEAM: F. J. Harris, G2BOF, 143 Collingwood Road, Sutton.  
 SUTTON COLDFIELD: L. E. R. Hall, G3IGI, 24 Calthorpe Road, Walsall.  
 THAMES VALLEY: K. Rogers, G3AIU, 21 Links Road, Epsom, Surrey.  
 WOLVERHAMPTON: J. Rickwood, 738 Stafford Road, Fordhouses, Wolverhampton.

**CLUB PUBLICATIONS RECEIVED**

We acknowledge, with thanks, the receipt of the following Club publications: **Reigate** (*Feedback*, No. 14); **Southgate** (*Newsletter*, May); **I.H.H.C.** (*Newsletter*, Vol. 1, No. 2); **Wolverhampton** (*Newsletter*, May); **Mitcham** (*Newsletter*, April); **A.R.M.S.** (*Mobile News*, Vol. 2, No. 6); **Enfield** (*Lea Valley Reflector*, Vol. 12, No. 12); **Crystal Palace** (*Newsletter* No. 63, May); and **R.A.I.B.C.** (*Radial*, Vol. 7, No. 3, May 1961).

this issue. They entered for the Two-Metre Field Day with G3MAR/A on Lickey Beacon, and made 76 contacts despite strong winds and showers. A meeting and lecture will be held on June 20, 7.30 p.m. at the Birmingham and Midland Institute, Paradise Street, Birmingham.

**Nottingham** (note QTH of new secretary, in panel) meet every Tuesday and Thursday and report a steadily increasing membership. Slow Morse practice can be arranged for any interested members, and a new console is under construction, to house the Club transmitter and receiver.

**Reigate** hold their monthly meeting at The Tower, Redhill, on June 17 at 7.30 p.m., when G3FRV will be talking about SSB; an informal night will be held at the same place on July 6, and the regular meetings on July 15 and August 19 will not have a set programme. Full activities will be resumed in September.

**Sutton & Cheam** will assembly at The Harrow, High Street, Cheam, on June 20; they recently held their AGM and elected G2AYC president, G5LC and G3HSK vice-presidents. G4DH chairman, G8DF vice-chairman and G2BOF secretary.

**Rotherham** have recently heard lectures on RTTY (by G3MBQ) and Causes of TVI (by G3HFD); they will be moving to a new location in July, and will then have G3OAM on the air during each club night, mostly on CW. From July 1 the summer schedule is in force, with meetings on the first and third Wednesdays. June 7 and 21 are the next dates, with the lecture starting at 8 p.m. sharp, and Morse practice at 9.30 p.m. **Thames Valley**, who had a large attendance at their May meeting on a Mobile Transmitter by G2CRD, will be hearing G3HQX on the Simple Approach to SSB at their June meeting, on the 7th, at the Carnarvon Castle Hotel, East Molesey. Six new junior members have now been enrolled, as it is TVARTS policy to encourage the young.

From the current issue of the R.A.I.B.C. publication *Radial* we get it that, through the helpfulness and generosity of G3NMR and Mrs. Margolis of A.R.M.S., a booklet on the G2FUX/M journey through Canada and the U.S. has been produced for the benefit of R.A.I.B.C. funds. This can be obtained with any remittance you may care to make, on application to the hon. secretary, R.A.I.B.C.—see panel for QTH.

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### SEQUENCE OF U.K. CALLSIGN ISSUES

It is commonly supposed that in the pre-war period U.K. callsigns were issued in a tidy numerical sequence, which automatically made a G2 "senior" to a G5, a G4 to a G6, a G3 to a G8 and so on. Nothing could be wider of the facts, as the following notes, first published in *SHORT WAVE MAGAZINE* in June, 1956, and here brought up-to-date, show quite clearly :

When amateur callsigns were first issued, before the 1914 war, they consisted simply of a group of three letters, e.g. DKX. After 1918, they came out with a numeral (2, 5 or 6) and two letters, roughly in alphabetical sequence, but with no prefix, e.g. 2DX, 5LS, 6XG. The prefix (initial letter) system followed in the mid-1920's, and for a time also carried, unofficially, a letter to indicate the Continent, thus, EG6ZR, for a U.K. station (in Europe). At that period, British two-letter callsigns with the 2, 5 or 6 numeral were issued quite indiscriminately, depending rather upon the applicant's name or initials, e.g. G5FJ, G6DH, G6WY.

