

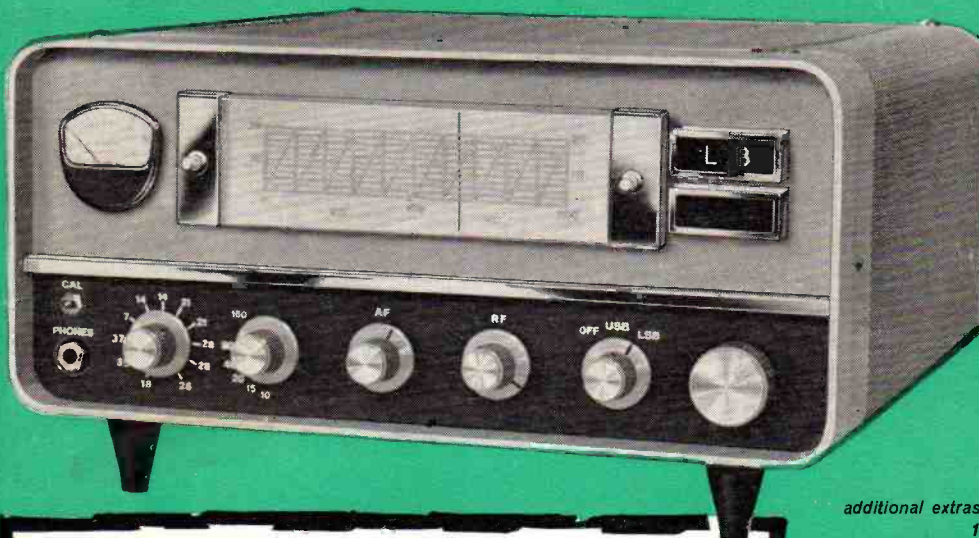
The SHORT WAVE Magazine

VOL. XXV

APRIL 1967

NUMBER 2

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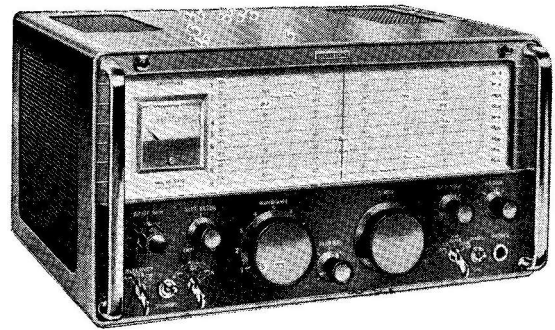
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- 4 The value of Panoramic adaptors with amateur bands receivers and the facilities required.

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COMPETITION RULES

- 1 Essays should not exceed 1,500 words with the author deciding which of the four suggested subjects are of the greatest importance.
- 2 Manuscripts to be typed or alternatively written in ink, on one side of lined foolscap with wide margins.
- 3 Author's name, address, age and occupation to be clearly shown.
- 4 Entries to be posted in a 'sealed' envelope to Eddystone Radio Limited, Alvechurch Road, Birmingham 31 and received by August 31 1967.
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Improving Existing Receivers

There are several small things that can be done to an existing receiver to improve its performance, making the reception of SSB signals a pleasure instead of a fight! One of the biggest failings in the older type of receiver (AR88, SX-28, HRO, etc.) is lack of BFO injection. This has the effect of making very strong stations unresolvable, slightly weaker stations being very distorted, and very weak stations tending to be crowded out by everything else and therefore difficult to find.

BFO injection in this type of receiver is typically by means of a very low value capacitor (2 $\mu\mu\text{F}$ or so) connected to the diode envelope detector. The answer is to move the injection point back into the IF strip. Connecting the BFO into the grid of the last IF stage should make a great change—so much so that a vast improvement will be noticed in the SSB reception performance. In the writer's opinion this is a "must" with any Rx suffering from lack of BFO injection.

Probably the next most important thing is to try an improvement in receiver selectivity. A half-lattice filter added to an ordinary receiver proves to be a great advantage but still leaves a lot to be desired. This type of filter will attenuate unwanted signal by about 35 dB. The assistance it gives in copying an S2 signal alongside an S9+ barrage is only marginal with this degree of selectivity. (Receivers must have better selectivity than transmitters.) It is therefore recommended that at least a two half-lattice filter be used. This will give about 55 to 60 dB attenuation of off-tune signals. For even better results a three half-lattice section filter would give about 80 dB rejection of unwanted signals.

Any of the filters described in Parts III and IV (February, March, 1966) of this series will be found to be suitable. These include commercial mechanical

filters; either the Clevite, Collins, Kokusai or Lafayette at 455 kc will greatly enhance the performance of the receiver. The only snag is that there is some small loss when inserting these filters.

Using Filters

It is, as discussed earlier, an important matter *where* these filters are placed in the signal chain in order to minimise cross-modulation problems. In place of the IF transformer in the anode of the mixer is the ideal phase position. The Kokusai filter offers some slight advantage over the others in that it can, because of its size and shape, replace directly the large type of IF transformer used in these older receivers. If space is available the Collins or the Lafayette (which is cheaper) can be used to replace the IF transformer. In the case of the Clevite filter space is not a problem (it is only about 1½ in. long by ¾ in. diameter). Its input and output impedances are very low—about 1,500 ohms. This means that to incorporate this in a receiver the secondary of the IF transformer in the mixer anode should be replaced with a low-impedance link suitable to match the filter. For minimum loss the output of the filter should feed into an untuned link over a tuned circuit but if the loss can be tolerated then the output can be fed straight into the grid of the first amplifier. Figs. 2, 3, 4, 5 and 6 show the connections for the various types of LF filters that can be used—see p.99.

The circuit shown in Fig. 2 can be improved on by using two half-lattice sections cascaded for greater rejection of unwanted signals. As previously stated a further half-lattice section could be added, the best position for this section being following the first IF amplifier.

(To be continued)

RAIBC MEMBERSHIP SURVEY

According to G3LWY's latest listing, the Radio Amateur Invalid & Bedfast Club (devoted to the needs and interests of those amateurs who are disabled in various ways) now has nearly 100 transmitter-members in 13 countries, of whom more than 40 are blind, the remainder being incapacitated, either totally or partially. In addition, the RAIBC lists more than 170 disabled SWL members, of whom nearly 50 are blind.

This constitutes a significant body of enthusiasts within the orbit of Amateur Radio who, while not asking for charity, can always do with a bit of help—indeed, the RAIBC is primarily a self-help organisation, and no special reliance is placed upon outside assistance. Nevertheless, with such a large membership, it is quite possible that there is an amateur or SWL in your neighbourhood, or not far from you, who would be glad to see a new face or someone to talk to about Amateur Radio. Help with transport is a frequent requirement.

If you would like to investigate the possibility, the obvious move is first to get in touch with the hon. secretary, RAIBC: Mrs. Frances Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs. But remember that she, too, is a very busy person with more than enough to do already—so enclose an s.a.e. and a post-card on which simply a quick answer or a QTH can be written in reply.

LISTENING ON UNAUTHORISED FREQUENCIES

Judging by the general correspondence, many readers are not aware that, by the terms of their ordinary receiving licence, they are not permitted to listen to transmissions *outside* the amateur and broadcasting bands. This is a constant source of embarrassment to us, as when we are asked to recommend, *e.g.* "a receiver suitable for listening to ships and aircraft," or likewise an aerial arrangement for the purpose, the reader already being in possession of the required Rx.

When, as we are bound to do, we explain the licence conditions, we are not infrequently challenged about some of the advertising we carry! The answer is, of course, that a large proportion of our readers are professionals—who need such specialised apparatus for their work on commercial frequencies—or are otherwise licensed to operate on aircraft or marine channels, being the owners of private aircraft or sea-going yachts. The point is that the listener sitting at home with the ordinary Rx licence we all have to get from the local Post Office is confined to broadcasting (which includes met., standard frequency and certain press services, whether on speech or by telegraphy) and the amateur bands *only*. (Don't blame us—it is not we who make the rules!)

SOME PRACTICAL NOTES ON RELAYS

CONSTRUCTION, USE AND OPERATION

Relays in great variety are available at very low prices. They can be used in many ways. For instance, it is not always understood that what are known as "P.O. type" relays can be adapted to suit various circuit requirements, and that the energising voltage/current needed to operate the relay depends mainly upon the loading imposed by the spring-set. This article gives some useful practical information on these points.—Editor.

ALTHOUGH a large number of relays are in the hands of radio amateurs (mainly from surplus sources) there is little published information available about them and their operation in control circuits.

The relays normally encountered in amateur stations are the P.O. types 3000 and 600, although other relays for aerial change-over and power control have also found their way into the market.

The 600-type relay is almost identical in construction with the 3000-type shown in Fig. 1, only minor differences being apparent; but the 600 relay is physically smaller than the 3000.

As any relay involves a mechanical process in addition to the electrical circuit, it is necessary to appreciate its construction to obtain a proper understanding of the operation.

The construction itself may be split into three sections: (a) The magnetic circuit; (b) The energising circuit; and (c) The spring-sets.

The Magnetic Circuit

As will be seen from Fig. 1, the relay is built around the yoke which is, like the coil core and the armature, of soft iron. In the 3000-type relay shown the front of the yoke has a knife edge upon which the armature is pivoted, although in the 600-type this edge is absent. In both types the armature is held in position by a spring-loaded washer on the armature retaining screw.

In the centre of the armature face (Fig. 2) is fitted a non-magnetic residual stud or screw for the purpose of maintaining an air gap between coil core and armature; this is to ensure positive releasing action, and, as will be explained later, the residual screw adjustment is preferable to the fixed stud.

The Energising Circuit

The energising coil resistance can vary between 0.3 and 20,000 ohms, depending on the gauge of wire employed and the number of coil turns. The coil itself may be a single winding, or split into

two separate windings which can be joined together forming a single circuit or used as a relay common to two separate control circuits. The windings are normally tested at 500 volts, although the insulation can be higher where necessary, and the connections to the coils are brought out to the rear of the yoke.

The Spring-Sets

This term applies to the entire switching assembly of the relay, and the individual springs are either "fixed" or "travellers"—depending on their function.

The springs are fitted between insulated spacers which are secured to the heel of the relay by screws passing through the metal holding plates, down through insulating sleeves (threaded through the spacers) to the yoke. The central screw on each spring-set goes only into the bottom holding plate, so that the spring-set may be removed without coming apart.

A centrally positioned, stepped insulated block is fitted to control the movement of certain springs,

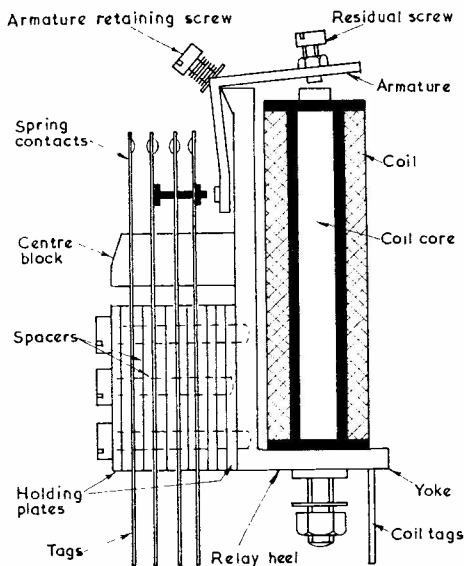


Fig. 1

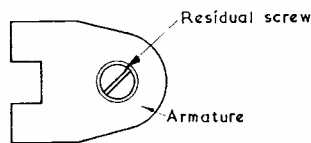


Fig. 2

General electro-mechanical arrangement, Fig. 1, of the well known GPO-type relays. As the article shows, there is a good deal more than meets the eye when it comes to the best use and proper operation of relays. Fig. 2 is explained in the text.

thus reducing pressure on the armature and preventing excessive spring movement when the relay is operated.

The spring combinations are detailed in Fig. 3, a complete spring-set consisting of any of these combinations so long as the total number of *springs* does not exceed eighteen for the 3000-type relay and twelve for the 600-type. This designates one of the basic differences between them.

The small contacts on the spring ends can carry a maximum current of 300 milliamps, and the larger, flat contacts up to one ampere at a maximum inter-spring potential of 500 volts—although if the insulating spacers are thickened, with a corresponding increase in the diameter of the bolt sleeves, a higher potential may safely be applied.

Operating Characteristics

These are rendered complex by the necessity of converting the power in the energising coil into the purely mechanical pull of the armature against the spring-set and frictional forces involved.

As a result, these latter forces determine the operating current, *i.e.*, the current necessary to close the contacts for any given relay, and any change in the spring-set force—for it is difficult to change the *frictional* forces involved—will result in a corresponding change in the current.

The mechanical pull of the armature can, therefore, be measured in milliwatts and the table below tabulates the power necessary to operate a relay with the given spring-set combinations. When the spring-set contains more than one type of combination, the powers quoted for each combination must be added and the total multiplied by 1.5 to

SPRING-SET COMBINATION	OPERATING POWER (milliwatts)
1 make	22 mW
2 make	43 "
3 make	64 "
4 make	81 "
6 make	144 "
1 break	36 mW
2 break	64 "
4 break	144 "
1 change-over	36 mW
2 change-over	72 "
4 change-over	144 "
1 make-before break	25 mW
2 make-before break	49 "
4 make-before break	100 "

This table is to show the energising power, in milliwatts, required to operate a Post Office 600 or 3000 type relay with the spring-set combinations given. The actuating voltage/current depends upon the magnetic pull needed to operate the relay under the spring-set loadings shown. The operating voltage is not critical, and 12-14v. DC should be suitable for pulling the relay in.

overcome the additional friction involved and ensure satisfactory operation.

When the power is determined, the voltage necessary for operation is $V = \sqrt{WR}$, where *W* is the power in watts and *R* is the coil resistance in ohms.

For example. A relay with a 2000 ohms energising coil has a single "make" and a single "change-over" combination. To use this relay, the practical information required is the voltage to be applied.

From the table, the "make" combination requires 22 mW and the "change-over" requires 36 mW, total = 58 mW. Taking into account the additional friction = $58 \times 1.5 = 87$ milliwatts.

Now as $V = \sqrt{WR}$ and minimum voltage necessary for operation is

$$\sqrt{\frac{87}{1000}} \text{ (watts) } \times 2000 \text{ (ohms)} = \sqrt{\frac{174000}{1000}}$$

$$= \sqrt{174} = 13 \text{ volts approx.}$$

and if this is applied to the relay, then

$$\text{the current will be } I = \frac{V}{R} = \frac{13}{2000}$$

$$= 6.5 \text{ milliamps.}$$

Tolerances

Relays are manufactured to close tolerances, but operating characteristics—which depend on the spring-set force—can differ widely between otherwise identical relays, and so users invariably employ higher voltages than are absolutely necessary to ensure reliable operation. For instance, in the example quoted it is quite permissible to apply 24 volts instead of the minimum of 13, and as the relay coil is quite rugged and not easily overheated, then the only effect of the increased potential will be to cause magnetic saturation of the core.

In actual fact, relays are normally designed to operate on standard voltages of 6, 12, 24 or 50 volts, although when using surplus relays the guiding factor should be the calculation already given, because some of the relays were designed for HT operation.

A good general rule when designing circuits to operate these relays is to ensure that the operating voltage will err on the high side rather than the low.

Spring-Set Modification

It is quite in order to modify or arrange spring-sets to suit individual requirements, so long as it is appreciated that a relay is a sensitive mechanical device the satisfactory operation of which can easily be impaired by rough handling, and every

care should be taken not to twist or bend the springs.

Taking out the two fixing bolts will permit the relevant half of the spring-set to be removed, which will come away from the relay as a unit that is held together by the third central bolt — screwed into the metal holding plates at top and bottom of the spring assembly.

Before dismantling the assembly a rough drawing should be made, and as dismantling proceeds a note kept of the number of *spacers*—which may vary—between the springs, so that reassembly will present no problems of alignment.

The most efficient way of dismantling is to start from the bottom of the assembly and place the component parts in sequence, as they are removed. The springs themselves should not be touched during either dismantling or reassembly, being gently eased out of, or into, position at the spacer end to avoid any twisting or buckling, which will damage the springs.

Removal of springs or spacers will naturally result in the bolts and bolt sleeves being too long and both must be carefully cut to the new length. Under no circumstances should the bolt sleeves be omitted during reassembly, as the springs may short on the "naked" bolts.

When reassembled, the fixing bolt should not be tightened until the springs have been carefully realigned so that the traveller contacts meet those of the fixed springs, and on re-placing the assembly on the yoke all springs that were fitted into the central block should be replaced in the correct sequence.

Increasing Sensitivity

If the sensitivity is to be improved to reduce the operating current (and hence lower the minimum operating voltage) then unwanted springs must be removed to reduce the force on the armature and the resultant magnetic pull necessary to close the relay.

When all spring combinations are in use, adjustment of the residual screw will directly affect the sensitivity and this is why it was stated earlier that relays with residual screws, instead of studs, are preferable. However, the stud can always be drilled out, the hole tapped, and a non-magnetic screw inserted with an external locknut to take the place of the stud when necessary.

Taking the mechanics for granted, the energising current necessary for operation will be directly proportional to the gap between coil core and armature in the operated position, and from published figures it is found that where a gap of 4 mils (thousandths of an inch) demands 43 milliwatts to operate a given relay, a gap of 12 mils requires 64 milliwatts, while 100 milliwatts is required when the gap is 20 mils.

The Isthmus Armature

This is a method of reducing relay sensitivity and bringing the values of operating and releasing currents closer together, and is particularly useful

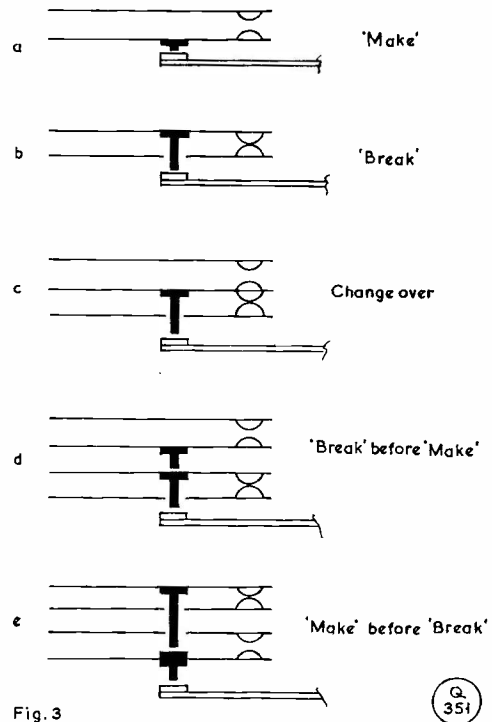


Fig. 3

Fig. 3. Showing some possible arrangements of contacts on a GPO relay. When bought as surplus, almost any contact configuration may be encountered.

when a relay is inserted into the anode circuit of a control valve—the relay being inactive under a given value of standing anode current, but operating on a slight increase of current due to an applied signal, or whatever.

The armature is cut into the form shown in Fig. 4 by removing the two dotted sections and thus increasing the reluctance of the magnetic circuit. Commercially available isthmus armatures are usually slotted, but the V-shape accomplishes the same purpose and is easier to do on the bench.

As will be realised, relay sensitivity may also be reduced by increasing the gap between coil core and armature by a suitable adjustment of the residual screw. However, a standing current through the relay may cause "chatter" and the real solution is an isthmus armature.

Aerial Change-Over Relays

This type of relay is not as common as it used to be on the surplus market, and is rarely of the 3000-type, because the insulation between springs and core is insufficient. Aerial relays are usually larger, with more robust springs, adequate insulation and large, flat contacts to handle the RF current involved.

The operational principles are, however, iden-

tical to other relays and the power expended in operating the relay again depends upon the pull necessary to close the armature, although aerial relays are usually fitted with adjustable spring-loaded contacts, the tension on which may be varied.

For amateur use it is possible to modify the spring-set of a 3000- or 6000-type relay to act as an aerial change-over by replacing the insulated spacers with low-loss washers fitting over the individual bolt sleeves, or making new spacers out of mica foil, in both cases the spacing being the same. The relay itself should be isolated from earth by mounting on an insulated panel, thus increasing the insulation between contacts and earth by that of the energising coil insulation.

But there will always be some slight coupling by capacity across the contacts, and this point must be borne in mind if a transistor Rx is being switched with a transmitter.

VHF Relay

The spring-set of this type of relay is shown in Fig. 5, and it will be seen that additional springs are fitted between the normal springs for the purpose of earthing the spring that is not in use. The inter-spring distances are, in some common types, made equal to the physical dimensions required for a 70-ohm transmission line. Other features are ceramic insulators to reduce VHF losses, while the actual contacts are as large as possible.

When this type of relay is to be used for VHF working the springs should not be unduly disturbed because of the possibility of upsetting the dimensions between the springs.

Mains Switching Considerations

Relays for this purpose, of the 3000- or 600-type, are designed to carry five amps AC; the contacts are large and circular, and the distance between them when opened is limited to the gap necessary to avoid flash-over, or short circuiting by dust. Insulation is much stronger than normally and the relay itself is sometimes fitted with a slugging device to reduce the speed of operation and release.

The ordinary relays may be safely utilised by amateurs for switching mains so long as the current through the contacts does not greatly exceed one amp. The contacts themselves should be as large as possible; "arcing," on closure or opening, can be prevented by connecting a 0.1 μ F condenser in series with a 100,000-ohm resistor across the contacts, to absorb the energy which would otherwise burn the contacts.

Any sharp points, or "pitting," observed after relays have been in operation for a while should be smoothed away with a fine file, although with the arrangement mentioned this should not occur.

One final point: Power supply (DC) for the 600- or 3000-type is most easily provided by using a low-voltage output AC transformer, 14 volts, with a small metal rectifier of the battery-charging

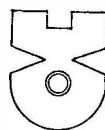


Fig. 4

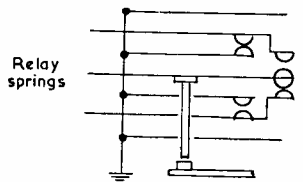


Fig. 5

Fig. 4. The isthmus armature—see text. Fig. 5. A contact configuration to give change-over operation when used with coaxial cable. This kind of motion can be built up by manipulating contacts suitably. It is simply a matter of careful examination of the available spring-set parts.

type. (No smoothing chokes or condensers are necessary.) If this combination will give about one amp. at 12 volts, it will be found that several relays, in parallel, can be operated satisfactorily. The relay supply can, in fact, be fitted and forgotten.

More Sophisticated Types

To complete the picture, it is worth mentioning that there are also various types of miniature relays available. Nowadays, these are rugged and reliable and have quite a high load capacity, in spite of their small size. For instance, the new STC Type 65 is a multi-pole change-over relay with a mechanical life of about 100 million operations; available in either 4-pole or 6-pole c/o versions, it can switch 30 watts (1 amp. or 100v. DC). Then there is STC's new high-sensitivity reed relay, the single-pole contact of which can switch 60 watts at 1 amp. with a coil signal as low as 20 milliwatts, and hold-on at 6 mW. The working voltage of this new device, the HRE 804/1G, can be anywhere between 29 and 100v. DC with a 20K coil.

AMERICAN LICENSING CLASSIFICATIONS

To get it all clear as to the U.S. amateur call sign system, the *Novice* prefix is WN (the other "KN" has been discontinued), and WN's are provisionally licensed for one year of CW-only in portions of the 2m.-15-40-80m. bands, with a power limitation of 75 watts. WN's can be fairly easily worked on 15-metre CW and are always glad of a QSO (and a QSL). For Alaska (only) the *Novice* prefix is WL7, and the same conditions apply. These licences are not renewable; if the holder wishes to stay on the air, he must take out a full licence.

All other U.S. amateur prefixes are in the series W, K, WA, WB and (before long) WC. These cover holders of the Technician, Conditional, General, Advanced and Extra class licences—of which the great majority are in the General category, *i.e.*, the W/K operator you normally encounter on the DX bands. Those in the *Technician* class are permitted only to operate on the 50 mc (6-metre) band and upwards—rather like our G8/3's, but with a lower frequency limit. The requirements for the Conditional, Advanced and Extra class licences are suggested by their designations, and need not concern us here, as all have the same operating privileges and the use of all amateur bands.

MORE MODIFICATIONS FOR THE S.640

TUNING INDICATOR,
BANDSPREAD CALIBRATION,
CRYSTAL MARKER, INTERNAL
SPEAKER

F. G. RAYER, A.I.E.R.E. (G3OGR)

The Eddystone S.640, though now regarded as one of the more venerable post-war types, is still worth its place in the average amateur or SWL station. This is proved, if proof were needed, by the way it has held its re-sale value over the years. There are many good S.640's, still in regular use, that have been through the hands of several owners since first leaving the factory in the late 1940's—Editor.

THE January, 1966, SHORT WAVE MAGAZINE contained information on securing improved results with the Eddystone S.640. While the modifications described here apply particularly to the S.640, some could be usefully adopted with other receivers.

The straightforward and efficient circuitry of the S.640, its good crystal filter and extremely smooth electrical bandspread have always seemed excellent points. But other features have been an irritation. It was to clear up these that the modifications described here were carried out, and it may be worth noting that none of them are irreversible!

Tuning Indicator

This was always wanted, for netting, aerial tuner adjustments, and even to give comparative signal strength reports, and there came a time when the separate meter, on its flex, seemed untidy and a nuisance. An internal EM84 indicator, behind the dial, was decided upon. It is inexpensive, simple to fit, and trouble-free. Fig. 1 is the circuit used (p. 106).

A small bracket holds the indicator base to the vertical part near the dial opening. Heater and HT returns are *via* this fixture. The 9-tag base is pre-wired, with colour-coded leads. Eyelet holes were found near the smoothing capacitor. A lead passes through to condenser positive (HT +) and the remaining heater connection goes to the adjacent accessory power outlet (tag 7). The AVC circuit was tapped by the tuning capacitor, where a lead rises for the RF and FC stage grid leaks.

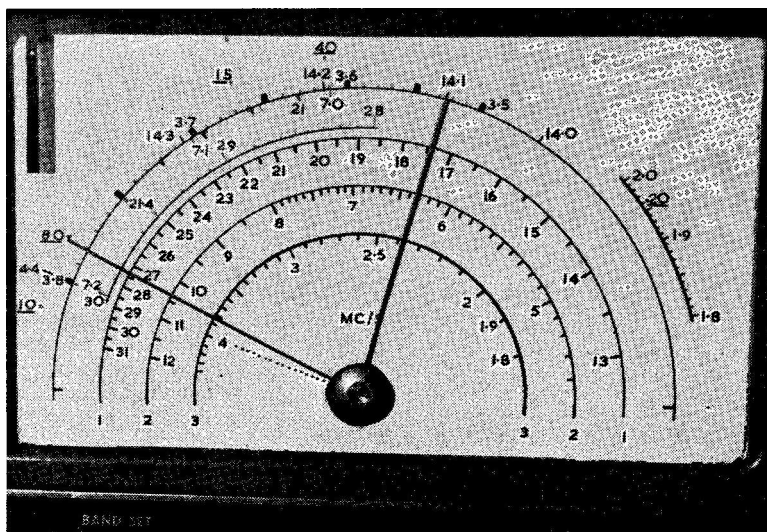
Fig. 2 is included for anyone preferring a meter. The small square miniature type can be accommodated in the same position as the EM84. Either indicator or meter requires a hole in the dial, but this was made in the new dial below.

Amateur Calibration

Original bandset scales cover 1.8-32 mc in three ranges, and the bandspread pointer works over a 0-100 degree scale. It was long felt that amateur-band calibration for the bandspread pointer would be most useful.

The scale, glass and pointers were removed by taking out the four screws behind the dial, and the small screw on the bandset spindle. The new scale was drawn with coloured inks on thin, smooth card. The main 1.8-4, 5-21, and 13-32 mc bands were traced exactly as before for general tuning, the old band markings (1.75-2 mc, etc.) being omitted. An

Appearance of the S.640 dial as modified by G3OGR for bandspread calibration over the amateur ranges. The scale was lettered with a stencil. At top left is the aperture for the EM84 tuning indicator (see Fig. 1).



unmarked semicircle replaced the 10-0-100 bandspread reference. Some 1/16in. paxolin was cut to back the scale, and a slot for the EM84 was made in both. The dial was then replaced, without covering glass.

Calibration of bands 10-80m. was on the unmarked semicircle, for one bandset position in each case. Adjust bandset tuning so that the related amateur band comes with the bandspread capacitor nearly fully open for the HF end, as this gives best spread. A small coloured dot was put at the end of the band-set pointer position. Each was marked 10, 15, 20, 40 or 80 (to distinguish from megacycle markings) and the band is then calibrated at 100 kc points, with a crystal marker, and using the same colour. The 50 and 10 kc points can be filled in after.

For 160 metres, full bandspreading is only about 1.8-1.9 mc and 1.9-2 mc, requiring two "bites." So this band alone was calibrated 1.8-2 mc for the bandset pointer, with bandspread returned to the zero position of the original 10-0-100 scale.

The photograph shows the markings provided. Other methods of arranging the scales could be devised. The card was removed, finished in ink, cemented to the paxolin, and replaced, with glass. As the paxolin is opaque and the EM84 glows for "on," the dial lamps behind the original scale were omitted.

Crystal Spotter

One aim of the new dial was accurate, direct readings in the amateur bands. So a crystal spotter was made, to avoid loss of accuracy from aligning the bandset pointer with its appropriate band dot.

After trying several circuits, that in Fig. 3 was adopted. If a suitable crystal is to hand, building cost is very small. The crystal used was 3550 kc and gave strong pips at 3.55, 7.1, 14.2, 21.3 and 28.4 mc. The switch is most conveniently a press-for-on type,

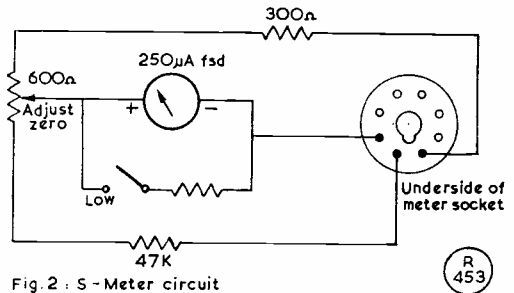


Fig. 2 : 5 - Meter circuit

R 453

placed near the accessory power outlet behind the cabinet.

The bandspread pointer is turned to the appropriate crystal frequency or its multiple. The bandset control is then finely adjusted, if necessary, for maximum indication on the EM84. Other frequencies in that band then arise at the marked scale positions. The spotter is built on a small piece of aluminium, which fits between the 6V6GT and 6X5GT valves.

Internal Speaker

While clearing up it was decided to get rid of the separate external speaker. The receiver front has two louver-covered openings, shaped internally as if for a miniature speaker. The four corner holes of a small 2/3-ohm speaker were found to match four round marks on the inside of the stout casting. These holes were at 2 1/4 in. spacing. The maximum depth available is just over 1 1/2 in. because of the BFO valve. The speaker actually used is about 3 in. square, with a "thickness" of 1 1/2 in., just under.

Four holes for self-tapping screws were drilled from inside, and these were used to hold the speaker. Leads run from it outside the mains transformer to the receiver terminals. Phones may be plugged into the panel jack as originally.

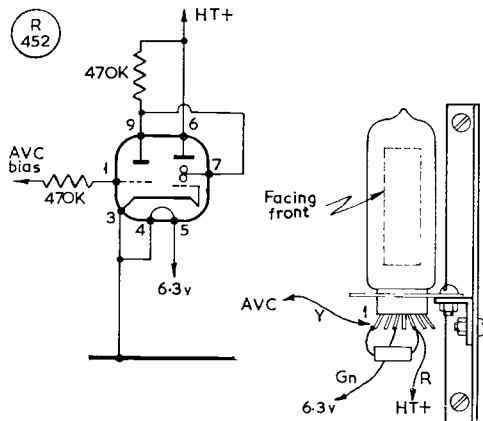


Fig. 1: Circuit and layout for EM84 tuning indicator

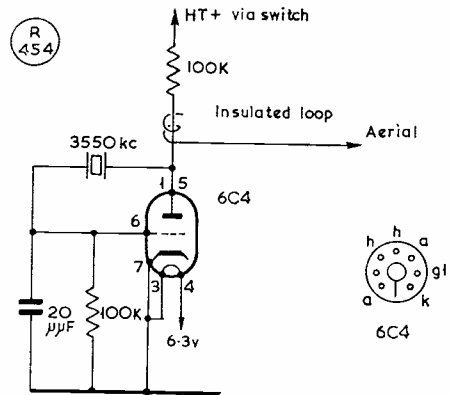


Fig. 3: Crystal Frequency Spotter

MOBILE RALLY CALENDAR

With something like 2,200 mobile licences now in force in the U.K.—representing about 16 per cent of the total of licences in issue—the prospects for the forthcoming Rally season are brighter than for any year previously. Unquestionably, in the eleven years since we reported the first-ever Mobile Rally to be held in this country, the interest in /M operating and its techniques has made enormous strides.

There is now a good selection of excellent commercial equipment available, and apart from that some fine examples of home-designed and constructed installations can be seen at any Rally. There are also examples of those that are not so hot—either in design, appearance, performance or safety—but in the process of time their owners get round to seeing the light.

The Calendar is now as set out here—and we would once again remind organisers that the full details for their event should be with us in time to catch the issue for the month in which their Rally takes place, *e.g.* by April 10 latest (to Editor, SHORT WAVE MAGAZINE, BUCKINGHAM) for meetings to be held in May. A closing date will be given for each month.

Similarly, we would be glad to have reports and (good) photographs as soon as possible after the event, so that it can be covered in the earliest possible issue.

April 23: Solo Mobile Expedition—for details *see* this page.

April 30: North Midlands Mobile Rally, at Drayton Manor Park, near Fazeley, Tamworth, Staffs, half-a-mile off the A.5 at Fazeley. There will be excellent catering facilities, ample parking space and plenty for the family to do and see—there is a Zoo, for one thing, and there will be an exhibition and raffle. This Rally, one of the biggest of the season, is organised jointly by the Midland and Stoke-on-Trent Amateur Radio Societies. For further information apply: R. Palmer, G5PP, 22 Sherlock Road, Coventry (74070), Warks.

April 30: Medway A.R.T.S. Rally at British Uralite Works, Higham, near Rochester, Kent, with talk-in stations G2FJA/A 160m., G6CH/A 4m. and G3VFC/A 2m. on the air from 11 a.m. An interesting and eventful day is being planned for everybody. Further details from: P. Carey, G3UXH, 29 Miskin Road, Hoo, Rochester, Kent.

May 6-7: International Rally Week-end in Belgium, starting in Brussels at ON4UB on the Saturday, and taking in a meeting and lunch on the Sunday, with a dinner at the Red Cross Hq., Brussels in the evening.

May 7: Thanet Radio Society Mobile Rally, at Cliff Top, Cliffsend, Ramsgate, Kent, with talk-in stations G3DOE 160m., G3JMB 70.56 mc and G3BAC 144.48 mc. Refreshments available on site, hotel and restaurant nearby, and magnificent sea views. For details, write: R. A. Bastow, G3BAC, 57 London Road, Ramsgate, Kent.

May 21: Northern Mobile Rally, organised by the Northern Amateur Radio Mobile Society, at Harewood Park, near Leeds, as in previous years.

Reception from 12 noon, with all the usual attractions, including raffles and a grand surplus equipment sale. Refreshments available on site. Information from: D. Binns, G3MGI, 80 Gipton Woods Road, Leeds 8, Yorkshire.

June 11: Mobile Rally at Mote House, Mote Park, Maidstone, Kent.

June 18: Hunstanton (bucket-and-spade) Rally, organised by the local group.

June 18: Amateur Radio Mobile Society annual Rally at R.A.F. (U.S.A.F.) Station, Alconbury, near Huntingdon, Huntingdonshire (*details later*). Advance information from F. J. Barns, G3AGP, 40 Park Ridings, London, N.8 (*for exhibition*), or N. A. S. Fitch, G3FPK, hon. secretary, A.R.M.S., 79 Murchison Road, Leyton, London, E.10 (*Tel. LEYtonstone 6700*).

June 25: West of England Mobile Rally, the 10th in the series, at Longleat House, near Warminster, Wilts.

July 9: South Shields Amateur Radio Club Mobile Rally, at South Shields.

July 16: Mobile Rally organised by the Worcester & District Amateur Radio Club, at Upton-on-Severn, Wors.

July 16: Reading Amateur Radio Club Mobile Picnic at Childe Beale Trust Pavilion, Lower Basildon, Pangbourne, Berks.

July 30: Saltash & District Amateur Radio Club annual Mobile Rally, at Calstock, Cornwall.

August 13: Tenth Annual Mobile Rally organised by the Derby & District Amateur Radio Society, at Rykneld Schools, Derby (*details later*).

September 3: Swindon & District Amateur Radio Club Mobile Rally at Lydiard Park, Swindon, Wilts.

September 15-17: Third International Amateur Radio Convention and Rally at Knokke, Belgium.

September 24: Harlow & District Radio Society annual Mobile Rally.

SOLO MOBILE EXPEDITION

Sunday, April 23, 2.30 - 5.30 p.m.

Arising from the suggestion by G3HBZ/M in the March issue, we propose that the idea of a Solo Mobile event be tried on Sunday, April 23, p.m. The ploy is that you go out with your /M rig and, finding a good spot on high ground, you then operate as a /P station ("fixed mobile"), attempting to work as many other /P mobiles as possible, at whatever range. If it is a fine afternoon, and a sufficient number of /M's are out, it could be a very interesting event. All who take part are invited to send in a brief report, listing contacts made and best DX worked, band(s) and gear used, and location (the Ordnance Survey one-inch sheet of the district is the most convenient reference). A photograph taken on site would also be interesting.

If we could have these reports in by Saturday, *May 6* (Editor, SHORT WAVE MAGAZINE, BUCKINGHAM) the event can be written up for the June issue—and, of course, if the idea catches on, other such Solo Mobile Expeditions can be laid on for odd Sunday afternoons through the summer months.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for May Issue: April 7)

(Please address all reports for this feature to "Club Secretary," SHORT WAVE MAGAZINE, Buckingham.)

OUR comment in this piece recently about a Club Newsletter which omitted to mention the meeting-place or the programme of events touched off a letter in reply from a member of the club concerned, who felt that his own satisfaction with the publication concerned justified him in criticising our comment. However, the point at issue went a little deeper than that—after all the newsletter that falls into the hands of a non-member is the one that really matters insofar as this is the copy that recruits the new chums. If a member of the group is visited, let us say, by a young SWL, often he will feel that it would be a good way to introduce him to the Club by lending him a current copy of the news-sheet. If he then has to write all the essential data in pencil across the front page . . . the object of the exercise as regards the effort going into production of the Newsletter is being defeated.

The other point that was being made was that if a Club appoints an editor and gives him a mandate to produce a publication which reflects the group faithfully, it has also corporately taken upon itself the responsibility for giving the editor the material to compile his magazine. If the compiler of a newsletter is forced into either writing the entire thing himself, or of lifting interesting bits from the national press to fill out, it is a shocking indictment of the attitude of the members. The fact that so many Club publications are obviously written by one hand and yet are so consistently good does not so much reflect on the devoted efforts of the editors concerned to make the result interesting each month—they are making the very best of a difficult task—but rather does it emphasise that the members who *could* help, particularly with operating gen. and even technical notes, are not giving enough support in a very difficult and time-consuming task. Even help with the chore of addressing the envelopes, or winding the handle of the duplicator, is not to be sneezed at if the publication is to come out on the due day.

Finally on this point, our duty for this space is to report on these matters as we find them. This may not please everybody all the time—but that is not the object of the exercise either!

First Place

Talking of devoted service, we must give first place to the **Grafton Radio Society** this month. Way back in 1946, Bill Jennings, G2AHB, called the inaugural meeting in Grafton School, Eburne Road, Holloway, and since then they have consistently been one of the strongest and most active groups in the area, while the vast

majority of the members of both Grafton and some other Clubs in North London owe their very licences to the devoted work of the R.A.E. classes organised at the instigation of the Grafton committee; and that committee has, over the years, been well blessed in always having the very best in its officers—of whom one of the most prominent and hard-working has been G2CJN. The lucky members of Grafton are shortly to celebrate their Club's coming-of-age, by way of a Dance/Bufferet at Beale's Restaurant, 368 Holloway Road, London, N.7, on April 15 from 7.30 till midnight. Most of the founder-members are expected to be there, including Bill Jennings himself, and although it is probably fair to expect most of the tickets to be taken up by the members, a few may be available at a price of 18s. 6d. single (or 35s. double) if rapid contact is made with Bert Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middlesex. It only needs us to add that Grafton are in session no less than four times each week, at Montem School, Hornsey Road, Thursdays being the only week-night they pass up; on Monday, Tuesday and Wednesday the kick-off is at 7, and on Fridays at 7.30 p.m.

A new name goes down in the records, as the former Flintshire Radio Society has changed to **Rhyl** and District Amateur Radio Club. After what they describe as a "dormant period," they are now alive and kicking once again, and on the second Tuesday of each month are to be found in the Rhyl Silver Band rooms, off Windsor Street, Rhyl, where any prospective new members or visitors are assured of a special welcome.

North Kent get together at the Congregational Church Hall in Bexleyheath on the second and fourth Thursdays of each month; on April 13 the subject to be considered is that of "Basic Colour Television."

Over at **Cheshunt**, they evidently have catholic tastes—invariably a sign of a lively lot—and in the last month or so have allowed Joe Hollington, G4GA, to tell them what makes a good Club, and also have been learning all about Model Control from G3TZZ, who not only talked but demonstrated both parts of the system and a complete model.

The **Sutton and Cheam Radio Society** have a regular session once a month, on the third Tuesday, and various other activities, which include this month the Annual Dinner and Ladies Festival, which takes place on April 8, at the Woodstock Hotel, Stonecot Hill, Sutton, the arrangements for which are in the hands of G3DCZ. A novel idea for one of the trophies has been adopted by Sutton and Cheam, insofar as the Scott Pot seems to be awarded on the basis of a cumulative total of points,

awarded in a predetermined manner for participation *in an active way* in all the things they do—two points for each attendance, so many points for an entry, a place or a win in the Construction Contest, so many points for obtaining a lecturer, and so on. Judging from the tone of the *Newsletter* the scheme seems to work out very well indeed.

A very fine article, in light-hearted vein, appears in the *Southgate* publication, the subject being that of "Collecting Information," written by G3PQL; as for the meeting this month, it is at Parkwood Girls' School, at the rear of Wood Green New Town Hall, to hear G3FD, who will be talking about VHF.

Verulam have a fine Hq. at the Cavalier Hall, Watford Road, St. Albans, which will no doubt be filled to capacity on April 19 (7.30 for 8) when the interest will centre around the lecture to be given by Ray Hills, G3HRH, on his all solid-state VHF receiver.

* * *

Meetings of the crowd over at **Crystal Palace** seem to be held on the third Saturday, but it is suggested that prospective members or visitors should contact G3FZL, at the address in the Panel, to confirm the details.

After your conductor had been losing sleep for a whole month at the thought of the *Tamar Pegasus*, put out by the **Saltash** chaps, disappearing for lack of support, back it came with a bang—a full-size issue again! On alternate Fridays, Saltash are to be found at the Burraton Toc-H Hall, time of kick-off being 7.30.

G3BA will be talking to the members of the **East Wores** Radio Group, on April 13, his topic, of course, being connected with VHF. The venue for this one will, as usual, be The Old People's Centre in Park Road, Redditch, and the time 7.30 p.m.

Sheffield get together every Thursday evening in the Church Hall, Amptill Road; on April 6 G3EUS will show and talk about Commercial and Government Surplus Test Equipment, while on 13th, the president will be discussing Advances in Medicine. A week later, on April 20, the NFD rig is to be given a dummy-run. The month is to be rounded off by a talk given by G3DPO on CW operating procedures.

Up at **Lothians**, NFD is also well in hand for the coming month, while the forward outlook promises talks on Electronic Organs and Radio Astronomy. For the details, contact the hon. secretary, at the address in the Panel.

"Problems" is the theme for the session on April 18 of the **Acton, Brentford, and Chiswick** crowd, at their usual venue, which is Chiswick Trades and Social Club, 66 High Street, Chiswick. They particularly invite visitors or prospective members with any problems to put in an appearance.

Chester meet weekly at the YMCA, except on April 4, when they hold their net at 8 p.m. on both Top Band and Two Metres; for the 11th a BICC film show is scheduled, with G3TTN giving a lecture on Workshop Practice the following week, the 18th. The 21st is given over to the Annual Dinner. The last date in April, the 25th, is set aside for a lecture, but no further details are to hand at the time of writing.

Those with TVI problems in the **Worthing** area will

probably be hot-footing it to the Rose Wilmot Centre there on April 11, to hear Mr. D. R. Topping of Ultra Radio's Gosport TV Unit giving a lecture on "Dual Standard Television." The time of the start of this is given as 8 p.m.

Clubs' Group Activity

The S.A.R.A. group of clubs seem to be going like the proverbial bomb; **Purley** are in session for a "natter night" on April 7, followed on the 21st by their boffin, G3GKF, who is to give a talk on "Mavars, Masers, Lasers and Things." Both these are at the Railwaymen's Hall, 58 Whytecliffe Road, Purley. Incidentally, the side entrance is the one to look for. This is a group that have enrolled from one to seven new members *at each meeting* for the past twenty months! From the same publication, we also learn that the **South London Mobile Club** are to be found at Clapham Manor Baths, at 7.30 p.m. on April 8 for a Mobile talk, and on the 22nd to get the business of the AGM out of the way. The third member of the S.A.R.A. group is **Wimbledon**, who meet at 124 Kingston Road, S.W.19, on April 14 to hear G3MFB talking about "Semiconductors."

Yet another group is mentioned in the pages of the **Purley Splatter**—they ought to charge for the publicity!—and this is the relatively new **Addiscombe** club, who are to be found in the delightfully named Coal 'Ole—always assuming you can find the Coal 'Ole! The secret is first of all to locate the Toc-H Hall, 158 Lower Addiscombe Road, Croydon; through the main entrance, into the door under the stairs, through the cellars, and then up into what was once the garage. And don't blame us if you get lost on the way out!

Always a delightful effort to read is the **RAIBC** magazine *Radial*, which manages to slide from the sublime to the other thing and on to the thought-



Our photograph shows Mr. C. L. Drury (licensed before the Kaiser's War as DXB), founder member of the Derby Wireless Club and now vice-president of the re-named Derby & District Amateur Radio Society, presenting the Founder Members' Trophy to one of their youngest members, G3URU, as winner of the constructional contest, which for years has been a feature of Derby's activities. The winning entry by G3URU was a home-built communications receiver.

provoking in every page. The article on the reasons for the Amateur Radio licence, explaining the need for the R.A.E. and the Morse Test (borrowed from G5MP's foreword to the *Examination Manual*) should be required reading for every SWL; the story of Astronaut Albert, as told by GO2HEL explains exactly what the viewers think of TVI, all neatly rounded off by a paragraph indicating that the Ghosts' Union has just appointed a new spooksmen—but all the banter does not alter the fact that the Bedfast Club is *always* in need of more and yet more help, of a practical kind; nor does it alter the fact that the first thing to do, whenever a handicapped SWL is located, is to put him or her in touch with RAIBC, through the hon. secretary (address in the Panel).

Royal Signals ARS have been centred on Catterick for quite a long time now; it will no doubt be quite a wrench for the Hq. station to be transferred to Blandford, Dorset, where it will be operating under the call G4RS which has been given up by one of their members. However the old call of G3CIO will, it is understood, still be in evidence from the shack at Catterick.

Eltham, Sidcup, and Orpington is the district served by the Cray Valley RS, whose Hq. is at Eltham Congregational Church Hall; however we have no up-to-date information on the programme for April. Contact the hon. secretary, as Panel.

Not a lot of notice for the next affair at Torbay, who are at their Hq., Bath Lane, rear of 94 Belgrave Road, Torquay, on April 1 for the March meeting (which has been put back because of Easter) to see a Film Show; the April meeting proper is given over to the AGM.

Nasty Accident

Sad news from Cornish is that their hon. secretary has had a serious prang with his motor-bike and is, at the time of writing, understood to be in the Treliske Hospital, Truro, and making slow progress. This being the case, it is suggested that any enquiries be addressed to the new address shown in the Panel. It is sincerely to be hoped that by the time the next issue of this piece is written the news will be better, and meantime our best wishes and sympathy go out to Martin's people and to the Club. A quick run-down on Cornish activities shows a main meeting at the S.W.E.B. Social Centre, Pool, Camborne, on each month's third Thursday; also the SSB and VHF groups respectively on the second and third Thursdays, at the Coach and Horses in Truro. Soon, it is hoped, the fourth Thursday will be taken up by the Falmouth sub-group.

Up in Leeds the April programme shows a lecturer from Fane Acoustics slated for the 12th, and on the 26th a talk on the subject of Crystal-controlled Converters. Starting time is 7.30 p.m. for these affairs and the venue as usual is the Swarthmore Centre.

Norfolk A.R.C. have their QTH at Old Lakenham Hall, Norwich, where they are to be found on Monday evenings at 7.45; details of the programme are not to hand but it is hoped they will be printed in the next issue of their magazine *Challenge*, which is due out shortly.

"All hands to the pumps" has been the cry at the Midland club, where everything went overboard in the effort to make their stand at the Birmingham Boat Show, earlier in the year, a success; hence we cannot tell you

what is doing on the third Tuesday in April, at the Midland Institute in Margaret Street, Birmingham.

Sorting Out Brighton

Seems we got into a knot about the Brighton lads, and transferred the "mention" from one group to another! There are four Colleges and a University in the Brighton area. To set the record straight, G3VXT is the call of Brighton College of Technology, and they are looking for skeds. On the other hand Brighton Technical College, who got the handout that should have gone to the others, are having their AGM in Room G13 of the Engineering Dept. on April 25 at 7.30 p.m. From then onwards it seems like a question of alternate Tuesdays, commencing from April 11.

Another Service group to report is the R.A.F. Amateur Radio Society, whose Hq. station, G8FC, is located at Locking, Weston-super-Mare, Somerset. A review of the gear there is rather mouth-watering, but the number of contacts being made with it seems to be rather low—maybe someone is passing up a good chance to operate one of the best-equipped stations in the country!

Burgess Hill is the home of the Mid-Sussex crowd, who are due to foregather on April 5 to hear G3VAK discuss the excellent G3HTA receiver; on the 19th, the evening is given over to Part 2 of a talk on a SSB Transmitter, by G3RMY. Both meetings will be at Lindfield Primary School, near Haywards Heath.

Mobile News is the organ of the A.R.M.S., and the most recent issue to come to hand has a lot of very interesting and well-presented material.

April in Echelford is the time for the Annual General Meeting—on the 27th, at the new meeting-place, St. Martin's Court, Woodthorpe Road, Ashford.

On the other hand, Coventry are using the spring to enjoy the odd trip out, first date being given as April 7. However, as one would expect this to be limited-number affair, it is suggested that contact be made with the hon. secretary first.

* * *

The title of the Radio Society of Harrow magazine is *QZZ*, and a fine effort it is this month, with an emphasis on getting going on Ten, plus a list of the commercials on Top Band, and much else besides. All the same, it is a pity that their very complete list of events and activities does not extend far enough forward to enable us to quote the current programme or the venue for the weekly sessions.

In a similar way, the Surrey Radio Contact Club *Newsletter* is out-of-phase with our deadlines—so we can only say that judging from past history the month's programme will be of interest; but here we *can* tell you the place to look for, namely the Blue Anchor, South Croydon; the date, which is April 18, and say that we believe it to be the AGM.

On April 3 at the Golden Lion G6GR will be talking about "Private Radio Systems," to the members of Wolverhampton A.R.S.; the 17th is given over to a debate at the Hq., Nechells Cottage, Stockwell Road, Tettenhall, Wolverhampton. One sincerely hopes that the committee will be stirring up a bit of that controversy which always stimulates a lively outfit.

Some of the members of the Newark Short Wave Club, where they have a very active junior section, at present building receivers as a Club project, and in session every Monday evening—all this under the supervision of member Brian Robinson. Eight of those in the picture hold call signs.



Baden-Powell House is the home of the Scout Amateur Radio Station, G3TGS, who foregather to hear a lecture by Arnold Mynett, G3HBW, on the third Thursday in April. In addition G3TGS is on the air most Tuesday and Saturday evenings, and would like to arrange skeds with other Scout stations.

Snags crop up in the best-run organisations, and the gremlin jumped out of his bottle to "get at" the Salop chaps last month. However, this month sees the Annual Home-Construction Competition which is to be judged by G3KMT, on April 13, while the other "formal session" is given over to a Junk Sale, presided over by G3KYU, who, it is claimed, would be an asset to Sotheby's—so watch your pockets! As for the other Thursdays, these are set aside for operating the Club station on 80 m. All this happens at the Old Post Office Hotel, Milk Street, in Shrewsbury.

Big Junk Sale

Another Junk Sale is laid on, for April 21, this time by the Skegness lads, at the Bull Hotel, Halton Road, Spilsby; an admission charge of 2s. 6d. will be made to cover the usual facilities offered. This affair is always a big show, organised by G2ABK, who has been running it for years.

Nice to see a new club being formed—the Farnborough and District Radio Society, with their Hq. located at the "Railway Enthusiasts Club" which is to be found at 310 Farnborough Road, Farnborough. The April date is the 11th, when a lecture on "Semi-conductors," will be given by Mr. D. Robertson, commencing at 7.30 sharp. Incidentally, it is proposed to run an R.A.E. class next autumn in the area, so anyone interested should contact G3NVM (*panel*) for details—and what better way to do this than by going along to the meeting?

New Club Proposed

Anyone in the Eastbourne area interested in forming a club? That is the question put by Geoffrey Chapman, who would like to hear of others with the same idea, by

letter, call or telephone, to him at Woodcot, Upper High Street, Heathfield, Sussex (*Heathfield 2454*) any evening after 6.30 or weekends. Let us hope he gets enough support and that we are able to report an Inaugural Meeting. (There used to be a very strong club in the district in pre-war days, presided over by the late G5BW.)

Now to **Mansfield, Notts**, where the local chaps have decided to change from monthly to fortnightly sessions, on the first Friday—when the main meeting for the month will be held—and the third, which will be the informal get-together. On April 7, G8HX will be bringing along a small commercial transistor tester, when the lads can set to work and weed the duds out of their junk-boxes.

A change of venue and a change of meeting-night for the "informals" of the Cray Valley crowd. It is to be on Thursday, April 20, at All Saints Church Hall, Bercta Road, New Eltham, S.E.9. However, before this, there is the matter of the AGM to dispose of, and this will be at the Congregational Church Hall, Court Road, Eltham, on April 6, starting at 8 p.m. We are told that they will also be at the same venue on May 4, but the programme has not yet been finalised.

Reigate are having a Jumble Sale at St. Phillip's Hall, Nutley Lane, Reigate, on 1st, and on April 12, the normal club meeting at the George and Dragon in Cromwell Road will hear Geoff Stone, G3FZL.

Up in the **Northern Heights** nothing is specifically mentioned for April, although on May 10 a ragchew, and on May 24 a lecture by G3TCS on the "Line-output Linear," are slated; however, a quick call to G3MDW (*panel*) will undoubtedly reveal that *something* is laid on for April!

In Westmorland, the membership of the **Kendal** Amateur Radio Society has recently jumped from 4 to 17, thanks to a well organised and publicised visitors' night, when G3VNX gave a lecture on the ins-and-outs of Amateur Radio. Future meetings are to be on the first and third Friday of each month in the Radio Room of

the Allen Technical College, Sandes Avenue, Kendal.

April for the **Silverthorn** chaps means a visit to the local telephone exchange to view the progress on the STD system, although the date is not mentioned. An "Open Weekend" is being planned for June 17-18.

Hull seem to be running a fine weekly programme, which implies that someone is going a good job of organising things. On April 7, G3NOP will lecture on "Marine Procedure," while a week later, on the 14th, the topic will be "An Approach to Radio Fault-finding," by G3RDM and G3PQY. As for the 21st, G3TEU will talk about the Mathematics of Radio, and the month is rounded off nicely by a workshop session on the Club projects—a 2m. converter and a receiver.

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A specialist interest within the framework of Amateur Radio is catered for by the **British Amateur Television Club**, who operate in various centres throughout the U.K., as well as running a regular annual convention in London. Issue No. 61 of the *Journal* carries an article and pictures on "Slow Scan TV" by Grant Dixon, together with notes on the convention and a couple of technical articles of a high standard. Anyone interested who is not already a member should allot some time to the effort of joining, *pronto!*

Mis-use of a Club station and its callsign is a thing that always has to be watched fairly closely, and it is nice to see the **Chippenham** newsletter rubbing the point home; they having recently acquired G3VRE. The big event of the month is on April 31, when the AGM comes round—which we are particularly asked to mention, so that no one has an excuse for not turning up!

Recently, a group was formed at the Community Centre, Blackfield, **Fawley**, Hants, and we are told that since then, a regular "gathering of the clan" takes place there each Monday evening, starting at 7 p.m., with various activities (including R.A.E. and Morse) being set up.

Nothing is mentioned by the **Port Talbot** Club as being laid on for April, but it is understood that for May the date is May 30, 7.30 p.m., at Trefelen Workmen's Institute, 8-10 Jersey Street, Port Talbot.

Bedford have not reported for quite some time, but have suffered a change of address which should be noted down in the records of all those who are members, prospective members, or visitors. They are, at the time of writing, going through the messy business of redecorating their very own room in the Dolphin public house, Broadway, Bedford; once this is out of the way the normal programme will be resumed.

Another group in the same boat are **Medway**—but in their case they have only a temporary home for the month of April, at the Conservative Club, Cuxton Road, Strood, Kent, where the dates to watch are 10th, when films to be shown are by courtesy of BP, and the 24th, which is given over to a talk and demonstration by a leading equipment manufacturer. Spade-work is being done for the future events, but, of course, all is "held" pending the clearance of the problem of finding a home.

Getting Known

Our recent preamble on the question of local publicity struck an answering chord from **Maidenhead**, who

showed us a copy of the excellent local publication *About Town*, claimed to be the best in the country—certainly it is streets ahead of anything the writer has ever seen, containing details of 39 different local organisations. The get-togethers are still at the Victory Hall, Cox Green, Maidenhead, where April 3 is set aside for a lecture on Computers by a member of the Ferranti organisation, followed on the 18th by a lecture by G6CL, who travels out from London to talk about Amateur Radio.

A combined Construction Contest and Equipment Exhibition at **Reading** is said to mean that the "last year's models" are to be shown—this year's models being in the nature of secret weapons! Not satisfied with this, the second affair of the month is devoted to the matter of Buying Surplus Equipment—or—"Bigger and More Sophisticated Junk Boxes!" Sounds good, in both cases, so reserve April 11 and 25 for these two events.

A new name appears in the address panel following the recent AGM at **Lichfield**. It has now been arranged that the entry of those under 18 can take place to the Hq. at the Swan Hotel, Lichfield, on the first Monday and third Tuesday (no, that is *not* a misprint!) at 8 p.m.

"Sparks, Plain or Coloured," is the intriguing title of the last event at **Chelmsford**, when Mr. Woods gave a lecture on radio from 1901, through to 1914, and showed a coherer. In the coming month, the outdoor season starts, and is celebrated with a D/F event in miniature on the 2nd, a full-blown one on April 23, and, to fill in the time, they will get together on the 4th at Marconi College, Arbour Lane, Chelmsford, to entertain the Basildon lads to a Quiz.

Second Monday and fourth Wednesday, at the Fox, Walmley, for **Sutton Coldfield**; the session on the 10th is given over to G3AYJ who is to talk on the subject of Interference. This is a topic which does not seem to appear very often, but it is indeed a matter of practical interest.

CLUB PUBLICATIONS

We acknowledge with thanks the receipt of the following Club Publications:

Cornish (*Cornish Link*, March); **Sutton & Cheam** (*News Letter*, January); **Southgate** (*Newsletter*, February); **Saltash** (*Tamar Pegasus*, February); **Verulam** (*News Sheet*, February); **Crystal Palace** (*Newsletter*, February); **Ghana Amateur Radio Society** (*9G1 News*, January); **Lothians** (*Newsletter*, February); **Purley** (*Splatter*, March); **RAIBC** (*Radial*, February); **Cray Valley** (*QUA*, March); **North Kent** (*Newletter*, February); **Midland** (*News Letter*, February); **RAFARS** (*Newsletter*, February); **Mid-Sussex** (*Mid-Sussex Matters*, March); **ARMS** (*Mobile News*, February); **South London** (*Newsletter*, February); **Echelford** (*Newsletter*, February); **Wimbledon** (*QRK-5*, February); **Coventry** (*News Letter*, February); **Harrow** (*QZZ*, February); **Surrey** (*Monthly News*, February); **Southampton** (*QUA*, March); **Reigate** (*Feed-back*, March); **BATC** (*CQ-TV*, No. 61); **Aeronautical Centre Amateur Radio Club, Oklahoma** (*Collector and Emitter*, February); **Chippenham** (*News Letter*, February) and **BARTG** (*Newsletter*, Winter 1966-'67, No. 36).

Crawley are having their Annual Junk Sale on April 26. Recent activities have included a home-construction event which was won by G3SGA, with his VHF receiver using transistors.

Edgware are proud to note that their new G3WCW callsign is held by a member aged only 15. As for the programme, this shows a discussion on NFD 1967 for April 10, followed a fortnight later by a return visit by G6RNK/T who is to give a lecture on UHF and Amateur TV.

The home of the **York A.R.S.**, G3HWW, is at 61 Micklegate, York. They have a visit to the local Telephone Exchange laid on for April 25, which should prove interesting. Last month, at Hq., the GPO film "Ship-to-Shore" was shown and enjoyed by the members.

Direction-finding events have been discontinued by

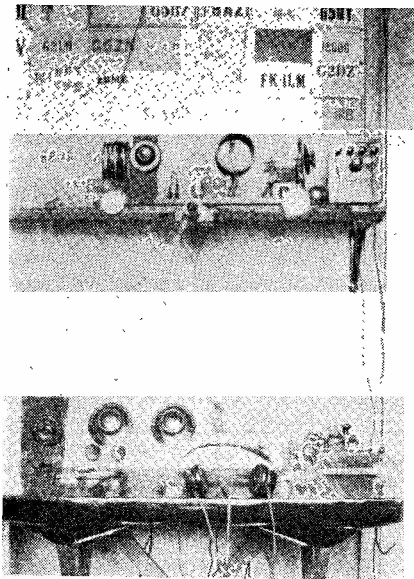
the **Derby** chaps, partly due to the lack of interest, and partly because of the insurance problem(?) but a hint is dropped that they could be revived if there is enough demand. Efforts are being made to find more suitable Hq. than the present place, at Derby and District College of Art.

Nice to hear from **Southport** that their attendances continue to grow; by the time this gets out to readers, one of their members—the first for almost five years—will be taking his Morse Test, and so it is to be hoped that then their licensed members will total six.

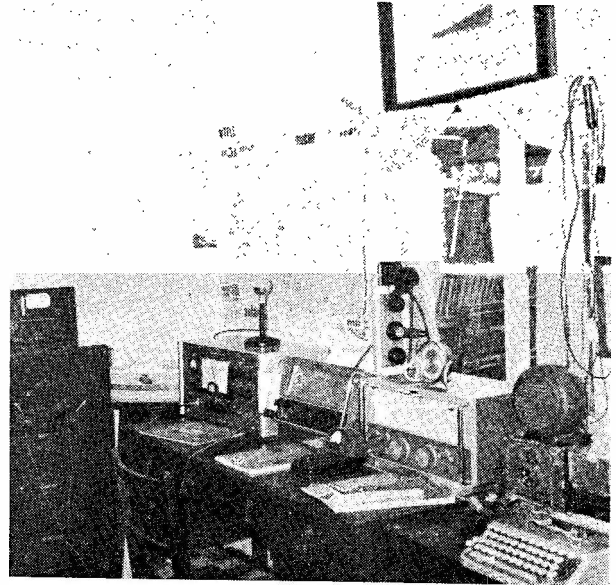
Which brings us to the bottom of another colossal pile. For the coming month the deadline is **Friday, April 7**, for all the news and programme data for the month of May. Address to: Club Secretary, **SHORT WAVE MAGAZINE**, BUCKINGHAM.

Names and Addresses of Club Secretaries reporting in this issue:

- ACTON, BRENTFORD & CHISWICK:** W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.
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BRIGHTON (Technical College): R. A. Bravery, G3SKI, 7 Cope Hill, Brighton, 5.
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WOLVERHAMPTON: J. P. H. Burden, 28 Coalway Road, Wolverhampton.
WORTHING: S. G. Williams, 79 South Street, Lancing (5377), Sussex.
YORK: J. A. Rainbow, 14 Temple Road, Bishopthorpe, York.



G2JA, 1937



G4JA, 1967

THE OTHER MAN'S STATION

G4JA

IT all began about 1925 with a Christmas-gift crystal set (cost 5s. 9d.). Almost immediately came the urge to improve it, then to build a superior model, and so through the sequence of a triode amplifier, a two-valver, thence into the little known "short wave" region. L and C were continually being reduced. Know-how came from the then very limited items dealing with HF, in weekly and monthly radio journals, long since defunct. Gear consisted of items from junk shops. A veritable "Aladdin's Cave" existed in those days, at a place off Victoria Street called Strutton Ground, just round the corner from SHORT WAVE MAGAZINE in its present office. (Those shops also are gone!—*Editor.*) Even a roll of DCC copper wire, essential for every circuit in those days, was a strain on a schoolboy's pocket.

With intensified interest, and the limited scope for telephony reception on the HF bands at that time, it was realised that the Morse code should be mastered. This was done rudimentarily at first with the aid of a torch, buzzer, school pal of similar interests and radio beacons transmitting slowly their repetitive call signs in Morse, just as they do today. Early in 1929, normal academic interests were cast aside and a course at a radio school commenced. Morse became a "must" and instead of a casual interest, was driven in, so that even while on

a short bus or tube journey, every advertisement in the compartment was converted into code until it no longer consciously comprised dots and dashes. A new world was opened up, and not least, the amateur bands.

Thoughts turned to a transmitter, entailing many more visits to Aladdin's Cave and an even bigger strain on the pocket, though that first transmitter probably cost little more than 10s.—quarter-inch copper tubing (wound on a jam jar) for the inductances, and a wire-wound grid resistor—the rest being butchered from old receivers, even the valve, usually a battery-driven AF amplifier!

A licence application was the logical sequence, and later, that wonderful piece of paper bearing the letters G2 (and my Father's initials!) JA. (Being a minor myself, it was in his name that the original licence was issued. Now aged 84, he is naturally amused at the idea of being one of the most aged living original licence holders *still* unable to read a letter of Morse.)

And so G2JA took to the air, and for some time after that only about three hours per night were left for sleep, much to the disgust of parents. But G2JA was being heard in far-off places, tighter and tighter went the AOG aerial tap to the "hot" end of the plate tank, the PM2 went red as it struggled to produce 2 watts RF

from battery HT. Operation was on the 40 and 20 metre bands, the transmitter a TPTG, the receiver an 0-V-1 with Reinartz reaction, the aerial a 66-foot wire with its end smack on the plate. And Oh!—that DX! W1, W2, W9, SU8WY and VQ4LMA and much else besides. Only utter exhaustion would terminate a session.

But towards the end of 1930 came the first sea-going appointment and an abrupt ending to the opening phases on the amateur bands. Activity continued spasmodically during periods of leave, but lessened. A couple of watts left much to be desired after running a 2 kW transmitter at sea. G2JA finally lapsed in 1936, and the “bug” was to lie dormant for over 20 years.

* * *

For all of two decades, thoughts of Amateur Radio were almost completely shelved, being for the most part preoccupied with sea-faring, pub-keeping, Hitler's War, and a pair of growing children, all demanding a seven-day week! However, late in 1957, the male harmonic, then attaining the age of “What makes it tick?” and being denied the household TV, as a basis for his experimentation began to investigate the contents of some long-stored boxes of archaic radio components, QSL cards, logs and periodicals—the outcome of which was, of all things, his building *unaided* a battery-driven 0-V-1 short-wave Rx, constructed entirely of 30-year-old parts! It was an almost perfect replica of the G2JA original of the 1920's, even down to a microphonic valve, hand capacity, and a refusal to oscillate over the lower portion of the tuning scale. Even the original phones were in use—and still are! So, tuning around almost to a point at which regeneration ceased completely, a tightly packed group of CW signals was discovered, all calling “CQ.” *Eureka!* It was the old 40-metre band again. The bug took a savage bite!

Upon enquiry, the GPO immediately offered renewal of the licence, even to the extent of granting the original call letters “JA,” to make it the present G4JA. An Eddystone 750 was acquired forthwith, and the ensuing year spent listening to new amateur procedures, and getting used to other changes, such as the new prefixes, the idea of the flexibility of the VFO, with stations all calling and answering on the same frequency, instead of having to search the band after a CQ. The 15-metre band was now permitted to British amateurs, as also was

the increase of input power to 150 watts from a mere 10! Techniques had changed and there was more than enough to be absorbed in respect of new equipment. At the same time the relative merits of various transmitters were weighed, and a decision made to try to strike the happy medium. After so long, Ohm's Law seemed to be all that there was unchanged from the “Good Old Days,” and even at that positive seemed to be changed to negative at will!

Early in 1959, a K.W. “Vanguard,” 160-metre version, was acquired, a “dog-leggy” end-fed wire draped from the chimney, and G4JA was launched on May 5, 1959. A change of QTH late in 1966 (and change of occupation) meant little change of gear apart from the erection of a slightly more presentable aerial, which has turned in S9 from ZS and S7 from VK, so there is little inclination to change to a more complex system.

As a hide-bound pounder of straight brass, operation is 90% CW, all bands, Top to Ten. A certain amount of AM phone is conceded, but confined to local nets on 160 metres, and short-haul work on 80 and 40m. DX is still the main fascination, but treated in a less frenzied and much more stoical manner. Unless temptation gets utterly out of hand in consequence of something outstandingly exotic being on offer, anything suggesting a “rat-race” means a change of frequency for G4JA. Outlet is found in such steady pursuits as DXCC, WAZ, WAS, WABC, etc., the scope of which are quite sufficient for a part-time hobby.

In the course of just on eight years, post-war, rather less than 2,000 QSO's have been made (including local phone natters). In this total are 168 countries, 36 Zones, all States (including D.C., KH6 and KL7) and 75 British counties, figures which on analysis reveal some surprising averages. But then “CQ” is seldom if ever sent, except on an apparently dead band! However, as it took nearly six years to rustle up North Dakota to complete WAS, there are still a good many hours—and years—of happy hunting, and being a member of the Rag Chewers Club, as well as FOC, TOPS, and A1-Ops, all claiming operating time, they will surely be necessary in order to reach the top of the respective ladders!

Nowadays, Alan Stenning, G4JA, can be found at Powis Cottage, Ruyton-XI-Towns, near Shrewsbury, Shropshire—and he wonders if something of what has been said here might arouse some nostalgic memories for a few old timers, who may even recognise their cards in the 1937 picture on the opposite page.

WHAT DOES “A” DO?

Quite recently, a subscriber wrote in saying: “Unless I get my copy on the Friday it is no use to me, as the Small Ad. bargains are all sold by the time I can get round to them. If you cannot guarantee delivery by Friday, I will have to cancel my subscription.”

Well, in the first place we cannot guarantee anything where the mails are concerned. Secondly, if this reader does cancel his subscription, he loses all chance of seeing any of the small advertising. And anyhow, strictly speaking he cannot cancel his subscription (in the

sense of having his money back) solely on these grounds, because the only contract implied by the acceptance by us of a direct subscription is that we undertake to post him a copy on the due date each month—that is the only guarantee we can give.

One guinea is offered for the best letter (that we can print!) in reply to this reader, and it must be of not more than about 200 words. Try your answer on: The Editor, SHORT WAVE MAGAZINE, BUCKINGHAM, and head it “What Does ‘A’ Do?”

NEW QTH'S

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

- DL5YB**, W. Booth (*G3RKD, ex-DL2BH / MP4BFR / MP4TBW*), Queen's Royal Irish Hussars, B.F.P.O.33.
- E15BH**, P. Quast (*ex-PK4PQ*), 1 Auburn Villas, Athlone, Co. Westmeath.
- G3VLM**, J. S. Jones, 39 Seaview Drive, Scarborough, Yorkshire.
- G3VOT**, G. C. Webster, 44 Furnival Street, Sheffield 1, Yorkshire.
- G3VQH**, Mrs. Barbara J. Clegg, 8 Hillside, Leak Hall Lane, Denby Dale, Huddersfield, Yorkshire.
- G3VQT**, R. W. Evans, 58 Westminster Drive, Bromborough, Wirral, Cheshire.
- GM3VRQ**, J. R. M. Wood, 4 Lloyd Street, Dennistoun, Glasgow, E.1.
- G3VTL**, J. Levett, 5 Newlyn Drive, Western Boulevard, Nottingham.
- G3VTQ**, F. J. E. Bolton, 8 St. Marychurch Road, Milber, Newton Abbot, Devon.
- GW3VVJ**, J. Butler, 81 Llancaoy Street, Bargoed, Glam.
- G3VVV**, Nailsworth and District Amateur Radio Society, c/o J. W. Dudbridge, Grey Gables, Amberley, Stroud, Glos.
- G3VWM**, J. Gillies, 15 Hart Road, Byfleet, Weybridge, Surrey.
- G3VWW**, D. Hill, 32 Blundell Road, St. Annes-on-Sea, Lancs.
- GW3VXP**, R. J. E. Williams, Petherton, Wordsworth Avenue, Penarth, Glam. (*Tel. Penarth 708310.*)
- G3VXT**, Radio and Electronics Club, Brighton College of Technology, Moulsecomb, Brighton 7, Sussex.
- G3VYS**, A. W. Nell, Beckbury Cottage, Beckbury, Shifnal, Salop. (*Tel. Ryton 205.*)
- G3VYU**, R. Chamberlain, 40 Elmfield Road, Peterborough, Northants.
- G3VYV**, D. A. Duff, 4 Skinburness Road, Sillioth, Cumberland. (*Tel. Sillioth 331.*)
- G3VZP**, R. T. Morrison, 12 Walls View Road, Wareham, Dorset.
- G3VZV**, G. P. Shirville, Tansor Court, Tansor, Peterborough, Northants. (*Tel. Cotterstock 224.*)
- G3VZY**, F. G. Norman, 1 Burton Close, Haverhill, Suffolk.
- G3WAF**, A. J. Fullbrook, 8 Sheepslands Avenue, Mellow, Guildford, Surrey.
- G3WAG**, D. J. Gillett, 2 Connaught Close, Enfield, Middlesex.
- G3WAO**, T. F. Biddlecombe, 39 Portland Avenue, Gravesend, Kent.
- G3WAP**, A. Philp, 156 Darnley Road, Gravesend, Kent.
- G3WAR**, R. North, Pyrmont, Dukes Wood, Crowthorne, Berks.
- G3WAU**, D. Smith, 6 Newcombe, Brimpsfield, Glos.
- G3WAW**, A. W. Ellis, West Cottage, Seaton, Ickham, Canterbury, Kent.
- G3WAX**, D. J. Paterson, 15 Kilnhouse Lane, St. Annes-on-Sea, Lancs.
- G3WBA**, I. Currell, 16 Coleridge Vale Road South, Clevedon, Somerset. (*Tel. Clevedon 3691.*)
- G3WBD**, D. Tudor-Cole, 78 Baldry Gardens, Streatham, London, S.W.16. (*Tel. POL 4348.*)
- G3WBN**, A. Thurlow, 19 Gravel Hill, Croydon, Surrey. (*Tel. ADD 2761.*)
- G3WBT**, A. G. Thorburn, 27 Banklands, Workington, Cumberland.
- GM3WBX**, M. V. Kathrens, 2 Castle Drive, Boddam, Peterhead, Aberdeenshire.
- G3WBY**, A. V. Hoare, 26 Kingsway, Euxton, Chorley, Lancs. (*Tel. Chorley 4098.*)
- G3WBZ**, D. H. Facer, 20 Kendal Green, Kendal, Westmorland. (*Tel. Kendal 513.*)
- G3WDZ**, F. Woolliscroft, 119 Seatonville Road, Whitley Bay, Northumberland.
- GW8AUU**, E. J. R. Forster, 68 York Place, Newport, Mon.
- G8AWN**, J. B. Procter, Crag House, Snowdon, Otley, Yorkshire.
- G8AWO**, R. Gray, 4 Longmore Gardens, Welwyn Garden City, Herts.
- G8AXN**, C. B. Amery, 67 Foxley Lane, Purley, Surrey. CR2 3EH. (*Tel. 01-660-6241.*)

CHANGE OF ADDRESS

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- G2KQ**, R. C. Cave (*ex-ZBIKQ / GM2KQ*), 6 Thompson Drive, Church Road, Leckhampton, Cheltenham, Glos.
- G3DDG**, G. Cowey, 1 Rosedale Road, Cheveley Park Estate, Belmont, Durham.
- G3LNW**, J. McGuire, c/o Sgts.' Mess, R.A.F. Station, Cosford, Wolverhampton, Staffs.
- G3NRW**, A. I. H. Wade, 49 Hampton Road, Great Baddow, Chelmsford, Essex.
- G3NXM**, W. G. Borland, 10 Ashfield Drive, Baildon, Shipley, Yorkshire. (*Tel. Shipley 51373.*)
- G3OME**, D. Holland, 34 Lisker Drive, Otley, Yorkshire.
- G3PFE**, G. W. Spriggs, 15 Lincoln Road, Sleaford, Lincs.
- G3PQC**, P. D. G. Turk, 102 Manor Road, Farnborough, Hants.
- G3SVF**, J. W. Mitchell (*ex-4S7WM / VSIGW / ZC5ML*), 154 Pine Square, R.A.F. Station, Wattisham, Ipswich, Suffolk.
- G3TER**, K. R. Evans, 5 Bertram House, Popple Way, Stevenage, Herts.
- G3TJP**, D. J. Pratt, 28 Monmouth Place, Clayton, Newcastle, Staffs.
- GM3ULP**, G. A. Hunter, The Bungalow, Broomside Braes, Camp Road, Motherwell, Lanarks. (*Tel. Motherwell 2331, ext. 26.*)
- G3VJV**, K. W. Fowler, 11 Bar Walk, Copsy Hall, Aldridge, Staffs.
- G3VHB**, C. Swallow, Shop 1, Moor Lane, Watcombe Park, Torquay, Devon.
- G6SAU/T**, A. W. Reynolds, 11 Peters Crescent, Marlton, Paignon, Devon.

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SMALL ADVERTISEMENTS

(" SITUATIONS " AND " TRADE ")

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TRADE

CAMERAS, Projectors, Enlargers, Binoculars, etc., etc., offered in Part Exchange for your Tx and Rx equipment.—York Photo Serv.ce, 51 Fossgate, York.

JIM FISH, G4MH, announces the opening of The Ham Radio Shop, at Town End, Golcar, Huddersfield, Yorkshire. Stocking Codar, K.W., Eagle and Eddystone equipment. Also Rx and Tx gear: AR88's, SX-100, R.107, HRO, BC-348, Vanguard, Top Band Tx's, etc., etc. Components and aerial equipment. **WANTED:** All types amateur-band apparatus. Open Monday to Saturday, and Sunday afternoons 2.0 to 5.0 p.m. Telephones: Huddersfield 52653 and 54650.

HUNDRED-PAGE Illustrated Catalogue No. 17 of Government and Manufacturers' electronic and mechanical surplus, including a completely new section covering the latest semiconductors and miniature components, with a credit voucher worth 2s. 6d. Send for your copy now, price 3s. post free. The reading alone is worth the money!—Arthur Sallis (Radio Control), Ltd., 93 North Road, Brighton, Sussex.

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QSL CARDS: Attractive two-colour designs, 25s. per 100. Send s.a.e. for samples. — G3OYI, Cotswold Banks, Honley, Huddersfield, Yorkshire.

AERIAL MAST SECTIONS: Set of ten 3ft. long by $\frac{1}{4}$ th inch diameter tubular steel rods, with screwed and socketed ends, for construction as aerial masts, price 50s. the set. **STAY or GUY WIRES:** 30ft. lengths of $\frac{1}{8}$ th inch galvanised steel at 7s. 6d. Ditto, in 60ft. lengths. 15s.—BRADFORDS, RAMSEY, HARWICH, ESSEX.

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MOECAN ELECTRONICS OFFER: Eddystone EC-10, £35; AR88D, £45; NCX-D, unused, £30; Honda generators, new, £73. Semi-auto Bug keys, 85s. Low-pass filters, 84s. Channelmaster "Tenn-a-Liner" rotators, £15 10s. and £19 10s. Enquiries and part exchanges welcomed. All items carriage paid. **WANTED:** Communications Receivers. — Moecan Electronics, 11 Westbury Road, Cheltenham (24217).

MAY Issue out on April 28. Single-copy orders, at 4s. post free, by Wednesday 26th, pse.—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COLLINS S-Line equipment, as new. Receiver 75-S3B, with three filters and extra crystals, £295. 32-S3 Transmitter, with AC/PSU, £325. 30-LI Linear, £200. 31-2B unit, with Phone Patch and SWR indicator, £65. VHF Transverter 62-S1, SSB, £290. Carry-case KWM-2, £25. All U.K. duty paid.—Box No. 4472, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: AR88 Receivers, D and LF Models, also spares for these types.—Box No. 4465, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-. payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 Extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

SELLING: Transmitter for 160m., as described "Short Wave Magazine" February '62, with modulator, PSU and 5763 PA, bargain at £10 plus carriage. R.107 Rx with some mods., and handbook, price £10, carr. extra. Valves: EF86, EF95, ECC83, 2s. 6d. each, five for 10s., post free. — Wheeler, G3RHF, 88 Village Way, Asnford, Middlesex.

SALE: Two English Electric klystrons, type K.302, with micrometer tuning and wave-guide flanges. Best offer secures.—Jeapes, G2XV, 165 Cambridge Road, Great Shelford, Cambridge.

WANTED: And £2 offered, for handbook for U.S. Navy 'Scope Type TS-34/AP. Also any miniature suitcase-type transmitter/receiver, and obsolete types of radio and TV valves.—M. Gee, 11 Whitehorse Lane, Stepney, London, E.1.

WANTED: For RTTY, two tuning forks, for 87.6 and 96.19 c/s, for 45 and 50 bauds, as used with TG7B printers.—Firmstone, 50 Bendee Road, Little Neston, Wirral, Cheshire.

EXCHANGE or SALE: Eddystone 840C, perfect, only 6 months old, nearest £40, or preferably take a BC-221 in part exchange (London).—Box No. 4453, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

REQUIRED: Automatic Morse transmitter and tape-punch; must be in good condition. Also want manual on TCS equipment.—Dumbleton, G3HCM, 11 Woodburn Close, Allesley Park, Coventry (73460), Warks.

OFFERING: Portable Battery/Mains radiogram, two-speed two-band, record/battery meter, remote control, with matching AC/PSU suitable other 9-volt equipments; recently valued at £50, needs slight attention, will accept £25. Need a good BC-221, AR88D cabinet, speaker and S-meter, exchanges, W.H.Y.? Send s.a.e. — Parry, GW3VVC, Bwlch Farm, Llanfechell, Anglesey, North Wales.

SALE: T.W.2 transmitter, in mint condition and unused, £23. Going transceiver. **WANTED:** Top Band Mobile Rx.—Casling, G3MWZ, 31 Fiskerton Road, Cherry Willingham, Lincoln.

SELLING, Mobile Rig, for 80 and 160m. Minimitter transmitter and its control box; Command receivers 1.5 to 3.0 mc, and 3.0 to 6.0 mc; 12-volt PSU; loading coils, whip mounting, lapel microphone, with circuits, etc., all for £25.—Rickett, G3PV, QTHR (Berkhamsted 3622).

FOR SALE: A National NCX-3, in perfect condition and unmarked, in maker's carton, with professionally-built power supply, price £120.—Morgan, G2HNO, 39 East Avenue, Bournemouth, Hants. (Tel. Westbourne 61578).

SALE: Danish "Sailor" Type 16T all-transistor marine receiver, covering navigation bands, LW/MW and 1595 to 4000 kc, for 9, 12 or 24v. DC working, in good operating condition, with instruction manual, £30 or near offer?—Woodhouse, G3DDX, 12 Sandows Lane, St. Ives, Cornwall.

WANTED: KW-2000 or similar modern transceiver. **SELLING:** K.W. Viceroy Mk. IIIA, with extra filter. £100. KW-160, £15 or offer?—Ackerley, G3RIR, QTHR. o/b/o Coventry Amateur Radio Society, or ring Tile Hill 66981.

FOR SALE: Hammarlund Super-Pro Rx, coverage 540 kc to 20 mc, in good condition, with handspread, price £18 10s. Power supply unit suitable 6HF5 Linear, giving 800v. at 1 amp., first-class job, very comprehensive, £17. Command Rx, 540 kc to 1.5 mc, new and unmodified, 50s. Denco DCR-19 Rx, coverage 200 kc to 35 mc, working but requires some attention, price £8 10s.—Hayhurst, G3NJE, QTHR.

WANTED: A Collins 30L-1 Linear Amplifier.—Foulkes, G3UFZ, 16 Blue Waters Drive, Paignton, Devon. (Churston 2630).

WANTED: Urgently, CR-100 receiver in good condition, preferably modified for SSB reception. Also illuminated World globe; audio filter unit; 2000-ohm muting relay; manual for R.107 receiver.—Giddings, 14 Warren Road, Blundellsands, Liverpool, 23.

SALE: Pye 20-watt two-metre fixed station, complete, £12. Transformers for mobile transistor PSU's, 60-watt rating, s.a.e. data. Two-metre RF section, 15-watt, 9in. by 4in., ideal for mobile or as 70 cm. driver, £8. Crystal-controlled converters for two metres, four metres and 70 centimetres, with PSU, £6 15s. Send s.a.e. for full details any item.—Sandall, G3LGG, 21 Dale View, Ilkeston, Derbyshire.

SALE: Marconi CR-100/8, latest model with noise limiter and 3-ohm speaker output, in perfect condition, price £20, prefer buyer collects. — Porter, G3SZQ, 346 Kings Road, Ashton-under-Lyne, Lancs. (Tel.: 061-330-2526).

FOR SALE: Receiver R.107, in excellent condition, with handbook, £10. R.208, also with manual but less case, £5. Tube 3BP1, with screen, base and data, perfect, £5.—Allberry, 17 Norris Gardens, Havant, Hants.

PROPERTY of The Late G3LBK: Heathkit DX-40U and VF-1U, almost new, complete with handbook, nearest £25. Delivery to 60 miles, or carriage forward, carefully packed. — George, G2CAV, 126 Weston Hill, Olney (273), Bucks.

OFFERING: Elmac AF-67 Tx, with PMR-7 Rx, coverage all bands 10 to 160m., 50-watt AM, superb Mobile equipment, with excellent performance and in original one-owner condition, complete with PSU's, cables and instruction books.—Soans, G2HJV, 39 Northumberland Road, Leamington Spa (25395), Warks.

SELLING: National HRO, with nine coil packs, PSU and speaker, price £17 or near offer. Also a Joystick aerial for Tx/Rx, price £5. Meters, speakers and other items.—Powers, 27 Boundary Crescent, Lower Gornal, Dudley, Worcs.

FOR SALE: Complete Hallicrafters SSB Station, comprising HT-37 Tx, 120 watts, 2/6146 PA, Vox and full break-in; receiver SX-111, double-superhet, with xtal calibrator, T-notch filter, auto-transformer and aerial c/o. Price £180 all in.—Hunt, 8 Small Court, Ealing (2587), London, W.5.

SALE: Viceroy SSB Exciter, 50w. p.e.p., self-contained, coverage 10 to 80m., with Vox, Mox, p-t-t, and two half-lattice filter, price £60, buyer to collect. Write. — Chowaniec, G3PTN, 3 Toronto Place, Leeds 7, Yorkshire.

SELLING: Pye "Reporter" Mobile Transceiver, suitable 4 metres, double conversion, with circuit diagram, £4. Marconi 4-metre base station, matching transmitter/receiver, double conversion, complete, £6. Z-match ATU, 50-watt, £4. New "Magnetic Devices" coax relay, 15s. Barker & Williamson audio phase-shift network, with three American matching transformers, suitable SSB phasing exciter, 50s. Pye 20-watt Tx, suitable 4 metres, 230v., with circuit, £8. All items in first-class condition; part carriage required.—Brickham, G3RQY, 15 Tiercel Avenue, Sprowston, Norwich, Norfolk, NOR.76.R.

SALE: TW-2 two-metre Tx, 18 watt, little used, £16. Capacitors, .001 mF, solder-in feed-through type, Lemco, vy FB, 20 for 5s., post free. — Purchase, G3LXP, 68 Hughenden Road, St. Albans, Herts.

WANTED: Parmeko table-top transformer, or similar, giving about 550-300-0-300-550v. at 250 mA, for SSB Tx. Good price paid.—Hart, G3SJK, 42 Gravel Hill, Croydon, Surrey.

FOR SALE: KW-77 receiver, in mint condition, and excellent performance, price £75.—Caldwell, G8US, QTHR.

SMALL ADVERTISEMENTS, READERS—continued

FOR SALE: In spotless condition, R.216 VHF receiver, covering 19 to 157 mc, with matching PSU, metered, price £33. Also Type 7B teleprinter, sprocket drive, with silence cover and base, RTTY table in steel, with PSU and converter all built in, £15. Command Rx for Top Band, with output stage and S-meter, price £3. Buyer collects. — Hickey, G3OBI, 41 The Croftway, Handsworth Wood, Birmingham, 20.

SELLING: KW-500 Linear Amplifier, in FB condition, price £50. **WANTED:** An HA-14 Linear.—Eckley, G3UFQ, QTHR.

FOR SALE: Complete Collins TCS-12, with Tx, Rx, ATU, remote control unit, speaker, microphone, 240v. AC/PSU and 12v. DC/PSU, with all connecting cables and manual, price £55, or near offer (carriage extra).—Lowson, 2 Muirbank, Brechin Road, Forfar, Angus, Scotland.

SELLING: In as-new condition, Lafayette HA-350, Top Band version, with 100 kc xtal calibrator, price £75 or near offer. Cannonball SSB Tx for Top Band, with control box, £30 or offer. Both these items very little used and unmarked. Reason for sale—going VHF only. Prefer buyer collects, or could deliver N. or E. London, or Midlands area.—Box No. 4454, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Eddystone EC-10, battery/mains, as new, price £37. Would consider EXCHANGE for Gelson G.209.—Bevan, 57 Weston Crescent, Aldridge (53616), Staffs.

EXCHANGE: A G.E.C. BRT-400D in immaculate condition, with manual, for National 183D, 5T, Hallicrafters SX-100, SX-140 or any other American receiver in comparable condition, or will sell. All enquiries answered. — Box No. 4455, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Circuit or manual, A.M. VHF receiver R.1949, 23 to 143 mc, No. 10A/18251, Serial 726. State price.—Vaughan, 16 Fortfield Grove, Tenure, Dublin 6, Eire.

WANTED: K.W. Gelson Converter, in working order. All letters answered.—Taylor, GM3UNJ, 23 Houghtgate Terrace, Leven, Fife, Scotland.

FOR SALE: Commercial 300-watt VHF-AM Transmitter, at present on 98 mc, but coverage 68 to 174 mc, with handbook, £55. Three Pye mobile receivers, with mains PSU, on 19in. panel, with S-meter, £4 each. Signal generator covering 95 to 150 mc, xtal or VFO, mains PSU, £4. Pye Type 257 base station for two metres, £6. Marconi power meter, 75-ohm 25w., £7 10s.—Storey, G3HTC, 49 Avon Road, Sunbury-on-Thames (4422), Middlesex.

SELLING: Heathkit RA-1 receiver, £27 10s. Heathkit RG-1 Rx, £27 10s. Heathkit HO-10E monitor 'scope, £27 10s. Minimitter Mercury-200 Tx, coverage 10 to 80m., 2/807 in PA, £25. Codar CR-66 Rx, with S-meter and PR-30X preselector, £20. Grundig TK1 tape recorder, £5.—Hayward, G3UCC, 29 Golden Hill, Wiveliscombe (361), Nr. Taunton, Somerset.

SALE: Canadian 19 Set variometer. 7s. 6d. Condensers: 4 mF 2000v., 2s.; 8 mF 1000v. 2s.; 200 mF 500v., two for 5s., six for 12s., 12 for 20s. Valves: 6V6 1s. 6d., three for 3s. 6d. Postage extra all items. P.O.'s only please. Offer closes July 31. — Box No. 4457, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

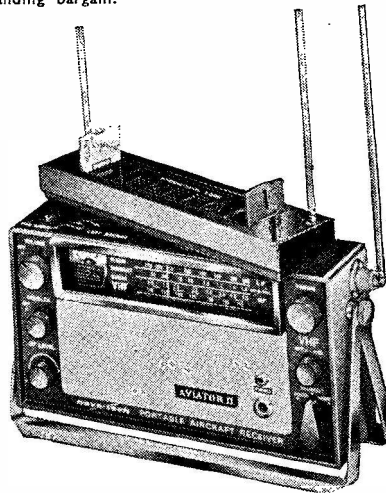
FOR SALE: The ideal amateur-band Rx, Hallicrafters SX-28, covering 550 kc to 43 mc, £25. Cossor oscilloscopes Type 1035, HF, £12, and Type 1049, LF and DC, £15. A.P.T. variable stabilised PSU Type 1120-D (up to 250 volts), and spare, £8.—Ring Lock, Maidenhead 29455.

SELLING: Eddystone 840C receiver, in excellent condition, new Sept. '65 and little used. Good value at £45, s.a.e., enquiries.—Bennett, 98 Queens Road, Whitley Bay (25879), Northumberland.

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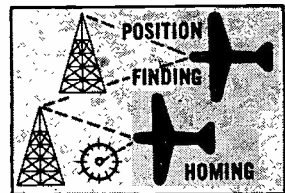
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CANADIAN MARCONI 52. 1.75 to 16 Mc/s., 13 valves, etc. with ZE12 power unit for 115/230 volts A.C., £13/10/-, carriage paid. Reprinted handbook with all circuits, 5/-.

R209. 11 valves. 1 to 20 Mc/s. 12 volts D.C. input, £15, carriage £1.

For callers only **MARCONI B28** (CR100) from £18/10/-, R107, £10.

OSCILLOSCOPES. Cossor 1049, £17/10/- or 1035, £20, carriage paid. Marconi valve voltmeter No. 2, £4, carriage paid.

TRANSISTORISED MAGNETIC BROADCAST RECEIVERS, vest pocket size. Battery operated. Fixed frequency. Epoxy resin block construction. $\frac{1}{2} \times 4\frac{1}{2}$ " Ferrite rod aerial. No other information. Used, good condition, 10/-, post 2/6.

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TEST SET, Type 261, 175 to 305 Mc/s. or type 266 95 to 180 Mc/s. Modulated. 6 volt vibrator supply. Complete with dipole aerial, either type £2 post paid. Wavemeter W1433. Signal generator, 154 to 260 Mc/s. 4 Mc/s. crystal check. C.W./M.C.W. 230 volts A.C. Easily altered for other frequencies, £3, carriage paid.

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All equipment offered is complete but not tested unless otherwise stated. Carriage charges quoted are for England and Wales only. Telephone Worthing 9097.

Terms: Cash with order. Early closing Wednesday.

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SMALL ADVERTISEMENTS, READERS—continued

SELLING: Marconi 52 Set Rx, with case, handbook and AC/DC PSU, £10. Marconi CR-300 Rx, coverage 85 kc to 25 mc, with manual and home-built PSU, £10. Also a Pye PCR-2 receiver, 900-2000m., 200-550m., and 6.0 to 22 mc, price £3. All in working order; carriage extra.—Parker, Burswell Cot, Low Burswell, Hexham, Northumberland.

SALE: In mint condition, with operating and alignment instructions, HE-80 Rx, coverage 540 kc to 30 mc plus two-metre band, with product detector, Q-multiplier, crystal calibrator, etc., price £35. Also a Minimitter, 120-watt Tx, AM/FM/CW, in FB condition, with circuitry, at £35—or £65 together. Prefer buyer inspects and collects. — Houlty, G3UHS, 9 Bayard Street, Gainsborough, Lincs.

FOR SALE: National HRO-MX, with external speaker and PSU, all matched. There are 8 coil-packs covering amateur and broadcast bands, also six spare valves. Set was reconditioned about two years ago; appearance excellent for an HRO of this vintage. Price £20 or nearest. Owner going Transceiver. Prefer buyer inspects and collects. (Chippenham, Wilts. area).—Box No. 4456, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EVERYTHING MUST GO, to Mini-ise Shack! Good R.R.1155B, AC/PSU, output stage and 5-in. speaker, all built in, sockets for converter power, phones, ext. speaker, with circuit and layout, fair on 20m. Sideband, £8 15s. Mobile PSU's: 220v. 100 mA, 400v. 180 mA, relay controlled, 12v. input, with circuit, overhauled and in good condition, £4 15s.; another similar, less covers, first-class running order, £4. Generators from these PSU's: 220v. 21s.; 400v. 25s. DC/PSU for 19 Set, vibrator and rotary gen., with connectors, spare vibrator, rectifier, changed to pos. earth, and circuit, 35s. Valves: 4CX250B/7580 (2 off), unused and unopened, with R.C.A. data sheet, offers? Unused 813, 70s.; unused 807's, 6s. TBY T/R unit only, with micro-photocopy of 60-page manual, £3 15s. Tx/Rx Type A.510, coverage 2.0 to 4.0 mc, very sensitive Rx, Tx 4-channel xtal, running 200 milliwatt phone, 500 mW CW, with operating instructions, hand-tel-mic, matching unit for whip aerial (can be used with dipole or wire aerial) mini-key and spare batteries, bargain at £10 (price elsewhere £15). Two field telephones, hand-generator ringing, as new, £3 6s. the pair. Very heavy duty variable time-delay relay, 0.45 secs., single pole, vertical mounting, 4in. by 4in. by 5in., clockwork delay control, 15s. Circuits and Notes for: T.1542A/R.1543A, 4s.; Wavemeter 1191, 1s. 6d.; R.1475 Rx, 2s. 6d.; BC-221 manual, 5s.; BC-640 manual, 12s. Circuits for: R.1543A, T.1542A, R.1392A/B, R.1392D/E, 1s. Crystal Oven for 12/24v. AC/DC, takes two HC6U type, 8s. Jason FM Tuner, needs aligning, with manual, 40s. Light Morse key, 2s. 6d. All items carriage paid, with reduction if collected. Open to offers throughout.—G3KXF, QTHR.

APRIL 26 for single-copy post orders for May issue, due out on April 28, 4s. post free. — Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Green & Davis Linear; perfect, new 7094, price £45 or near offer.—Box No. 4458, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Pair 811A and 866A valves. **SELLING:** Transistors, limited number brand new 2N3053 silicon n.p.n. types, as specified for many transistor transmitter circuits, 5 watts dissipation, price 10s. 6d. each, post paid.—Box No. 4459, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Modified National HRO receiver, with eight coil packs (BS for 10-20-40-80m.) PSU and speaker, price £15.—Arnold, G8AHE, 24 Albert Road, Stechford, Birmingham, 33.

WANTED: Three-element Beam for Twenty.—Neale, 32 Oxford Road, Farnborough, Hants.



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Containing 5 cores of non-corrosive flux, instantly cleaning heavily oxidised surfaces. No extra flux required. Ersin Multicore Savbit Alloy reduces wear of copper soldering iron bits.



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Contains 12 ft. coil of 18 s.w.g. Ersin Multicore Savbit Alloy.

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From Electrical or Hardware shops. If unobtainable write to:
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SMALL ADVERTISEMENTS, READERS—continued

OFFERING: Heathkit Mohican receiver, £25 or offer? Norman Price Oscilloscope, working but needs some attention, £10 or near offer? Mixed valves, 15s for 25. Cash orders.—Catton, 11 Grenville Road, Hayes, Middlesex.

EXCHANGE or SELL, for Boating Gear or an LM-14 Frequency Meter: Vintage Cossor Tx, T.1087, also T.1131, TR.1133; and a BC-453 Q5'er with triple-bank flexible drive and remote control panel.—Box No. 4460, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FIVE Crystals for 5 mc double half-lattice filter and carrier oscillator, suitable G3RNL SSB Transmitter (see November-December "Short Wave Magazine") price 13s. 6d. incl. post/packing.—Turner, 51 Hilton Road, Harpfields, Stoke-on-Trent, Staffs.

WANTED: Cowl-gill or similar antenna rotator motor.—Whitbread, 108 Gascoigne Road, New Addington, Surrey. (Tel.: Lodge Hill 4671).

FOR SALE: Home-built receiver, with Electroniques front end, works well, price £30.—Also home-built Phone/CW Tx, 10 to 80m., with PSU, price £12. — Howell, 14 Snowdon Road, Cannock, Staffs.

COMPLETE STATION for Sale, with contents of shack. Comprises PR-120V Tx, HA-63A receiver, relay switched, SWR meter, GDO, ATU and valves; also books, maps, etc., etc. Reason for sale, going Mobile. The lot for £75. View any time or will deliver anywhere and help with installation (journey at cost).—Elliott, G3SDM, 7 Hirst Drive, Rotherham, Yorkshire.

SALE: R.C.A. AR88D in excellent condition, professionally aligned Jan. '67, with handbook. Price £40, buyer collects (week-ends only).—Griffiths, 124 Baldwin Webb Avenue, Donnington, Salop.

PROPERTY of the late Basil Scudamore, G6BS, for Disposal: Three HRO receivers, complete with coil-packs, power units and speakers. Bendix BC-221M Frequency Meter. Gelson crystal microphone. Three Acos crystal microphones. Lionel bug key. FHL No. 7 Crystal Calibrator. Mosley V-4-6 aerial assembly, new. Radiomobile 12v. car radio, almost new. Also a 500-watt AM/CW Tx with 300w. modulator, ATU, etc.—plus a host of components, such as transformers, meters, rotator motors and indicators, valves, etc. Offers? Buyers to inspect and collect.—Jones, G5JO, The Grange, Bottisham, Cambs.

WANTED: VHF Receiver R.216, Hallicrafters S.36A, or similar. For SALE: CR-100 receiver, covering 60 kc to 30 mc, price £10.—Bowers, 10 Windmill Hill, Saltash, Cornwall.

SELLING: Type 7B Teleprinter, with FS-10 T.U., 80-0-80v. and 24v. DC PSU's, £19 the lot. Offers for single items considered. Inspection by appointment. Will deliver in south-east England.—Coombes, 110 Nower Road, Dorking, Surrey.

TRANSCIEVER on Order! Present station, in use d'v. available to best offer. Comprises Heathkit DX-100U with SB-10U, RA-1 Rx with extras, Eddy-stone 840C in superb condition, also RSGB "Bulletins" 1959 and "Short Wave Magazine" 1954 to date. Will deliver to 50 miles. Enquiries s.a.e., please.—Box No. 4461, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: All-band Transceiver, for 10 to 160m. Must be in first-class condition. All letters answered.—Higgins, G3PNR, 13 Falcon Road East, Norwich, Norfolk, NOR.88R., or ring Norwich 48551.

SELLING: R.107 receiver, immaculate condition and in good working order, coverage 1.2 to 17.8 mc. with S-meter. Price £13, buyer inspects and collects.—Goldman, 8 Nunroyd Road, Leeds, 17.

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HELP! Going Transceiver. Must sell Heathkit
 DX-100U with SB-10 Sideband Adaptor, coverage
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 (Tel.: Wideopen 3044).

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 straight swap for good commercial Sideband trans-
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EXCELLENT VHF QTH (22 Countries worked on
 two-metre band), three-bedroom detached house,
 with garage and garden (space for 500ft. wire),
 full central heating, 40 mins. Euston, price £7,300.—
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SALE: Meters, 0.1 mA moving-coil, 2 1/2 in. square,
 new surplus, 10s. 6d. each, post free.—Groom,
 G3ONE, 8 St. Margarets Road, Chelmsford, Essex.

FOR SALE: CW Transmitter, 15 watts output over
 10 to 80m., price £10. TCS-12 receiver, covering
 1.5 to 12 mc, with PSU and speaker, £8. Three-
 element beam, 10-15-20m., £8. 30ft. sectional mast,
 £5. Crystal calibrator (temperamental), 20s.—
 Ledger, G3UBL, 13 Blenheim Drive, Andover, Hants.

SALE: BC-312, with xtal filter, modified as "QST,"
 in fair condition, with new condensers, £16;
 suitable PSU, £3. LM-7 (Navy version BC-221), in
 new condition but without charts, £10. Class-D
 Wavemeter, integral PSU, £3. Absorption wave-
 meter, band switched, 40s. Quantity 3 + 5 mF
 600v. paper condensers, 4s. 6d. each. Could deliver
 Manchester-Liverpool-North Wales area, or carriage
 extra. **WANTED:** Xtal for BC-221; also new
 BC-342, BC-221.—Box No. 4462, Short Wave
 Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Heathkit DX-100U Tx, in perfect con-
 dition, recently completely revalved and realigned,
 £55. AR88D, with manual and S-meter, also in
 perfect condition, £30. Heathkit Mohican Rx, little
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 Cottage, Kirdford, West Sussex. (Ring Kirdford
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VHF AERIAL System Complete: On 16ft. rota-
 table mast, complete with cowl-gill motor, mag-
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 skeleton slot for 70 centimetres, with low-loss coax.
 Price £15.—Kiddle, 53 Cranleigh Road, Merton Park,
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WANTED: Withers T.W. Converter for 144 mc.
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FOR SALE: Labgear twin Tx for 160m., mobile or
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 mA. 250v. 80 mA. 6.3v. 2 amp., etc., and other com-
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WANTED: Instruction Manual, hand book or what-
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 Two new ex-W.D. 6-volt 30 A.H. accumulators, recently filled and charged, buyer to collect, 75s.
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Geloso 212-TR AM Tx, in mint condition, the best of its kind, above-average modulation quality complete with original carton and manual, £45.
Labgear 160m. Tx, as new and hardly used, with manual, £15 10s. (Not keen on Top Band here).
T.W. two-metre mobile Rx, 12-volt, hardly used, £20. (Find 2m. mobile disheartening).
Eddystone 888A, as new, with carton and manual, complete with matching speaker and S-meter, excellent on SSB after warm-up, £75.
 All above prices include carriage at buyers risk.
WANTED: Modern Communications Receiver, top quality and in mint condition; must have bandspread; would consider really good amateur-band model. All letters answered.

—Parker, G3DUV, 28 Kempson Avenue, Sutton Coldfield (7240), Warwickshire. (Day Tel: Birmingham East 2466).

OLD-TIMER YL Going QRP, not QRT, has For Sale: Elizabethan Tx, 110 watts, coverage 3-5 to 28 mc, with modulator and three PSU's, in five black-crackle G4B1 cabinets. PSU's switched for manual and wired for relay operation. Including LP filter, band-switched ATU, and outdoor Joystick. The lot for £30. Could deliver up to 35 miles. Please phone, or s.a.e. with enquiries.—Constance Hall, G8LY, 10 Clanwilliam Road, Lee-on-the-Solent (79547), Hants.

FOR SALE: KW-160 Tx, AM/CW on Top Band, self-contained, price £12. National HRO Rx, with set of nine coil packs and PSU, £15. Heathkit RA-1 receiver, with CL-1 crystal calibrator, £25. Prefer buyer inspects and collects.—Webster, G3LLE, QTHR.

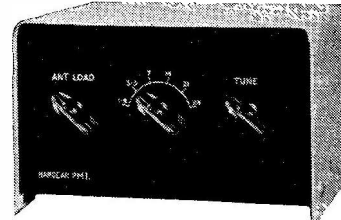
SHACK CLEARANCE: Heathkit DX-40U, £18 10s., and VF-1U, £7 10s., both with manuals. R.1475 Rx (covers 160m.), £7 10s.; speaker and PSU for same, £3. Self-contained 160m. Tx, plate-screen mod., with PSU, eight valves in TU cabinet, £6 10s. Command receiver for 160m., £6 10s. Command Tx for 80m., runs 120 watts, with 80-ohm output, £5 10s. Relays: Six P.O. type and six U.S. miniature, 25s. Vibrator PSU, 12v. input to 250v. 100 mA DC output (heavy), 20s. Collins 30-watt multi-tap mod. xformer, 15s. AVO Multiminor, OK on DC but requires attention AC ranges (shunt o/c), £3 10s. Large stock components, such as meters, Tx variable condensers, TU-type ceramic coil formers, chokes, valves, switches, knobs, relays, etc., etc.; send 5s. postal order—if I've got it, you can have it! Also many "Bernard" radio manuals, 2s. 6d. each; all issues "Short Wave Magazine" 1963 to date; "Practical Wireless," 1955 to date; "Radio Constructor," 1963 to date; "R.C.M. & E," No. 1 to date—all these at cover price plus postage. Please include carriage or post all other items.—Pearson, G3KOC, 10 Woodgarth Villas, New Holland, Barrow-on-Humber, Lincs.

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SALE: R.C.A. AR88D, in case, good condition and appearance, with manual and spare valves. Price £24. (Co. Durham).—Box No. 4464, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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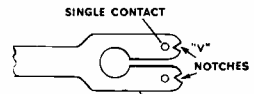
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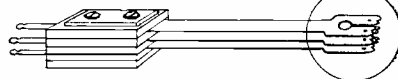
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Trio JR-60-U, 540 kc/s.-30 mc/s. and 142-148 mc/s., bandsread and xtal cal. (NEW) ...	£61/19 (25/-)
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Star, SR-350, Bandsread receiver ...	£50 (25/-)
Eddystone 840C, 550 kc/s.-30 mc/s. ...	£48 (25/-)
Lafayette HE-80, 540 kc/s.-30 mc/s. and 142-148 mc/s. ...	£46 (25/-)
GELESO, G-207-DR, bandsread receiver ...	£45 (30/-)
R.C.A. AR88LF, 75-550 kc/s. and 1·5-30 mc/s. ...	£42 (40/-)
Eddystone EC-10, 540 kc/s.-30 mc/s. transistorised ...	£40 (20/-)
Heathkit R-1, bandsread receiver ...	£35 (20/-)
Heathkit GC-1J Mk. II, 600 kc/s.-30 mc/s. with bandsread ...	£35 (20/-)
Trio 9R-59, 540 kc/s.-30 mc/s., with bandsread (NEW) ...	£34/13 (15/-)
Marconi CR100, 60-420 kc/s. and 500 kc/s.-30 mc/s., with noise limiter ...	£30 (30/-)
Eddystone S.640, 1·8-30 mc/s., with bandsread ...	£25 (25/-)
R.206 Receiver with power unit, 550 kc/s.-30 mc/s. ...	£23 (40/-)
Eagle RX-60-N, 550 kc/s.-30 mc/s. with bandsread ...	£22 (20/-)
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SMALL ADVERTISEMENTS, READERS—continued

OFFERING: Lafayette HA-350, with speaker; also HA-55; both these new in carton. Signal Generator TS-419U, coverage 75 kc to 40 mc. AR88 gearbox, manual and tools.—Wright, 249 Sandy Lane, Hindley, Wigan (55948), Lancs.

SALE: B.44, £4. B2 Tx/Rx, 12v-230v. PSU, complete station, £12. Hallcrafters HT-40 Tx unit, 75 watts, price £30. Micro-ammeters, 0-500, 10s. WANTED: Command Rx; Panda PR-120v. and Explorer Tx's; W.H.U.?—Phillips, G3KYR, 3 Queens Road, Westbury, Wilts.

FOR SALE: Woden items—UM3 mod. xformer, £3 10s.; DT3, 20s.; DT1, 15s. Labgear wideband multiplier, 65s. TW2 Converter, IF 28 to 30 mc, £3 10s. Large mains transformer, 2000-1500-0-1500-2000v. at 500 mA, £5, carriage 20s.—Button, G3BG, 31 Gold Street, Hanslope, Bucks.

WANTED: Hammarlund HQ-170A, or Drake 2B. **SALE:** Codar A.T.5 Tx with AC/DC PSU's, as new, £25. Codar T.28 Rx, £11, with speaker and phone sockets. 3FIF whip for Top Band, £4. Package deal, £38 delivered.—G3SEL, QTHR.

SELLING: AR88, works well, with manual and spare valves, less base-plate, £27. Lab type stabilised PSU, 350v. 100 mA and heaters, with meters for current and voltage, 60s. R.A.F. PSU, 600v. 150 mA, 35s. Modulator, pair KT66, 35 watt, 35s. Crystal controlled 25w. Tx 6L6 PA, including mod. and PSU, in case, 40s. "Newmarket" Type PC5 3-watt amplifier, 30s. Type DB-20 Preselector, with spare valves, works well, £6. Relays: Siemens 50-ohm high-speed, 3s.; plug-in assorted, 2s. 6d. each. Eight ft. whip for 160m., 7s. 6d. TR-7 transistor Rx, slight fault, covers 160m., 60s. Solon and Lightsold 25w. irons, 7s. 6d. each. Valves: QQV03-10, 4s.; 811A, 17s. 6d.; 5B255M, 5s.; 12AT7, 1s. 6d. Large metal cabinet, AR88 size, 17s. 6d. Many odds and ends, s.a.e. lists.—Papworth, 25 Station Road, Over, Cambs. (Tel. Wavesey 339).

SEEKING Accommodation: KW-2000 and its owner, somewhere inside the London area.—Lindsay, GM3KTZ, c/o 40 Gaultley Avenue, Clapham, London, S.W.4.

BARGAIN: Eddystone EA-12, at £130.—Macdonald, BG3SZN, Fairholme North, Northdown Road, Bideford, Devon.

SELLING: Pair 38 Set transceivers, coverage 7·3 to 9·0 mc, with PSU and acid batteries, £8, in excellent condition, working and complete with microphones, headphones and connectors. Also 31 Set, in excellent condition, converted to a mains Rx and with variable tuning to cover BBC-1 sound; the Tx section is intact; in an aluminium cabinet, with headphones and circuitry, price £4.—Spottiswoode, 13 Wingate Road, London, W.6 (Ring Shepherds Bush 8920, evenings).

WANTED: A.R.M.S. "Newsletter," April 1960; "Mobile News," October '62, January and August '63, January and March to May '64; BSWL "Review," January 1937, September '39 to May '41, March '42.—Herridge, G3IDG, 96 George Street, Basingstoke, Hampshire.

ON OFFER: Hallcrafters S.27/S.36 Rx, coverage 27 to 143 mc, working, with instruction book and transformer, price £30 or offer? Hallcrafters S.95, tuning 152 to 174 mc, working, but needs alignment, with leaflet, £15 or offer? Nombrex signal generator, at £8, or offer? (Bradford area).—Box No. 4466. Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Heathkit Q-Multiplier QPM-1 and SWR Bridge HM-11U, both new, price £6 each. Mosley V3Jr. aerial, £3. Panda LP filter, 20s. Grundig tape recorder 700L, £14. Tx/Rx Type ZC1 Mk. II, no PSU, £5.—G3LGL, QTHR.

WANTED: Small quantity Junction Box J1 24V ZA.46288 (Interconnecting Box 5820-99-949-1011) and associated control boxes.—Ridd, 8 Beaufort Road, St. Leonards-on-Sea, Sussex.

SMALL ADVERTISEMENTS, READERS—continued

SELLING: CSE Tx and microphone, TW Topmobile, £40. Type 10 Crystal Calibrator, 12s. 6d. Top Band converter, 7s. 6d. PCR-3 vibrator, 7s. 6d. Transformer 350v. 180 mA, 10s.—Reeves, G3OAB, 59 Lech-lade Road, Great Barr, Birmingham, 22A.

SALE: Minimitter Top 2-7 24-watt Tx, £18 or near offer; view, or QSO any time by sked.—Crane, G3GOX, QTHR. (Tel. HOUUnslow 1873).

FOR SALE: K.W. Viceroy Mk. IV, as new, includes extra filter, £120 or offer. Also Marconi CR-150/3, with extra balanced demodulator and 50/500 kc calibrator, price £40. Owner, now emigrating, has had both since new.—Baker, