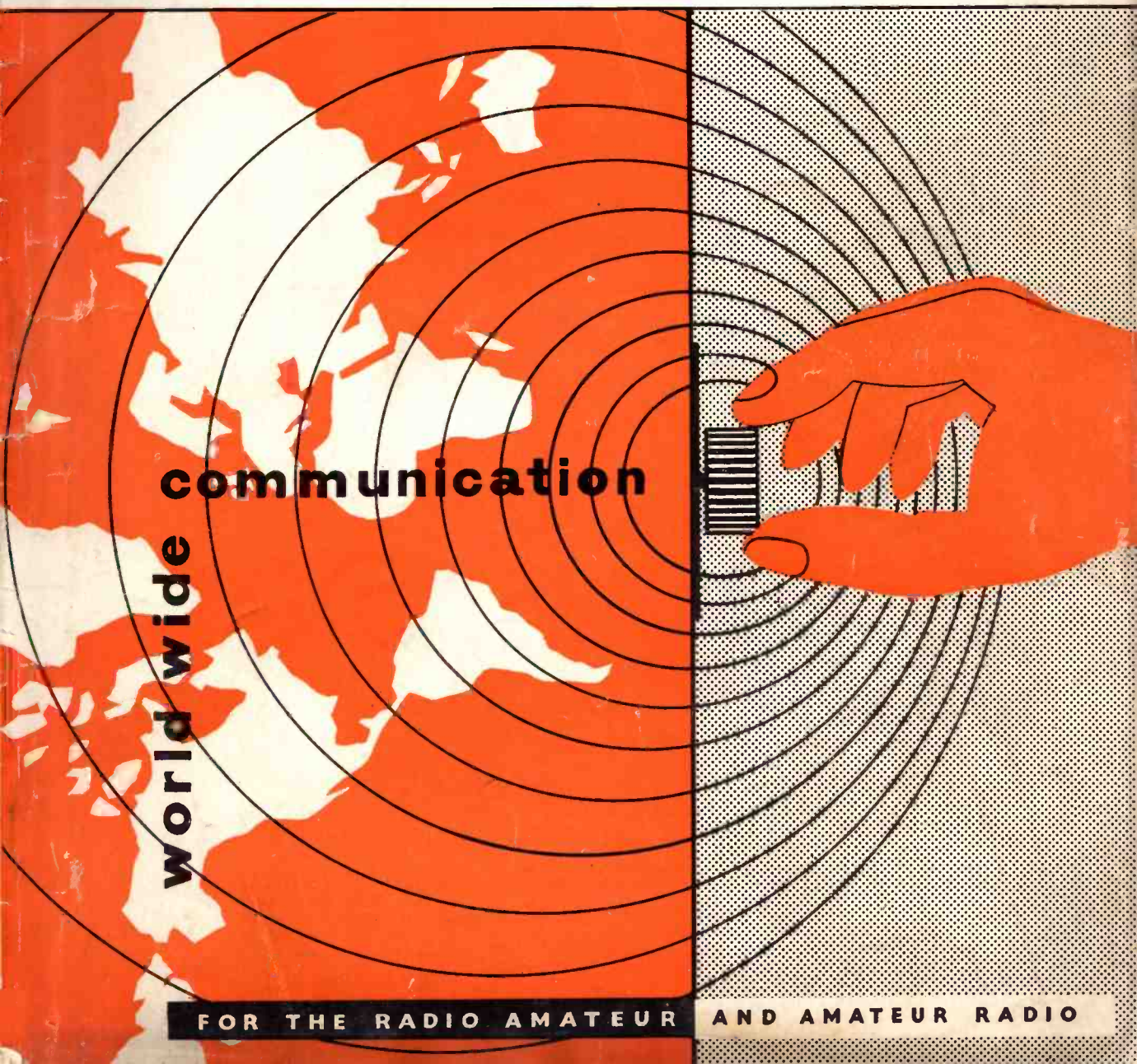
The SHORT WAVE Magazine

2/6

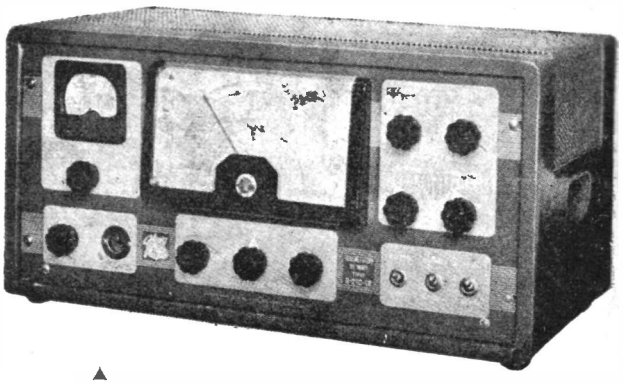
VOL. XV MARCH, 1957 NUMBER 1

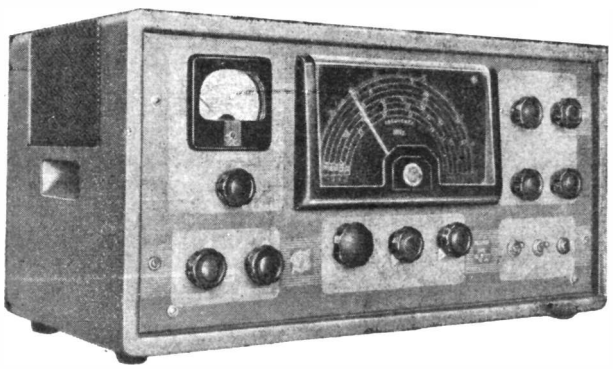


FOR THE RADIO AMATEUR AND AMATEUR RADIO

K. W. ELECTRONICS
LIMITED
for GELOSO Equipment

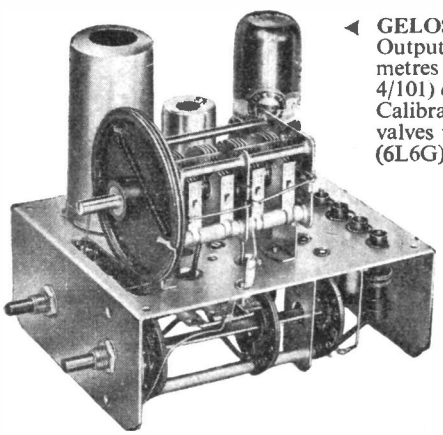
This world famous Equipment for the radio amateur is now available through K. W. Electronics Ltd. who Laboratory test this equipment before dispatch.





▲ **TRANSMITTER G.210/TR.** Completely enclosed with power supply unit 35 watts input. 80, 40, 20, 15, and 10 metres. Mod. pair 6L6g's. Pi output circuit. Audio input for crystal Microphone. Phone/c.w. A beautiful compact job. Price **65 gns.** Complete with valves.

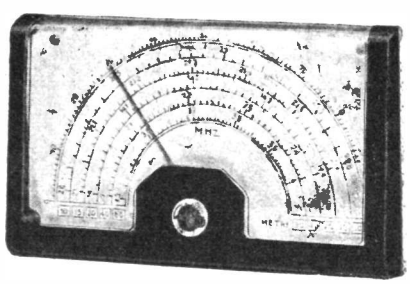
◄ **RECEIVER G.207/DR (1957 Model).** Double conversion super-het. Band spreads 80, 40, 20, 15, 11, 10 metres A.M. and N.B.F.M. and C.W. 'S' Meter. Crystal filter. Excellent Signal/Noise figures. Price complete with valves, **£83.**



◄ **GELOSO SIGNAL SHIFTER.** Output 80, 40, 20, 15, and 10 metres to drive single 807 (model 4/101) or two 807's (model 4/102). Calibrated dial 8¼" x 5". Uses valves type 6J5GT, 6AU6, 6V6G (6L6G). Price less valves, **£7/17/6.**

Use it to drive that 6146 (*QVO6-20*) *or a pair, miniature* 807's, 829, 4*D32, etc. Just the job for that mobile rig. Available ex-stock.*

Credit sale or H.P. facilities available.



▲ Dial and Escutcheon supplied with Signal Shifter.

T.V.I. PROOFING?
Use our LOW PASS FILTER. 75 ohms impedance (co-ax line). Negligible insertion loss up to 35 mc/s. At least 80 db attenuation at T.V. frequencies. 1 kw. rating. Size 12" x 2" x 2". **Price £3 17s. 6d.**

DEMONSTRATIONS ARRANGED

REMEMBER — K. W. ELECTRONICS Ltd. for GELOSO Equipment. We also manufacture "Hamobile" 2 metre transceivers and a complete range of VHF "BUSINESS RADIO" EQUIPMENT. All enquiries are given the personal attention of G5KW or G8KW.

IMMEDIATE DELIVERY

K. W. ELECTRONICS LTD.

G5KW 136 BIRCHWOOD ROAD, WILMINGTON, DARTFORD, KENT **G8KW**

Telephone: Swanley Junction 2137.

INDEX TO ADVERTISERS

SHORT WAVE MAGAZINE

VOL. XV MARCH 1957 No. 163

CONTENTS

Managing Editor: AUSTIN FORSYTH, O.B.E. (G6FO)

Advertisement Manager: P. H. FALKNER

Published the Friday following the first Wednesday each month at 55 Victoria Street, London, S.W.1. *Telephone: Abbey 5341/2*

Annual Subscription: Home and Overseas 30s. post paid.

AUTHORS' MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT WAVE Magazine

EDITORIAL

Justification

This issue of SHORT WAVE MAGAZINE *starts yet another volume, the 15th in the series and our 12th since the war — which means that 132 monthly issues have come out in those eleven years. A long time, and a lot of work — but we may perhaps claim that there is something to show for it, and that the policy to maintain complete independence on all matters pertaining to Amateur Radio has been fully justified.*

Independence of thought or action is, however, not always popular. Sometimes, in what we have considered to be the general interest, it has been necessary to take a line or express views which have by no means pleased everybody.

The interesting thing is that in important instances the course of action suggested, or the prognostication made, in SHORT WAVE MAGAZINE *has in the end (dare we say it!) turned out to be the right one, in every way justified by later events. This is not "being clever," nor is it just guessing, or simply luck. It is the proper result to be expected when long experience is brought to an objective and impersonal examination of a particular situation or problem. Indirectly, the proof of this lies in the fact that some suggestions on a major issue, first put forward by the writer in these pages just five years ago, are now being actively canvassed by the very people who rejected them out of hand at the time when they were first made. The validity of the original argument has been proved by the course of events since. Another five years may perhaps see the fulfilment of all those ideas.*

However that may be, our business is always to look forward. Readers may be assured that while the policy of independence of thought and action — first adopted for SHORT WAVE MAGAZINE *nearly 20 years ago — will be maintained, that policy will continue to be shaped (as the last ten years have shown) in what we conceive to be the best interests of the radio amateur and Amateur Radio.*

Austin Forbes Gotfa

Inexpensive Single-Sideband Exciter

DESIGN, CONSTRUCTION AND ALIGNMENT PROCEDURE (FILTER SYSTEM UNIT)

J. HEADLAND (G3BFP)

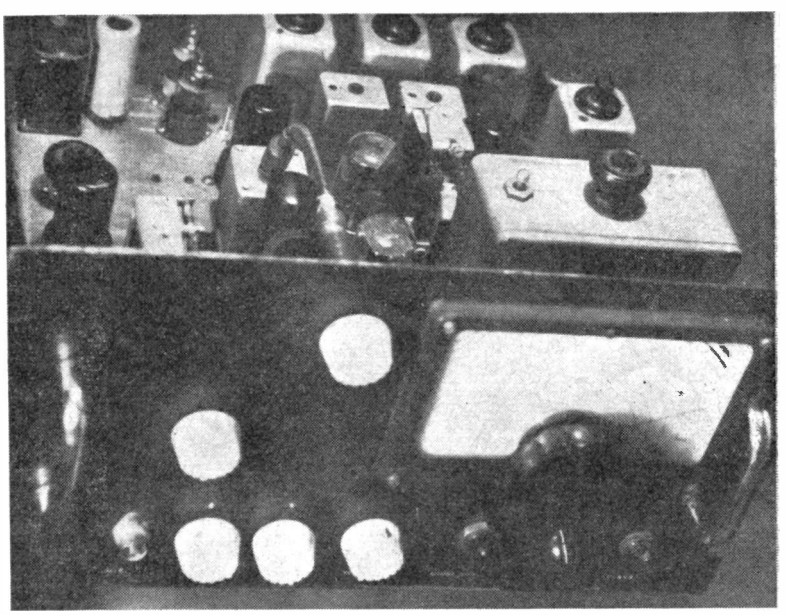
The information given in this essentially practical article will enable anyone with experience of constructing amateur-band transmitting equipment to get started on SSB. Our contributor, working from first principles, has produced a complete SSB Exciter Unit which has already been copied at several stations now using this design on the air. The SSB mode of amateur-band telephony working has so much to commend it that no keen operator can afford to ignore it as an effective system of communication. This article, while showing how the Exciter can be constructed and set up, also explains the basic principles of the filter-system technique for producing an SSB signal.—Editor.

MOST amateurs have either heard or actually experienced the advantages of Single Sideband operation. The author's interest was first aroused in 1954 after building a selectable sideband receiver which allowed a check to be made on many of the SSB signals then on the bands. After a short spell of listening it was obvious that here was a system which offered a new concept of phone operation: A 6-9 dB increase in talk-power over a similar powered AM transmitter, voice controlled break-in and, above all, something new to try.

Of the two methods of generating SSB signals, phasing and filtering, the latter probably appeals most to the amateur who desires to experiment and although initially some thought was given to the possibility of using the phasing system, after due consideration it seemed that the filter system offered far more scope for cut-and-try.

The filters usually employed in single-side band generators operate either at frequencies of 20-30 kc or in the normal IF range of 400-500 kc. In the former case toroidal-wound coils are employed because of their high-Q capabilities. The IF-type filters make use of quartz crystals, arranged in half-lattice or full-lattice sections; here, for reasons of economy, the well-advertised "surplus" FT241 series find favour. However, the supply of these with the right frequency spacing necessary for correct operation of this type of filter has now become difficult, and even if the correct channel numbers are obtained there is no guarantee that the crystals will be on the wanted frequencies.

The heart of the home-built selectable sideband receiver at G3BFP is an 85 kc strip with the transformers liberated (if that is the word) from a surplus BC-453 Command receiver. It seemed that these transformers might offer a possible solution to the problem of obtaining suitable filter elements. Further impetus was given to this idea when a number of people "in the know" suggested that it was *not* a workable proposition! However, through the kindness of a fellow amateur, four of the 85 kc IF transformers were collected to act as a nucleus of an exciter operating in the 3.5 mc band.



General appearance of the SSB Exciter designed and built by G3BFP. The VFO unit is in the box, at right, behind the panel in line with the tuning dial. The voice-control relay is to the immediate left of the VFO box — see main layout plan Fig. 3.

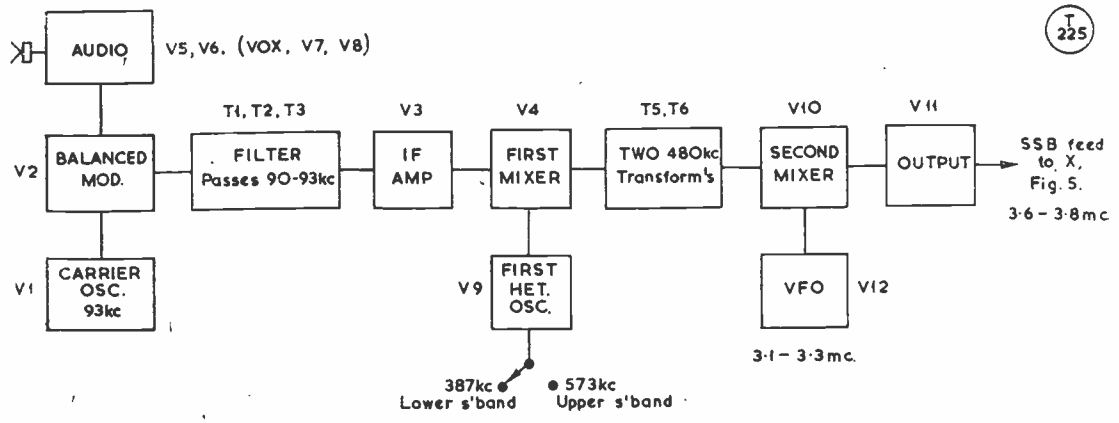


Fig. 2. Block schematic of the unit layout of the G3BFP filter-type SSB Exc ter. SSB drive output is given over the range 3.6-3.8 mc. Circuitry of the various units is shown in detail in Fig. 1.

Next, let it be said that the exciter-transmitter described here is not a "one off" special, but represents a design that has been duplicated by several amateurs in the South London area. It is simple to construct and can be aligned without recourse to any equipment which would not be found in almost all amateur stations.

Circuit Description

The SSB signal is generated at a frequency of 93 kc—see Figs. 1 and 2. This particular frequency was chosen only because a crystal was immediately to hand. Crystals on 85 kc have since become available on the surplus market and in fact, any crystal within *plus* or *minus* 10 kc of 85 kc would be suitable. The crystal oscillator (V1) is of the conventional tuned-grid, untuned-anode type with the crystal replacing the usual grid coupling condenser. The output of this oscillator is fed into the cathodes of a pair of 6C4 triodes (V2) which are used as a conventional balanced modulator with the AF fed into the grids in push-pull, the output being two sidebands 90-93 kc and 93-96 kc with the carrier completely eliminated if the anode circuit is correctly balanced. The HT is fed to the balanced modulator anodes *via* the variable arm of potentiometer R4, which is connected across the primary of the first IF transformer T1. This control, together with the variable condenser, C5, are brought out as front-panel controls for ease of adjustment. Two further IF transformers, T2 and T3, together with T1 coupled in cascade with 3 $\mu\mu$F capacities, provide the main sideband filtering. Because of the crystal frequency used it is necessary to modify the IF transformers so that they tune to the sideband frequencies. The modification consists in removing the small fixed condensers from inside the transformers and replacing them with 100 $\mu\mu$F mica trimmers connected externally across the primary and secondary windings. The first IF amplifier is a 6SK7 (V3), which is gain-controlled by a variable resistor in the cathode circuit; this is necessary to prevent over-loading of later stages. The output from the 6SK7 is transformer-coupled to a 6SA7 mixer (V4) which heterodynes the wanted sideband from 93 kc to 480 kc. The oscillator voltage for the mixing operation is derived from a further crystal oscillator (V9) which operates on either 387 kc or 573 kc, depending on whether the upper or lower sideband is required. The frequency of 480 kc was carefully chosen because of the possibility of spurious beats, produced at the fifth harmonic of the 93 kc carrier oscillator, leaking into the second IF chain and thus generating a carrier on an adjacent frequency.

Two transformers in cascade, tuned to 480 kc, couple the output of V4 to one grid of the double-triode balanced mixer valve (V10).

The VFO covers a frequency range of 3.12 mc-3.32 mc. The oscillator is a cathode-tapped Hartley with the output taken from the anode, as shown at V12, B.

V10 is used to mix the 480 kc sideband signal with the VFO output into the 80-metre band. Cathode injection to V10 of the VFO voltage is used and experience has shown that this mixer arrangement is superior to the single-ended pentagrid type because it requires only minor capacitative balancing to give a high attenuation factor to the two input signals and unwanted mixer products.

The 80-metre output of V10 is capacity-coupled to the grid of valve (V11) which is a conventional Class-A amplifier with both grid and anode circuits tuned. Damping resistors

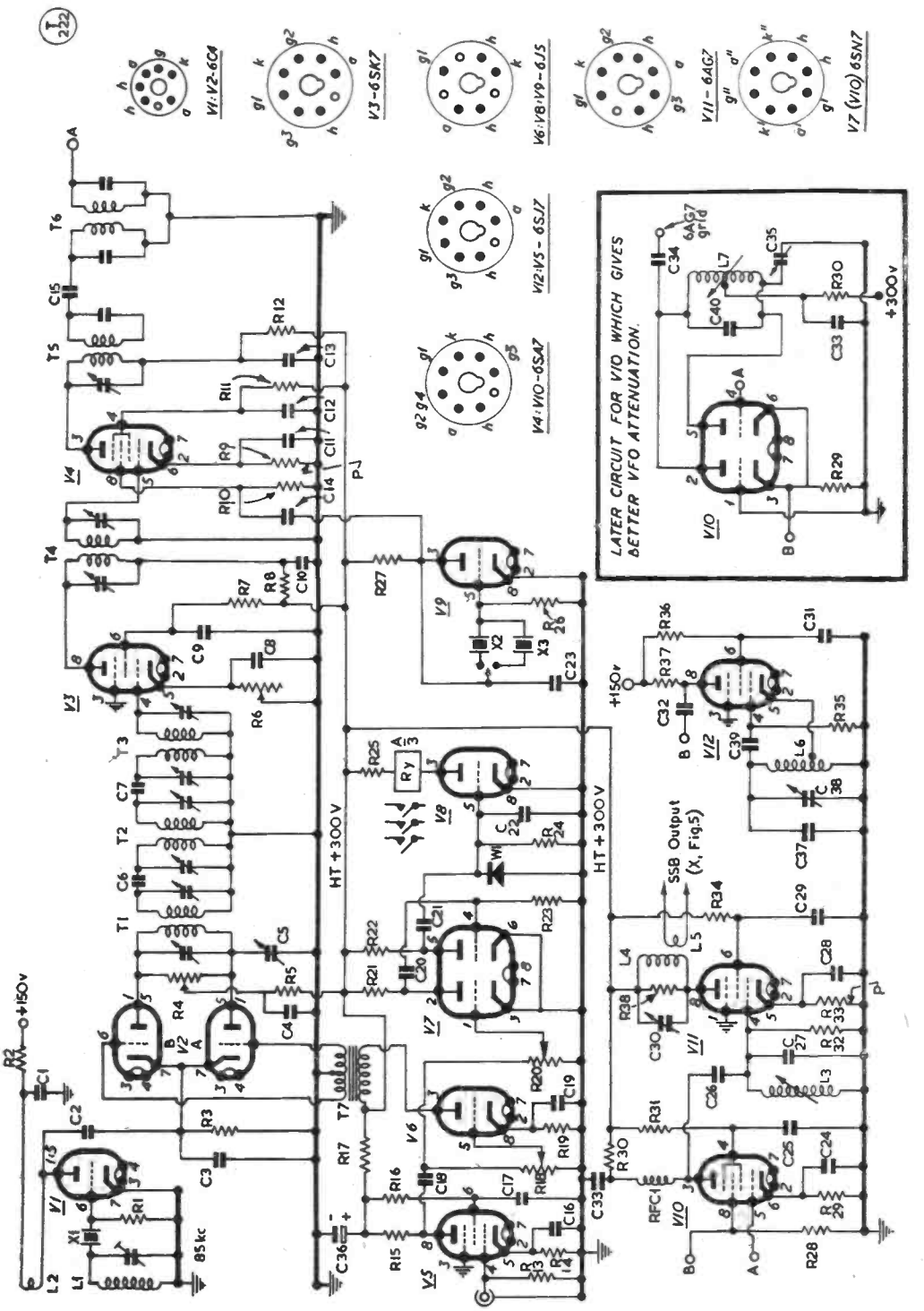

V1: V2-6C4
V3-6SK7
V6: V8: V9-6J5
V11-6AG7
V7 (V10) 6SN7
V4: V10-6SA7
V12: V5-6SJ7
LATER CIRCUIT FOR V10 WHICH GIVES BETTER VFO ATTENUATION.
+300v
+150v
HT +300 V
SSB Output (X, Fig. 5)
85 kc

Fig. 1. Circuit diagram complete of the Filter-Type SSB Exciter designed and described by G3BFP. Referring to this circuit and to the block schematic in Fig. 2, V1 is the carrier oscillator, V2 the balanced modulator, V3 IF amplifier, V4 1st mixer, V5-V6 first and second audio stages, V7 the voice-control amplifier acting at points P in the cathodes of V4 and V11, V8 is the VOX (voice-control) relay, V9 the first heterodyne oscillator, 387 or 573 kc, V10 second mixer, VII the output stage, and V12 the 2nd heterodyne oscillator, actually a VFO covering 3.1 to 3.3 mc.

Table of Values

Fig. 1. Circuit of the Filter System SSB Exciter by G3BFP

C1, C4, C8, C9, C10, C11, C12, C13, C20, C21, C24, C25, C28, C29, C31, C33	= .01 μF	R21, R22, R32	= 100,000 ohms
C2, C14, C23, C26, C27, C30, C32, C34, C38, C39, C40	= 100 μμF	R23, R24	= 500,000 ohms
C3	= 500 μμF	R25	= *See text*
C5, C35	= 30 μμF	R33	= 150 ohms
C6, C7, C15	= 3 μμF	RFC1	= 1.5 mH RF choke
C16, C19	= 50 μF, 25v.	W1	= Westector WX1
C17	= 0.1 μF	X1	= 75-95 kc crystal
C18	= .005 μF	X2	= T5-T6 freq. *minus* X1
C22	= 0.25 μF	X3	= T5-T6 freq. *plus* X1
C36	= 8 μF, 500v.	T1, T2, T3, T4	= 85 kc
C37	= 300 μμF, silver mica	T5, T6	= 465 kc
R1	= 25,000 ohms	T7	= Wearite Type 232
R2	= 250,000 ohms	V1	= 6C4
R3, R37, R38	= 10,000 ohms	V2A, V2B	= 6C4
R4	= 50,000 ohms, var.	V3	= 6SK7
R5, R8, R12, R30	= 6,800 ohms	V4	= 6SA7
R6	= 5,000 ohms, var.	V5, V12	= 6SJ7
R7, R26	= 20,000 ohms	V6, V8, V9	= 6J5
R9, R29	= 220 ohms	V7	= 6SN7
R10, R11, R28, R31, R34, R35, R36	= 22,000 ohms	V10	= 6SA7, or 6SN7
R13, R16	= 1 megohm	V11	= 6AG7
R14, R19	= 1,500 ohms	L1, L2	= 85 kc BFO assembly
R15	= 500,000 ohms	L3	= 35 turns on ¼-in. dia. slug-tuned former
R17, R27	= 50,000 ohms	L4, L5	= 30 turns 22g. enam. on 1½-in. dia. former with 4-turn link
R18, R20	= 500,000 ohms, var.	L6	= 20 turns 18g. enam. on 1-in. dia. former, tap at 6t. from earth end
		L7	= 30 turns total, wound bifilar on ¼-in. dia. slug-tuned former, 22g. enam.

R32 and R38 are included across each tuned circuit to improve linearity.

The output is taken *via* a link and short length of co-axial cable to a TV type socket on the rear chassis apron.

Audio Side

The audio section consists of a 6SJ7 valve followed by a 6J5 (V5 and V6) in a straightforward voltage amplifier circuit; ample gain is available for low output crystal or dynamic type microphones.

The output is fed through a single-ended to push - pull transformer to the balanced modulator valves (V2). The speech level is controlled by a potentiometer R18 connected in the grid of V6.

Voice control operation (VOX) is obtained by connecting a further AF stage (V7) to the output of V5. The VOX amplifier is a 6SN7. The output is rectified by a Westector type WX1 (cathode earthed) and the resultant DC provides the negative voltage to cut off the relay control valve (V8); condenser C22 and resistor R24 provide the necessary hold-in delay between words. The VOX relay has a 4000-ohm coil, and is a double-pole break (when energised) type, obtainable from "surplus" sources.

Potentiometer R20 is the threshold control which is used to adjust the VOX gain to suit local noise conditions. Resistor R25, in series with the VOX relay in the anode of V8, is chosen so that under static conditions (no audio input) the current through the relay coil is sufficient to close the armature firmly. Under "talk" conditions V8 is biassed to cut off, thus passing no anode current and the relay is de-energised. One set of relay contacts controls the cathodes of the second mixer valve (V4) and also the amplifier (V11), breaking at points P in Fig. 1. The second set of contacts can be used to key external circuits, *e.g.* aerial relay, power supply, and so forth.

Construction and Layout

The exciter is built on an aluminium chassis 12ins. x 10ins. x 2½ins., the front panel measuring 14ins. x 8ins. x 16 SWG.

The general layout can be seen by reference to the constructional drawings and it will be seen that it closely follows the theoretical sequence.

Not so obvious on the plan view is the control of V11 grid tuning, L3. This is a slug-tuned coil housed in a screened box adjacent to V11. The slug is adjusted from the front panel by means of a flexible drive, bending through 90°.

In the photograph of the underside of the exciter it can be seen that the filter section is completely screened from the other circuits. Screens are also placed across the filter transformer bases, thereby isolating the primary circuits from the secondary to prevent capacity coupling—apart from that intended between them, this consisting of a piece of 80-ohm ribbon about 1¼ins. long. The screen across the first transformer is most essential as without it random RF from the balanced modulator wiring will couple into the secondary of this transformer and destroy the effectiveness of the carrier balancing.

Alignment Procedure

For those in possession of a receiver covering

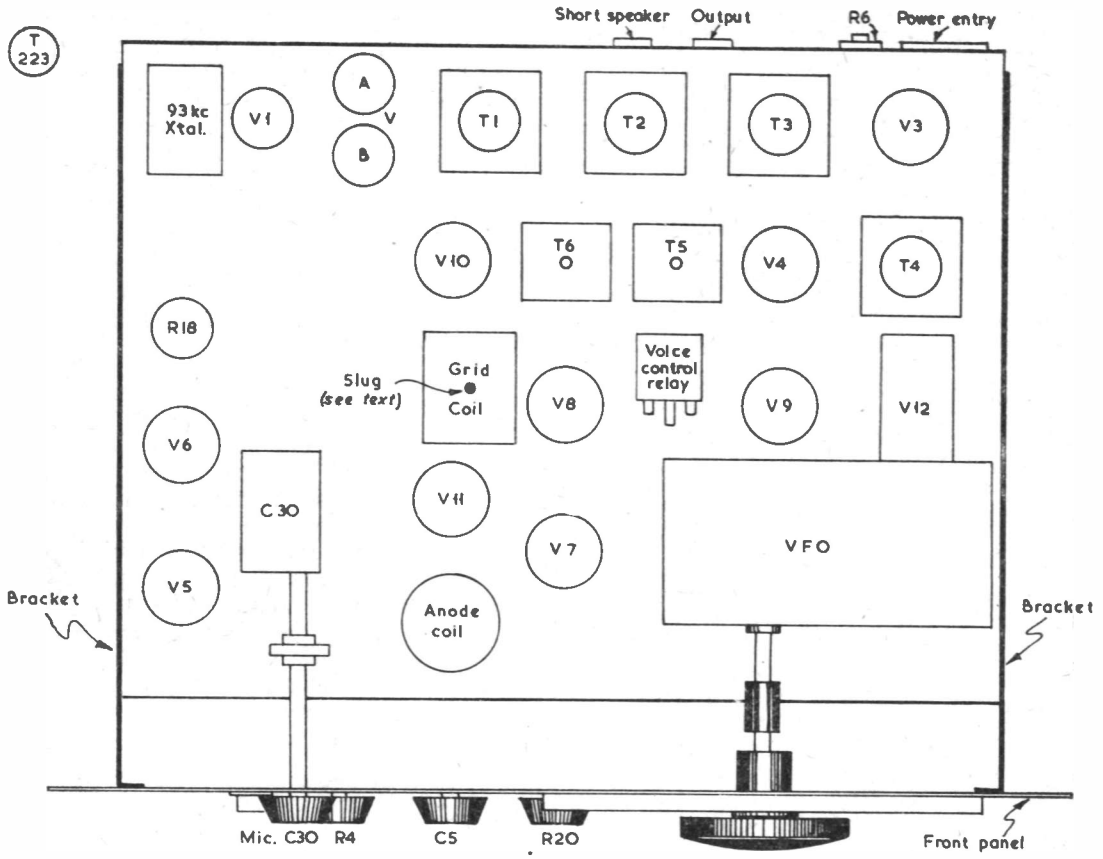


Fig. 3. Plan view of the general layout, showing placement of parts, which can also be identified in one of the photographs accompanying the article.

the frequency of the filter, *i.e.* 90 kc approximately, the lining-up procedure is extremely simple. (A National HRO with 50-100 kc coil, an R.A.F. R.1155, or a CR-100 are very suitable receivers for this purpose.)

The aerial input of the receiver is loosely coupled to the signal grid of V4 and an audio tone of about 2·8 kc injected to the microphone socket of the exciter. (In the writer's case this was obtained with the aid of a spare receiver together with the frequency meter and the resultant tone introduced by feed back between the loudspeaker and the microphone.)

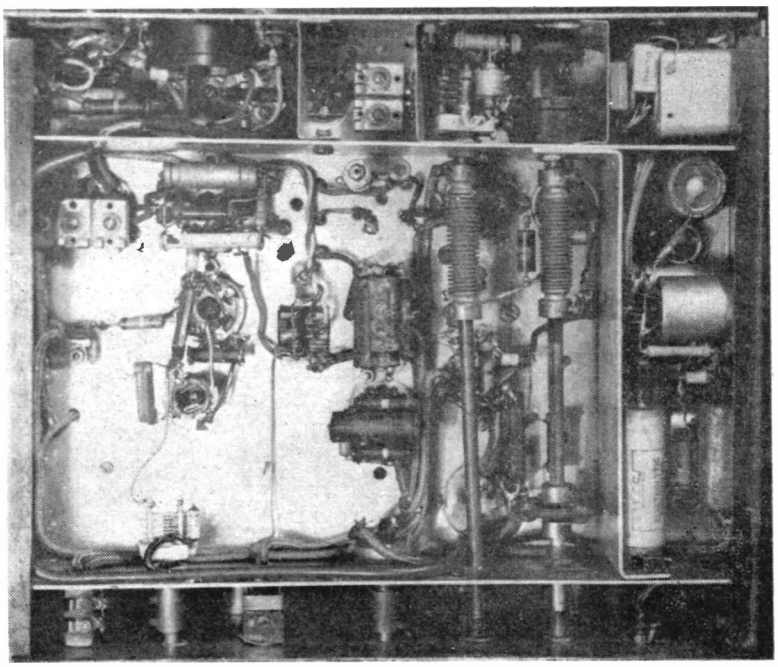
Tune the receiver to 93 kc, where the carrier will be found with its two sidebands at 95·8 kc and 90·2 kc. Ensure that all the filter transformers have their plungers withdrawn to the high selectivity position. Retune the receiver to the lower sideband on 90·2 kc and adjust the under-chassis trimmers (or those on top of the transformers if the filter is to be on 85 kc) to give maximum S-meter reading. (It will be found that the primary tuning of T1 is very flat due to the presence of R4). It is wise to repeat this alignment as the primary and secondary circuits have a detuning effect on each other. Having peaked all the transformers on the lower sideband, the selectivity plunger of T3 is pushed down slightly to broaden the response curve of the filter. This may sound a rather hit-or-miss method and although the resulting curve is not ideal for SSB generation, having neither a flat top or very steep sides, on-the-air reports of unwanted sideband rejection of 30 dB are generally received and tests with an audio oscillator show that frequencies above 3 kc are attenuated in the unwanted sideband far in excess of this figure. Whilst discussing the filter, the question may arise as to why 2·8 kc was chosen as the lining-up frequency; it was found after several tests that lining up the filter on this frequency was the best compromise between unwanted sideband attenuation and voice reproduction.

After tuning the filter, carrier balance can be checked by adjustment of R4 and C5. If the latter control seems to have no effect on balancing, re-wire it to the other side of T1 secondary. It should be possible to reduce the carrier by at least 60 dB, only leaving some extraneous hum which will not be radiated on the transmitted signal.

Now cut off the audio input, unbalance R4 to let through some carrier, transfer the receiver coupling to the unearthed grid of V10 and tune the receiver to 480 kc. (If this is not possible, due to lack of receiver coverage, tuning to the second harmonic at 960 kc on a BC receiver will suffice).

Adjust transformers T5 and T6 for maximum S-meter reading. This "maximum reading" should occur whichever position the sideband selector is in. It it does not, it means that crystals X2 and X3 are not separated by twice the frequency of X1 and the necessary adjustments must be made to the crystals by careful edge grinding.

Having previously checked the VFO coverage, it should now be possible to identify the signal on the 80-metre band by transferring the receiver coupling to the anode circuit of V10 and peaking L3 for maximum output. Connect a 6·3v. bulb to the anode coil of V11



Under-chassis layout of the G3BFP SSB Exciter. The audio section is in the right-hand compartment, and the 93 kc carrier oscillator (X1 section) in the top right-hand corner.

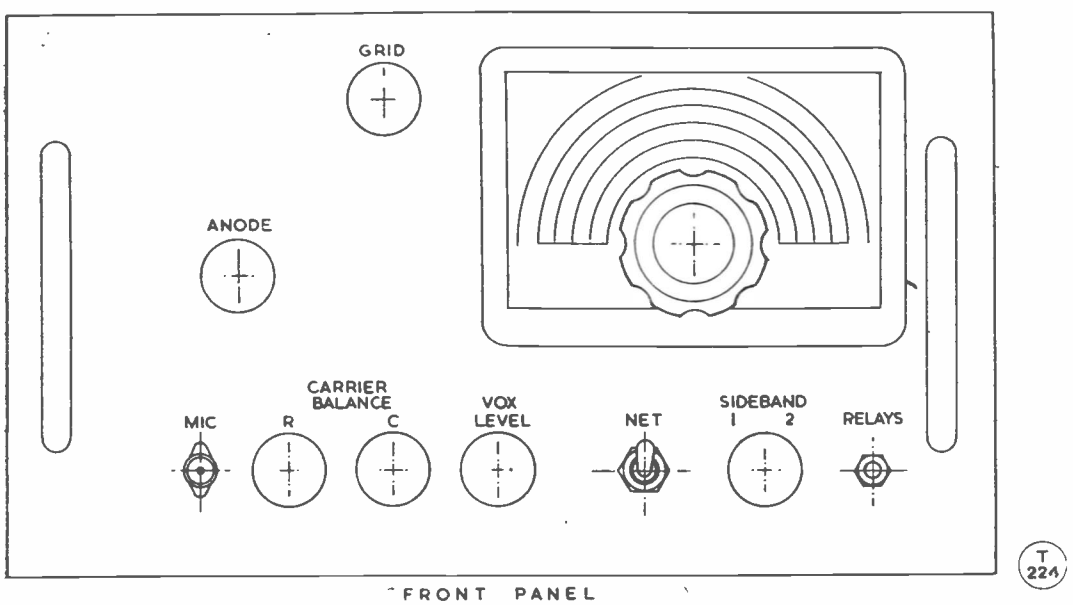


Fig. 4. Front panel layout of the G3BFP SSB Exciter.

Table of Values

Fig. 5. PA Driver Stage for SSB Transmitter

C1, C2, C3. C6 = .001 μF
C4 = To tune bands with L1
C5 = 100 μμF
C7, C8 = 50 μμF
R1 = 10,000 ohms, 1-w.
R2 = 4,700 ohms
R3, R4 = 20,000 ohms
R5 = 6,800 ohms.
L1 = For 14 and/or 21 mc
L2 = Tapped for 18 and 25 mc
X = 6.10 or 8.35 mc crystal.

via the output link, and either by fully unbalancing R4, or whistling into the microphone when the carrier is balanced, it should light to full brilliance. Presence of the VFO signal in the output is reduced by tuning the receiver to the VFO frequency and adjusting C35 in conjunction with L7 for minimum level.

Resistor R6 controls the overall gain of the stages previous to the output valve, V11. During the early trials with the exciter it was found that the unwanted sideband was not clean and that several inter-modulation products were present. This was traced to V11 not being run under true Class-A conditions because it was being driven into slight grid current. Reducing the overall gain of the previous stages by the introduction of R6 eliminated this trouble. A milliameter inserted in the anode of V11 acts as an indicator, and R6 is adjusted until the current remains practically constant with or without full drive, such as a whistle or unbalanced carrier.

The best setting for the speech amplifier gain control was found to be that which, on speaking, produced an indication of about half brilliance on the dummy load bulb.

The VOX gain control, R20, is set as high as possible, the controlling factor being room background noises and, of course, the level of talk-back signal from the loudspeaker. Too low a setting will tend to make the operator shout in order to hold the VOX relay in.

Linear PA Unit

Although not strictly included in the title of this article, it was thought that some information on a companion PA driver unit covering the HF bands would be of interest.

The circuit design, Fig. 5, is kept as simple as possible. Output from the 3·5 mc exciter is *via* a low-impedance link to the cathode of a 6SK7. The signal grid of this valve is driven by the output of an overtone crystal oscillator on 18030 kc or 25050 kc; the "difference output" of 14 mc or 21 mc appears in the anode circuit and is extracted by a parallel-tuned circuit which is capacity coupled to the grids of a pair of 807's, as in Fig. 6. Pi-coupling is employed in the anodes of these valves to

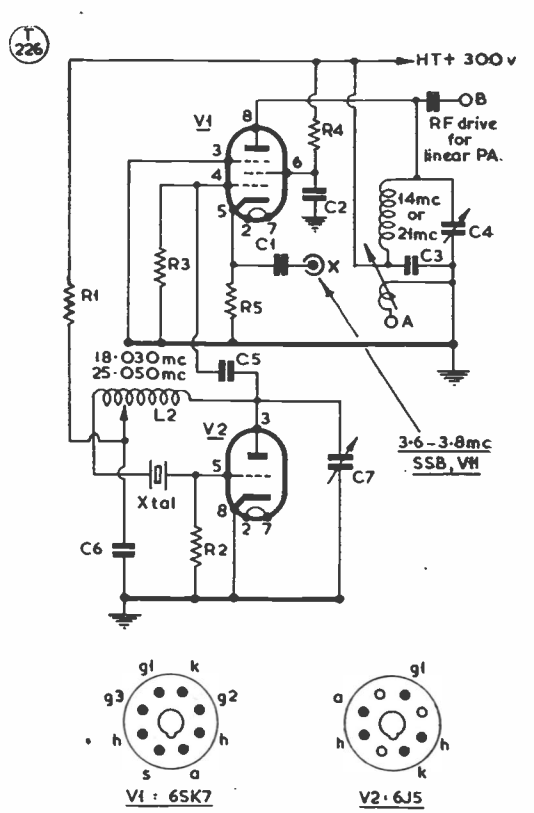


Fig. 5. SSB driver stage as the penultimate unit for a linear PA. V1 in this circuit is driven on the cathode by the SSB Exciter proper, and produces output on 14 or 21 mc by mixing with V2, using a harmonically excited crystal. V1 is a 6SK7 and V2 a 6J5. The frequency relationships chosen give final SSB drive over the phone areas of the 14 and 21 mc bands.

give an output impedance of 80 ohms. The two small link coils in the pi-coupler are used for neutralising and are gang-switched with the taps on the main coil.

An anode HT of about 1,250 volts is used, derived from a power pack employing only condenser smoothing of 14 μF.

A stabilised screen supply of 300 volts is obtained from two VR150's in series and grid bias is supplied by a 30-volt deaf aid battery.

As a point of interest, it has been found that Hytron-manufactured 807's (those with the smoky glass) stand up to the high voltage better than other makes. Typical grid and anode current figures are 1 mA and 150 mA respectively for normal speaking, rising to 3 mA and 300 mA for a sustained whistle.

Future Additions

It is hoped to employ an anti-trip system in the near future whereby the receiver can be run at a good volume without the necessity of

Table of Values

Fig. 6. Suitable Linear PA for the G3BFP SSB Exciter

C1, C2 = .001 μF
C3 = .01 μF
C4 = 50 μμF, 2500v. DC test
C5 = 100 μμF
C6 = 500 μμF
RFC = RF chokes
L1 = Tapped pi-tank coil for bands required

turning down the VOX gain to prevent the relay from operating. This is easily done by rectifying the receiver output and applying the resulting DC voltage in reverse polarity to that produced by the VOX rectifier.

An additional advantage on the Exciter itself would be some visible form of monitoring the carrier balance, such as magic eye or meter.

A modification, which has now been made and will be the subject of a future article, is the fitting of electronic pass-band tuning. This overcomes the necessity of crystals for X2 and X3 and allows optional positioning of the side-band on the filter characteristic curve, whilst still maintaining the same output frequency.

Sideband switching is still available from the same control position.

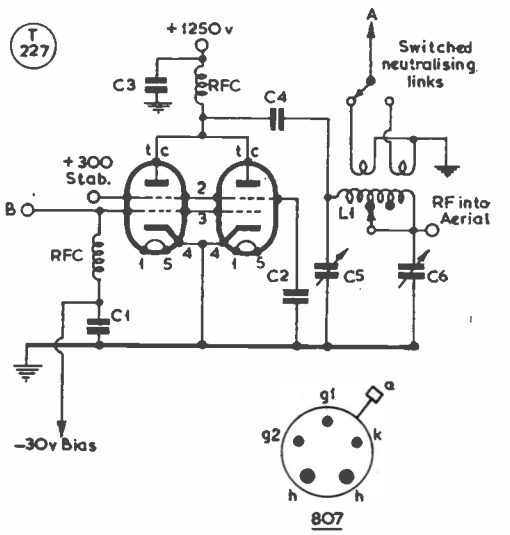


Fig. 6. Suggested linear RF amplifier for 14 and 21 mc, using 807's in parallel, a familiar arrangement in this application. The mixer-drive unit shown in Fig. 5 and the PA given here are built together on the same chassis section.

INTERNATIONAL GEOPHYSICAL YEAR

With plans for the great endeavours connected with the International Geophysical Year now building up to a climax—the year opens in July next—it is interesting to know that it will be possible to radiate, world-wide, advance warnings of Aurora (Borealis and Australis) manifestations. The expectation is that 2-3 days' notice can be given, and it is hoped that, in this country, the BBC will agree to put out the warnings. The most convenient times would be at the opening of the 6.0 p.m. TV hour, and in the 7.0 p.m. News on the Light Programme. At the moment of writing, it is understood that final agreement with the BBC has not been reached. The Corporation at first suggested giving the warnings in the 6.30 *a.m.* News on the Home Service! Not very helpful.

EXPECTING QSL CARDS?

Many SWL's, and operators new to Amateur Radio, tend to expect a quick return on the QSL cards they send out to the stations they hear or work. In fact, in the ordinary way, progress through any QSL bureau may take anything from three weeks to six months or more. The reason for this is that many overseas amateurs QSL only on receipt of a card; if they work exclusively through their own national bureau, how soon they receive a card sent them depends upon *(a)* Whether they keep envelopes at the bureau for return cards, and *(b)* How many cards for them the bureau holds before an envelope is deemed full enough to send off. The card having arrived at the addressee, it then depends upon how soon he makes out the return QSL before it can start on its journey back through the bureaux; in the ordinary way, the return-sender will wait until he has a batch to make out large enough to warrant sending it to his bureau as one packet. This, in turn, depends upon the level of his normal operating activity, and how soon other operators QSL *him!* In general, all QSL bureaux, throughout the world, clear cards as rapidly as possible—indeed, they do this in self-defence, to avoid a colossal pile-up of cards. But how quickly an individual exchange of QSL's is effected depends entirely upon the human factor—the people at each end of the exchange. If you are short of cards, you can bet your boots that it is not due to any hold-up in the QSL Bureau, either ours or anyone else's.

MALAYA AND FAR EAST

The firm of Communico, P.O. Box 725, Penang, Malaya can accept orders for all radio books and manuals as advertised by us, and also subscriptions to *Short Wave Magazine* at the local currency equivalent of 30s. for a year of twelve issues.

THE "YASME" RESCUE

In case anyone may think that the operations in which Danny Weil involved his rescuers last October (when *Yasme* had to be abandoned) were undertaken free of all charge from purely humanitarian considertions, it is of interest to note that he has been presented with a bill for £700! As the yacht was uninsured, in fact uninsurable, and he lost everything he possessed in the wreck, this was a bit of a facer, coming on top of everything else. He is now in the States, looking for backing to enable him to buy another 6-tonner, to start out again.

Simple Grid Dip Oscillator

CONSTRUCTION AND CALIBRATION OF A WIDE-RANGE UNIT

R. IRELAND (G3IRE) and V. PENFOLD (G3JZ)

There is hardly need to stress the importance of the GDO in the amateur scheme of things—yet at many stations its benefits are as yet unknown and its practical utility untested. Described here is a neat design, easy to construct and calibrate. A grid dip oscillator should be within reach on every amateur work-bench—and if anyone ever wants to borrow yours, tell him he should build one of his own!—Editor.

TIME appears to be a commodity in short supply with most amateurs. So often one hears "there is no time to do" this or that—consequently, many good intentions never reach fulfilment. However, in constructional work, particularly, the amount of time *lost* in applying the cut-and-try-again method when winding coils and in general bench work must add up to a considerable number of man-hours, to say nothing of the frustration suffered if, for instance, the PA meter will not rise on 21 mc, for the very good reason that the driver stage is doing its best on anything but the right frequency. Possibly 90% of the time wasted in this way could have been saved for more useful pursuits if a Grid Dip Oscillator had been at hand!

The instrument described here requires few components; most of them will probably be already available. For those who have yet to discover how they ever managed without a GDO, here is the opportunity to construct, at very little cost, a most useful piece of apparatus and one that should be in every amateur station. When calibrated its accuracy will be quite sufficient for all average requirements.

There is nothing unusual in the circuit as shown. Two 955 acorn triodes are employed, one as an oscillator of the Colpitts type, which allows the use of single layer coils without taps or reaction windings. Grid current changes are produced by the proximity of a resonant circuit, and these are fed to the second acorn, arranged as a simple amplifier. The meter is connected in a bridge circuit which gives high sensitivity, thus enabling a 1 mA f.s.d. meter to be used instead of the more expensive microameter. Note that other triode valves such as the 6C4 or L77, or a twin triode (with separate cathodes, like the 12AT7) can be used in place of the acorns.

Layout and Construction

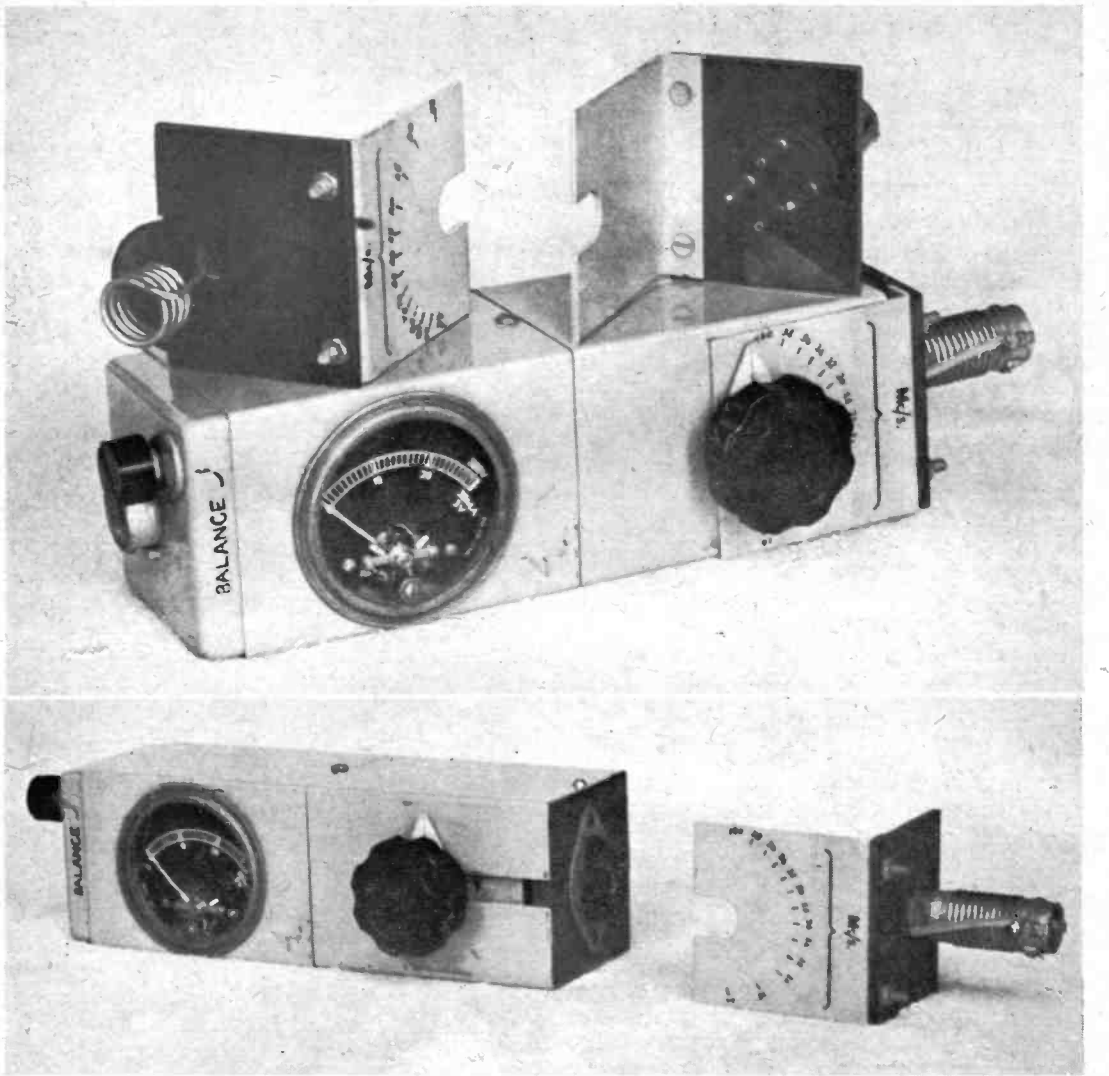
Constructional work and the wiring of the instrument is simplified by the use of plug-in coil units, each with their own calibrated scale, in place of the more usual multiple scale with its cramped readings when calibrated for the various bands. The coil unit plugs into one end of the instrument with the scale then lying under the pointer on the condenser knob.—*see* photograph.

The dimensions of the metal box into which the instrument is built will depend upon the meter available and the size of the variable condenser. With the standard 3½-inch meter, a box 6 inches by 4 inches by 2¾ inches deep will take all the components quite comfortably. If a small meter is used, the size can be reduced very considerably, for the other components take little space. The size of the instrument shown in the photograph is 7½ inches by 2¾ inches by 2¾ inches.

Standard components are used throughout, but the 2-gang condenser, C1, which is of the type used in small broadcast receivers and has a capacity of about 500 $\mu\mu$F each section, requires modification. Any integral trimmers should be removed and, as only four moving plates are needed in each section, the others should be pulled out with a pair of long-nosed pliers. (There is no need to touch the fixed plates.) With some condensers it may be found necessary to fit additional earthing forks to prevent fluctuations of the meter due to intermittent earthing through the ball bearings. Alternatively, a small tuning condenser of about 150 $\mu\mu$F per section could be used.

Coils

The coil units can be constructed from 4-pin valve bases and small coil formers mounted on a piece of paxolin, and the scales from sheet aluminium. The general idea can be seen from the photograph. Any type of plug can be adopted, and although only two pins are used, the additional ones give firm support to the coil unit when it is plugged in; the valve base, if used, provides a convenient means of handling and a protection for the winding. The scale is enamelled and the calibrations put on with drawing ink, after which they are given a coat of clear varnish.



(*Above*) **general appearance of the completed grid dip oscillator. with two of the plug-in coil units. (*Below*) showing how the coil units fit across the tuning capacity, so that the tuning control registers with the scale.**

As each individual constructor will use materials he already has by him, no details of the coil windings are given, but, as a rough guide to start from, the coil to cover Top Band with the condenser specified at C1 will need approximately 150 turns on a half-inch diameter former. By using the station receiver, no difficulty will be experienced in calibrating the coils for the amateur bands. It is better to complete and calibrate the lowest-frequency coil before the others are wound ; it is then a simple operation to allow for a slight overlap of frequency in each range.

The power requirements (for the model) are 150/200 volts at 10-15 mA and .3 amp. for the heaters (depending on the valves or valve used), and these are brought into the box by a 3-core cable. In order to avoid the necessity of providing a separate power supply, arrangements could be made to take what is required from the receiver supply ; in this event, the voltage should be dropped by a suitable resistance and decoupled with a 0.1 μF condenser.

Setting Up

Due to changes in the amplitude of oscillation over the various frequency ranges, it is necessary to be able to re-set the meter to bring

Table of Values

C1	= *See text*	R7, R8	= 20,000 ohms
C2, C3	= 100 $\mu\mu$F	VR1	= 100,000-ohm pot'-meter
C4	= .001 μF	M	= 0-1 mA m/c meter
R1	= 68,000 ohms	V1, V2	= 955 Acorns (or 6C4, L77, 12AT7)
R2, R4	= 10,000 ohms		
R3, R6	= 47,000 ohms		
R5	= 100,000 ohms		

the needle to about half-scale deflection; this facility is provided by VR1. The calibration of the meter scale itself is immaterial, as no actual readings are required.

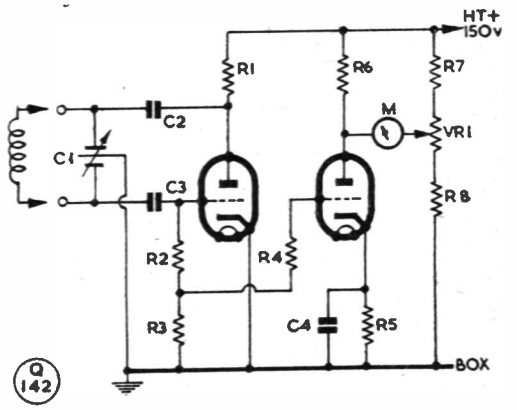
To test for oscillation, the coil should be touched with a finger; if there is a change in the meter reading, all is well. If, however, the meter remains steady, the circuit is not oscillating and the usual checks should be carried out to see that the wiring has been done correctly, the coil is not open-circuit or the condenser shorting.

An approximate calibration to check the coverage of a coil in course of construction for the GDO can be obtained by plugging it in and picking up a beat note in the receiver. However, care should be taken to make sure this beat is the fundamental and not a harmonic by listening on half the frequency, *e.g.* if a beat appears on, say, 7 mc, tune to 3.5 mc to see there is nothing on this frequency. Another way of checking roughly for the fundamental is to link-couple the coil, loosely, across the receiver aerial-earth terminals; the coil should be in position across its condenser. On adjusting the receiver tuning, a "plop" or dead-spot will be heard at resonance. This can only happen on the fundamental.

Applications

When testing circuits, the meter, depending on how it is connected as regards polarity, will rise or dip when resonance occurs. It may be of passing interest to add that the degree of dip is an indication of the Q of the coil which is in the circuit being measured; the larger the meter movement, the higher the Q. It is important, particularly on the higher frequencies, that when resonance has been found, the coupling between the GDO and the coil should be reduced by moving the instrument as far away as possible whilst still maintaining sufficient indication on the meter — otherwise the accuracy of the reading is impaired by pulling of the GDO frequency.

Whenever possible (and always on the higher frequencies) coils should be measured *in situ*, for the stray capacity and inductance of a circuit can lower the frequency by several mc, and it is not easy to allow for this if coils are measured before they are wired into circuit. If



Circuit of the sensitive grid dip oscillator described by G3IRE and G3JZ. Values are given in the table.

difficulty is experienced in placing the GDO near enough to a coil already in a piece of apparatus, a short length of coaxial cable with a 2-turn link at each end, used as a probe, can be arranged for coupling the GDO to the coil; although this method will slightly alter the calibration of the GDO, the reading will remain sufficiently accurate to give the information normally required.

The usefulness of this instrument will be increased if a coil unit is constructed to cover the TV frequencies as well. For those on VHF, it may be of interest to mention that the highest frequency range coil of the GDO shown in the photograph covers from 90 mc to 190 mc. When using a GDO, it is important to remember it will give indications of harmonics when there is *power* in the circuit being checked; apart from this, the rise (or dip) will show only the fundamental frequency. As mentioned above, the stray capacity in a circuit will affect the resonant frequency of a coil. Therefore, if the coil under test is to be used in a circuit which requires no parallel tuning capacity, it will be necessary to simulate the stray circuit capacity by placing a condenser of about 20 $\mu\mu$F across the coil. When an actual capacity is specified across a coil, this should, of course, be in position when it is being checked. It is hoped that the simplicity with which this piece of apparatus can be constructed will encourage those who have yet to experience the benefits obtained from owning a GDO to "take a step in the right direction."

EXHIBITION OF SCIENTIFIC INSTRUMENTS

The Exhibition of Scientific Instruments and Apparatus will be held at the Horticultural Hall, London, S.W.1, during March 25-28. Information can be obtained from: The Secretary, The Physical Society, 1 Lowther Gardens, London, S.W.7.

The GELOSO Signal Shifter

DESIGN, CONSTRUCTION AND OPERATING NOTES ON A COMMERCIAL VFO

R. G. SHEARS, B.E.M., A.Brit.I.R.E. (G8KW)
(K. W. Electronics, Ltd.)

THE "Geloso" Signal Shifter has, for the past two years, been very popular in Europe, Australia, New Zealand, South Africa and other parts of the world. It is now fast gaining popularity in this country. For those who are already using one, or like to study the design of commercial equipment, or are contemplating including one in a new installation, the following notes will probably be of interest.

The Unit, to the circuit of Fig. 5, is supplied with an attractive calibrated band-spread dial and escutcheon 8¼ins. x 5ins., as shown in the photograph, and is already wired. The chassis is 5½ins. x 4½ins. and 2ins. deep and is designed for mounting directly into a transmitter assembly—the cut-out required is shown in Fig. 1.

The Circuit

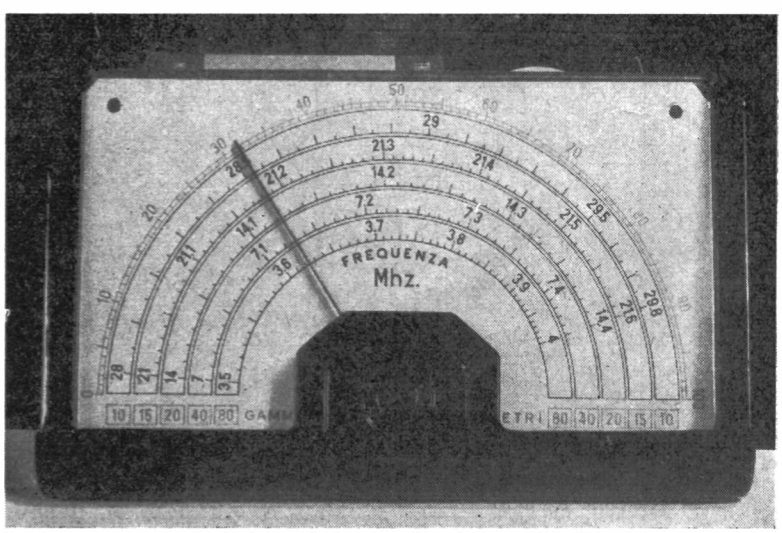
The circuit sequence is a 6J5GT Clapp oscillator, 6AU6 isolator and 6V6G (or 6L6G) output stage. Particular attention has been paid by the manufacturers to the stability of the VFO. The frequency bands covered by the unit are in three switched ranges, 3·5-4·0 mc for the 80-metre band, 3·5-3·6 mc for 20 and 15 metres, and 7·0-7·45 mc for the 40-metre and 10-metre bands. This system provides excellent band-spread over all bands 10 to 80 metres. The tuning of the oscillator is controlled by a 4-gang condenser. Two sections are connected in parallel for the 80-metre oscillator, the third section is used in the oscillator for 20 and 15 metres, and the fourth section in the 40 and 10-metre oscillator. In order to obtain complete isolation and freedom from pulling effects between the oscillator and output stage the 6AU6 isolator stage is employed. This is fed by a 100 $\mu\mu$F condenser from the cathode of the oscillator valve. On 3·5 mc and 7 mc this stage is an untuned aperiodic amplifier, but on 14, 21 and 28 mc it functions as a frequency doubler. The output stage operates as an amplifier on the 3·5 and 7·0 mc bands, a doubler on 14 and 28 mc and a tripler on the 21 mc band.

Two Models

There are two models made. The Model 4/101 is designed for driving a single 807, and the 4/102 for driving directly a pair of 807's in parallel.

The only difference between the two models is in the value of the five inductances in the output stage (L7, L8, L9, L10 and L11 in the circuit Fig. 5). This is to suit the appropriate grid input capacity of the PA stage. With a pair of 807's this is about 22 $\mu\mu$F *plus* stray capacities, and with a single 807 approximately half this. A 6L6G is normally used in the output of Model 4/102 and a 6V6G in Model 4/101. Alternative PA valves, such as 6146 (s), 829, 5B/251M and similar can be used. Each coil is slug-tuned, which provides quite a large tuning coverage. The slugs of the five output coils should be adjusted for maximum grid current in the PA stage, in accordance with instructions supplied with each Unit. Coax should *not* be used to connect the output of the unit to the PA grid because with the additional capacity it may not be possible to resonate the five output inductances.

[over



Panel appearance of the "Geloso" Signal Shifter, which gives good spreading of the five amateur bands covered.

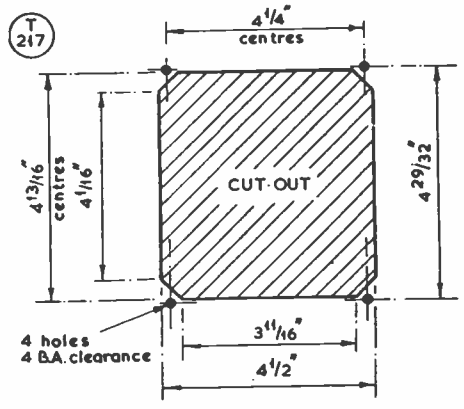


Fig. 1. Standard chassis cut-out to accommodate either model of the "Geloso" VFO-driver unit. The idea is that it should be fitted into a transmitter assembly.

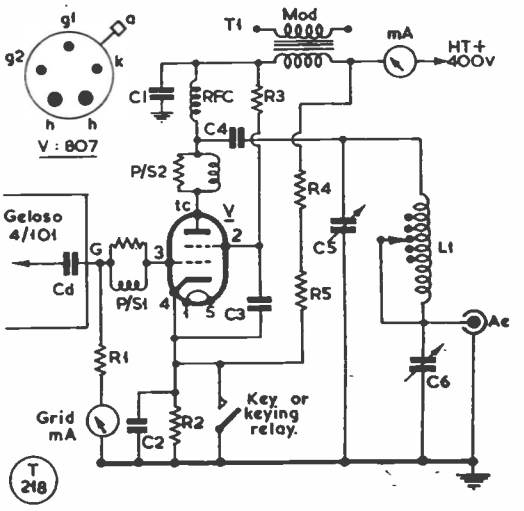


Fig. 2. Circuit of a suitable 807 PA to follow the "Geloso" 4/101 Signal Shifter. The tank coil L1 can either be a single winding for the preferred band, or a coil tapped for operation on several bands.

Grid Drive

The level of grid drive provided over all bands averages 3·5 mA through 25,000 ohms for a single 807 (4/101) and 8 mA through 12,500 ohms for a pair of 807's. It is recommended that, to drive an 813 PA for AM telephony operation at 150 watts input, a Model 4/101 be chosen with an intermediate stage consisting of an 807 or 5763. If an 807 or 5B/251M (miniature 807) is used in this stage it can be operated, in the interest of TVI reduction, in Class-A. However, it has been found by test that adequate drive for an 813 can be obtained from a Model 4/102 Unit by putting in a KT66 instead of the 6L6G and

Table of Values

Fig. 2. Circuit of 807 PA Stage for Geloso Unit

Cd = 100 μμF drive coupling, as fitted in Unit

C1, C4 = .002 μF
C2 = .005 μF
C3 = .001 μF

C5 = 200 μμF, tank tuning

C6 = .001 μF output tuning (2 x 500 μμF twin-gang BC type, sections in parallel)

R1 = 25,000 ohms

R2, R4 = 68,000 ohms
R3 = 22,000 ohms
R5 = 47,000 ohms

P/S1 = 5 turns 16 SWG, ½-in. dia. by 1-in. long on 33-ohm resistor

P/S2 = As P/S1, but 6t. spaced 1-3/4 ins.

RFC = 2.5 mH RF choke

T1 = Mod. xformer

L1 = Tank coil, tapped for bands as required.

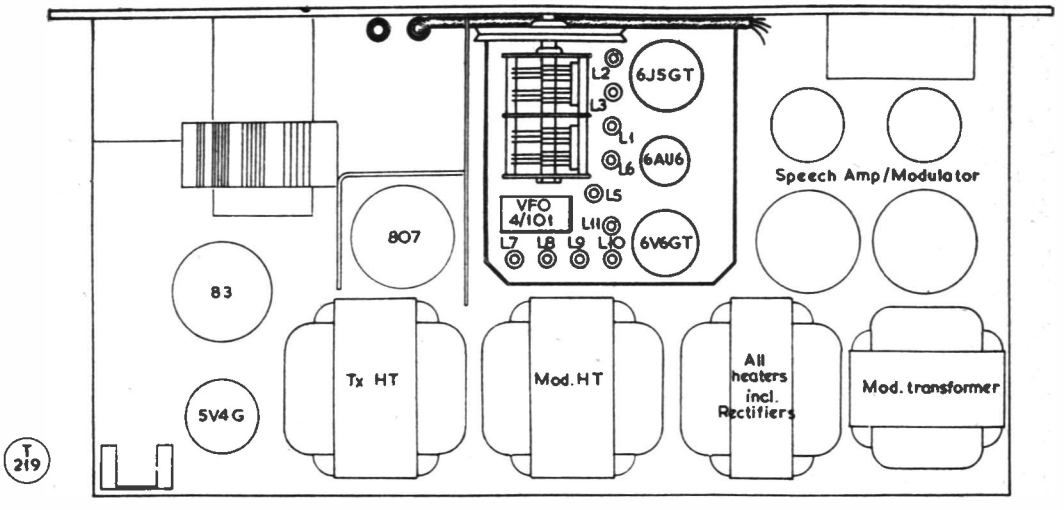
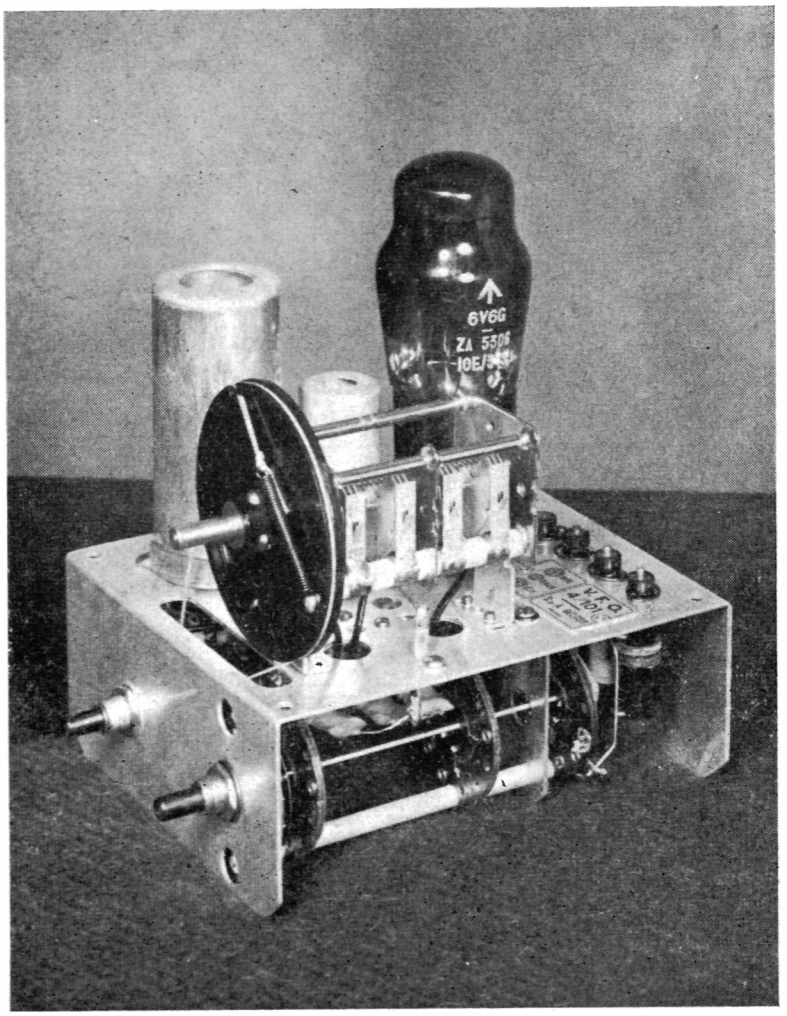


Fig. 3. Suggested layout for a cabinet or table-top transmitter using a Type 4/101 "Geloso" Unit as VFO-driver; its positioning is emphasised in this sketch. The PA could be a single 807, with associated speech-amplifier/modulator and power supplies. The Signal Shifter should be fully screened from the PA.

keeping the grid connection to the 813 as short as possible. The degree of drive is adjustable by a potentiometer in the screen of the output stage—*see* circuit.

Power Requirements

To obtain the drive figures indicated above the HT supply to the Unit must be 400v. at 32-54 mA for the 4/101, and 400v. at 75-86 mA for Model 4/102 using a 6L6G in the output stage. The heater requirement is 6v. AC (or DC) at 1 amp; with a 6L6G it is 1·5 amps. The HT voltage dropping resistors R1-R7 are *not* supplied with the unit. The values shown are for use with a 400v. supply and, all except R7. may be proportionately reduced with a lower HT voltage. R7 should be 470 ohms for any supply up to 400v. (In the circuit Fig. 5. R7 is the unmarked 470 - ohm resistor connected to point (1).



The "Geloso" Signal Shifter is available in two models, the Type 4/102 being the high-output version. It is designed to fit straight on to a transmitter chassis and the unit shown here will drive an 807 direct as a PA.

TVI Factor

The harmonic content of the Unit is no more than from the average VFO and driver. The effects from direct radiation are, however, better than average, because of the efficient and compact design. To minimise TVI particular attention must be given to the design and layout of the PA stage. The Geloso Unit should be mounted into the transmitter chassis and the whole installed in a fully-screened steel cabinet. It is also desirable completely to screen the bottom of the Unit. All HT and heater leads need to be well by-passed to RF. The PA stage should be designed with a Pi-output circuit. A low-pass filter in the aerial feed should preferably be installed inside the transmitter cabinet. No "cut-out" in the front panel is required for the Geloso dial and therefore leakage can be kept to a minimum.

In order to maintain the maximum stability of which the VFO is capable, the stage following the Signal Shifter should be keyed. In many transmitters this will, naturally, be the PA stage and the usual methods of blocked grid, screen or cathode keying can be adopted. Geloso, in their G210/TR Transmitter, make use of cathode keying of the 807 PA; a circuit for this is shown at Fig. 2. For those who wish to work "break-in," the cathode of the 6J5GT oscillator may be keyed. It will be necessary for the 6AU6 grid leak to be changed to 10,000 ohms and approximately −7·5v. bias fed through it. Also, the 6V6G (6L6G) grid leak should be made 6,800 ohms with −10v. bias. HT to the 6J5GT must be stabilised.

(over)

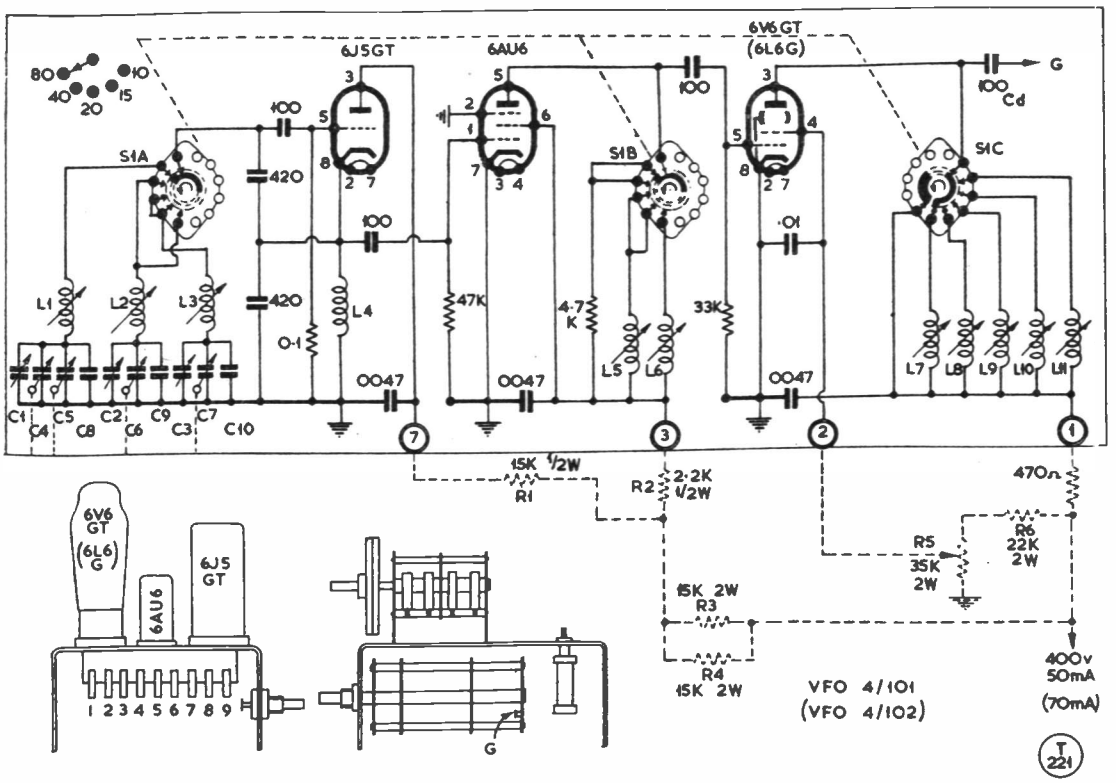


Fig. 5. Circuit of the "Geloso" Signal Shifter, which consists essentially of an oscillator (6J5), isolating stage (6AU6) and buffer-doubler/amplifier (6V6, or 6L6 in the higher output version, Type 4/102). Circuit elements shown dotted are explained in the text. Either unit gives RF drive on five bands, 3.5 to 28 mc. *(Note—In this circuit the 470-ohm resistor connected to Point (1) should be marked R7)*

Frequency Stability

Frequency stability of a very high order can normally be obtained from the VFO but if the mains fluctuate badly it is advisable to fit a "stabilavolt" such as a VR150/30 in the HT feed to the 6J5GT—see Fig. 4. Calibration of the dial is very accurate and once set up re-calibration should not be necessary unless there has been a change of oscillator valve.

Conclusion

This is a Unit which has been well tried and will appeal to those who wish to save many hours of labour in building a VFO and driver stages. It will help to give the transmitter that "professional" look and it will ensure an excellent performance at a reasonable cost.

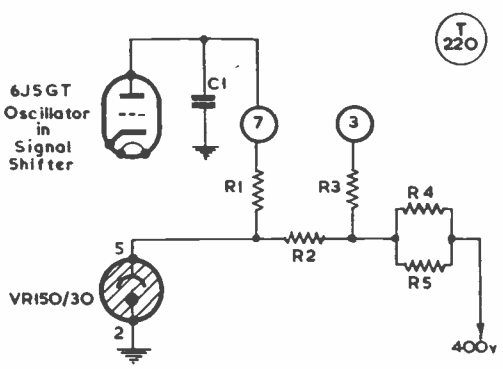


Fig. 4. Method of stabilising the HT supply to the oscillator valve for the Signal Shifter. C1 is .005 μF; R1 is 1,000 ohms; R2 10,000 ohms 1-watt; R3 2,200 ohms; and R4, R5 are both 15,000 ohms, 2 watt.

ELECTRICAL ENGINEERS' EXHIBITION

Over-lapping by three days the R.E.C.M.F. Exhibition, the Sixth Electrical Engineers' Exhibition will take place at Earls Court, London, during April 9-13. Organiser and general manager of this important undertaking, for which more than 360 exhibitors have taken space, is P. A. Thorogood, better known to many readers of SHORT WAVE MAGAZINE as G4KD. Full details about the E.E.E. can be obtained from him at: 6 Museum House, 25 Museum Street, London, W.C.1. He tells us that more than 50,000 invitations for the Exhibition have been sent overseas.

"NARROW MINDED LOT!"

MATTERS OF OPINION

WHEN three Old-Timers, of vintages 1922, 1923 and 1924 respectively, get together in the local, one expects a little nostalgia. The three particular types (whose call-signs, between them, were 102 years old) were not of the Old Fogey sort, nor were they inclined to believe that "Amateur Radio isn't what is was when *we* first started"—but they did have some pretty trenchant comments to make on present-day activities.

Fortunately for the narrator, their call-signs were G2..., G5... and G6... respectively, which makes it quite easy to separate them out and still keep their anonymity, on which they insisted.

Taking the subject of the meeting, broadly speaking, as The State of Amateur Radio To-day, they each turned out to have one particular hobby-horse. Gee Two opened the proceedings by describing present-day amateurs as a Narrow-Minded Lot—in the friendliest possible way. "Of course, they are," he said; "they grumble about the inadequate frequency-bands they are allotted, but they don't make use of them. How many can *you* name who are active on, say, *six* bands? You lot grouse about the QRM on Eighty-Metre phone, but you don't go on One-Sixty instead. You say there isn't enough DX CW on Fifteen, but you won't bother to go on phone. You don't like Two because your location is not on top of a hill, but you haven't even got going on Four yet."

Gee Five agreed. "Surely one of the outstanding things about our hobby is the terrific variety that it offers, yet the chaps get themselves into grooves. Look at those DX-chasers who live for the appearance of a New One . . . . they don't get the slightest pleasure out of working a country they've worked before, although it might be a *real* QSO and not an RST-Pse QSL affair. Look at the local natterers who refuse to have anything to do with the DX bands. Look at the AM (ancient modulation) types who won't even investigate FM or SSB. In fact, look at practically all of them . . . . narrow-minded lot!"

Gee-Six concurred—he was the sort of chap who normally does concur rather than agree. But he did make the point that the Hundred Per Cent. Amateur, using all bands, all modes of communication, all types of apparatus and the necessary radiating systems to go with them, would need (*a*) an awful lot of space both outside and in, (*b*) an awful lot of money, and (*c*) rather more than an awful lot of time. A rough calculation worked the latter out at about 48 hours a day.

He, however, then mounted his own hobby-horse and said "The really serious trouble to-day is the lack of manners. We used to hear someone and call him. If he didn't come back, then he was probably working someone else, so we did likewise. If he *did* come back, we had a QSO, which was as long or as short as we mutually cared to make it. But what happens now? If you get the station you call, you've no sooner exchanged how-do's when someone else starts wildly hopping up and down on the frequency and wants to join in. Rather like dialling your number in a telephone kiosk and having someone tapping on the window all the time. You can't even raise a local on phone without squeaks and groans preceding the announcement that 'G3... is on the frequency'—this means he wants to butt in. Let him in, and up comes another one, and so on until you've forgotten what you wanted to talk about with the first bloke and have to listen to learned dissertations, smug sermons, facetious anecdotes and just plain pig's-trotters from a whole pack of chaps."

We all agreed that this was so, but pleaded the overcrowded state of the bands. Gee Two remarked that things would be in a sorry state if we all did as we used to in the 1920's—sitting more or less on one frequency all the time and tuning the whole band for replies. Gee Five thought the idea sounded rather attractive, since the would-be butter-in would have to scan the whole band to find the station you were working before he could announce that he was On The Frequency.

Gee Five's own sore point was "Handles." Just one more darn thing to remember, as he said. "Isn't the call-sign good enough? If you know the chap personally you'll know his name and you can call him by it, but when it's just a hit-and-run contact, an RST-and-QSL affair, does it make any difference whether it's Bob or Steve? Forbid the exchange of Christian names until you have worked the same station at least three times."

Gee Two rather shot this down by saying that one of the things he hated most was working someone that he knew he had worked before, and having to try to remember his name (or look it up in the log); but one of his greatest pleasures was to hear the same fellow come back pat with *his* (Gee Two's) name. You can't have it both ways, but it would be rather nice!

The meeting finally settled down (somewhat mellowed by this time) to the original theme of narrow-mindedness, and agreed that those who missed most were those who shut themselves into watertight compartments and either ignored or derided what went on outside them. In these categories we listed the following types: The VHF Bug; the DX Hound; the Net Natterer; the One-Band Wonder; the Phone-Only and CW-Only specialists; the Beamish Boy; the Bit-of-wire Bloke; and such types as those who think that QRP is frightfully clever just for its own sake.

Not one of the above causes any active harm, but they all miss a lot which they should be enjoying. If you get tired of chasing Counties on Top-Band CW, then the use of SSB phone on Twenty is as good as a complete change of hobby. If you tire of chasing DX on Ten-metre phone, then a little CW on Two, or Eighty, provides a complete change of air. And, of course, there's always Amateur TV . . .

DX COMMENTARY

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

BV1US

WE have another excellent month to report, with conditions coming up very nicely at the time of writing, after a slightly dull patch. One thing that must be realised—and it will be forcibly brought home during the next year or so—is that severe interruptions due to the Aurora are far more frequent during the years when the sunspot numbers are high. These will probably be the major cause of bad spells of conditions.

For those who don't know the symptoms, may it be explained that when you run round the dial and hear practically everything sounding like the most watery W6 you ever heard in your life, then is the time to go outside and look northwards. The odds are that you won't see anything—but you might! When even short-wave BBC stations have such an audio flutter on them that you can't make sense of their modulation, then you may as well assume that the Aurora is in full swing, and that conditions will be far from normal for some days. The VHF boys show quite different reactions to the same phenomena, and there are times when the night air is loud with the creaks of beams being turned northwards.

Apart from the Aurora interruptions, however, things have been very good on the HF bands. The "turnover" of the Five-Band DX table is always our index of activity, and this month it has been terrific. And so to the band-by-band review of the situation.

CALLS HEARD, WORKED and QSL'd

DX on Ten

Ten metres has, on many occasions, reached the levels that one associates with the previous peak year of 1948. Everything, from W6 and VE7 in the afternoons to JA and KG6 in the mornings, has been there at S9, phone or CW. All you have to do is to find the right day and time! East Coast W's have hit the most phenomenal signal levels on some days, and form a pretty effective blanket against any other DX. If it's the exotics you want, don't choose any time between 1300 and 1800 or you will probably imagine that the world is populated entirely by W/K operators.

Incidentally, your commentator—in the course of his tours round the bands—worked several scores of them during the month and it was very interesting to note the powers being used over there. Out of more than 100 W's and K's worked, only *two* confessed to using the full kilowatt. Five were running 500 watts or over. Fifteen were using more than 200 watts. And the rest, representing about 85 per cent. of the QSO's, were putting in 150 watts or less. Of these, rather more were in the 75-watt region than above it. At least ten W's worked on *Ten* were using 20 watts or under, the lowest being a 5-watter with a really solid 589 signal. One wonders what the band would sound like if all the kilowatts (Californian and otherwise) did come on together. Probably the really notable ones are only around at the time a new DX-pedition is likely to show up.

G5BZ (Croydon) raised ST2NG, ZD6, TF3AB, UAØLA (Vladivostok), JA, 3V8 and all W and VE on CW; on phone he collected ZD3BFC and LU3ZS (South Shetlands).

GM3BCL (Aberdeen) is a "Ten-only" man, and his phone reached CX1AK, 4CS and 7BR, HP1RB, LU's, OQ5BK, PY's, UA1KFA, VP6HR, VQ2 and 5, ZE, ZS and 3V8. In the ARRL Contest he found there wasn't much point in "tuning from the low end up" and so forth—he just called them on zero-beat and

usually hit the nail on the head; as GM3BCL says—Contests form their own band-plans as they go along. He still has eight States to find—six of them in W7. Harking back to our remarks on the Aurora, GM3BCL reports that on January 21 he was able to work G's by turning his beam north. With it facing south signals disappeared. All signals reflected from the Aurora curtain had the usual terrific "roar" on them—very rapid fading at a mixture of audio frequencies.

G2DC (Bulford) found 10 metres patchy, but was pleased with results between 1200 and 1400 GMT. The best worked were VP8AI and 8AQ, MP4BBE and 4BBL, ZS's, VS6CO and ZD6BX.

G3FXB (Southwick) describes his ten-metre work as "routine stuff," but it includes CR9AK and VP5ML. G3GZJ (London, S.E.23) also raised CR9, plus CX, ST, ZD6, VQ2, MP4, ZS and the like—both phone and CW. G3GGS (Preston) collected 4X4, VQ2 and "the usual stacks of W, VE and short skippers."

New ones for G6VC (Northfleet) were ZB1HKO and CN8CR. G3CMH (Yeovil) noticed a lack of VK and ZL signals, but on phone he raised CR9AL (1250), CX's, KG6AGC (1100), TG9BG, stacks of VE4, 5, 6 and 7, VQ2 and 4, W7's in Arizona, ZD4, ZE and ZS.

G3HCU (Chiddingfold) found FY7YC and UQ2AN for two all-time new ones, and also worked YN1BR, VP4LF, KA7GF, CN2BL, ST2DB and VQ4EU, all on phone.

G6QB was surprised to find himself in the middle of a pack of JA's on February 10, 0930 onwards. At one time five of them were calling him! G3DNR (Broadstairs) worked LU, UQ, OQ, VQ2, ZD1DR and ZD6RM, and CT2AH. G3BHW (Margate) found three new ones in TG9MB, OA4AI and ZS3S. Others, on phone, were HP1RB, ZP5AM, 5EC and 5ET, CX, KZ5, OX, TI, VP6, ZD3 and ZD6. GW3DNF (Chirk) has a highly-directional 200-ft. wire which only seems to raise W and OH.

DL7AA (Berlin) added CT2AH, UN1AB, HR4WH, OX3LD, BV1US and WØBLV/KG6 on phone. He is flat out for WAZ on five bands!

Fifteen Metres

This band has again suffered from the most appalling selection of rude noises. Russian jammers tend to appear almost anywhere, and the very powerful Thing just below the LF edge spreads very badly on occasions. Sometimes it has parasitic whiskers of frightening ferocity; sometimes it just smears its way over the CW band like a creeping jelly. The only thing to do is to persevere with the cultivation of selective eardrums.

G3BDQ (St. Leonards-on-Sea) raised VK9AJ (Cocos) and VK9XK (Papua) for new ones, as well as VQ6LQ. Others worked were VS6DN and ZD4BQ. G3FXB found a new one in JZØPC (phone), and CW brought him UAØKKB, AP2RH, VK9 and a few more.

G3CMH kept to phone and emerged with DU6IV (1310), JZØPB (1250), JZØPC (1253), lots of VK's, VS6CL and some ZL's. Gotaways were BV1US, KR6GT, UQ2AN and VS6CR.

G2YV (Cannock) raised 4X5RE (portable in the Sinai Peninsula), who closed down on February 1. He also worked MP4BBF, and tells us that HS1MQ is on phone most afternoons (he is in the Agentine Legation, Bangkok). G2YV suggests that when working Russian stations, one should mention the jammers on 21 mc to them. They pass no comment, of course, but it doesn't do any harm!

G2DC noticed no great changes, but thinks the W-QRM is fading out a little earlier, with some of the East Coast signals developing an echo and then disappearing. He found VK's plentiful, around 1200-1400 GMT, and also worked all ZL districts. Best contacts were VQ6LQ, ZD2DCP, ZD4BQ, VE 6 and 8, VK9DB and 9XK, AP2RH and LU2DAW.

G3HCU, chasing for the WAZ Marathon, collected new ones in the shape of KL7RZ, PY, SP, 4S7YL, KG6AGO, VS2BD, VK6LL and TF2WBT—all phone. Others, not new, included CR9AH, BV1US, LU3ZS (South Shetlands), ZP5CF, KR6RB, ZS3V, CT2AC—building up a total of 48 countries worked on 21 mc phone *this year*.

G3LEQ (Tunbridge Wells) didn't

FIVE BAND DX TABLE
(POST-WAR)

Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries	Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries
DL7AA	800	108	166	223	162	141	234	G3JWZ	243	48	60	65	38	32	95
W8KIA	690	61	145	265	109	110	265	G3GZJ	240	18	43	72	67	40	107
G5BZ	681	64	118	239	150	110	245	GM3EFS	237	26	46	98	39	28	113
G3FXB	657	71	126	200	158	102	200	G3JLB	232	39	41	59	51	42	97
G3FPQ	587	62	83	184	156	102	203	G3IUW	222	31	38	67	59	27	103
G3DO	564	24	46	218	128	148	236	G3JVJ	190	23	60	53	37	17	84
W1VG	536	25	115	190	114	92	199	DL2ZO	177	2	43	98	33	1	106
W6AM	502	30	58	271	86	57	271	G3JZK	163	15	30	38	61	19	83
G2YS	439	65	83	145	93	53	162	G3DNR	144	10	21	69	17	27	80
GM2DBX (Phone)	411	34	31	158	97	91	172	G3HQX	136	9	36	36	36	19	66
G3WL	392	38	73	135	75	71	154	DL2ZS	131	2	31	82	15	1	92
W6AM (Phone)	339	13	32	234	39	21	234	G2BLA	121	15	34	36	34	2	58
JA1CR	334	15	49	170	67	33	173	GW3DNF	103	17	27	43	14	2	48
G2HPF	333	33	54	151	56	39	161	G8TJ	70	5	20	35	7	3	44
G3BHW	318	15	32	132	74	65	158	G3HEV	70	10	21	17	20	2	44
G3INR	310	45	57	119	58	31	130	G3IDG	67	11	14	9	12	21	33
G6VC	308	30	43	134	62	39	140	G3JSN	66	14	16	21	10	5	32
GM3EDU	298	43	59	113	47	36	135								

Some years ago — to be precise, on p. 357 of our issue for July, 1949 — we published a photograph of the bedside station of G3EGR, then at Mundesley-on-Sea, Norfolk. Now, at the age of 70, G3EGR operates his station, still from what he calls the "relaxed, or horizontally polarised, position," at the Crown & Horns Hotel, East Ilsley, Berks.

think he could get his transmitter to go on Fifteen, but he "squeezed" the 20-watt PA down there and was staggered to get a "5 and 7" report from ZL4IM on his first call; thereafter he worked other ZL's and a VK. On January 30 he found the band completely dead except for BV1US, who was S8 on phone.

G5BZ worked all VE, all W, LU2ZS, KG4AN, VK9DB, VQ4, MP4BBE, ZS and VK 2, 4 and 6. G3DNR (Broadstairs) recorded UA, LU and SV1AE on phone for new ones.

G2BLA (Morden), entering these columns for the first time, reports working VS6DN, VQ4AQ, ZD2DPC, VK9XK as well as SP, VK, VO, VE, ZC4 and the like.

G3BHW found an all-time new one in VS4BO—the first VS4 he has even heard. Other QSO's were EL, HK, KV4, MP4K, VK, VQ5, VP6, VS2, VS6, 4S7 and 4X—all on phone. On CW he raised AP2RH, VE8PB, ZC4IP, VK2GW and VQ2GR, giving him a WBE in one hour and ten minutes.

GW3DNF collected LZ, ZC4 and VE8 with his 12 watts. G2HPF (Chelmsford) raised KT1TW, VK6RU, VK9XK and ZD2DCP; he also worked plenty of W7's, but still needs Utah.

DL7AA added to his already large score with LU3ZS, who makes him 162 on the 15-metre band. VS2DB reports that though the U.K. is not often heard on 21 mc, the band was open for G's between 1400 and 1600 GMT during February 2—7. In Malaya, VK's, ZL's, KA's and JA's are regarded as just local QRM.

Twenty Metres

Several of the veteran 'chasers insist that *Twenty* is still the best band of all, despite the plague of short-skip from which we continue to suffer. Certainly it seems to offer a wider variety of DX than the others, chiefly because the activity happens to be there. Our opinion is that if some of the "exotics" who stick to Twenty would shift to either Fifteen or Ten they would have better signals, with less QRM.

G8TJ (Wallasey) restricts his operating hours entirely to 0600-0800 GMT and mentions ZD9AX, LU3ZS and FY7YF, plus the usual VK's, ZL's and W's—all on CW. G3DNR collected new ones in the shape of KT1, PZ1AP, UI8KAA and a 4X4—also on CW.

GM3EOJ (Aberdeen) has been almost entirely on this band during the past month, his best being KR6SS, DU1OR and VK9XK. FY7YF was also raised after he had worked FE8AE, but the FE8 remains a gotaway for 'EOJ. GM3EFS (Alexandria) worked LA9LF/P and hopes to find that he really was on Jan Mayen and not a phoney or pirate.

G5BZ's very long list includes UA1KAE (Antarctica), VP 6 and 7, CE, FB8BD, VQ6LQ, LU3ZS, UH8's, UI8, FY7, AP2RH, VK9XK, 4X5RE, ZD 4 and 6, ZD9AE, XE1A, CR7MB and many others. He says Twenty is "streets ahead of the other bands" but notes the scarcity of VK and ZL signals compared with earlier years. G5BZ has clocked up his 100 countries in the first 38 days of the year, and says he will now sit back and watch the others get to 200 . . .

G3LEQ remarks that he has worked several ZL's recently, and that they seem to be very easy to raise between 0800 and 1000; he adds that more unidentified stations crop up and make the band a bit difficult to handle, but that the "bubble-gum" noises have not been worse than average.

G2DC finds that 20 metres has come back into its own again, very often being open all round the clock. Far East signals are improving, and recent scalps have been VE 7's and 8's, AP2RH, KR6AQ, VS1GZ, VK9XK, UH8AB, ZD6BX and a batch of VK's.

G3GZJ worked VP5, LX and CT1 for new ones, and says that

W A Z MARATHON, 1957

All Bands

Station	Zones	Countries
G5BZ	36	102
G2HPF	32	65
G3HCU	31	73
G3BHW	31	71
G3HLY	29	70
G2DC	29	60
GM3EOJ	28	78
G6PJ	26	45
G3GGS	25	50
G3FXB	25	38
GM3BCL	22	37
G3GZJ	20	41
G3JWZ	19	48
ZB1BF	18	39
G8TF	16	40
G3DNR	15	39
G3HQX	14	35
G2BLA	14	25
G3INR	10	10
GM2DBX	6	27

LX2GH said "QSL *via* DJ2PQ." G3GZJ finds short-skip terrific during the day (and don't we all?).

Six new ones came up for G3GGS—VK9AJ, FQ8AF, AP, ZD3A, I5RAM and the two OH's on Aaland Island, all on CW. Among others worked were PZ, KH6, UA1KAE, UI8, UD6, YV and VS6. 'GGS has been stalking ZD9AE and ZD8JP, both heard consistently between 1800 and 1900 GMT, but without any luck. He asks whether 4X5RE (Sinai Desert) counts as a "new one"—but we simply don't know. OQØCZ was also worked, but the "powers" have decreed that that territory counts only as OQ5.

G3FXB made two brand-new ones with UM8KAA and ZS2MI. Otherwise he worked "the usual stuff"—but he adds that what we now call the usual stuff would have been noteworthy DX a year ago.

G3BDQ winkled out KL7BXJ, whose QTH is Kotzebui, an Eskimo village on the Bering Strait. Others that came his way were F9SC/FC, CR7AG, VQ8AG, VQ5GJ and LU3ZS.

G6TC (Wolverhampton) raised PZ1AH, VQ5GJ and FG7XD, as well as "routine" VK's, JA's, KH6, KL7, CX, AP and VS 1, 2 and 6. G3BHW worked around his happy hunting-ground (still Twenty!) and brought out UPOL4, CT2, ET, CR7, FQ8, KH6, KV4, OX, PZ, UO5 and many others. GW3DNF's QRP fetched in EA6AQ, ZB2 and CR7MB.

G2HPF worked VK9CK and 9XK, UA1KAE, OH1RT/Ø, 4X5RE, CE3ZO and YV5AE.

MP4KDS, at Kuwait, Persian Gulf, is ex-OD5BM; he runs 100w. to an American Viking transmitter, his receiver being an Eddystone 840A. The aerial is a three-element rotary beam.

Forty Metres

The diehards who braved the terrors of *Forty* were numerous enough to justify a report on the band this month. When you like Forty, you really do like it—enough to sit down and write a sharp note to your Commentator who, now and then, waxes rude on the subject of this weird and wonderful band, on which everything that is good, bad, indifferent, comic or merely ludicrous can be heard.

G6TC rushes to its defence and lists VE, all W districts, including a W7 in Montana, and VP2AH (Windwards). He is an old hand on Forty, from whom we haven't been hearing much lately.

G2BLA worked TF, ZC4, PY, VO, W's and a bunch of Europeans. G6VC managed to unearth UA1BM, UC2AO and UB5KIA.

G3GGS raised VE8OW at 0040, and heard but missed VQ6LQ and VQ4AQ. VP2LH was another gotaway, but VP6RG did come back. G2DC thinks a lot could be winkled out if only people would brave the QRM. He worked all W districts, VE's including 6 and 8, VQ4AQ, VQ6LQ, VE8OW and a peculiar one signing VEØND (might be a Maritime Mobile).

G3GZJ risks the wrath of the "Forty-fanciers" by saying that he thinks it is the best band for short-wave broadcast reception, and leaves it at that! G3LEQ feels the same way, and says the band remains packed full of locals until nightfall, after which it becomes an annexe of the 41-metre broadcast band, and phone working is out of the question.

G2CZU (Bath) retreats from the Top Band now and then, with his 10-watt CNY1, and recently raised two new ones — IT1AGA and LZ1KSI. GM3EFS comments on the very consistent signals from VK3XB every morning between 0800 and 0900—he has never heard anything like it before. Other DX on Forty for him was UI8KBA and VP2LU, as well as lots of W and VE.

G8TJ collected PY7HT, PY7IP and TA1FA in his early-morning sessions. GW3DNF raised HA5AM and two W's. G2HPF had good QSO's with VQ6LQ and VP6RG. As we have said before, whatever may be one's feelings about Forty, the DX *is* there, and it can be worked.

Eighty Metres

Month after month this band has a narrow escape from falling right out of these columns. It carries an enormous amount of traffic, and where should we be without it, and so on, but it is simply *not* used for DX these days. Nevertheless, G2DC managed to work all W districts except the 7th, and East Coast VE/VO stations;

he also had a good QSO with VQ2FF at midnight.

G3LEQ raised PI1RRS in the early hours, and remarks that most of the clickety-clack noises go to bed at about 0200, after which the band can be quite peaceful. But another menace is creeping up on us, of purely amateur making—a large number of DL's who play gramophone records instead of calling CQ. The strange thing is that it *works*, for one of these types recently had a mammoth pile-up of stations who apparently really wanted to work him! Can you beat it!

TOP BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
G5JM	97	97
G2NJ	97	97
GM3EFS	96	96
G3JEQ	95	95
G6VC	94	94
G3GGS	91	92
G3HEK	90	94
G2AYG	88	89
G3JHH	88	88
G3FNV	87	90
G3BRL	84	84
G3KEP	83	83
G3AKX	80	82
G3DO	74	75
G3KOG	73	78
G2CZU	69	69
G3HGY	68	68
GM3KLA	66	68
G3KOC	65	67
G3COV	60	65
G3EJF	60	64
G2HDR	60	60
G3KYU	52	55
G2HPF	48	65
G3ICH	42	58
G3HKF	40	59
G3KXT	36	42
G3KNG	35	46
G3JZP	35	43
G3JSN	34	47
G3KNQ	24	34
GM2BUD	12	25
GM3COV	9	34

(DL7AA is definitely *not* one of these! His recent additions on this band were FQ8AF, UR2AK and UN1AA). It is to be hoped that the D.A.R.C. will take steps to put a stop to gramophone-grinding on 80 metres. If anyone thinks this sort of thing is something new, and therefore "progressive," let it be said that gramophone-grinding was the curse of Amateur Radio 30 years ago, and in this country was stopped by the G.P.O. taking exemplary action.

Top Band DX

This season's DX tests have been very disappointing except for one or two mornings when the signals suddenly came up. The best one since early December was February 3, when W1BB, 1PPN, 1LYV, K2ETJ, W3RGQ, 2GGL, K2BWR, K2KWP and W9PNE all worked a few G's and heard others.

The previous one, January 27 (which was a scheduled "Test" morning), was a washout, when not a single European was heard on the other side. The only DX logged by W1BB was YN1AA, who was worked at 0525.

Flash! — or Is-This-A-Record Department... G3LOE (Clitheroe) received his licence on February 2, and on the following morning he went straight on One-Sixty and worked W1BB, 1PPN, 2GGL, 3RGQ, K2BWR and VE1VN. We should very much doubt whether *this* has been done before! The VE said G3LOE was *his* first DX QSO.

On February 10 G3LOE was reported as heard by W1PPN, and he had received 'PPN earlier, but missed the QSO. G3LOE's brother, G3GKQ, also of Clitheroe, worked W1BB and W3RGQ earlier in the season.

Other G's who worked across successfully on February 3 and 10 were G3PU, 5JU, 6GM, 3ERN, 3GGN, 3JVI.

VP2LU showed up on the band on February 8, and made a "First" with W2QHH at 0953 GMT. This was the culmination of a long series of skeds, made very difficult by QRM and Loran troubles.

G3PU (Weymouth) now has his six cards for WAC on Top Band. We believe he is the very first G to achieve this, and offer him hearty congratulations (which will be echoed by all who read these lines) on achieving what used to be the proverbially impossible ("about as likely as a WAC on One-Sixty!" as the saying went).

W1BB's summaries of conditions and results suggest that this season is slightly down on last year, but it still has not been really bad. Part of the falling-off is due to the fact that DX is so good on other bands that some of the former stars of Top Band have been attracted elsewhere. The real high-spot this season seems to have been December 16, when W1BB worked G and GM, and was heard at good strength in DL, HB, EL, ZB1 and PY *simultaneously*.

That intrepid SWL, Robert Iball (Worksop) thinks his log presents "a dismal picture," but after making allowances for conditions we think it is far from dismal. His careful loggings confirm everything that has already been mentioned, and show that February 3 was the best morning this year. He asks if we know anything of the French BC station that comes up on W1BB's frequency every Sunday morning at 0557 (for 0600). This would appear to be a harmonic of Radio Lyons on 602 kc, which conveniently falls on 1806 kc! A case for PTT, not GPO.

GDX on Top Band

A G3 from up North says he is considering a tour of the GM counties this summer, and would like to get in touch with someone who has plenty of spare time and would care to co-operate in the venture. He asks us not to mention his call in case the plans fail to materialise, but if anyone interested will write to "WABC Expedition, c/o DX Commentary," we will forward letters to him.

WABC scores do not show any startling changes. Again, it is the counter-attraction of the DX bands that is responsible, for the Five-Band Table is fairly buzzing with activity. G3KEP (Bingley) has added GM3DGI (Midlothian), GM3BXW (Renfrew) and GM2BUD (Ayr), and his score on Phone is now 55 worked, 38 confirmed.

G2CZU (Bath) is also moving towards a Phone WABC with 51

worked and 48 confirmed. He tells us that GM3KHH (Moray) will be in Banff on March 30-31, so please keep the pile-up orderly.

G3LNR (Nottingham) was licensed on January 26 and has been on One-Sixty ever since, with 5 watts and 67 feet of wire. He has worked G, GM and OK so far, and has been hearing W1BB, ZB1HKO and the DL2's.

G3HGY (Coventry) recently claimed his WABC and now scores 68. He tells us that GM3KJN/A (Kinloss) puts a fine signal into the Midlands; last time he signed /A he was in Elgin, so he is worth watching. G3HGY mentions the high standard of CW operation heard from most of the new "tickets" on this band.

G2HPF collected a few new ones on phone, including GW3LDC (Monmouth) and GI3IOS (Co. Down).

Prolongations

The DX Committee of the Little Twerpington Radio Club recently met in plenary session, and came to the following confusions: That the average time of a QSO is diminishing far too rapidly; that abbreviations are responsible for making contacts very stereotyped and unfriendly; and that something should be done about it.

Accordingly they decreed that many stock abbreviations shall henceforth be *taboo* among their members, and that the following "prolongations" shall take their place.

For "R," *read* "OK on your 150 watts, OK on your two-element beam, OK on your Wx, OK on your report on my sigs, OK on your QTH, OK for QSL via Bureau and please also QSL via Bureau . . ." *(Don't stop until you run out of ideas).*

For "QRU," *read* "Well, I guess not much more here for now, so may as well turn it back to you again, oh, by the way . . ." *and on, from there, to any subject that seems suitable.*

For "73," *read* "Well, I wish you all the very best 73's and good DX so 73's and hope cuagn, best DX and 73's o.m."

For "QTH London," *read* "The QTH here is L for Leonard, O for Oboe, N for Nuts, D for Denmark, O for Oboe, N for Nuts . . . I repeat . . . L for Lemon . . ." *and so on.* And if you have a really good one like Tallahassee, Florida, make the most of it and don't forget the "AAA" and "MIM" in between each time.

For "Sigs 579" *read* "Your sigs are RST RST 579 579 RST 579 579 579." If your own report was 599 you can repeat once more, for luck.

Further suggestions will appear from time to time. Meanwhile, if those who do *not* belong to the Little Twerpington DX Committee would kindly digest the above and use them in the reverse direction, countless users of the bands would be very happy.

DX Strays

ON4QX (Antwerp), who believes in making a DX-pedition each year, tells us that he will be in San Marino during June or July. Meanwhile, several G's who worked ON4QX/LX last year have not sent QSL's; if they will do so, they may be sure of a reply, as ON4QX is a 100-per-cent. man.

W6ITH looks on the projected military base on Gan Island in the Maldive Group, as a hopeful sign. This will be a stopping-off point for long-range RAF aircraft on the Great Circle route to the Far East, and there will be a radio communications station there. Dare we hope that someone will feel like starting a pile-up on the HF bands?

Another base (also quoting W6ITH) is projected for the island of Fernando de Noronha, 225 miles off the Atlantic Coast of Brazil. This one is in the middle of a guided-missile range—and if the G-M boys from the States go there, you can be pretty sure of hearing a new prefix.

Three stations were actually being set up on Christmas Island (Pacific) around January 27, when we received a letter reporting that VR3E, VR3F and probably VR3G will all be making an appearance. Licences will not be available for frequencies lower than 14 mc, but they hope to work that band and also, probably, 21 and 28 mc, phone and CW. G's have been heard out there, around 0500 GMT. VR3F's first three hours of operation landed ZK1, ZP, JA,

On the left is G3IAG, radio officer of the m.v. "Pinemore," with G3JU, who was a passenger in the ship on a recent trip to Cyprus, where he hopes to come on with a ZC4 call. Here they are testing the ship's lifeboat transmitter — not in the expectation of having to use it, but because a routine check must be carried out from time to time.

KH6, ZL, VK, VE6, W's and South Americans—no Europeans.

Activity will be mainly on 14195 kc, 0500-0900 GMT, and also 1800-1900 at week-ends. Our correspondent is G3KDE, who says all cards for VR3's can be sent to him . . . 4038613 Sgt. Cheeseman, Sgts. Mess, RAF 160 Wing, British Forces P.O. 170.

ZS2AT (East London) claims his WFE and sadly remarks: "In the old days one was quite proud of 'getting across the pond'; but now you can never have a QSO with a rare country without those same gents crowding in on you and usually wrecking the contact."

W6AM (Long Beach) puts his score up to 271, but not by working a new one. Researches have apparently shown that C8FP, who gave many people their only Zone 23 contact some ten years ago, was in Mongolia and can count as such! Those lucky ones who have a C8FP card in their possession can chalk up an extra point on the score sheet.

No news of 50-mc DX this month, but G3JZK (Cambridge) tells us that a local viewer seems to have been receiving a South American station on his TV set. He is awaiting something more definite in the matter of a call sign and so on.

New and rare sheepaskin, suggested by G3IDG—the HNCC or "Holds No Certificates Certificate," for those who couldn't care less. G2HPF's version is the NATC—not able to claim.

Short Wave Magazine

DX CERTIFICATES

The following have been awarded since the publication of our last list, in the December 1956 issue:

WFE

No. 26 JA1CR (Tokio)
27 VU2MD (New Delhi)
28 ZS2AT (East London)

FBA

No. 71 SM5YG (Bromma)
72 EA1AB (Santander)
73 G6VC (Northfleet)
74 DL1IP (Schleswig)
75 EA4BH (Madrid)
76 CT1BK (Lisbon)
77 G3WL (Plymouth)
78 ZB1BF (Hamrun)

WNACA

No. 119 DL9PX (Rossacker)
120 ZP5CF (Asuncion)
121 G3IMV (St. Albans)
122 G5CG (Bulwell)
123 SL3AG (Solleftea)
124 PY1ANR (Rio de Janeiro)
125 G3ESY (Hereford)
126 G5MN (Hull)
127 G8FW (Doncaster)
128 G3DQO (Urmston)

WABC

No. 141 G3KOR (Liverpool)
142 G3ILO (Slimbridge)
143 G5QI (Solihull)
144 G3HKX (Bexleyheath)
145 G3HGY (Coventry)
146 G3HAL (Winslow)

WBC

No. 59 EAB5D (Valencia)
60 SM7BVQ (Visby)
61 YU1AG (Belgrade)
62 SM5EC (Linkoping)
63 DL2UY (BAOR)
64 SM3ATY (Oestersund)
65 PY2OE (Sao Paulo)
66 4X4CJ (Tel Aviv)
67 KP4KD (San Juan)
68 VE3BWY (Toronto)

Details of MAGAZINE DX AWARDS and CERTIFICATES, and the claims required for them, appeared in full on p. 246 of the July 1956 issue.

Overseas claimants are now asked *not* to send the QSL cards with the application, but to submit instead, a full check list. From this we shall be liable to ask for any or all QSL's to be produced . . . but please do not send them with the original application.

A complete list of the U.K. Counties was given on p. 20 of the March 1956 issue.

DX Shorts

Some terse items from W6YY: I5RAM is a not-too-common one on 14078 . . . Aaland Island does not count as a new one until March 1. Activity up-to-date has come from OH2NG/Ø, OH3RA/Ø, OH1RT/Ø and OH1ST/Ø, all CW . . . CEØAC is on again from Easter Island, 14065 CW, around 0600 . . . W6ITH is the first W to have made WAZ on Phone; he worked 37 of them on SSB . . . SVØWD holds a licence in Crete, but is not on the air yet . . . ZD2GW and ZD9AF are both active on CW.

CR4AS is on 21232 kc, phone . . . VQ8AB and 8AD are both on CW, with VQ8AF on phone—all 14 mc . . . although Saarland returned to Germany at the beginning of the year, the 9S4's are still using their old call-signs—they want it both ways!

W6YY and W6CUQ both recently worked YA1AM on phone . . . ET3RL (Box 399, Addis Ababa) has a fine phone signal, 14162 kc . . . ZD3BFC has opened up again on 28 mc phone.

4X5RE contacts should be carefully "stored"—he might possibly count as a new one . . . AC5PN left Bhutan last October, but may be back again by now; any supposed contacts during the interim period were definitely ungood . . . instead of his old B.2, he now owns a BC 610, but doesn't know how to "carry it to Bhutan."

VP2LU is W1TBS and much enjoys being in a DX location . . . ZK2AB, active between 1954 and 1956, was a pirate . . . ST2NG is reported on the way to VS9, and HK3AB to be going to HKØ-land in March. ZD8JP is CC on 14021 kc, running 20 watts . . . HC1LE is reputed to be the only CW station in Ecuador—all the others prefer phone . . . JZØPC will be on 21200 kc every Saturday and Sunday, 0300-0500 . . .

ZL4CK, *via* G2HPF, says "Look out for ZL5AA and ZL5AB shortly" . . . VP8BK, *via* G6YQ and G6QB, says that he doesn't know of any other station on South Georgia, despite the fact that a station signing VP8AX recently claimed to be there . . . ZC5JM, 14 mc CW, is good for Labuan, and has worked numerous Pacific stations.

More cold cheer for the devotees of Forty: The following were worked on 7 mc by JA1CO and JA1EF . . . UA9, UAØ, U18, HL2AC, KR6AD, KH6, VE7, W7, 3W8AA, ZD8. JA1CR worked KW6CA. Lots of interesting stuff is circulated in the *JDXRC News*, but unfortunately we have some difficulty in coping with some of the items—it's mainly in Japanese!

HI8WL is back in the States and now signs W5DUG. If anyone didn't receive his QSL, he will now fix it (if it checks!) . . . The projected Tannu-Tuva expedition, UAØKTT, seems to have jumped the gun, as one or two W's report working that station in December . . . UM8KAA operates mostly on Forty CW . . . Although there is said to be no activity from Franz Josef Land at present, UAØKTO/FJ is the call-sign of a "collective" station up there.

From the current issue of *The Malayan Radio Amateur* we learn that the following new licences have been issued: VS4FC, Sarawak; ZC5ER, Brunei; ZC5GL, 5JM, 5TS and 5VN, Labuan. We also rather like their "DX Hunt," a novel form of contest in which, basically, a list is published which contains only the countries which

no one among the contestants has worked. Then, as the lucky man appears from time to time, the country he has added is struck off the list and he is awarded points. Only 40 countries appear in the current list. By the way, QTH for the Malayan QSL Bureau is Box 777, Kuala Lumpur.

Forthcoming Contests

The following dates are worth noting:

March 9-10: *ARRL DX Contest, Phone (second leg).*

March 23-24: *ARRL DX Contest, CW (second leg).*

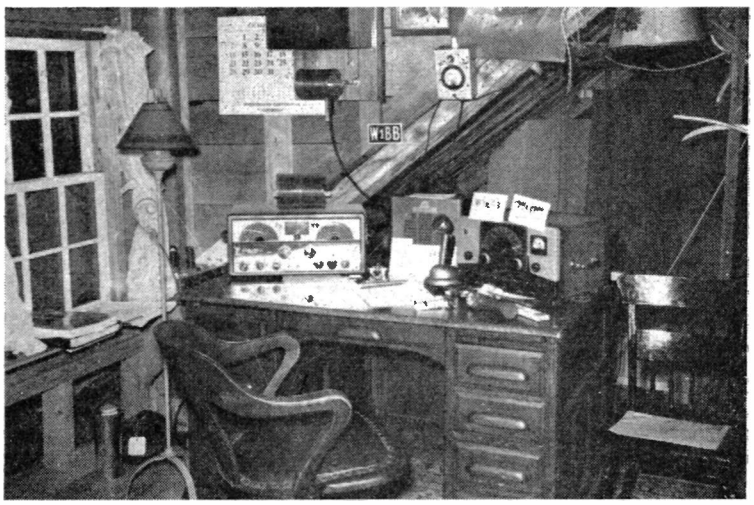
April 13-14: *REF DX Contest, Phone Section.*

April 27-28: *PACC Contest, CW Section.*

May 4-5: *PACC Contest, Phone Section.*

May 18-19: *Helvetia 22 Contest (CW/Phone, all bands).*

The "PACC" is sponsored by VERON, the Dutch national society, and the contest begins at 1200 on the Saturdays, finishing at midnight on the Sundays. Amateurs outside PA transmit RST (or RS) and a three-figure serial; PA stations send two letters indicating their province. Notes to enable an entry to be made in the Helvetia (Swiss) Contest will be given next month.



Stew Perry, W1BB, has a "hide-out station" in Maine, signing W1BB/1, operating on 160 metres. His is probably the callsign best known to those who seek DX on Top Band. W1BB has been conspicuously successful in the long series of 160-metre Tests, extending over many years, which he has helped to organise in collaboration with "Short Wave Magazine."

Heading Note

BV1US, on Formosa, the subject of our heading photograph this month, is a well-known and very much sought-after station on the DX bands. Fortunately for all concerned, BV1US is a multi-operator station, also on SSB—and credit must be given them for being very prompt with their QSL's.

And that just about sums up this month's news. May we remind you that next month is your last chance to enter the WAZ Marathon—no entries for the table will be accepted after the April issue appears.

Deadline for the next issue is **first post on Friday, March 15,** and overseas readers might like to note that the following one will be *April 12.* Address everything to "DX Commentary," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1, to arrive by the above date. Until then we wish you Good Hunting, 73 and BCNU.

OBTAINING THE MAGAZINE

We still get numerous complaints implying that there is some difficulty in obtaining *Short Wave Magazine* locally, or that it is "always late." In fact, if a newsagent puts in an order in the usual way, there should be no grounds for either of these complaints. All orders are cleared the day before publication, and bookstall copies should be available at newsagents almost anywhere in the country by the day after publication (always a Saturday) at the latest. In the nature of things, bookstall copies for casual buyers will only be found in the larger centres, since we do not supply on sale-or-return, which means that every copy must be ordered.

SUGGESTING ANOTHER TA-12B MODIFICATION

G3KDK (Plymouth) writes that a TA-12B which does not quite cover the 40-metre band can be treated very simply by screwing brass slugs into the VFO and buffer coils; there is sufficient wax inside the formers to enable the slug (which should have the usual adjusting slot at one end) to cut its own thread. G3KDK reports that he was able to extend his 40-metre coverage from 7090 to 7400 kc by this method, which also permits the drive to be set for maximum in the buffer stage. He adds that the idea was originally suggested to him by G3JYB.

IMMINENT DANGER

We have to report the likelihood, if not the probability, of the reappearance (perhaps fairly soon) of G9BF, who some years ago wasted space in these pages with spurious accounts of DX worked using gear of which he gave entirely unreliable descriptions. We know that he is in circulation again, unfortunately, because in a long and complicated letter to the office recently he described how, on his new all-813 sideband splitter, he got a "QRZ?" from a W3 on 11 metres. "This proves am still out in front all DX chasing" is how G9BF put it. But we happen to know that he is still waiting for a card from a 40-metre phone station signing SUSIE, worked in 1947.

Producing a Signal Generator

FROM THE TA-12 MF RANGE OSCILLATOR

A. D. TAYLOR (G8PG)

THE medium-wave VFO fitted in the Bendix TA-12B transmitter covers the range 300-600 kc and forms the basis of the signal generator described in this article. The original circuit is shown in Fig. 1, together with the few additional components involved in the conversion. It will be noted that a variometer-tuned Colpitts circuit is employed in the oscillator, this being common practice in commercial equipment of this type. By means of the simple modifications to be described, the oscillator in this otherwise unusable section of the TA-12 can be converted to a useful piece of test equipment capable of providing a modulated or unmodulated signal over a wide range of frequencies.

The same sort of modification could also be applied to those other " marks " of TA-12 in which Channel 1 covers a different LF range.

Construction

As the transmitter proper will normally be required for other purposes, it is necessary to remove the MF oscillator and mount it in a separate metal case. Provided care is taken, the whole oscillator assembly can be withdrawn without disturbing any of the wiring except the heater leads. which have to be cut off in any case.

To withdraw the MF section. first remove the cog-wheel which is mounted on the variometer shaft and meshes with the worm drive controlled from the front panel. The grub screws on the cog-wheel can be loosened with a small Bristow key (this is the type of key also used to remove control knobs and similar fittings) and the cog-wheel will then slide easily off the variometer spindle. The locking nut securing the variometer to the panel should then be removed, also the screws holding the component mounting tag strip and valveholder in place. If the HT+ and output leads are then disconnected from their respective feed-through insulators and the heater leads cut, it should be possible to withdraw the whole oscillator assembly from its compartment.

Once the oscillator is out, certain preliminary wiring can be done. Remove the earth strap from the suppressor grid pin on the valveholder and take a lead from this pin to the slider of the new 300-ohm potentiometer, RV1. At the same time a twisted pair is wired from the two heater pins on the valveholder to the other ends of RV1.

The metal box selected to house the oscillator should be large enough to allow all the components to be mounted on the back of the front panel, this being drilled so that the oscillator components fit on it in the same way that they are mounted on the bottom of the oscillator compartment in the transmitter. For mounting the valveholder, the pillars in the transmitter oscillator compartment can be removed by unscrewing, and then bolted to the front panel. Additional space must be provided on the panel for the two new potentiometers, the co-axial output lead and a suitable power socket. At this stage, a good slow motion drive with a blank scale should also be fitted to the variometer.

Once the components are fitted, the remaining wiring can be completed. The existing output lead is taken to one end of the 250,000-ohm potentiometer RV2, the slider of this potentiometer then being connected to the inner of the co-axial socket and the other end being taken to earth. The existing HT+ lead and the live heater lead are taken to their correct pins on the power socket and the HT— and earthy heater pins on this socket are earthed. The unit is then ready for test.

Controls and Power Supplies

Before describing the testing and calibration of the unit, a note on the circuit modifications and power supplies is in order. RV2 is a conventional output control, interposed between the oscillator anode and the co-axial output lead to the equipment under test. RV1 is the modulation control, and allows the output to be modulated at mains frequency (50 cycles) without the need for a separate modulator valve. With the slider of RV1 at the earthy end of the potentiometer, the suppressor grid of V1 is earthed and the oscillator output is unmodulated. As the slider is moved away from the earthy end of RV1, a 50-cycle modulating voltage derived from the heater supply is applied to the suppressor grid of the valve ; the further the slider is moved away from earth the greater the percentage modulation. If a higher modulation frequency is required, a separate AF oscillator valve can, of course, be employed, but the scheme suggested has proved simple, cheap and effective.

Either a 6SK7 or 12SK7 can be used in the

oscillator with the appropriate heater voltage, while the most suitable value of HT is around 50 volts. This provides a good harmonic output but at the same time keeps the fundamental output down to a level where it does not interfere on the IF channel of nearby broadcast receivers. The HT can be derived either from a potential divider connected across a normal power pack or from a 48-volt battery, the drain being only a milliamp or so.

Testing and Calibration

Set RV1 at the earthy end of its travel and RV2 at the live end, then connect suitable power supplies to the oscillator and check that it is oscillating over the fundamental range of 300-600 kc. If no 300-600 kc receiver is available, use a broadcast set to check the second harmonic over the range 600-1200 kc. In either case a strong beat should be obtained with the co-axial output lead connected to the aerial/earth terminals of the receiver. Next, feed the output into a receiver with a BFO (the fourth harmonic falling in Top Band can be used for this purpose) and check that RV2 does control the output level and that, as RV1 slider is moved away from the earthy end of the potentiometer, a steadily increasing level of 50-cycle modulation appears on the carrier. With a 12-volt heater supply and 50 volts of HT, over-modulation can be obtained if RV1 is advanced too far, and it is easy to find a point which gives a satisfactory modulation effect.

Calibration is carried out in two stages—50 kc points and 10 kc points. To obtain the 50 kc points, return the oscillator to the CW condition by adjustment of RV1, then connect the oscillator output and the output from the station 100 kc crystal calibrator to the aerial/earth terminals of a medium-wave broadcast receiver. Find the 600 kc harmonic from the crystal calibrator on the receiver, then tune the oscillator towards the LF end of its range and zero-beat the second harmonic of 300 kc with the crystal calibrator signal. Repeat at each hundred kc up to 1200 kc. In each case, the oscillator frequency is *half* the frequency to which the broadcast receiver is tuned, *e.g.*, 700 kc on the receiver is 350 kc on the oscillator, and so on. Carefully mark each calibration point on the oscillator tuning dial.

The 10 kc points are obtained in the same way by using the oscillator, crystal calibrator and station communication receiver over the range 3 to 6 mc. The oscillator frequency is now equal to *one-tenth* the frequency of the crystal harmonic against which it is beating, *e.g.*, if the oscillator is beating with the 3100 kc harmonic from the crystal calibrator, it is tuned to 3100/10 kc = 310 kc, and so on. Once the 10 kc points are recorded on the tuning dial, 5 kc points can be inserted with the aid of a pair of dividers.

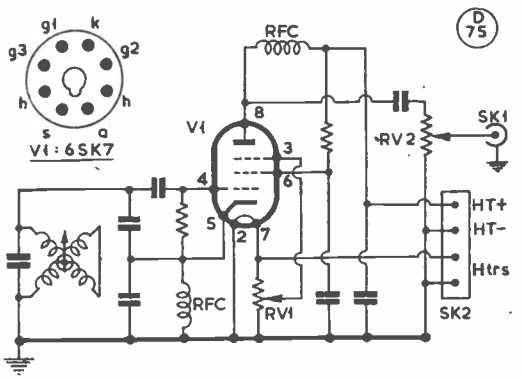


Fig. 1. The MF VFO section from a TA-12 modified for use as a signal generator, as described in the text. The only additional items required are those marked: RV1, 300-ohm w/wound; RV2, 250,000 ohm w/wound; SK1, coax output socket; SK2, power socket or tag board. The valve can be either a 6SK7 or a 12SK7 (see text).

Uses of the Oscillator

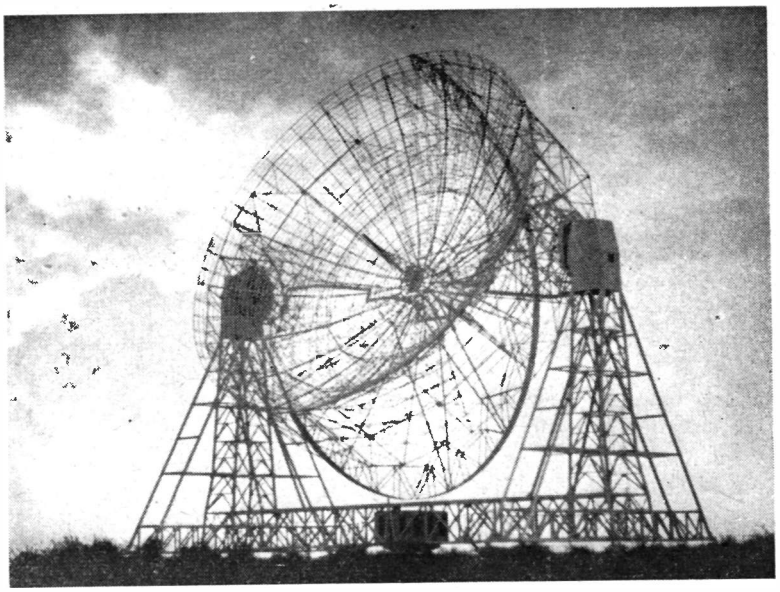
Output on either the fundamental or harmonics is sufficient for receiver alignment purposes up to above 3 mc. The instrument (which it has now become) will thus provide a signal for lining up almost any IF circuit in common use, *plus* the signal frequency circuits of broadcast receivers and the lower frequency ranges of communication receivers. In addition, useful marker harmonics can be picked up to above 10 mc, providing either 300, 400, 500 or 600 kc points for use in conjunction with a crystal calibrator.

Once the 5 kc points are marked on the dial, interpolation to 2½ kc becomes easy—therefore, a VFO or receiver can be calibrated to the nearest 10 kc point on 1·8 mc and the nearest 20 kc point on 3·5 mc. With a really large dial these figures could be even further improved upon. These are but some of the uses of the oscillator and no doubt others will suggest themselves to the would-be constructor.

After five years of ownership, the writer is still intrigued by the TA-12—there is always some new use to which this versatile set or its components can be put!

"MIRROR IN THE SKY"

This is the title of a particularly good instructional film, which was pre-viewed in London on February 6 last, by courtesy of the Mullard Organisation. It tells the story of the Ionosphere, and shows how, in 1924, Sir Edward Appleton, F.R.S., proved the existence of the Heaviside layer with the help of the old BBC station at Bournemouth. In 1931, Appleton was able to use a pulse technique to check the height of the reflecting layers. (It was this that gave Watson-Watt the basic idea from which he developed radar.) Other very interesting sequences from the film are a reconstruction of the scene of Marconi's original Trans-Atlantic experiment—the letter S in Morse was first heard at 1230 GMT on December 12, 1901—and of the equipment used by Hertz, in 1887, to prove the existence of wireless waves. The film deals with developments in the field of radio propagation over the past 25 years, and the setting-up of research stations to analyse and record changing conditions in the ionosphere, the influences created by disturbances in the sun, and the potentialities of the radio telescope for astronomical research.



The great Radio Telescope at Jodrell Bank is located about 3 miles north-east of Holmes Chapel, in Cheshire. This is actually a photograph of the model, as the structure will appear when completed. The diameter of the dish is 250 feet, the bowl weighs some 500 tons, and the towers, which run on bogies to rotate the dish, are 180 feet high.

Mirror in the Sky runs for 22 minutes, and its production was financed jointly by Mullard Ltd. and the Educational Foundation for Visual Aids, 33 Queen Anne Street, London, W.1, who are the distributors. Among organisations collaborating in the making of *Mirror in the Sky* were the BBC; the Radio Research Station of the National Physical Laboratory; Manchester University; Marconi's; the Cavendish Laboratory of Cambridge; the Science Museum; and the High Altitude Research Laboratory of Boulder, Colorado. The film is available for distribution among schools and educational establishments generally.

THE R.E.C.M.F. EXHIBITION

This important Exhibition will, this year, be held in two sections—at Grosvenor House and Park Lane House, London—during the period April 8-11. Admission is "by invitation only," and all prospective *bona fide* visitors should apply in writing direct to: The Secretary, Radio & Electronic Component Manufacturers' Federation, 21 Tothill Street, London, S.W.1. The definition of *bona fide* in this context is, of course, those who have a professional, executive or administrative connection with the radio industry, the technical branches of the Services, the Service Ministries or Government scientific and telecommunications services.

SAMPLE OF DX TECHNIQUE

One evening recently, on 21 mc CW, ET2PA was calling "CQ LA," a perfectly legitimate ploy. He got back a W3 and an OH. He took the W3 (!), while an LZ1K came up calling "ET2PA/ET2FM?? QSP?" Having finished with the W3, ET2PA went QRT, with the LZ still at it. *Puzzle:* What happened to his contact with Norway? During the same listening session, UA3HI, who said he was using 200 watts and had a fiendish chirp smearing about 20 kc of the band, was given T9 by a W7. A little later, a G was heard to tell, quite properly, a W8 who had answered a CQ that his keying was so bad as to be hardly readable. The W8, who then came back with much steadier sending, read the G a lesson about how he (the W8) had been on the air for 25 years and that this was the first time anyone had told him they couldn't read his fist. The G replied, again very correctly, that it had been OK on the last over, but that this wasn't all—the W8's note was T8, chirpy. Though signals were S8 both ways, at this there was no further reply from the W8; two days later, he was heard again, with exactly the same sort of signal, being given T9 by a DL. What is the point of the T-code unless it is fairly used and respected by both ends of a QSO?

INDEX TO VOLUME XIV

Every copy of this issue should contain, as a free loose supplement, the Index to last year's work. The Index, under 21 subject headings, with some 340 referred items, shows that in the twelve months ending with the February 1957 issue, we made use of the (paid) work of 40 outside contributors.

VHF BANDS

A. J. DEVON

Poor Conditions & Low Activity—

Survey of the Bands—

Four Metres Waking Up—

Some Station Reports & News—

NOTHING much has stirred on VHF since last we met—that is to say, there has been no great opening, with high activity, much DX worked, and a flood of reports for this feature.

The picture your A.J.D. has to paint is precisely the opposite! Very little has happened since the Aurora opening of January 21—which, as it now transpires, was missed by many—and those reports that have come in are unanimous on one point: That activity, in terms of stations to work, has struck an all-time low, except for Monday evenings in the London area.

As we have said before, this does not necessarily mean that people have totally lost interest, and do not come on at all. The established VHF operators are always available if conditions are favourable, and there are plenty of others, up and down the country, who show up regularly to keep local schedules. But unless conditions are good, they do not get heard outside their areas of local influence. The nett result is that, most nights, the two-metre band sounds pretty dead.

None of this affects the dedicated VHF types—if conditions are not good enough for DX working, then they have plenty of experimental and constructional work on hand, and they are just as busy off the air as on it. So in spite of the dismal forebodings of some of those who have been writing in recently, it is the firm conviction of your A.J.D. that as the VHF season advances, so greater activity will develop and many interesting things will happen.

Lines of Thought

With four active VHF bands open, there is in truth plenty to be done. The VHF effort is now well spread over four metres, two metres, 70 centimetres and 23 centimetres. Many keen operators find that it is as much as they can do to keep going on two of these bands, yet there are several stations equipped for all four.

For the beginner on VHF, two metres is probably easier than four metres because there has been so much more information published on that band than any other. Over the years, converters, transmitters and aerial systems of all kinds have been described in detail. There is also more likelihood of regular local activity on two metres than on the other VHF bands. So those who are thinking of breaking into VHF would be advised to make a start on 144 mc.

As regards four metres, activity appears to be increasing, and this coming summer may well see EDX results by sporadic-E, that peculiar type of propagation which made Italian stations—and, indeed, the whole of Europe—workable in the old five-metre days. For this to be possible again obviously depends upon there being activity at the other end. This means the release of the 70 mc band in Europe generally.

On the 430 mc band, activity is dictated almost entirely by conditions and, here again, a certain amount of local working goes on all the time. The sort of results that can be expected on the 70-centimetre band is now well established and, since it closely follows two metres, it is probable that new records should be made on Seventycems this coming VHF season.

It is on 23 centimetres that original experimental effort is now concentrated, by people who have already "been through" 144 and 430 mc. There are not a great many of them, but they are doing valuable work. It has yet to be established whether 23 centimetres can give, under the right sort of conditions, DX working of the kind that we have come to associate with VHF.

Of the four VHF bands, therefore, 23 centimetres is at once the most difficult and the more interesting, because results and the conditions affecting them are pretty well understood on the other three. The 4-metre picture is not, perhaps, quite so clear as this statement suggests, because we do not yet know for certain whether 70 mc is going to be affected by sporadic-E, nor if the MUF is really going high enough to make DX possible in the same way that it is on, say, 50 mc.

Only activity and careful

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1956

Starting Figure, 14

From Home QTH only

Worked	Station
47	G3GPT
42	G5MA
41	G3KEQ
35	G3GHO, G5ML
34	G3LHA
33	G2CIW, G3DKF, G3IOO, G3JWQ
32	G2DVD
30	GC3EBK
26	G3KHA, G3WW
25	G3CKQ
24	G3KUH
23	G3KEF, G3KPT
19	G3FIH
18	G5MR
15	G3IER

This Annual Counties Worked Table opened on September 1st, 1956, and will run till August 31st, 1957. All operators who work 14 or more Counties on Two Metres in the year are eligible for entry in the Table. The first claim should show a list of counties with stations, which can be added to thereafter as more counties are worked.

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH Only

Worked	Station
75	G5YV
70	G6NB, G6XM
68	G3BW
66	EI2W (286), G3IUD (302)
65	G3CCH
64	G3GHO, G5BD (435)
62	G3BLP (630)
60	G2FJR (427), G2OI (402), G3DMU
59	G3EHY, G4SA
58	G3IOO, G8OU
57	G8SB
56	G3WW (770), G5DS (654)
55	G2HDZ (495), G2HIF, G5BM, GW5MQ
54	G5MA
53	G2AJ (519), G3FAN, G4CI
52	G2NH, G6RH, G6XX, GW2ADZ
50	G3ABA, G3GSE (518)
49	G3HAZ (358)
48	G3FIH, G5ML, G6TA (487)
47	G3HBW, G5WP
46	G4HT (476), G5BY, G6YU (205)
45	G2DVD (362), G2XC, G3BJQ, G3KEQ, G5JU
44	G2CIW (208)*, G3BK, G8DA
43	G2AHP (500), G3BA, G3COJ, G3HWJ, G4RO, G5DF
42	G2HOP, G3BNC, G3DLU*, G6CI (220), GM3EGW (146)
41	G2FQP, G3DO, G3WS (255)
40	G2DDD, G3CGQ, G3IER, G3JWQ (256), G8KL
39	G2CZS (275), G2IQ, G3DKF, G3DVK (208), G3GBO (434), G3VM, G8IL (325)
38	G2FCL (234), G3APY, G3CKQ, G3HTY, G5MR (336), G8VN (190)
37	G2FNW, G2FZU (180), G3DLU
36	G2DCI (155), G3CXD, G3IIT, G3KHA (195), G6CB (312), G8IP
35	G3FZL, G3FYY (235), G3HCU (224)
34	G3AEP, G3BKQ, G3LHA (117), G8IC, GC3EBK
33	G3HHY (125)
32	G3HIL, G8QY, G8VR, GC2FZC

schedule keeping during the next few months will give us the answers so far as 4 metres and 23 centimetres are concerned—and it is clear that it is on the former rather than on the latter band that most activity can be expected.

Results on Four Metres

Which brings us easily to an interesting report from Bill, G2HCG of Northampton, now pushing out a very nice 4-metre signal from a 4-over-4 slot-fed beam. On February 11, he made a 70 mc "First" with PE1PL, and it seems that the QSO is possible almost any time that PE1PL can be worked on two metres, except that 4-metre signals are down by a couple of S-points on the two-metre result; G2HCG also finds this with G3FAN. Bill runs 50w. to a QQVO6-40.

Worked	Station
31	G3HXO, G3KPT (108), G5RP
30	G3FRY, G3GOP (208), G3GVF (129), G3IRA, G3KEF (110), G5NF, GM3DIQ, GW8UH
29	G3AGS, G3AKU, G3FIJ (194)
28	G3ITF, G3KUH, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160) G6GR, GI3GQB, GW3GWA
26	G2BRR, G3CFR (125), G3SM (211), G4LX, G4MR (189)
25	G3JMA, G3JXN (220), G5SK, G6PJ
24	G3DLU*, G3FD, G3FXG, G3FXR, G3GSO (112), G3JHM
23	G2AHY, G3CWW (260), G3HSD, G3YH, G4JJ/A, G5PY
22	G2DRA, G3AGR (135), G3ASG (150), G3BPM, G5AM, G8NM
21	G2AOL (110), G3DVQ, G3IWJ, G6XY
20	G3EYV, G3IOE
19	G3FEX (118), G3GCX, G5LQ (176)
18	G3DBP, G3JGY, GC2CNC
17	G3EGG
16	G3FRE, GM3DIQ*
15	G3IWA
14	G2DHV, 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 are worked.

* New QTH

And now, after all these years, from whom do you think our next report comes? None other than Louis, G3EHY of Banwell, Som., back again on the VHF air, and fully operational on 70.2 mc, working every evening between 1800 and 1900 GMT, and later on after 11.0 p.m. At these times, he is in a regular four-way with GW2ACW, GW4CG and GW8SU, getting "5 & 9" on phone all round. On CW, G3EHY has worked into London, a good QSO being obtained with G3CLW on the evening of February 9. The contact earlier with GW8SU was the G/GW "First" on four metres. The beam at G3EHY is a 3-element with ¼-wave reflector and 0.1 w/l director spacings, the driven element being a folded dipole fed with 300-ohm ribbon through a matching transformer; this beam, says Louis, gives the best results of the several he has tried. His transmitter runs 40w. or so to an 829B.

Two other stations expected on four metres very shortly are G3HHY and G3YH, both in Bristol—so the West Country is well represented on the 70 mc band.

Among the two-metre reports this time, G3IOO (Oswestry) discusses his results during the Aurora opening. On that January 21, he worked F3JN, F9QE and GW8UH—but in his case he could only hear them with his beam headed north-*east*, and to get F3JN on the latter's final, Nat had to swing the beam right round to *west*. There was no sign of any of the stations with the beam in the right directions for them. This is rather an interesting result, because most other reports said that the DX could only be heard with beams north-west. It may possibly have been that G3IOO was involved in some local reflection effects—there does not appear to be any other explanation.

Vernon of G5MR (Hythe) drops a line to say he is "still about"—we *had* wondered, not having

heard from him for three months! He can receive on four metres, and will "continue to listen." G3CGQ (Luton) has re-installed the beamery for two metres and 70 centimetres. G5WW (High Wycombe) is now regularly on the two-metre air, and can be heard on 144.72 mc knocking off his first-time contacts.

G3DLU (Sheffield) has built the noise-generator described in the September 1954 issue of SHORT WAVE MAGAZINE, in order to get his new YU1AD converter really on the top line, as advised! We hope to hear in due course how it works out.

G2CIW (Cambridge) is very unhappy about the level of activity; he feels that if he calls six CQ's in one session without a single reply, he is justified in switching off and saying "nothing doing." However, he was one of those who got a break during the Aurora opening with DL3YBA (Hanover) as best EDX worked—and very nice, too. By the way, this 'YBA is a full call, but the last letter has the same significance as our /A.

In the month to February 14, SWL Stokes (Ruislip) logged 51 stations, nearly all in the area of London and the Home Counties; this figure suggests quite a reasonable level of activity. If only somebody would tell us, we have no doubt that about the same number can be heard in any one month from, say, Sheffield.

TWO-METRE FIRSTS

G/DL	G3DIV/A-DL4XS/3KE	5/6/50
G/EI	G8SB-EI8G	23/4/51
G/F	G6DH-F8OL	10/11/48
G/GC	G8IL-GC2CNC	24/5/51
G/GD	G3GMX-GD3DA/P	29/7/51
G/GI	G3DA-GI2HML	29/6/49
G/GM	G3BW-GM3OL	13/2/49
G/GW	G5MQ-GW5UO	22/10/48
G/HB	G6OU-HB1IV	12/9/53
G/LA	G6NB-LA8RB	29/6/53
G/LX	G5MR-LX1AS	23/7/55
G/ON	G6DH-ON4FG	25/9/48
G/OZ	G3WW-OZ2FR	1/6/51
G/PA	G6DH-PAØPN	14/9/48
G/SM	G5YV-SM7BE	1/6/51
GC/DL	GC3EBK-DL3VJ/P	22/3/53
GC/EI	GC2CNC-EI2W	8/10/51
GC/F	GC2CNC-F9OK	17/11/53
GC/GI	GC3EBK-GI3GXP	14/9/56
GC/GW	GC2FZC-GW8SU	16/6/54
GC/ON	GC3EBK-ON4BZ	4/3/53
GC/OZ	GC3EBK-OZ2FR	2/3/53
GC/PA	GC3EBK-PAØHA	16/7/55
GD/EI	GD3DA/P-EI2W	30/7/51
GD/GM	GD3DA/P-GM3DAP	29/7/51
GD/GW	GD3DA/P-GW5MQ	28/7/51
GI/DL	GI3GXP-DL1SE	5/1/56
GI/EI	GI3GQB-EI2W	13/6/51
GI/GD	GI2FHN-GD3DA/P	29/7/51
GI/GM	GI2FHN-GM3OL	1/7/49
GI/GW	GI2FHN-GW3ELM	8/7/49
GI/ON	GI3GXP-ON4BZ	5/1/56
GM/DL	GM2FHH-DJ1XX	29/5/55
GM/EI	GM3BDA-EI2W	12/6/51
GM/ON	GM3EGW-ON4BZ	21/11/53
GM/PA	GM3EGW-PE1PL	22/4/53
GW/DL	GW5MQ-DL4XS	22/9/51
GW/EI	GW2ADZ-EI8G	19/4/51
GW/F	GW2ADZ-F3LQ	14/5/50
GW/HB	GW2ADZ-HB1IV	14/9/53
GW/ON	GW2ADZ-ON4YV	13/5/50
GW/PA	GW2ADZ-PAØHA	13/5/50
GW/SM	GW2ADZ-SM6QP	1/7/53
CN2/CN8	CN2AO-CN8MB	26/6/55
DL/OZ	DL6SW-OZ2FR	4/3/51
DL/SM	DL2DV-SM7BE	10/3/51
EI/DL	EI2W-DL3VJ/P	29/8/52
EI/F	EI2W-F8MX	9/8/56
EI/ON	EI2W-ON4BZ	21/9/51
EI/PA	EI2W-PAØFC	10/10/53
ON/LA	ON4BZ-LA1KB	4/7/53
ON/LX	ON4TR-LX1MS	? ?
ON/OZ	ON4BZ-OZ2FR	3/6/51
ON/SM	ON4BZ-SM7BE	2/3/53
ON/9S4	ON4UD-9S4BS	19/8/56

VHF from ZC4

ZC4DT/VQ4EI has set off for Cyprus "loaded with two-metre gear" and will be on 144.80 mc exactly w.e.f. mid-March, running 25w. to a 6-ele Yagi, with a CC converter into an Eddystone S.750. He will be on with CW and phone *every day* at 1800 GMT beaming south for VQ4, and then again at 1830 looking WNW for Italy and Malta.

When ZC4DT was in Kenya as VQ4EI, this was the gear he used successfully on two metres, so he knows it works. We would say that he has at least a reasonable chance of contacts with I and ZB1, where there is activity; as is well known, the right sort of propagation conditions for VHF DX working develop very frequently in the Mediterranean area.

If the local licensing situation makes it possible, ZC4DT will also be on on 70.2 mc (exactly)—he has undertaken to let us know about this. And, of course, we shall also be very interested indeed to hear whether he is able to make any two-metre contacts from ZC4. He may find himself alone on the band in that area, but it will be a start that may encourage some activity in neighbouring countries.

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
29	G2XV
26	GW2ADZ
23	G3BKQ, G6NB
20	G3HBW
19	G3KEQ
18	G3IOO
16	G6NF
15	G4RO, G5YV
14	G2HDZ
13	G2CIW
10	G2OI, G3IRW
9	G5DS
7	G2DDD, G2HDY
6	G3FAN, G3JHM, G3JMA, G3KHA, G3WW
5	G3FUL, G3IRA, G3IUD, G5ML
4	G3JGY

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

The Earth Satellite

As already reported—p.597, January "VHF Bands"—the agreed frequency for the earth satellites, to be launched about July, is 108 mc. In the American spheres, the transmitter is to be a miniaturised 13-oz. unit, giving 10 milliwatts output, powered by mercury cells capable of running it continuously for two weeks. From the information available so far, it seems that this transmitter will not actually be radiating all the time, but will be interrogated from the ground whenever data are required as to what is happening on the orbit. The unit is built into a small aluminium container

BRITISH ISLES
TWO-METRE ZONE PLAN

(This is reproduced here for the attention of all concerned).

Zone A & B: 144.0 to 144.2 mc.	All Scotland.
Zone C: 144.2 to 144.4 mc.	All England from Lancs. Yorks., northward.
Zone D: 145.8 to 146 mc.	All Ireland.
Zone E: 144.4 to 144.65 mc.	Cheshire, Derby, Notts., Lincs., Rutland, Leics., Warwick and Staffs.
Zone F: 145.65 to 145.8 mc.	Flint, Denbigh, Shrops., Worcs., Hereford, Monmouth and West.
Zone G: 144.65 to 144.85 mc.	Northants., Bucks., Herts., Beds., Hunts., Cambs., Norfolk, Suffolk.
Zone H: 145.25 to 145.5 mc.	Dorset, Wilts., Glos., Oxon., Berks. and Hants
Zone I: 145.5 to 145.65 mc.	Cornwall, Devon, Somerset.
Zone J: 144.85 to 145.25 mc.	London, Essex, Middlesex, Surrey, Kent, Sussex.

which is gold-plated for heat shielding purposes.

Naturally, nothing is known about the Russian plans, except that the frequency is the same as that for the American spheres. Yet it is the Russian one that we are more likely to hear (or see) in this country. Incidentally, these spheres will not work phone, or even CW! They will radiate an MCW coding signal which will, probably, only be identifiable by the frequency. Anyway, as more information comes in, we will keep you informed.

The Tabular Matter

This is presented with all claims right up-to-date, and we hope that anyone who needs an adjustment or can take a place in the Tables will let us know in time for the next issue.

The G3HBW Article

Those who are interested in the G3HBW 23-centimetre converter design will no doubt like to know that the second part of his article will appear in the April issue. There will probably be a final instalment in May or June.

Keep the Fire In!

With the peculiarly unseasonable weather we have been having, the meaning here is not so much to keep the shack warm, as to remind you that the closing date for the next issue is **Wednesday, March 20,** certain, with all your VHF *gen* addressed to: A. J. Devon, "VHF Bands," SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1. And may we have, please, more reports of more activity, and some calls-heard lists!

TWO METRES
COUNTRIES WORKED -
Starting Figure, 8

16	ON4BZ (DL, EI, F, G, GC, GI, GM, GW, HB, LA, LX, ON, OZ, PA, SM, 9S4)
15	G3GHO, G4MW, G5YV, G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, ON, OZ, PA, SM)
14	G2FJR, G2HDZ, G3IOO, G5BD, G8OU
13	G2XV, G3BLP, G3CCH, G3DMU, G3GPT, G5DS, G6XM, G6XX
12	G2HIF, G3WW, G5MA, G6LI, G6RH
11	EI2W, G2AJ, G3ABA, G3DVK, G3HAZ, G4RO, G4SA, G5UD
10	G2FQP, G2HOP, G3BK, G3BNC, G3EHY, G3FAN, G3GHI, G3GSE, G3WS, G5MR, G8IC, GM3EGW, GW5MQ
9	G2AHP, G2CZS, G2DVD, G3FIJ, G3IUD, G5ML, GC3EBK, PAØFB
8	G2CIW, G2DDD, G2XC, G3AEP, G3DKF, G3GBO, G3HCU, G3HWJ, G3JWQ, G3VM, G5BM, G5BY, G8SB, GC2FZC

ENQUIRIES BY TELEPHONE

Readers are specially asked *not* to ring up the office with technical queries of any sort. The reason is that somebody competent to answer is very seldom available for telephone consultations, which means that "a message has to be taken." This may or may not be correctly transcribed if it is taken down by a staff member whose normal duty is, say, to maintain the direct-subscriber index or deal with orders for books. Hence, technical queries should invariably be written in, and accompanied by a stamped, addressed envelope.

PHILCO U.S.A. TRIP

Among the 80 British and radio TV dealers who were invited over to the States, by Stratocruiser, on the visit organised by Philco recently, were G3FGY (Ripley, Derbys.), G3GIL (West Hartlepool), G3JNY (Castleford, Yorks.) and old-timer GW5TJ (Merthyr Tydfil). They were "shown the town" in no ordinary fashion, meeting, among many other W's W1IIM at the building of the United Nations, and W2NCH, a blind amateur who plays the electronic organ at the Hotel Dixie in Times Square, New York. W3NA showed them round the Philco factory.

"RADIO FREE SCOTLAND"

Further to the note on p.570 of the January issue of *Short Wave Magazine*, it appears that the operations attributed to "Radio Free Scotland" are even more fatuous than we had supposed. It seems that a phone transmitter on the Kirk o' Shotts sound (TV) channel is built into a T.1154 cabinet as disguise, and operated semi-mobile. The transmitter is used to interrupt or break in on BBC transmissions with a political flavour. It is said, though we hope it is not true, that a licensed GM is largely responsible for what a correspondent rightly calls "this tomfoolery." The Scottish National Party, in whose interests these capers are carried on, will have something to answer for when the authorities catch up with the GM in question.

THE AUDIO FAIR — 1957

This year's Audio Fair will take place at the Waldorf Hotel, Aldwych, London, W.C.2, during April 12-15. It will be a tape recorder and hi-fi jamboree on a greater scale even than before. Tickets can be obtained on application to: Exhibition Office, London Audio Fair, 42 Manchester Street, London, W.1.

Fitting an S-Meter

SIMPLE AUXILIARY UNIT AND A METHOD OF CALIBRATION

MANY amateur-band receivers are operated without any sort of S-meter. The need for *some* such device to indicate comparative signal level is, therefore, constantly felt—even by those who bravely proclaim that *they* go by what comes out of the speaker and know an S9 signal when they hear one (which is pretty often). One of the most elastic terms in the whole vocabulary of Amateur Radio is S9!

Fortunately, it is quite an easy matter to make good the deficiency of not having a meter by which to read a signal. But before discussing the circuit shown here, a little consideration of the whole subject of S-meters—which is a very wide one, with many unexpected angles—may be helpful to the newcomer.

The first point to make is that even S-meters as fitted in standard commercial receivers do no more than compare the relative level of signals, either from different stations, or the same station at different times. Receivers fitted with calibrated S-meters *appear* to give an absolute indication of signal strength, but in fact the reading by itself is meaningless unless the level at which the S-meter was calibrated into its receiver is known, and the receiver itself is always operated under precisely the same conditions as those obtaining when the calibration was originally made.

This can practically never happen—different manufacturers calibrate at input values of their own, and when the receiver gets into the hands of its user, his local noise level varies from day to day, the mains voltage fluctuates, interference on the frequency puts a "false zero" on the S-meter, while the gain of the receiver itself will vary from band to band and will drop off as the receiver gets older.

What all this comes to is that, generally speaking, nobody's S9 is the same as anyone else's—indeed, as the writer has done, it is interesting and instructive to line up half-a-dozen receivers on the same aerial, tune in the same signal, and see what the S-meters say. They will all read differently, the variation being anything from a conservative S7 to a generous S9+20 dB. What, then, is the practical use of an S-meter?

The answer is that in spite of all the apparent anomalies, it will still *compare* the level of signals as between stations on the same band, or the result of tests, provided that due allowance is made for any noise or interference that may be present when readings are taken. This is, really, the sole practical use to which the S-meter can be put (as a measuring device) under the normal conditions of amateur working. But it is an extremely useful application, and alone justifies the fitting of an S-meter—and in spite of all the theoretical arguments that can be put forward, the fact remains that it is very nice to have on the receiver some sort of calibrated meter which moves upwards as signals are tuned in!

Practical S-Meter

The circuit herewith has been tried, very successfully, with a CR-100 and an R.1155, and also (for check purposes) in several receivers already fitted with some kind of regular S-meter. The needle "reads upwards" as the signal level increases, *i.e.*, the rest position of the needle is the normal zero. Though an additional valve is involved, almost any small triode will do, and the unit can be powered from the receiver supply.

[over

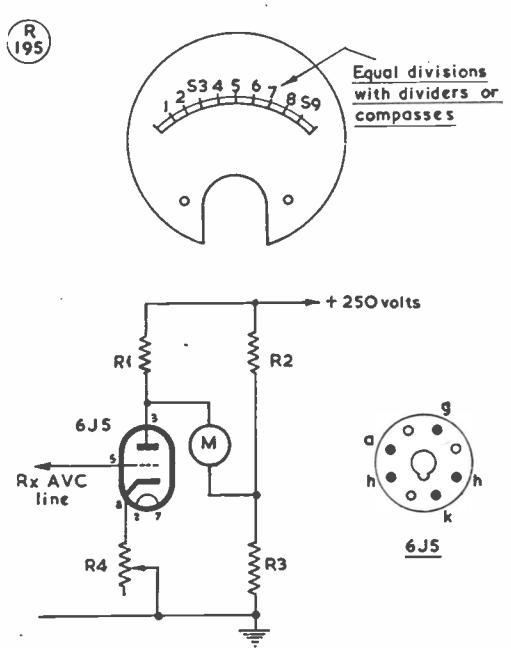


Table of Values

Circuit for the S-Meter Unit

R1, R2 = 500 ohms, 1-w.
R3 = 50-70,000 ohms, 2-w. (*see text*)
R4 = 5,000 ohms, 3-5w. w/wound
M = 0-1, or 0-10 mA m/c movement (*see text*)
V = 6J5, or any similar triode

Operation of the circuit depends upon the fact that the voltage developed in a receiver AVC circuit bears such a relationship to the level of the incoming signal that the plate current of the meter valve can be made proportional to this voltage, applied to its grid. With the meter connected as shown, in a bridge circuit, the needle movement will, as it conveniently happens, bear a linear relationship to incoming signal levels.

The meter itself can be almost any sort of moving-coil movement, scaled either in microamps., or in milliamps. from 0 to 1, or 0-10 mA. The resistor network is simply adapted to accommodate whatever meter (but not reading higher than 10 mA f.s.d.) that may be available.

Values as given in the circuit are for an 0-1 mA movement, and will handle a signal range of more than 70 dB, *i.e.*, from zero to S9+20 dB or so on the usual amateur reckoning. If calibrated by the method suggested later, the action is self-protecting in that any signal over the maximum calibrated level will not increase meter current—therefore, the needle can never " wrap itself round the stop," no matter how strong the local signal tuned in.

Construction

Clearly, the few components needed can all be clustered round the valveholder, itself mounted on a small aluminium bracket bolted somewhere conveniently inside the receiver, with the meter connections brought out on flying leads. In the CR-100, for instance, a good place is in the space to the left of the line of valves, looking into the receiver from the front. In any receiver, there will be enough space somewhere for the unit.

The extra HT/LT load involved is very small, and well within the capacity of any receiver power pack.

Adjustment

With the valve pulled out of its socket and the receiver switched on (HT on) prune on R3 till the scale reading is a maximum ; the easiest way to do this is to reduce the value of R3 till the reading is enough over-scale to enable it to be brought accurately on-scale by means of a shunt across the meter terminals.

Then plug in the valve, warm up, and after the receiver has settled to normal working conditions, turn the AVC control to " off " and adjust R4 for zero meter current.

When AVC is switched on again, the meter needle will respond to the incoming signal.

If the receiver with which the S-meter is to be used has no manual AVC on-off control, the grid of the meter valve should be earthed while R4 is adjusted. When the AVC control voltage on the grid of the meter valve goes high enough (as when a very strong signal is being received) to cut off the plate current, the meter will read its maximum and no signal will increase it further.

It is here that a certain amount of adjustment and cut-and-try may be necessary in the preliminary setting-up. Obviously, one does not want the meter valve to cut off before the strongest signal likely to be received is tuned in.

Calibration

This is one of those rare occasions when one does not need to say " if a signal generator is not available "—for, in fact, it is not necessary.

Since the S-meter now evolved can only work as a comparative signal level indicator, what better than to tune in the weakest readable telephony signal on some quiet frequency and, wherever the needle sits, call that S3. Then tune in a medium-wave BBC station and, wherever the needle stops, call that S9+20 dB. This is, of course, done with AVC " on " and the RF gain at maximum ; any IF gain, if fitted, should also be at full.

Take 6 dB per S-point, and mark off the scale in equal divisions accordingly—thus, the scaling from S1 to S9 will " cover " 54 dB, the S9+10 mark then being " equivalent " (by our arbitrary reckoning) to 64 dB, and S9+20 to 74 dB, which is about the practical limit of the device with any receiver having reasonable front-end gain.

This will not be so far out, either. In the first place, S9+20 dB is a good average value for a BBC medium-wave transmitter and, secondly, 6 dB represents the accepted " times 4 " power gain between S-points, while S3 is a reasonable level at which to put the minimum readable signal.

When all this has been done, the advantage of starting with a 2½-in. (or even 3-in.) meter, mounted externally, in a little box of its own, will be apparent. The movement will be more sensitive to small changes, and the scale will be much easier to mark. This is done by fitting thin white card, cut to shape, over the original scaling and marking off with a very thin black pen—a pair of dividers, a sharp hard pencil, a stencil set, a draughtsman's ruling pen and Indian ink are useful accessories for making a really neat job of it.

And when you see that meter needle swing across the scale as you tune 'em in, you will never regret the time and trouble it may have taken you to get thus far.

AN INTRODUCTION TO AMATEUR RADIO

STRICTLY FOR THE BEGINNER

PART I

The object of this article is to initiate the Beginner—to explain what is meant by Amateur Radio, and how he can become an active participant in the greatest, and now the oldest, scientific hobby in the world. It is not supposed that this short series will give all the answers for every beginner, but it will set him on the right path and thereby enable him to solve many a problem for himself, or see the reasons for things that may now be unclear. A picture of Amateur Radio, regarded either as an art or as a hobby, cannot be painted upon a small canvas. It is now so large a field of endeavour that no longer are there individuals who know it all. The discussion here represents the fruit of years of experience in helping others to get started, particularly in the fascinating field of DX.—Editor.

THE term "radio amateur," as most people are well aware, has gradually come to be associated exclusively with short-wave work. Presumably the keen high-quality enthusiast, the model controller, even the television constructor, have equal rights to be known as radio amateurs—but they are not. An "amateur" is one who is keen on short-wave reception and transmission. His main interest is *communication*, preferably over longish distances.

To analyse the whole vast extent of his interests is a tall order. This, for the benefit of the uninitiated, is an attempt to describe the somewhat specialised world of radio in which our amateur pursues his hobby.

Amateur and Professional

To some people it is strange that so many short-wave enthusiasts should call themselves "amateurs" although they are engaged on a whole-time basis in some branch of the radio profession. It is a fact that quite a large proportion of short-wave transmitting enthusiasts are radio engineers, servicemen, retailers, ships' radio officers, or research workers with well-known commercial concerns—including the BBC, the GPO and the Services.

The explanation lies in the fact that Amateur Radio is a hobby. One engages in it purely for the enjoyment of building one's own gear, trying out one's own aerial and control systems, making one's own contacts and, in short, doing what one likes (within the terms of the licence!)

To individuals engaged in almost any aspect of commercial radio, it is a complete change to be able to sit down at home and talk, by means of either key or voice, to someone in the United States, South Africa or New Zealand. Even if some little time has to be spent on maintaining and servicing the gear, there is quite a different feeling about it!

At the other extreme among the amateur fraternity, there are, of course, many thousands to whom it is their *only* interest in radio. Insurance clerks, grocers, postmen, stockbrokers and doctors—practically every occupation or profession is to be found represented among the ranks of the amateurs. To such, the hobby represents a complete and absolute escape from the daily toil and responsibility. Usually, such amateurs are no less capable than their professional brothers, as, indeed, is the case with most other hobbies.

So imagine an extremely mixed array spread over some 250 different countries of the world, comprising men and women of every race, every creed and every social stratum. All are able to converse with each other in terms of their common interest—Amateur Radio. Now for what they talk about and how they do it!

Call-Signs and Prefixes

Just as every commercial or service wireless station in the world must be capable of being instantly identified, so with the amateurs. Every amateur (and there are more than 200,000 of them) has his own personal call-sign, usually consisting of a figure followed by either two or three letters. Ahead of this is a "prefix," consisting of either one or two letters, which merely shows what country the call-sign hails from. This combination of prefix and call-sign constitutes a "signature" which is never repeated; meaning that it is a complete and sufficient identification of a particular amateur station. Take the call-sign 6QB, with the prefix G (for Great Britain); there are other 6QB's, such as LA6QB (Norway), SM6QB (Sweden) and ZS6QB (South Africa), but there is no other G6QB. Thus the system is kept in order, and every amateur has his own individual call-sign.

[over

AMATEUR BAND	KNOWN AS	CW/PHONE DIVISION
1800-2000 kc	*Top Band* 1.8 mc 160 metres	*None*
3500-3800 kc	*Eighty* 3.5 mc 80 metres	*CW:* 3500-3600 kc Mixed 3600-3700 kc *Phone:* 3700-3800 kc
7000-7300 kc	*Forty* 7 mc 40 metres	*CW:* 7000-7050 kc *Phone:* 7050-7300 kc
14000-14350 kc	*Twenty* 14 mc 20 metres	*CW:* 14000-14100 kc *Phone:* 14100-14350 kc
21000-21450 kc	*Fifteen* 21 mc 15 metres	*CW:* 21000-21150 kc *Phone:* 21150-21450 kc
28000-30000 kc	*Ten* 28 mc 10 metres	*CW:* 28000-28200 kc *Phone:* 28200-30000 kc

NOTE: Agreed American Phone Bands are 3800-4000, 7200-7300, 14200-14300, 21250-21450, and 28500-29700 kc. Hence, G phones (and most others) should operate in the areas 14100-14200, 14300-14350, 21150-21250, and on ten metres, between 28200 and 28500 kc, or in 29700-30000 kc.

One slight deviation from this simple procedure is perhaps worth a mention. In the case of some British and American possessions (and in other instances also) the *figure* also forms part of the prefix rather than the call-sign. Thus ZD1 represents Sierra Leone, ZD2 Nigeria, ZD3 Gambia, ZD4 the Gold Coast, and so on. "ZD" alone does not tell you where the station is located. On the American side, KP4 is Porto Rico, but KP6 Palmyra Island; KS4 is Swan Island and KS6 American Samoa. But still the complete call-sign, including the prefix, remains unique to one particular station, and is complete identification of who and where he is.

In the past few years the various national licensing authorities have found themselves running out of letters for amateur prefixes, and a new hybrid has come to be heard on our bands—a prefix consisting of a figure and a letter, instead of the traditional one or two letters. Thus we have a prefix like "4X" for Israel, and the stations have call-signs beginning with the figure 4 also. The combination produces stations signing 4X4BX, 4X4CL, and so on. From Tunis we have a prefix "3V," giving 3V8AB, 3V8AN, and the like. Another of these is 4S7 for Ceylon. An up-to-date Prefix List was given in the August 1956 issue of SHORT WAVE MAGAZINE.

In spite of all this, an amateur type of call-sign remains easily recognisable, and should there be the slightest doubt about its status, there is always the matter of the frequency on which the station is heard, for amateurs are confined to their own bands.

The Amateur Bands

There was a time, more than 35 years ago, when the world's amateurs used a wavelength of 1,000 metres! But those were the days when anything much shorter than that was not considered practicable for "wireless" communication. Their next hunting-ground was on 440 metres, in among the embryo broadcasting stations of the pre-1922 era. Then, when broadcasting started in earnest and mutual interference resulted, the amateurs were moved down to the little-occupied (and less understood) territory between 150 and 200 metres.

Contrary to the expectations of the theorists, it was found that communication on these wavelengths was far more efficient than on the former bands, and the pioneering work of the amateurs led to the establishment of commercial stations on these "very short waves." Gradually the amateurs were allotted shorter and shorter wavelengths to conquer, always with the idea that such wavelengths would be of no use to anyone else; but, thanks to the experimental work of the early amateurs, the whole short-wave spectrum was opened up and the peculiar phenomena associated with long-distance communication rationalised and understood. The story of the discovery of short-wave radio is, in fact, the story of the amateurs. Time and time again they achieved the "impossible," simply because they *were* amateurs and didn't know it to be impossible.

In the 1920's the amateur bands were centred around 175, 90, 45 and 23 metres, until an International Conference straightened things out on a world-wide basis and allotted the present bands of 160, 80, 40, 20 and 10 metres (in 1928). Ever since then these bands have remained, in greater or lesser degree, in the hands of amateur transmitters.

But they are not by any means *exclusively* amateur, especially the longer wavelengths. The 160-metre band is shared with ship-to-shore telephony, lightships, trawlers and all manner of other services; the 80-metre band is shared with Service and commercial stations of various kinds. The 40-metre band is not even "shared"—the amateurs have had to endure pirate broadcasting stations, but they managed to retain their somewhat precarious hold, and now "the cracks" between the high-powered stations which made things so difficult for them have been widened.

The other bands are 20, 15 and 10 metres, and these three are, to all intents and purposes, exclusive amateur territory. This is fortunate, for, most of all, the long-distance work which is the life-blood of Amateur Radio is carried out on these three bands. The 15-metre, or 21-mc, band, was only opened to amateurs in 1952, although scheduled for their use ever since the end of the war.

How the Bands are Used

Each one of these bands of wavelengths has its own particular function. All through the radio spectrum there is a constant change in the characteristics of the various wavelengths, and this change is nowhere more apparent than on the shorter waves. For the benefit of the uninitiated, let us simply state a startling fact: That at, say, 1 p.m. in England an amateur with a 10-watt transmitter might put out a call on the 160-metre band. He would certainly not make his signals heard over a distance greater than about 100 miles, and *that* distance would be quite satisfactory communication for *that* band. But the same amateur, with the same transmitter, might put out a similar call on 20 metres or 15 metres, and would probably be heard in the U.S. or Canada—or at an even greater distance.

So, to understand the use of the various wave-bands, we must discuss their particular properties. All long-distance communication on the short waves is dependent upon "skip"—the phenomenon caused by the emitted waves travelling upwards until they are reflected by one of the various layers situated above the earth's surface. They are bent back from this layer until they strike the earth again at a distant point, from which the waves may again be reflected upwards from the earth, striking the layer a second time and being reflected downwards yet again.

All long-distance transmissions are single-hop or multiple-hop signals, because it is not in the nature of radio waves to bend themselves round and follow the earth's curvature. True, there is a "ground-wave" which does just that, but the distance which it will travel varies with the wave-length. On longer wavelengths the ground wave, if the transmitter is powerful enough, will cover hundreds of miles; medium-wave broadcasting reaches you by ground wave, at least in daylight. (When you suffer from "fading" after dark, you are the victim of "skip"—

you are receiving *two* waves. One of them is a steady ground-wave, and the other is a reflected wave, coming down from the sky, and varying somewhat in intensity and other characteristics. The mixture of the two causes the fading that is so troublesome at long distances after dark.) But on shorter wavelengths the ground-wave weakens very quickly and does not travel so far.

Another complication now has to be faced: That the manner in which the all-important reflections from up above take place is dependent upon the time of day, the season of the year, the state of the sun, *and* the wavelength concerned. So the process becomes quite tricky to understand and to forecast.

To simplify it for you, we will consider only two kinds of reception—daylight and after-dark. In *daylight* the longer bands (160, 80 and 40 metres) are mostly confined to short and medium-distance work, coming into their own after dark. This applies most definitely to the 160- and 80-metre bands; the 40-metre band is a kind of half-way case.

The 20, 15 and 10-metre bands are practically daylight bands, fading out after dark. Again, this applies most definitely to 10 and 15 metres, with the 20-metre band in a kind of half-way condition.

So, putting the two previous paragraphs together in another way, we can see that if we want to cover a longish distance (say anything upwards of 1500 miles) we could use 10 or 15 metres during daylight, 80 or 160 metres after dark, and 20 or 40 metres nearly all the time.

Seasonal Changes

As the hours of darkness vary with the seasons of the year (and also, of course, with the latitude in which we are situated), the use of the various bands to the best advantage has a definite, though not very simple pattern.

The 40- and 80-metre bands come into their own in the winter, when the hours of darkness are long for us; likewise the 20-, 15- and 10-metre bands, during the same season, are more restricted in their hours, since daylight fades quite early in the afternoon and is late coming in the morning.

Sunspots

We now come to another all-too-familiar snag. The layers in the upper atmosphere or stratosphere are always in existence; but they move about! Their height above the earth varies, and their condition for reflecting radio waves also varies. One of the chief causes of these variations is the radiation from the sun. It is this which causes "ionisation" of particles in these layers, and it is the phenomenon of ionisation which affects the way in which the layers react to our radio waves.

The reflecting layers (they are at two main heights, but there are secondary layers) are in a constant state of turbulence, rather like roughish water in a pond, and they are also constantly changing their heights, not only with the movement of the earth, but with the rotation of the sun on its own axis, and with a long-term (eleven-year) cycle of sunspots. So our short-wave communication is always dependent upon what we all call "conditions," and these conditions do not vary in any simple manner. The forecasting of the propagation conditions has only recently become organised, and it is an extremely complex business.

To all the above variables we must add another. It is not possible to state that at exactly a certain time, on a certain wavelength, it will be possible to communicate over, say, 5,000 miles. This would imply that the possibility covered every direction, and it certainly does *not*. Contacts over a North-South path are possible under much worse conditions than East-West contacts. This is partly because both ends of a North-South path are in the same Time Zone; in an East-West direction we have to face the additional hazard of the change in time—so that communication on a "daylight" band, while feasible for one station, is impossible for the other.

To avoid confusing the issue beyond all explanation, we can relieve your anxiety about all these variables by saying that they do condense down into a well-established pattern of behaviour for the various bands, which all active amateurs get to know. There is a certain amount of overlapping, but to maintain contact with any part of the globe for long periods it is only necessary to use *all* bands at their *most effective times.*

So much for the natural hazards that beset us on the short waves. They are most important, and a fair understanding of them is necessary before one can make any sort of sense out of short-wave work, whether it be just listening to broadcast stations, following the amateurs, or actually transmitting.

The Amateur Set-Up

For those who have evolved some slight interest in the amateur fraternity and are now at the stage of wondering what they do and why they do it, it is necessary to delve back into the history of the movement. "Amateur" transmitters were, originally, a band of experimenters who were granted licences to carry out their own scientific work in the newly-discovered art of wireless telegraphy. The early amateurs played with spark coils, coherers, magnetic detectors and all the familiar apparatus of the old-time electrical laboratory.

Being amateurs in the strict sense of the word—meaning that they were not harassed by any commercial requirements and were free to go ahead and find things out just for their own edification—they naturally did some unconventional things. These led to discoveries of the type made by true amateurs in any sphere—discoveries of strange and (then) unexplained phenomena which have since become perfectly understood.

But the main thing to remember is that the early amateurs were granted their licences for *experimental* purposes—not just for the purpose of talking to each other if and when they could. Indeed, in Great Britain the original licence was an Experimental Licence right up to September 1939, when they were all suspended. Since the war we have been licensed as *amateurs* with permission and authority to *communicate,* and there is no definite obligation to carry out any experimental work.

[over

The good old tradition, however, has persisted, and thus you will find that amateurs, all over the world, talk more about their home-built gear, their tests and experiments, and, most of all, their results, than about non-radio matters.

Nothing could be less intelligible to the uninformed listener than two amateurs discussing the latest "mod" to some Government-surplus gear (especially as many of them use queer abbreviations and slang terms unknown even in the radio industry!) But it all adds up to a certain amount of sense when you know the jargon.

A Typical Contact

Everyone visiting an amateur station for the first time asks the same questions: "How do you call somebody, and how do you know he is there?" The answer is that we only call somebody if we *do* know he is there! The good and considerate operator, whom we will talk about for a while, will go about things like this:—

Switch on and warm up. Listen round, on the band on which work is to be carried out. Note a station calling "CQ" (universal radio abbreviation for "all stations"). Silently tune the transmitter so that it is ready to operate on the same frequency as the calling station. When the "CQ" has finished with the words "G3XYZ" standing by, or "G3XYZ listening" call him. If on telephony, the form is "G3XYZ, G3XYZ, G3XYZ, this is G3XXX, G3XXX calling," repeated, perhaps, three times, concluding with "and G3XXX is standing by (or "listening," or "over").

Then, if the other station has heard our specimen amateur, he will immediately come on in reply to him, and a two-way contact will result. This is not a "duplex" contact, like a chat on the telephone, as neither station can talk and listen at the same time. So the "over-to-you" technique is used, with each station transmitting for not more than about five minutes at a time before listening for the other's reply. During the course of the contact, another station or stations may want to break in and make a threesome or foursome of it (this, by the way, is a post-war habit and perhaps not altogether a good one). To do this without causing annoyance is a tricky business and involves setting the third man's transmitter dead on the frequency of one of the others, then giving a quick call at the exact moment when one of them goes over.

All this, of course, has dealt with a typical contact on telephony. But rather more amateur work is carried out on CW than on telephony, and to cover the entire amateur world you will want to familiarise yourself with the Morse code and its method of use.

A CW Contact

The procedure is almost the same. Our specimen station will be found calling CQ again, but, in Morse, he will be sending "CQ CQ CQ de *(from)* G3XYZ G3XYZ G3XYZ." (This will be repeated three or four times, ending with "AR *(end of message)* K *(transmit)*." And the replying station will come up on, or near, the same frequency, sending G3XYZ G3XYZ G3XYZ de G3XXX G3XXX G3XXX . . . AR . . K." So XYZ now knows that 'XXX has duly heard him, is listening on the frequency, and ready for a two-way contact. And so it proceeds, with the traditiinal "AR . . K" instead of the "Over to You." There will not, in general, be breakers-in on a CW contact, unless one of the stations is in a particularly rare corner of the world and countless other amateurs are anxious to get him. In such a case patience often runs out, and the contacts must be cut very short in order to give everyone a chance.

Operating sometimes becomes so short-tempered that many stations can be heard calling the rare bird even while he himself is sending, and the general pile-up of jamming on his frequency is one of the problems that we have to contend with today. But the average CW contact is a simple two-way affair and does not often turn into a multi-way "net," like a phone contact.

Translation Needed

Now we arrive at the stage which baffles the newcomers. Whether the contact is on phone or CW, many strange sayings and abbreviations will give the impression that Amateur Radio is an esoteric hobby which makes sense to none but the initiated. To a small degree this is correct, but the codes and ciphers employed are very simple, available to all and, really, quite sensible.

It may come as a shock to tune in your very first amateur and to hear an apparently sane and sensible human being saying "Very glad to QSO, old man, but you're only RS 4 and 6 with heavy QSB and a certain amount of QRM. The name here is Honolulu America Radio Radio Yesterday . . . "

A translation of the above would read "Very glad to make contact with you, old man, but your signals are only readable with slight difficulty and fair strength, with heavy fading and a certain amount of interference. The name here is Harry. . . . "

Most of us deplore the phonetic spelling of simple words like the name, but that is the sort of thing you will hear, and you may as well be prepared for it. And, in particular, the use of place names for phonetic alphabets is remarkably silly, but it seems to be a tradition that has grown up in certain quarters, and many of its devotees simply can't be made to alter their technique.

This is seen at its worst when used for prefixes and call-signs. You may switch on and hear "This is Libya" . . . but actually you are hearing "This is Libya America Number Five X-Ray X-Ray," or, in other words, LA5XX, a station in *Norway* and nothing to do with either Libya or America. But there it is!

(To be continued)

POSTAGE — RATHER IMPORTANT

Readers sending in enquiries are reminded that they *must* be accompanied by a stamped, addressed envelope—or, in the case of readers overseas, the appropriate IRC's. We are compelled to make this ruling because of the increasing volume of our mail and the very heavy postage charges that it entails.

NEW QTH's

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

GW2FYW, D. Davies, Isfryn, Betws-y-Coed, Caerns.

G3BYM, D. W. Bushe, Flat 5, Warren Wood, Warren Road, Crowborough, Sussex.

G3JMZ, J. Hilton, 27 Birch Road, Atherton, Manchester, Lancs.

G3KBH, M. P. Hughes, Northdean, Meopham, Gravesend, Kent.

G3KEK, G. Carr, 63 Wagon Lane, Sheldon, Birmingham, 26.

G3KMY, D. G. Radford, 39 Belfield Road, Paignton, S. Devon.

G3KRF, K. R. Fulbrook, 2 Kent Road, Wellingboro', Northants.

G3KSF, R. E. Harper, Ivy Cottage, Wickham Road, Curdridge, Southampton, Hants.

GI3KUZ, A. R. Lloyd, 19 Mourne Drive, Waterside, Londonderry.

G3LDY, R. D. Taylor, 4 Old Fallings Crescent, Low Hill, Wolverhampton, Staffs.

G3LDY/A, Sgt. Taylor R. D., c/o Sgts' Mess, R.A.F. Station, Chigwell, Essex.

G3LIW, A. Wood, 5 Burnthouse Road, Heanor, Derbyshire.

G3LIZ, E. S. Davies, 20 Talton Road, Wavertree, Liverpool, 15.

GW3LJW, L. D. V. Taylor, 20 North Drive, Rhyl, Flintshire.

G3LKV, D. Locke, 17 Kitling Greaves Lane, Horninglow, Burton-on-Trent, Staffs.

G3LLZ, D. Goacher, 51 Norman Road, Swindon, Wilts.

G3LMB, A. A. Campbell, 43 Meersbrook Avenue, Sheffield, 8, Yorkshire.

G3LMH, R. Wellbeloved, 77 Upwood Road, Lee, London, S.E.12.

GM3LML, W. Farquhar, Cults Crossroads, Pitlessie, Ladybank, Fifeshire.

G3LMP, B. Page, 7 Queen's Gardens, Eaton Socon, Hunts.

G3LMX, T. W. Mitchell, 7 Burlish Crossing, Stourport-on-Severn, Worcs.

G3LNK, C. J. Bourne, 777 Lightwood Road, Longton, Stoke-on-Trent, Staffs. *(Tel.: Longton, Staffs. 39426).*

G3LNM, R. Scrivens, 26 Newlands Green, Smethwick, 40, Staffs.

G3LNO, P. H. Hawkes, 62 Stonebury Avenue, Broad Lane, Coventry, Warks.

G3LNP, A. R. Preedy, 22 High Street, Dawley, Shropshire.

GM6TF, W. Davidson, Alloa, Clackmannanshire.

CHANGE OF ADDRESS

G2BJY, W. G. Johnson, 46 Jesson Road, Walsall, Staffs.

G2BSQ, R. Andrews, Caradon, Dene Road, Ashtead, Surrey.

G3BUJ, P. H. Greenwood, 32 Pound Lane, Pinehurst, Swindon, Wilts.

G2CJ, S. Townsend, 20 Victoria Road, Camelford, Cornwall.

G2CWL, C. K. Haswell, 114 The Hillway, Portchester, Fareham, Hants.

GW2DUR, M. N. Lapper, 21 Heol Gwili, Llwynhendy, Llanelly, Carms.

G2FXQ, S. W. Saddington, 59 Hamilton Avenue, Pyrford, Woking, Surrey.

G3AHF, W. M. Howarth, 13 Parnell Square, Congleton, Cheshire.

G3BDS, K. T. Whithorn, 279 Oldbury Road, Worcester, Worcs.

G3DSV, R. W. P. Wilson, 66 Chestnut Avenue, West Wickham, Kent.

G3FGN, A. C. Earl, 14 Cherry Tree Camp, Mersea Road, Colchester, Essex.

GM3FJP, J. S. Nicholson *(VU2JP),* c/o Mrs. Mohr, Cliftonbank, Cupar Road, Newport-on-Tay, Fifeshire.

GI3FKL, C. Castles, Governor's House, Malone Training School, Balmoral, Belfast.

GM3FWM, J. Hutchison, 77 Preston Street, Glasgow, S.2.

GD3FXN, A. Radcliffe, Allerton, Terence Avenue, Douglas, I.o.M.

G3GMX, H. G. Glover, 151 Walton Road, Sale, Cheshire.

G3HOD, E. Bridgwater, 23 Woodchester Road, Dorridge, Solihull, Warks.

G3IQF, R. A. Fowler, 56 Dedmere Road, Marlow, Bucks.

G3ISG, S. E. Green, 12 Jubilee Road, Kingswood, Bristol.

G3IXG, G. R. Cobb, 75 Ampthill Road, Shefford, Beds.

G3JMW, J. M. Whittlestone *(ZC4MW),* c/o W.O.W.S., Beaumanor Park, nr. Loughborough, Leics.

G3JVY, D D. Devan, 61 Queens Park Rise, Brighton, Sussex.

G3JYA, F/Sgt. E. A. Smith, The Old Rectory, Feltwell, nr. Thetford, Norfolk.

G3KWJ, 5029969, J/T Valentine, N. B., Box 8, R.E.U., R.A.F. Station, Henlow, Beds.

G3KWK, R W. Nolan 67 Tower Road, Newquay, Cornwall.

G3LIU, A. D. H. Looney, 149 Page Moss Lane, Knotty Ash, Liverpool, 14.

G3QD, J. G. Treece, 51 Grove Avenue, Chilwell, Notts.

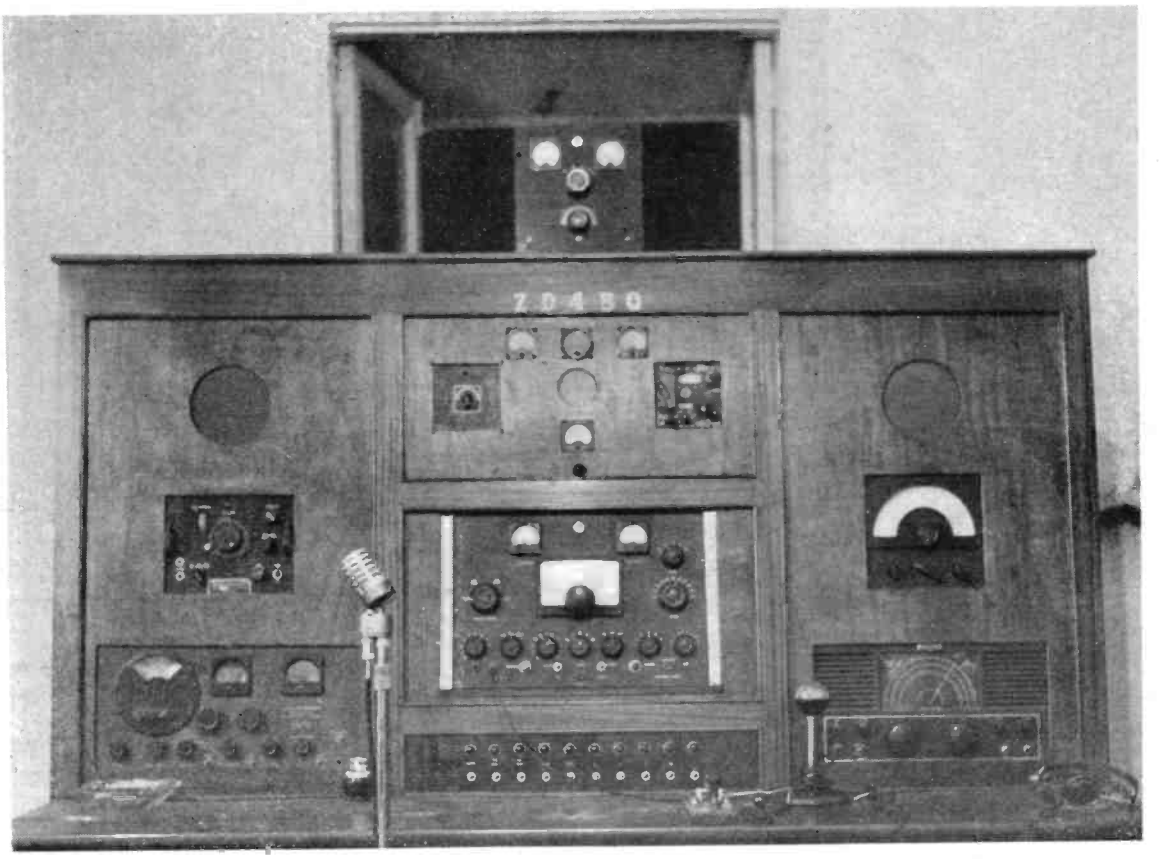
G4BL, Maj. F. J. Towell *(ex-VU2AU/MD5BL),* 48 White Street, Derby, Derbyshire.

GI6TK, F/Lt. F. A. Robb, 125 Downshire Road, Holywood, Co. Down.

G8TJ, A. Garnock-Jones, 32 Rolleston Drive, Wallasey, Cheshire.

The Other Man's Station

ZD4BQ



THE interesting assembly shown in our photograph this month is that owned and operated by J. A. R. Woodcock, ZD4BQ, P.O. Box 109, Tarkwa, Gold Coast, West Africa, who was first licensed in March, 1954, and is now active on all bands 80 to 10 metres, CW and phone.

His console was entirely home-constructed, with the aid of an African carpenter, for only five pounds, including timber. It houses all the operating gear, which includes, from left to right along the bottom, an SX-24 receiver with BC-221 frequency meter above, a Panda PR-120-V CW/Phone transmitter complete (centre), an Eddystone 740 on the right as main receiver, with a Radiovision preselector above, speakers for each receiver, and three aerial tuning units. Lower centre, below the PR-120-V, is the main control panel, with indicator lights. Once the station has been switched on, the whole change-over control is by relays actuated by a single knob. Any item of equipment can be removed for servicing in a few minutes.

Microphones shown are a Reslo ribbon (on the left) and a Ronette crystal, and there are two CW keys, one adjusted for speeds up to 30 w.p.m. and the other "to work the slower chaps."

The aerial installation at ZD4BQ is quite elaborate—a 67 ft. centre-fed (600-ohm) wire, 50 ft. high ; a 275 ft. long-wire, 65 ft. high ; an electrically rotated 4-element wide-spaced beam for 21 mc ; and what can be best described as "sundry experimental aerials."

Additional gear not shown in the photograph includes a 25-watt CW transmitter for all bands 3.5 - 28 mc ; a tape recorder and amplifier ; a Creed auto Morse transmitter ; and various items of test equipment.

ZD4BQ himself is an ex-sea-going radio officer and prefers CW operating—but is quite happy working anyone on CW or phone, local or DX. The QSL procedure is a card immediately for all first contacts. Usual time on the air is from 1700 GMT until "all hours of the night," most days, with 15 metres as the main channel of interest, followed by 40 metres — but all bands from Eighty to Ten are worked frequently. Projects in hand include a beam for 28 mc, to be stacked on the existing 15-metre array, with remote indication—and very nice, too!

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for April Issue : MARCH 15)

WE frequently hear from Club Secretaries that these notes are responsible for introducing quite a few new members. This month Surrey (Croydon) remarks: "Hardly a month goes by without an enquiry from a prospective member who saw the Club mentioned in the *Magazine*."

We are only too glad to make such publicity available to the Club movement, but we feel that Club Secretaries could make their own publicity even more worth while if they adhered to a few simple rules, as follows:

(1) The deadline quoted above, March 15, refers to the April issue, which will appear on April 5. Details should therefore be given of meetings occurring *after* that date — not of March meetings.

(2) The *Magazine* appears on that Friday whose date falls between the 3rd and 9th (inclusive) of the month; the deadline for Club notes, if you don't happen to see it in the previous issue, is *three weeks* before the date of publication. If you miss that date by two days or even one, your Club notes will appear a month late, and all the news of meetings is liable to be out-of-date.

(3) Please keep letters concise—give dates of meetings, subjects thereof, and meeting-place. We should appreciate these being kept together, with any general gossip about past doings relegated to a separate paragraph. Prolonged searching through a lengthy letter, from which one short paragraph must be produced, may well result in some of the important items being omitted.

(4) If the honorary secretary has a telephone number, include that with the address for the panel. Prospective members or visitors often like to have a word on the phone beforehand.

Summing-up: Watch the deadline, give details of meetings scheduled for *after* publication, time and place, and . . . keep the news items separate.

Clifton report that many members are using the facilities provided with the Club workshop, and new tools and test equipment are now being added. Useful "tools" are a chassis bender, a range of chassis cutters and a quartz crystal activity-testing set. On March 8 there will be a talk (Advance Components Ltd.), on March 15 and 29 Constructional Evenings, and on the 22nd a Junk Sale. All meetings 7.30 p.m. at 225 New Cross Road, S.E.14.

The *British Amateur Tape Recording Society* grows in membership with many amateurs on the list. The first International Association of Tape Recording Societies is now forming, and the B.A.T.R.S. will be a member. A monthly bulletin is circulated, and members exchange tapes through the post. Recorded tapes are in great demand for Morse practice, and the secretary will be pleased to hear from anyone willing to make practice tapes (tape supplied by the Society).

Warrington held their AGM on January 17 and elected their new officials *(see* panel for secretary's address). The society will continue to meet on the first and third Thursdays at the Royal Oak Hotel, Bridge Street, at 7.30 p.m. A course on Fundamentals and a Slow Morse Class have both been started.

Bailleul are now running a feature, "Short Waves from Bailleul," in the *REME Magazine*, which should stimulate more interest in Amateur Radio throughout the Corps. The Club station G3IHH is on Top Band most evenings. Morse classes are in full swing and very popular.

Bradford meet on March 12 for a display of members' gear, and on March 26 for their AGM. The *British Amateur Television Club* will hear a talk on A Home-made 3-cm Microwave Link, by Mr. P. Burrage, on March 14.

Future events at **Chester** are a talk on "Allied Subjects" on March 12, and one on a Home-made Double Superhet on March 19; their night on the air (Top Band net) is the first Tuesday of the month.

Deal will be involved in the "Citizens at Leisure" Exhibition during Easter week, when the Club hope to have a station working on 80 and 10 metres. Note new secretary's QTH, in panel.

Derby will be seeing the Mullard Film Strip on The History of Television on March 13; on the 20th there is an open evening in the club-house with G3ERD on the air. Frequency Modulation is the subject for March 27, and on April 3 there is a Sale of Surplus Items.

Newbury meet on March 22 to hear Mr. Charles Marshall, B.Sc., A.M.I.E.E., on Colour Television—The Problems. Their next meeting will be on May 3, when a BBC representative will talk on Microphones for Broadcasting. *(But see p. 47).*

Purley met in February for a lecture on Simple Transmitting Equipment, and will follow this at the March meeting with a talk on the Amateur Transmitting Licence.

Scunthorpe will be together on March 14 and 26 at the Talbot Hotel, Earl Street. Recent events have

Reports for this feature are welcomed from all Clubs. They should be addressed to: "Club Secretary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1, and posted to arrive by the date given every month at the head of the article.

At the Bournemouth Amateur Radio Society's Hamfest on February 9 last, a total attendance of 55 members and friends was recorded. This photograph was taken by G2FK.

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE:

BAILLEUL: T. Holbert, G3DXJ, B.R.S., Bailleul Camp, Arborfield, Berks.
BOURNEMOUTH: A. Ashford, G3KYU, 119 Petersfield Road, Boscombe East, Bournemouth.
BRADFORD: F. J. Davies, 39 Pullan Avenue, Bradford 2.
BRADFORD GRAMMAR SCHOOL: A. F. Fell, 20 Kelshall Terrace, Great Horton, Bradford 7.
BRITISH AMATEUR TAPE-RECORDING SOCIETY: E. Yates, G3ITY, 210 Stamford Road, Blacon, nr. Chester.
BRITISH AMATEUR TELEVISION CLUB: D. W. E. Wheele, G3AKJ, 56 Burlington Gardens, Chadwell Heath, Romford.
BURY: L. Robinson, 56 Avondale Avenue, Bury.
CAMBRIDGE: F. A. E. Porter, 38 Montague Road, Cambridge *55142.*
CHESTER: D. J. Rickers, GW3HEU, 97 Ruabon Road, Wrexham.
CLIFTON: C. H. Bullivant, G3DIC, 25 St. Fillans Road, London, S.E.6.
COVENTRY: N. J. Bond, G3IHX, 12 William Bree Road, Coventry.
DEAL: G. E. Nobbs, G3KFR, 47 St. Martins Road, Deal.
DERBY: F. G. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
GRAFTON: A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middx.
HASTINGS: W. E. Thompson, 8 Coventry Road, St. Leonards on Sea.
NEWBURY. NADARS, 83 Newtown Road, Newbury.
NORTH KENT: D. W. Wooderson, G3HKX, 39 Woolwich Road, Bexleyheath.
PLYMOUTH: C. Teale, G3JYB, 3 Berrow Park Road, Peverell, Plymouth.
PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
SCARBOROUGH: P. Briscombe, G8KU, Roseacre, Irton, Scarborough.
SCUNTHORPE: J. Stace, G3CCH, 38 Skippingdale Road, Scunthorpe.
SLADE: C. N. Smart, 110 Woolmore Road, Birmingham 23.
SURREY (Croydon): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
WARRINGTON: J. Mather, 28 Chapel Road, Penketh, nr. Warrington.
WELLINGBOROUGH: P. E. B. Butler, 84 Wellingborough Road, Rushden.
WIRRAL: H. V. Young, G3LCI, 9 Eastcroft Road, Wallasey.

included a lecture and film demonstration on the manufacture of Mullard CRT's, and lectures have now been arranged to supplement beginners' studies for the R.A.E.

Slade have organised a Brains Trust for March 15, followed by a lecture on RAEN, by G3FZW. The subject of the 29th is Direction Finding, by Mr. N. B. Simmonds and other members. They have just produced No. 1 of their quarterly journal, *Contact*, on which we congratulate them and wish them every success.

Wellingborough are scheduled for a Junk Sale on March 21, and a talk on Transistor Receivers on April 11.

Bradford Grammar School have two members awaiting licences and seven more "under tuition." The Club's 150-watt transmitter will be on the air in the near future. **Bury** will be meeting on April 9 at the George Hotel, Kay Gardens. The lecture arranged has had to be cancelled, but an alternative will be provided.

Coventry have two newly-licensed members (G3LJR and 3LNO), and a newly-built transmitter will be putting G2ASF on the air more frequently on 80 and 160 metres. Meetings are on Mondays at the Headquarters, 9 Queen's Road, Coventry.

North Kent have enrolled several new members and will be pleased to welcome still more. Their meetings are on the second and fourth Thursday, at the Congregational Hall, Chapel Road, Bexleyheath. Films on the fundamentals of radio are to be shown in the near future, to help the newcomers along.

Surrey *(Croydon)* recently heard a very interesting lecture on Frequency Measurement from G6JJ.

OFFER OF RECORDED LECTURES

Mr. Basil Wardman, G5GQ, tells us that he is prepared in certain circumstances to record lectures on specific subjects for the individual requirements of Clubs. This scheme is not to be confused with a standard lecture for general circulation. Rather does he suggest that a local secretary may get in touch with him and say that the members would like a talk of 20 or 30 minutes duration on such-and-such a matter. The secretary would then forward the reel of tape on which the talk was to be recorded (at 3¾ in. per sec.)

Secretaries wishing to take advantage of this generous offer should write to Basil Wardman, G5GQ, 60 Berners Street, London, W.1, with full details of what they have in mind.

Nothing definite is fixed for the March meeting, but the AGM, on April 9, is to be combined with the Constructional Contest. **Cambridge** will be holding their AGM on March 22, 8.00 p.m., at the "Jolly Waterman," Chesterton Road; all members are asked to be present.

Bournemouth mustered 55 for their Hamfest on February 9, despite petrol rationing. Contingents arrived from Southampton, Salisbury and Dorchester, but the visitor from furthest afield was VE4BB. GI3KYP was also present. On June 16 the New Forest Mobile Rally will take place at Stoney Cross Aerodrome, and talk-in will be available on Two and One-Sixty metres.

Grafton were recently on show at the Islington Handicrafts Exhibition, and lectures have covered Headphones (Messrs. S. G. Brown), The Past, Present and Future of Amateur Radio (G6CL), Grid-Dip Oscillators (G3JEA) and a Junk Sale. G3AFT is now active on the HF bands, working DX. New members and visitors specially welcomed on Mondays and Fridays.

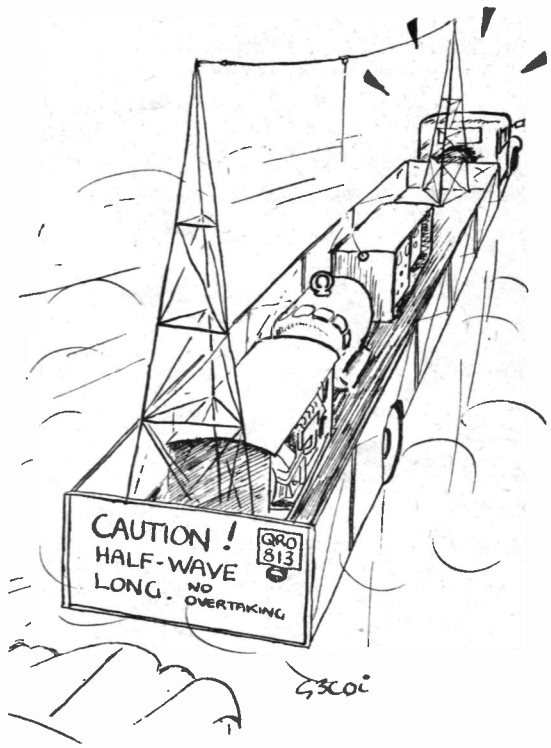
Plymouth meet on March 19, when their chairman will show a film strip on Transformers. Their usual attendance at the organised Tuesday meetings is now about 20—on the alternate Tuesdays "just a handful." Meeting place is Virginia House Settlement, St. Andrew's Cross, Plymouth.

Scarborough have arranged a programme which includes Morse and R.A.E. classes. On March 14 G3JBR will give a talk called "On the Sound Track," and on March 21 there is to be a Film Show. The club is to draw swords with the York Club in a transmitting contest in the near future. G5VO has presented a trophy to be awarded to the Morse learner making the best progress.

Wirral have scheduled a Junk Sale for March 20, and their Annual Dinner will be held on April 12 at The Coach and Horses, Moreton, regarding which the secretary will be pleased to answer enquiries.

Hastings held their constructional contest, at which the "G6QB Mug" was presented to Mr. W. E. Thompson, the hon. sec., for his home-made oscilloscope. Runner-up was G3HRI, a blind member, for his power unit. The judging was carried out by Mr. W. H. Allen, G2UJ, who afterwards gave a talk on Communications Receivers. The club now meets every Tuesday in its own club-room at 22 Middle Street, Hastings.

Late Note: Newbury meetings now cancelled due to petrol restrictions.



"....Yes, OM, am going in seriously for mobile..."

WE CAN'T HELP MUCH!

With the high MUF, we are getting constant enquiries from casually-interested listeners who hear some curious transmission they are unable to identify, usually in the commercial spectrum above 30 mc. They ask us what the station might be talking about, with full details of call-sign, frequency and location! Many of these are police services or similar private radio-telephone networks, on which no published information is available. In any event, we are not organised even to attempt to trace odd transmissions heard outside the amateur bands. Nor can we supply addresses from the *Call Book*, or the *Berne List!* All matters of amateur DX interest are dealt with through our activity features—"DX Commentary" and "VHF Bands"—and it takes us all our time to keep up with what the Amateur Radio fraternity all over the world is doing, let alone the commercials!

HELP FOR AN SWL

A. R. Barker, 5 Glenthorne Avenue, Brickfields, Worcester, who mentions with gratitude the assistance and advice he has already had from an established transmitting amateur, would like to hear from anyone else "with the time and patience to spare" to correspond with him "on the many questions he would like to ask." Unfortunately, there now appears to be no club organisation in the Worcester district.

Immediate Delivery From Stock

WORLD RADIO HANDBOOK

1957 Edition. *Price* **13s.** *Post Free. Detailed lists of the world's broadcasting stations. (Published by Lund-Johansen, Denmark.)*

HOW TO LISTEN TO THE WORLD

Latest Edition. *For the SWL. Price* **7s. 6d.** *Post Free. (Published by Lund-Johansen, Denmark.)*

THE RADIO AMATEUR'S HANDBOOK

1956 Edition, 600 *pages. Price* **31s. 6d.** *Post Free. (Published by A.R.R.L.)*

1957 Edition. *Price* **34s.** *Available February/March.*

THE RADIO HANDBOOK 14th Edition

American, Published by "Editors and Engineers," 768 *pages.* **60s.** *Post Free.*

RADIO AMATEUR CALL BOOK

Winter Edition

Abridged Edition excludes only American amateur stations. Otherwise complete with latest call sign-address listings for all countries, and including much DX data. In its 34th year of publication. *Abridged Edition, Price* **17s. 9d.** *Post Free. Complete Edition, Price* **37s. 6d.** *Post Free.*

ANTENNA HANDBOOK

Published by A.R.R.L. **(7th Edition). 19s.** *Post free.*

	Post free
AUSTRALIAN RADIO AMATEUR CALL BOOK (*Contains up-to-date list of all VK's*)	5s. 0d.
A COURSE IN RADIO FUNDAMENTALS (*New Edition*)	10s. 6d.
BASIC AUDIO COURSE	22s. 6d.
BASIC RADIO COURSE	19s. 0d.
BEAM ANTENNA HANDBOOK	22s. 0d.
HAMS INTERPRETER *Published by OH2SQ*	7s. 0d.
HIGH FIDELITY by G. A. BRIGGS (*Published by Wharfedale Wireless*)	12s. 6d.
HIGH-FIDELITY TECHNIQUES	8s. 6d.
HINTS AND KINKS, Vol. 5	11s. 0d.
HOW TO BECOME A RADIO AMATEUR	5s. 0d.
LEARNING THE RADIO TELEGRAPH CODE	4s. 6d.
MAINTAINING HI-FI EQUIPMENT	24s. 0d.
MOBILE HANDBOOK (*Published by CQ*)	17s. 6d.
MOBILE MANUAL (*Published by ARRL*) (*Second Edition*)	22s. 0d.
MODEL CONTROL BY RADIO	8s. 6d.
NOVICE HANDBOOK (*Available Mar.-Apr.*)	23s. 6d.
OPERATING AN AMATEUR RADIO STATION (*Published by ARRL*)	2s. 8d.
PRACTICAL DISC RECORDING	6s. 6d.
RADIO AND TV HINTS	8s. 6d.
SERVICING RECORD CHANGERS	24s. 0d.
SINGLE SIDEBAND FOR THE RADIO AMATEUR	14s. 6d.
SINGLE SIDEBAND TECHNIQUES	14s. 6d.
SURPLUS CONVERSION MANUAL Vol. 1	21s. 0d.
Vol. 2	21s. 0d.
SWEEP MARKER GENERATORS FOR TELEVISION RADIO	20s. 6d.
THE OSCILLOSCOPE	18s. 6d.
TRANSISTORS — THEORY AND PRACTICE (*Gernsback*)	16s. 6d.
TRANSISTOR TECHNIQUES (*Gernsback*)	12s. 6d.
UHF ANTENNAS, CONVERTERS AND TUNERS	12s. 0d.
VHF HANDBOOK (*Available Mar.-Apr.*)	24s. 0d.
WORLD RADIO TELEVISION VALVE HANDBOOK	14s. 9d.

MAGAZINES BY SUBSCRIPTION

	One Year		*One Year*
AUDIO	40s. 0d.	RADIO AND TELEVISION NEWS	36s. 0d.
CQ, RADIO AMATEUR'S JOURNAL	44s. 0d.	RADIO ELECTRONICS	33s. 0d.
ELECTRONICS (*Trade only*)	160s. 0d.	SERVICE	24s. 0d.
POPULAR MECHANICS	32s. 0d.	TELEVISION	48s. 0d.
POPULAR SCIENCE	45s. 0d.	TELEVISION ENGINEERING	32s. 0d.
QST, ARRL	36s. 0d.		

Subscription Service for all American Radio and Technical Periodicals.

SHORT WAVE MAGAZINE
(PUBLICATIONS DEPARTMENT)
55 VICTORIA STREET · LONDON · S.W.1 · *ABBEY 5341*

SMALL ADVERTISEMENTS

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

TRADE

VARIOUS CONVERTERS for 6, 10, 15, and 20 metres from £2 12s. 6d.; s.a.e. details. T/V highpass filter, 18/6. — G3FXB, 86 Cross Road, Southwick, Sussex.

WANTED: Prop Pitch Motor or suitable Rotator; 14-28 mc GC HRO coil. Instructions, etc., for Army Tx/Rx 9AB Type 687.—GM3BQA, 19 Edinburgh Road, Cockenzie, East Lothian.

G3CGD QSL's.—Fixed and mobile samples on request. Printing enquiries welcome.—30 St. Luke's Road, Cheltenham.

TELEVISION INTERFERENCE.—Receiver Filters: High-pass E.5037, 30/-; Low-pass E.5031, 30/-; Composite Band I/III, 49/6; Transmitter Filter E.5034, 80 dB, 1 kW, £6.—Labgear (Cambridge) Ltd., Willow Place, Cambridge.

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

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

IGY COMMUNICATORS, now available for 70 mc. We will modify to 144 mc later. *See* December *Short Wave Magazine*, p.557, or send s.a.e. for details. H.P. terms. — R.E.E. Telecommunications, Greenham Mills Works, Crewkerne, Somerset.

CRYSTAL Microphone Inserts (Cosmocord Mic. 6/4) in steady demand by Amateurs and Sound Engineers; guaranteed newly made and boxed; 15/6, post free.—Radio-Aids, Ltd., 29 Market Street, Watford, Herts.

TWO TONS OF GEAR must be cleared; no junk. Power supplies, condensers, valves, etc.; state requirements. Hallicrafters S20R Rx, 55-44 mc, manual, perfect, £12. CNY-1 Rx, complete, manual, £3. Pye strip, 30/-. R.1132, complete, £3. (All above unmodified.) Two-metre Tx, 829, converter, aerial, £4 lot; 300-watt C.43 Tx, PSU; offers? Clough-Brendle standard sig. gen., 0.1-32 mc, manual, perfect, £10. Bubble sextant, 30/-. West London.—Box No. 1844, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: BC610 Hallicrafters, E.T.4336 transmitters, BC312 Receivers, BC221 Frequency Meters and spare parts for all above. Best cash prices.—P.C.A. Radio, Beavor Lane, Hammersmith, W.6.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Box Numbers 1/6 extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

WANTED: Labgear or similar 150-watt transmitter, complete, in good condition. Exchange for new unused Eddystone 680X receiver and speaker, or consider offers.—Box No. 1832, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

JERSEY HOLIDAY.—Stay at "The Lincoln," 3 St. Saviour's Road, near sea, town centre; s.a.e., please, for brochure.—Douglas Byrne, GC3KPO.

SMALL ADVERTISEMENTS, READERS—*continued*

ONE Hallicrafters SX24, 540 kc-43.5 mc, xtal filter, built-in xtal frequency check; circuit servicing sheets; appearance fair; £22. — R. H. Bland, 1a Princess Terrace, Ripon, Yorks.

150-WATT RACK and Panel Transmitter; four switched bands; needs small attention; various sundries. — Lawler, Baynards, Woodcote Close, Epsom, Surrey. *(Epsom 4172).*

R.115A with built-in power pack and output stage; perfect condition; £7.—40 Kirland Square, Carrickfergus, Co. Antrim, Northern Ireland.

G3IES QRT: 60-watt 1.8 to 21 mc Phone Tx, relay operated; ZC Mk. II mobile Tx/Rx; meters, valves and gubbins.—Phone first: London, *GULLiver 2242.*

MOBILE Transreceiver ZC1 MK2, mike, manual, watch and speaker, £12; RCA AR77 and manual, £17; Collins TCS transmitter, receiver and power pack in matching unit, £15; 3.5 to 28 mc transmitter, G5RV circuit, and power pack, valved and metered, two units, 19-inch panels, £12 (complete).—13 Mount Echo Drive, London, E.4. *(Silverthorn 6264).*

MINIMITTER Tx for sale, as new, used 4 to 5 hours only, with aerial coupler and. low-pass filter, £80; BC-221AJ, modified model, with P/Pack, good condition, £22. Buyer to arrange collection of above (London area). Clocks, 8-day with 24-hour dial (two of), 25/- each.—Box No. 1933, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

PHILIPS TAPE RECORDER (cost £41), £30; Panda 150 aerial tuning unit, £11; 813, 30/-; 813 Woden heater transformer, 30/-; HK257B/4E27, 30/-; VHF receiver with power unit and speaker, £9; Perfect AVO 7, leather case and leads, £12. The following boxed, never used: Truvox tape recorder (cost £73), £56; Elpico tape recorder (uses Collaro 3-speed transcription deck; cost £58), £45; Collaro 3-speed high fidelity tape deck, £16; Truvox Mk. III TR7/V tape deck, £20; "Scotch Boy" long-play tape, 1,800 feet, 7-inch spool, 47/-; 900 feet, 5-inch spool, 27/-; Pure-tone tape, 1,200 feet, 7-inch spool, 16/-; Armstrong 10-valve chassis, RF and two IF, £10; EDIXA 35-mm. camera, f2.8 coated lens, 9-speed synchronised shutter, coupled range-finder, leather case, lens hood, filter, £20. Or offers any item? S.a.e., please.—Box No. 1934, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

TABLE-TOPPERS: 70w. Phone Transmitter, £20; 10w. VFO Phone/CW transmitter, 160m., £15; BC-454, 50/-; 12v. to 650v., 200 mA Genemotor, filtered, 35/-.—G3ATL, Hugglescott, Leicester.

FOR SALE: R1155L, FB Rx, Top Band coverage, D/F section removed, built-in, 6V6 O/P stage, £8; Eddystone 400X with plug-in coils (needs realignment), £7; Wavemeter, Type-D, medium condition, 230v. mains, reasonable offers considered. Buyer collects.—J. Love, 107 Fernside Avenue, Hanworth, Feltham, Middx.

SALE: HRO with 4 GC coils, £12 10s.; Type 105 420 mc oscillator, £3, or offers? WANTED: CR100 manual.—W. Gates, 67 Broad Street, Dewsbury, Yorks.

SELLING OUT: Rack-constructed TVI-proof relay controlled Tx, 10m. to 80m. modulator clipper, power packs and TVI filter; includes 160m. Tx and power packs, also Class-D wavemeter, standing-wave meter and many Tx spares; the lot, £40 (o.n.o.). — Evenings, except Tuesday: G3IIP, 9 Gordon Road, Yiewsley, Middx. *(West Drayton 3450).*

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: Transmitter, Type T.1131, with RF section partly stripped, but power units and modulator, etc., in FB condition; price £30 (no offers); buyer to collect.—G3LBT, 1 The Hedgerow, Vange, Basildon, Essex.

SALE: Transformers, receivers, transceivers, Westinghouse charger, chokes, meters, xtals; cost over £500; mostly at quarter cost, Exchanges, offers? S.a.e. list. — Box No. 1835, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

BRAND-NEW VHF GDO and Wavemeter, £5 the pair; brand-new RF-27 unit, 25/-; Eddystone mains power unit, 200v. 60 mA, 12v. 3a., £2; 813 heater transformer, £1; 6v. beam rotator, reduction drive, 10/-; 1000 kc xtal, 10/-; 464.3, 5/-; 8000, 10/-. Low-pass TVI filter, 300 ohms, 5/-; 4- and 6-pin screened plug-in coils, 1/6 each; 6SK7 and 12SK7, 2/6 each; 6B4G, 5/- each; 1N21B, 5/-. Quantity 1.4v. valves, mostly new (enquire types), cheap. Boxes of mixed components, all good, mostly new, 5/-, post free. Your choice of items if available.—plugs, sockets, switches, coils, condensers, resistors, etc.—at give-away prices. Going QRT; must clear. —Box No. 1836, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Radiovision Commander Receiver, in good condition; also 6v. phone mobile Tx/Rx for 28 mc, and U.S.A. Bug Vibroplex/Lionel. —Box No. 1837, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Hallicrafters SX28 Rx, in mint condition; no modifications or changes; original seals and test labels intact; manufacturer's manual; £45. Pye Telecon master station VHF, consisting of Tx, completely self-contained with own power supply; Rx ditto (both built into Pye metal cabinet); frequency 70 to 95 mc, according to xtal; £40; mint condition. Would prefer buyer collect.—Cutler, Barn Cottage, Walberton, Arundel. *(Phone Eastergate 367).*

SX28, good condition, £38; Woden UM2, £3; DT1, £2. Buyer must collect.—P. Carter, 51 Sundew Avenue, London, W.12.

VALVES, new boxed, and new ex-equipment: S130, 3/6; 6SL7GT, 6X5G, 5Z4, at 7/- each; 6AC7M, at 6/-. Please add 6d. postage. Other types available; s.a.e. enquiries.—G3BVT, 7 Tower Street, Darwen, Lancs.

SENDER 12 Transmitter, mint, no modifications, handbook, all plugs; tunes 21 mc; £12, c.p.—Box No. 1838, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COLLINS TCS Transmitter, £7 10s., and Receiver, £4 10s.; both 1.5 - 12 mc. Ten-metre xtal controlled converter, 25/-.—Armstrong, 32 Hillfield Place, Parcllyn, Cardigan.

WANTED: CR100 for new R.107 and cash; also tweeter speaker. New transformer, 250v. input, 375v. 200 mA CT, 6.3v. 6a., 6.3v. 2a., 5v. 3a. outputs, £2 10s.—Albans, 17 Fern Road, Cropwell-Bishop, Notts.

813 AND BASE, 35/-; 829 and base, 25/-; pair 811's, £1; 6 KT8C's, 3/- each (15/- lot); pair of 1625's, 8/-; 100 kc STC xtal, 10/-; 100 kc RCA xtal, 10/-. Lot of 93 valves, £3. List available. —G3LBT, 1 The Hedgerow, Vange, Basildon, Essex.

CR-100/7, late model, almost as new, £20; another, in nice condition, £15; Standard Radio Tx, 5 A.H. and Rx; B45 in new condition. Sell or exchange; w.h.y.—Box No. 1842, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

EDDYSTONE 750, virtually new, £45 (o.n.o.); G.E.C. Miniscope with wobbulator, complete, £6; spare CRT.—Stephenson, 11 Green Leas, Chesterfield, Nr. Whitstable, Kent. *(Chesterfield 561).*

AR88D SPARES, band switch, complete with screens, 50/-; complete set of IF Transformers, 60/-; Selectivity Switch, 12/6. Large Tuning Knobs (2), 4/6 each; large Pointer Knobs (16), 1/- each; Dials, 10/- per pair; Condenser Gear Box, 8/6; AVC Switch (2), 3/- each; Send-receive Switch, 4/6; RF EHT unit, 5-7 KB, £2; partly-built Harmonic Indicator, complete in case with power supply and 2½" 0-50 microamp meter, £3 15s.—16 Bloemfontein Avenue, Shepherds Bush, London, W.12.

BC-348 with power pack, less speaker; individual controls RF, IF, AF; wired for muting and break-in; £15 (or near offer?) — G4BP, Chapmans Yard, Waterhouse Lane, Scarborough, Yorks.

EDDYSTONE 740, mint condition; 8in. speaker in cabinet; S-meter, earphones, quantity components; £22 (or offers?)—13 Lee Road, Grangetown, Middlesbrough, Yorks.

FOR SALE: Brand-new Labgear LG.300 Transmitter and Modulator/Power Pack; complete with cables, plugs, instructions, circuits. Guaranteed unused and perfect; no snags. Cost £138; price £90 (delivered).—Box No. 1841, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

MANUALS, 20/- each; Viking, Valiant, Ranger, Pacemaker, 75A4, R9, T.90, S.37, HRO60, NC125. —R. Grain, 15 Waverley Gardens, Grays, Essex.

WHAT OFFERS?—TK9 Tape Recorder, 14-inch, 13-channel TV, 21 Set (ideal 15 and 10 mobile), complete, 6v. working. Six-volt car radio (brand-new). Would exchange lot for Panda or similar Table-top Tx.—Box No. 1840, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

NATIONAL 1-10, complete, £15; Marconi B29, complete with loop, etc, £8; Hallicrafter World Portable, as new, £45.—Box No. 1839, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

BARGAIN SALE: Elizabethan Assembly (Philpots), drilled, as new, 50/-; Power unit, 670-0-670v. 120 mA, 350-0-350v. 120 mA, all heaters, £5. Crystals: Q.C.C. with certificates, 7019, 7150, 3515 kc, 7/6 each. Meters at 5/-; 0-300 mA, 0-150 mA, 0-100 mA, 0-30 mA, 0-50 mA. Eddystone full-vision dial, 15/-. Thirty-two copies of *QST*, 1/- each. S.a.e. for full list.—G3ELJ, Claypole, Newark, Notts.

VALVES (2), EF80's (1), ECL80, 20/-; mains p/pack, output 250v. DC., 6.3v. 12v., 30/-. Collins Receiver with p/pack, £8 10s.—42 Malvern Crescent, Spring View, Wigan, Lancs.

R107 Rx, working order, £10 (carriage paid); AR88LF Manuals (2), 30/- each; Manuals for HRO, TBY, C52, etc.; many others. SCR-300 FM Tx/Rx, less valves and battery, box, £5; BC-306 Aerial Tuner, £1; 196A 100-150 mc Sig. Gen., £6 10s. Many valves, meters, etc. State wants.—169 Earlham Green Lane, Norwich.

FOR SALE: BC-348L, very good condition, £15. WANTED: All-band Rx.—G3KZW, 41 Booths Brow Road, North Ashton, Nr. Wigan, Lancs.

WANTED: Wilcox-Gay VFO, reasonable price. SELL: Three VCR-97's, unused; one VCR-138, unused; two 38 Sets. All 10/- each.—Williams, 4 Shutlock Lane, Birmingham, 13.

SALE: SX-28 and book, £30; BC-3480, internal power pack, £10.—Evenings or week-ends: 74 St. Augustine Road, Southsea, Hants.

HENRY'S (Radio) LTD

5 Harrow Rd., Paddington, W.2

PADdington 1008/9 and 0401

Open Monday to Saturday 9-6. Thursday 1 p.m.

Send stamps for New 1956/7 28-page Catalogue.

OVER 50,000 VALVES IN STOCK

QUARTZ CRYSTALS

TYPE FT243 fundamental frequencies. 2 pin ½in. spacing.
120 TYPES. 5675 Kc/s. to 8650 (in steps of 25 Kc/s.).
80 TYPES. 5706 Kc/s. to 8340 Kc/s. (in steps of 33.333 Kc/s.).
ALL BRAND NEW, **10/-** Each
Special price for complete sets of 80 or 120.
Above are suitable for re-grinding.

TYPE FT241A 54th harmonic Crystals. 2 pin ½in. spacing.
80 TYPES, 20 Mc/s.—27.9 M/Mc/s. (in steps of 100 Kc/s.).
Also available : 32.5 Mc/s., 36.3 Mc/s., 36.6 Mc/s. ; 32.6 Mc/s., 36.4 Mc/s., 36.7 Mc/s. ; 32.7 Mc/s., 36.5 Mc/s.

ALL BRAND NEW, **7/6** Each
FT241A 200 kc/s. **10/-**. 500 kc/s **10/-**.
Crystal Holders for both Types 1/3 each.

TRANSISTORS

JUNCTION TYPE (Red Spot) (P.N.P.) Offered at less than half-price

10/- each

(Tested and complete with Data and Circuits)

N.B.—These Transistors may be used in place of Mullard OC71 or similar Transistors.

PRE-SELECTED TRANSISTOR-SEVEN PUSH-PULL PORTABLE SUPERHET

Just switch to your favourite Station. No Tuning, no Aerial or Earth. Pre-select 3 stations. Complete with all components and seven Transistors. 7 x 4 Elliptical speaker. Teletron Superhet Coils and I.F.T.'S. Powered by 7½v. dry battery which lasts for months. 150 Milliwatts output. All the above with Circuits etc. £9/17/6.

Or with Matched Mullard OC72's (200 Milliwatts Output) and 7 x 4 Elliptical High Resistance Speaker **30/-** extra.

Suitable Plastic Cabinet easy to assemble **18/6**

Call and hear demonstration model working.

"EAVESDROPPER" 3-TRANSISTOR PERSONAL PORTABLE

No Aerial or Earth Required. Pre-selected 2-Station Receiver.

We can supply all the components for building the above set as per "Radio Constructor" less Microphone for **77/6d.**

With Acos Mike 90/- With Miniature Hearing Aid, 92/6

TRANSISTOR SQUARE WAVE GENERATOR
Ideal for signal tracing.
Complete Kit with 2 Transistors, Components, and Circuit, 25/-.

TRANSISTOR SIGNAL TRACER
Complete Kit with 2 Transistors, Components and 'Phones with Circuit, 42/6.

G2AK THIS MONTH'S BARGAINS G2AK

Items for the MOBILEER

- **12 V MINIATURE ROTARY TRANSFORMERS.** Output 360/310V, 30mA c.c.s. or 70mA i.c.a.s. Only 4½" x 2½" overall. Only **21/-** each or **£2** for 2, p. and p. 2/-.
- **AMERICAN BREAST MIKES.** Swivel head, push to talk and lock on switch. Excellent job. Only **12/6**, p. and p. 1/6.
- **BRITISH BREAST MIKES** complete with pair of H.R. 4000 Phones, in wooden carrying case, 8¼" x 4½" x 7½" New W.D. stock. Unrepeatable at **17/6**, p. and p. 2/-.
- *FOR PERSONAL PORTABLES* **3" P.M. LOUDSPEAKERS,** lightweight, only **9/11** each, plus 1/- p. and p.

- **THE NEW GELOSO V.F.O. UNIT.** Output on 80, 40, 20, 15 and 10 metres sufficient for fully driving pair of 807 or QVO6/20(6146) tubes. Complete with 8¼" x 5" calibrated dial and escutcheon. Price less tubes **£7.17.6** Set of 3 tubes **24/-.**
- **HEADPHONES, H.R.** type, 4000 ohms, very sensitive. Only **12/6** pair, p. and p. 1/6. C.L.R. (low res.) **8/6**, p. & p. 1/6.
- **AMERICAN 807 VALVES.** New boxed, **7/6** or **4 for 25/-**, post free.
- **TYPE 931A ELECTRON MULTIPLIERS.** Only **35/-** ea. or **2 for £3.** Holders **2/-.**
- **CONDENSERS.** T.C.C. type 111. 8mfd, 1000V. List, over £3. Only **10/6** each. post 1/9. 8mfd, 750V, 5/6 each, post 1/6.
- **SMALL POWER UNITS** in black metal case. 200/260V input, 200/250V 60/80mA output, also gives 6.3V 3A a.c. and 31V .3A d.c. Fitted with 6X5 rectifier. Fully smoothed and filtered. Only **50/-**, post free.
- **TRANSMITTING TYPE TUNING CONDENSERS** by E. F. Johnson, U.S.A. 500pF 1,500V rating. Ideal for Pi Output circuits. **15/-**, post 1/-.

- **COPPER WIRE:** 14G, H/D 140ft., **17/-**; 70ft., **8/6**, post and packing 2/-. Other lengths pro rata. **Stranded** 7/25, 140ft., **10/-**; 70ft., **5/-**, p. and p. 2/-.
- **ABSORPTION WAVEMETERS:** 3.00 to 35.00 Mc/s in 3 Switched Bands. 3.5, 7, 14, 21 and 28 Mc/s Ham Bands marked on scale. Complete with indicator bulb. A **MUST** for any Ham shack. Only **15/-** each, p. and p. 1/-.
- **RACK MOUNTING PANELS:** 19" x 5¼", 7", 8¾" or 10", black crackle finish, **5/9, 6/6, 7/6, 9/-** respectively, p. and p. 2/-.
- **RIBBED GLASS 3" AERIAL INSULATORS,** 1/6 ea., or 6 for **7/6.** 12 or more post free. **Small shell porcelain 4½d.** ea., or **4/-** doz.
- **COLLINS MODULATION TRANSFORMERS.** P.P. 807s, 20 watts audio to parr. 807s. Beautiful job. Only **12/6** post free. Very limited quantity available.
- **TWIN FEEDER:** 300 ohm twin ribbon feeder similar K25. **6d.** per yard. K35B Telcon (round), 1/6 per yard. Post on above feeder and cable 1/6 any length.

A good range of Components and Communication Receivers always available

Full range of **DENCO, REPANCO** *and* **EDDYSTONE** *coils and components available*

CHAS. H. YOUNG Ltd

No C.O.D. on Orders under £1 PLEASE PRINT YOUR NAME AND ADDRESS

Dept. "S," 110 Dale End, Birmingham *CENTRAL 1635*

Printed by The Courier Printing Co. Ltd., Tunbridge Wells, for the Proprietors and Publishers, The Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. The *Short Wave Magazine* is obtainable abroad through the following : Continental Publishers & Distributors, Ltd., William Dawson & Son, Ltd. ; AUSTRALIA AND NEW ZEALAND—Gordon & Gotch, Ltd. ; AMERICA—International News Company, 131 Varick Street, NEW YORK. Registered for transmission to Canada by Magazine Post. *March 1957.*