In the mid-1930's, the G8AA series commenced, followed, illogically enough, by the G3AA and then the G4AA. It was in the G4 two-letter sequence that calls were being issued up to the outbreak of war in September 1939.

Also in the pre-war period, AA ("artificial aerial, non-radiating") licences were being granted to amateurs, these consisting only of the numeral 2 and

three letters, without the prefix, e.g. 2AHK. On attaining full radiating status, by passing the Morse Test, the callsign would be changed to a two-letter, with prefix, from the sequence then being issued. This was the system until September 1939.

With the resumption of amateur activity in 1946, after the war, all original calls were re-granted and AA call-holders as at the outbreak of war were given the privilege of converting to full radiating licences, simply by taking the G prefix with their old AA callsign, e.g. G2BVW. All new callsigns issued since 1946 under the post-war regulations have been in the sequence G3AAA onwards—bringing us down to the present time, with G3P — coming up.

The "order of seniority," then, is : two-letter G2, G5, G6 indiscriminately, determined only by actual date of issue; then the G8's, and after them the G3AA-G3ZZ's, the two-letter 3's; then the G4's; followed by the G2AAA-G2ZZZ's, the three-letter 2's; and latterly the G3AAA-G3ZZZ in alphabetical sequence.

As a footnote, it might be added that the system post-war is not quite as smooth as this, because in the last few years the G.P.O. has re-issued to new applicants a certain number of the old two-letter calls, rendered void either by death, surrender or war casualty. Some, indeed, have been re-issued more than once. Generally speaking, however, it is only those with a two-letter call in the G2, G5 or G6 series who can have been licensed 30 years or more.

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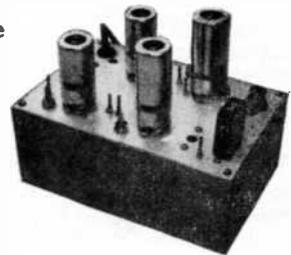
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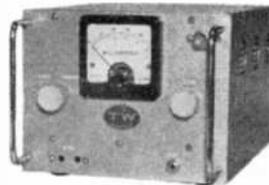
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**RTTY! Creed Type 3X Teleprinter, with ATM, FSK receiver adaptor, including pre-amp., limiter and PU, £20 o.n.o.?—G3DDK, Byways Mutford, Beccles, Suffolk.**

**PYE PTC-112 Radio-Telephone, 5w., 50 kc. 70-100 mc. 12v. input; ditto mains input; both overhauled, mint condition; £40 pair, plus carriage.—Box No. 2456, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**

**R. 107 RF UNIT, cased, electrical bandspread, xtal calibrator, 90s.; BC-453, AVC, 55s.—both units £7. Type 50 36 ft. mast, nine 4 ft. sections, pickets, guys, 90s.; 28 ft. mast, four 7 ft. sections, telescope down to 7ft. for transit, 70s.; two bottom sections, 14 ft. mast, 32s. 6d. Goodman's 12 in. speaker with multi-ratio O/P transformer, 70s. TU5B Top Band Tx, TT11 VFO, TT11 PA, 30s. Signal Generator, 45s. MN26C, internal power pack, 70s. Various transformers, power packs, components, valves, etc.; s.a.e. wants, details. Prices, carriage paid. — Williams, 12 Arowry, Hanmer, Whitchurch, Salop.**

**WANTED: B2 Tx/Rx; must be complete with power pack, coils, etc., and in mint condition. All letters answered.—Details and price to: Pete, c/o ZC4SS, P.O.B. 216, Famagusta, Cyprus.**

**MOVING QTH: Large amount gear to dispose of cheap: Tx, Mod., SX-28, E52B, BC-221, B2; transformers, meters, etc.; s.a.e. for list.—Box No. 2457, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**

**DST-100, Mk. III, 50 kc-30 mc. £17. No. 52 Set, 1.75-16 mc, £6; all good order, power supplies included. Two-speed reversible coil winder, rev. counter, £5 10s. All carriage extra; prefer collect.—The Vale, South Road, Horndean, Portsmouth, Hants.**

**HRO Rx, very nice condition, £20. TCS Receiver, £4. Heathkit VFO, new, £6 10s. Cossor 'Scope, faulty, with handbook, £7. Bulle battery clock, 50s. 9 in. speaker in case, 25s. 1000v. transformer, 20s.—Box No. 2458, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**

**SALE: American DX-100U with auto-transformer, exc. cond., £40. 10- and 15-metre Bi-Square, all-aluminium construction, with 25 ft. mast, guys and coax, £12. 30-watt Tx and 50-watt modulator, on 5 ft. rack, £12 o.n.o.?—G3NPZ, 73a Park Road, New Barnet, Herts. (Tel. Bar. 4144.)**

SMALL ADVERTISEMENTS, READERS—continued

**S**ALE: 1961 Minimitter MC8 8-band converter, power supply included; little used, as MR44/11 just received; £13 (carriage paid). Also a good R.107. offers? Will deliver reasonable distance.—Ivin, B.B.C. Ludlow, Shropshire. (Phone Brimfield 240.)

**W**ANTED: Compact Tx: DX-100 Valiant, etc., with accessories. Also decent Rx, GC or bandspread; can collect; s.a.e.—Merrett, C19, Chace Guildhouse, Coventry, Warks.

**W**ANTED: G3OVO wishes to buy or borrow a copy of Q57 for May, 1951.—Information to: Southend, Beck Hill, Tealby, Lincoln.

**E**DDYSTONE S.640, FB cond., £12 10s. or offers? Teleprinter, Creed 7B, excellent cond., £12 10s. Elizabethan WBM unit, £1 10s.—G3NDC, 3 Orchard Road, Farnborough, Kent.

**M**OBILE/HOME STATION, ZC1, Mk. 1, modified 160/80m., mains/battery, PSU, speaker, leads, extra speech amp., mike, £12. MCRI miniature communication receiver, 2000-16m. except Top Band, PSU, phones, £6 10s.—Swinerton, 4 Orchard Way, Rickmansworth, Herts.

**150**-WATT Tx, 7-chassis rack, 813 final, 90% complete; transformers cost over £30; Woden UM3, etc., 7 metres; £20. Exchanges welcomed. Gloucester area.—Box No. 2459, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**M**ALLORY 12-volt vibrators, 4-pin UX base, new, in sealed boxes, 5s. each; 5 for £1.—GM3BQA, 19 Edinburgh Road, Cockerzie, East Lothian.

**T**ELEPRINTER WANTED, Creed Model 7B. Must be in 100% condition; also RTTY converters. Would exchange 150w. Tx, similar to LG.300. All letters answered.—Write Box No. 2451, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**P**ANDA EXPLORERS: Two unused transmitters for sale; offers invited: will deliver any area, if necessary.—Walker, 5 Beacon Brow, Bradford 6, Yorkshire.

**W**ANTED: Mosley Beam; please state full particulars, where seen, etc. Labgear 5-position coax switch, E-Tx-Rx, relay, £3, or consider exchange W.H.Y.—G3NQX, 1 Gib Lane, Hoghton, Nr. Preston, Lancs.

**W**ANTED: Your unwanted, unserviceable receivers and/or transmitters; condition not import. Commercial items preferred, but amateur-built considered. All letters answered.—Box No. 2452, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**W**ANTED: Eddystone, Type S.390, power pack, less valve, perfect and unmodified.—Henderson, 13 Parkmount Parade, Belfast, 15.

**E**XCHANGE Minimitter MR-37 amateur communication receiver for good quality tape recorder or cash. **W**ANTED: Minimitter or Labgear LP filter.—Childs, G3GVC, 18 Glamorgan Road, Catherington, Portsmouth, Hants.

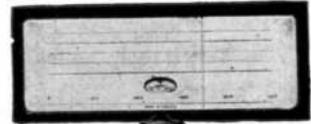
**25** EACH: 12AU7, 12AX7 (offers within 5 days). CQ, Jan. 1961, 5s.—R. Grain, 15 Waverley Gardens, Grays, Essex.

**HOME RADIO OF MITCHAM**

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**EDDYSTONE**

898 Slow Motion Dial



Geared drive with vernier scale and 110 to 1 reduction. Flywheel loaded movement giving smooth positive action. The pointer has 7" horizontal travel. Complete with escutcheon, knob, fixing screws, etc. Size 9 1/2" x 5 1/2".

£3.11.4 plus 1/- post overseas post 7/6

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Slender elegant appearance and suitable as hand, desk, or floor-stand microphone. High output moving-coil dynamic unit with level response from 50 to 15,000 cycles. Available in low, medium, or high impedance, and various adaptors and accessories for all uses. High impedance model with adaptor and base as illustrated, PRICE £9.19.6 post paid.



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**PETER SEYMOUR**

COMMUNICATION EQUIPMENT SPECIALISTS

	£	s.	d.
NATIONAL H.R.O. 50T1 with all coils, general coverage and bandspread covering from 1.7-30 Mc/s. including special 21 Mc. bandspread coil. Direct calibration on dial, built-in 1000/100 Kc. calibrator, power unit, etc. As brand new. ....	145	0	0
COLLINS 51J-3. .5-30 Mc/s. Xtal controlled front end, tunable I.F. system 30 bands dial accuracy better than 500 c.p.s. 100 Kc. calibrator. The new cost of this receiver is almost 500 pounds	195	0	0
EDDYSTONE S640. 1.8-30 Mc. xtal filter, bandspread built-in power, complete with 5 meter	25	0	0
MARCONI TF144G. Brand new in packing case with spares. Signal generator, covers from 86 Kc.-25 Mc/s. A superb instrument at a very low price (P/P £1)	25	0	0
BC221. Complete with charts	15	0	0
EDDYSTONE 840A. As new; 500 Kc.-32 Mc/s. 110-230 A/C-D/C input	35	0	0
A large purchase of Collins TCS receivers now enables us to supply these sets as new at £8/10/-, soiled at £5/10/-, R107 in fair condition £7/10/-, R200, similar £6/10/-, PANDA "EXPLORER" in first class condition, 150w. A1/A3, 80-10 mtrs.	45	0	0
TS175A/U in new guaranteed condition accuracy .01% 80-1000 Mc/s.	60	0	0
HRO COILS. General coverage, most types in stock	1	12	6
HRO IF TRANSFORMERS. .... 3 for AR88. "D" dials, 10/-; "D" and "LF" windows, 12/6; output trans. £1.	1	0	0
COLLINS TCS. BFO units complete in can with ceramic tuning capacitor	3	6	
COLLINS TCS. Mobile power supplies input 12 VDC, output 440 @ 200 Ma and 220 @ 100 Ma. Fully suppressed and filtered	5	0	0
BC453. "Q" fivers unmodified condition	4	10	0
1392 RECEIVERS. 100-156 Mc/s. unmodified	3	10	0
COMMAND. 4-5.3 Mc/s. transmitter	2	5	0

We are still desperate for communications receivers of all types and trust the many readers of the "Mag." may help us in this hour of need.

Part exchanges welcome, Hire purchase arranged on equipment over £35.

410 BEVERLEY ROAD, HULL, YORKSHIRE Tel. Hull 41938

**PRECISION MAINS FILTER UNITS**, totally shielded 2½ amps, 10/- (2/6). 2½" **ELLIOTT BASIC METERS**, 2000 ohms per volt, scaled 0/1v., 20/- (2/6). 2½" **MILLIAMMETERS** 0/30 or 0/100 or 0/500, 12/6 each (2/6); 0/1 m/a, 15/- (2/6). **5 FT. P.O. RACKS**, 19" wide, 55/- (15/-); 36" ditto, 40/- (7/6). **6 FT. BENDIX TRANSMITTER CABINETS**, open 19" front, full length rear door ventilated, 100/- (20/-). **BC-610 WHIP AERIALS** 9ft, long in canvas holdall, 30/- (5/-). **40" AMERICAN ONE PIECE MOBILE WHIPS** with loading coil in base effectively increasing height to 12 ft., 35/- (5/-). **28 FT. ALUMINIUM 1½" DIA. MASTS**, self supporting with all fittings in canvas holdall, total weight only 7 lbs. beautiful job with twin 150 m/cs. folded dipoles on boom and stainless steel strainers, 10 ft. ground circle required, £12 (paid). **BC-659 TRANSMITTER-RECEIVERS**, 14 valves crystal controlled (less crystals and valves), 35/- (10/-). **BC-659 POWER UNITS** for above, 6 or 12v. input (less vibrators), 25/- (10/-). **BC-659 BATTERY BOXES**, 7/6 (5/-) — all above are matching units and form complete mobile set. **MODULATION TRANSFORMERS** Bendix interstage, 7/6 (1/6); R.C.A. driver, 15/- (3/6); Bendix 50 watts, 15/- (3/6); Woden 85 watts, 40/- (7/6); G.E.C. 200 watts, 63/- (7/6). **MINIATURE RELAYS**, 1700 + 1700 ohms, SPDT, 10/- (1/-) also 700 ohms DPDT: 145 + 145 ohms DPDT, 10/- each (1/-).

**40 PAGE LIST OF OVER 1,000 ITEMS IN STOCK AVAILABLE — KEEP ONE BY YOU**

**COLLINS AUDIO AMPLIFIERS** with 3 transformer a/V C 2 x 2000 ohms output 8 x 5 x 4 chassis, 15/- (less valves, requires 2 = 6V6 and 1 = 12SJ7) (3/6). **METAL RECTIFIERS**, 12v. 1A., 5/- (1/6); 24v. 12A., 20/- (3/6). **CABINET RECTIFIER SETS**, 200/250v. A.C. to 110v. 0.7A., 59/6 (7/6); 50v. 1A., 59/6 (7/6). **STEP DOWN TRANSFORMERS**, 250 watts double wound enclosed G.E.C., 230/110v., 40/- (5/-); 1350 watts, £8/10/- (15/-). **WOODEN CHOKES**, 20H, 400 m/a, 20/- (5/-). **BENDIX CHOKES** potted II-H, 270 m/a, 12/6 (3/6). **HIGH QUALITY INTERPHONE AMERICAN AMPLIFIERS**, 4 valves, 3 stages, P/P output (P = 12A6), totally enclosed with dynamotor for 28v. D.C. input, 40/250 ohms output 5 watts easily convertible to hi-fi, size 9 x 5 x 5 with valves, 25/- (5/-). **AMERICAN MORSE KEYS** J-47, 3/- (1/6); British Morse Keys, enclosed type D, 10/- (2/6). **American T-27 desk carbon mikes**, 12/6 (2/6). **Chast Telephones** T.39, 12/6 (2/6). **TRANSMITTER DOOR SAFETY SWITCHES**, DPST surface fixing, 3/6 (1/6). **SIEMENS H.S. POLARISED RELAYS**, 500 + 500 ohms, 6/- (1/6). **SIX-INCH DIA. MILLIAMMETERS**, Turner 0/1, 79/6 (3/6). **KURMAN RELAYS**, 7000 ohms SPDT Sigma, 10,000 ohms, SPDT, 12/6 each (2/6).

We have large quantities of "bits and pieces" we cannot list — and invite your enquiries — we can probably help — every one answered.

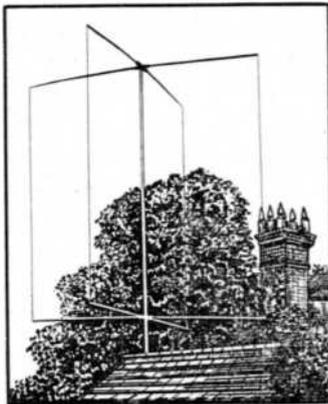
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**P. HARRIS, Organford, Dorset**

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- Compact Size — Less than half that of a Cubical Quad for comparable frequency.
- 9.5 DB. Forward Gain — 25 DB. F/B Ratio on 14 and 21 Mc/s.
- No interlaced elements. No compromises.
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Tel.: PADDINGTON 2160.

SMALL ADVERTISEMENTS, READERS—continued

**SALE:** R.1155 Receiver; needs slight attention; built-in power pack; BFO needs refitting. AR77E receiver, reasonable condition, one broken dial, needs aligning; also needs attention. What offers? Plus carriage or collect.—J. E. Robins, 18 St. John's Close, Marlborough, Wilts.

**URGENT:** Handbook and circuit for the R.107 and also *Short Wave Magazine*, October 1958.—Gorrill, 4a Southgate Parade, Crawley, Sussex.

**BARGAINS:** 2-metre Transmitter, originally cost over £200. Oil-filled transformers, etc., 50 watt output, sacrifice £30. Several ECC84 xtal-controlled cascode converters for 2 metres, £7 each. Transistorised electronic Morse key, £4. Eddystone S.640 receiver, S-meter and built-in speaker, £18. 100 assorted valves, £1. TU5B VFO, with 100 kc xtal check. £1 10s. Carriage extra all items; s.a.e. details.—G3GTW. D. Kirk, 74 Clough Road, Rotherham, Yorkshire.

**WANTED:** VHF Receiver, with mains power unit, 2 to 5 metres. I have camping equipment for exchange. Will collect Yorkshire area; send full details.—Box No. 2453, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** BC-312N, good condition, stabilised power pack, manual, £17 10s. or near offer?—Ward, 135 Norwich Road, Wroxham, Norwich, Norfolk.

**WANTED:** Manual for CR-100.—Pallant, "Royal Standard of England," Forty Green, Beaconsfield, Bucks.

**SALE:** Linear L50, 50-watt Hi-fi Amplifier, new EF86/EF86/12AX7, pair EL34's, GZ34 rectifier, £8 10s. o.n.o.—G3NJQ, 50 Vicarage Road, Norwich, Norfolk.

**MINIMITTER MOBILE RIG**, Tx, all-band converter, 1.5 mc IF, control box, transistor PU. aerial, mic, and stand, only needs cables, £50 o.n.o.—Fenton, Niarbyl, Gay Bowers, Danbury, Chelmsford, Essex.

**TX** 100w., 2/807 push-pull, RCA exciter, switched 3.5-28 mc, modulator and power packs, all in RCA steel cabinet, £20 o.n.o.—Lavers, 33 Motspur Park, New Malden, Surrey.

**SALE:** Heathkit Sideband Adapter, SB-10, FB condition, latest Heathkit modification, £30 o.n.o.—G13GXP, Sunmount, Kilkeel, N. Ireland. (Phone Kilkeel 298.)

**SALE:** Eddystone S.740, 9-valve, 500 kc-30 mc, 8 in. speaker, good condition, £25; buyer collects.—Searle, 1 Manor Court, Grange Park Road, Leyton, London, E.10.

**EDDYSTONE 680X** Receiver for sale, excellent condition, recently thoroughly overhauled by makers, separate speaker included; delivered Midlands: £78.—Box No. 2454, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**COLLINS TCS** mains PSU wanted urgently; must be complete and unmodified.—Please write: Quigley, 142 Bell Vue Road, Cowes, Isle of Wight.

**EDDYSTONE 358X** Communications Receiver, in perfect condition and complete with speaker, mains power pack and original maker's handbook; delivered reasonable distance; offers around £13.—G3LNK, 36 Oldfield Street, Fenton, Stoke-on-Trent, Staffs.

## SMALL ADVERTISEMENTS, READERS—continued

**TCS Tx/Rx**, complete with all plugs, loading coil, xtal mic., 230v. AC power supply, £20 o.n.o.?—Wagh. 30 Craiglockhart Gardens, Edinburgh.

**Ex-G2FL**, going QRT: Tx, Rx, transformers, valves, etc.; send s.a.e. for list.—Young, Homefield Road, Saltford Village, Nr. Bristol.

**VANGUARD 10-160m.**, mint condition, additional EF86 pre-amp., hi/lo sens. mic. inputs, grid block keying, provision Vox or push-to-talk control. Rx muting, relay supply, £40.—G3LCZ, 13 Almond Grove, Stockton-on-Tees. (Tel. 66248.)

**FOR SALE:** Eddystone S.740 receiver, with S-meter, FB condition, £22. **WANTED:** Service Data Ekco CR-61 car radio.—(Phone Harrow 1386, evenings.)

**HALLICRAFTER SX-100**, Woden S/D Trans-former, 10in. 3-ohm speaker; purchased mid-March 1961; £120. Owner emigrating ZL-land. Prefer buyer views and collects by appointment.—Coldwell, Lockram House Cottage, Nr. Mortimer, Berks.

**SSB PACKAGE**, complete kit of parts (less 6146), with mixer xtals for 14-21-28 mc, £15 (see QST, June 1958). Valves: New boxed QY3-65, £5; TT21, 28s. 6d.; QVO6-40A, 30s.; 6AG7, 7s. 6d. Rack with castors, 31 ins. high (hinged back), no panels, £2 10s. UM2, 60s. Xtals 12250 kc, 20s.; 1685, 1000 kc (U.S.A.), 10s. each.—Olley, 157 Wanstead Park Road, Ilford, Essex.

**VANGUARD Tx**, 160-10m., Chan 4 LPF, £40 o.n.o.? Minimitter Hamband convtr., 1.5 mc IF, £12 o.n.o.? Both exc. cond. Pair 8111A valves, 15s. each.—Offers to Pitt, 103 Bellshill Crescent, Rochdale, Lancs.

**AR 88D**, PVC wired, good condition, £37 10s. Home-built copy LG.300, complete with NBFM and sequence keying, but needs 6.3v., 350v., 1000v. power supplies, £18 10s.—G2FDF, 106 Liberty Lane, Adlestone, Surrey.

**MOBILE:** Complete MINIMITTER outfit: MC8 Converter, 1.8-30 mc; Transmitter, 1.8 to 7 mc; Control box; Transistor power supply, 12v.; Whip base, 3 loading coils and top section, Demonstration on car, circuit, ex. cond., £42 o.n.o.? K.W. "Vanguard" Tx, LP Filter, ex cond., 3.5-30 mc, £37 10s. o.n.o.? CR-100, S-meter, manual, K.W. Converter, £30; would separate. Labgear Top Band Tx, mint cond., manual, £20 o.n.o.? Ex-Navy Transformer, new, 1000/0/1000 tapped 1/2/4/6/800v., 250 mA, 45s.—French, G3HSE, 78 Brocklehurst Street, New Cross, London, S.E.14. (New Cross 1594.)

**FOR SALE:** 70-watt rack-built Tx, £5; 2/S.T.C. ball microphones, £3 each; other items. Send s.a.e. for list.—G3FZM, 46 Whirlow Grove, Sheffield, 11.

**CR-100**, very nice condition, £16. Geloso 4/102 VFO, complete, £6 10s. Carriage/postage extra.—Bailey, 13 Heywood Road, Alderley Edge, Cheshire.

## G. W. M. RADIO LTD

**RECEIVERS** Type 52 Canadian, 1.75 to 16 mc/s. in 3 Bands. 1 RF, 2 IF stages. 10 valves plus 3 valve Crystal Calibrator, 10, 100, 1,000 kc/s. Oscillator has separate vernier control for accurate frequency spotting. Crash Limiter. Broad/Sharp selectivity. 500 mic/amp valve check meter. 3" speaker or 'phones. Power required: 150 volts HT, 12 volts LT, £5 carr. £1. Vibrator pack to suit, 12 volts DC input, 10/- carr. 2/6.

**COMPONENTS** removed from Transmitter. 813 valve tested in 'Ham Transmitter, £1 post 2/6. Base to suit, ceramic, 2/6 post 9d. Cooling Fans, 12 volt, 1 amp DC, compact unit 7/6 post 2/-. Aerial Relay, 2-pole C.O. 12 volts DC, 3/6 post 1/-. P.A. Tuning Capacitor, 200 + 200 pf. suitable for 1200 volt use, 7/6 post 2/-.  
**VALVES**, Ex-equipment. All heaters tested before despatch. EF91, EF92, EB91, 1/- each, 9/- doz. 12AU7, 2/-; 6V6, 2/6. All guaranteed. Post 3d. singly, dozen free.

**COSSOR 339 OSCILLOSCOPES**, Overhauled and guaranteed working, £10, carriage 10/-.

**RECEIVERS B28/CR100**, Aerial tested before despatch. Overhauled and in good order, £17 10s., carriage £1.

**CRYSTALS**, last 200 mixed at 15/- dozen our assortment, 10X and B7G glass type. Post free.

**230 VOLT TRANSFORMERS**, 250-0-250 at 80 m/a, 5v. 2a., 6.3v. 4.5a., 17/6, post 2/6. These are new spares for type 3 rack mounting power pack.

**MULLARD Resistance/Capacity Bridges GM4140/1**, compact bench tester, 0.1 ohm to 10 megohm, 10µF to 10 mfd, £4 carriage 5/-.

**3 INCH RIBBED PYREX GLASS AERIAL INSULATORS**, 1/- each. Postage and packing 1/-, free on dozen or more.

All equipment offered is complete but not tested unless otherwise stated. Carriage charges are for Mainland only.

Terms: Cash with order. Early closing Wednesday.

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### THE TOP TEN

- EDDYSTONE RX'S**, 680X, £140; 888A, £110; 840A, £55; 870A, £33. Full range of components, including 898 dial, 71/4; Doublet Aerial, £3/3 complete, etc., etc. Post extra!
- HALLICRAFTERS**, HT37, £215; SX101A, £187; SX111, £120; SX110, £78; S38E, £28.
- BIRKETT'S BETTER BEAMS**. We introduce an add on 3 element unit which fits any W.S. 5 element 2 mtr. Yagi — with 1" Boom Price, 19/6 each, plus 3/6 carr. Our usual 5 ele. W.S. Yagi and bracket to fit 1" to 2 1/2" masts at 39/6 + 3/- carr. 8 element W.S. Yagi 59/- plus 3/6 carr.
- EX522 MOD. TRANSFORMERS**, 7/-, 2/- P.P.; Driver, 6/-, 2/- P.P.; Anode Choke, 5/-, 1/6 P.P. Have you got a spare?
- JAP STICK MIKE. BLACK AND CHROME**. Xtal. 100-8000 c.p.s. with switch and neckband. This mike is a low cost, superior finished and good output. Try one. Money refunded if not completely satisfied. Mike 45/- + 1/6 P.P. Heavy desk stand, 13/6 + 1/6 P.P.
- VIBRATOR PACKS**, 1/P. 12v., 4/5a. O/P 300v. 100 m/a's., 21/- each, 3/6 P.P. Also 1/P 12v. O/P 170v. 50 m/a's., 17/6 each, 3/6 P.P.
- 1961 BOOKS**. By return post. Call Book, 4/-, 6d. post; ARRL Handbook, 32/6; 55B Book, 14/-; Mobile Book, 23/6; Antenna Book, 18/6. All the latest issues! Add Postage please.
- ARBS CABINETS**. Black crackle or grey hammer finish. Repressed as new. Have one for your new Tx, etc., 89/6 each, plus 10/6, safe carr. and packing. Fits G2DAF TX.
- DO YOU KNOW WE STOCK?** Denco, Osamor, Repanco, Geloso, Weyrad. Radio control Tx and Rx's kits. Contessa kits. You name it. We've got, well almost! I, etc., etc., etc. Many ex-government lines to offer.
- LOG BOOKS**. Large, 15/9, 1/6 P.P.; Medium, 12/9, 1/- P.P.; Small, 7/9, 1/- P.P. Pair 6L6M, 12/6, 1/6 P.P. 8" x 1 1/2" Bamboo Poles, 8 for a £1, 7/6 carr. and packing. Tubing Alloy, O/D 1/2" — 8d.; 1/2" — 11d.; 3/4" — 1/1; 1" — 1/6 per foot. 14" x 2" Strong Alloy Masts, 83/9 + 7/- carr. Die Cast 2" Mast Couplers, 8/9 + 2/- P.P. Guy Clamps, 4/9, 1/- P.P., etc., etc. 50" whips, 100" whips, etc. See April Magazine.

We buy in any make of receiver in good condition (No fancy mad's please). Best prices paid. Part exchanges always welcome.

**NORMAN BIRKETT LTD**  
THE SPOT, 26 OSMASTON ROAD, DERBY

## SMALL ADVERTISEMENTS, READERS—continued

**R.** 1475 Rx. with manual, £10. BC-221 and PSU, no charts, but calibrated for Amateur bands. £5. Top Band Command Tx/Rx, 12v. rotary, £5. SX-28 up-dated, with manual, £25. GBL516 16-mm. sound projector, screen, spares, 10000 ft. film, best offer? Geloso converter, little used, £12. Denco VFL, £3. 50K preset pots, 3s. doz. 440 Tx, 2-metre 30s.—G3MVU (Phone DOM. 1299).

**S**WL requires information regarding conversion of R.A.F. Rx R.1392 to variable tuning.—J. Wilson, 18 Peebles Avenue, West Hartlepool, Co. Durham.

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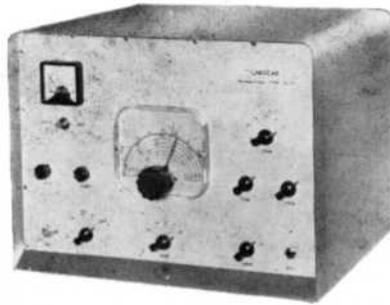
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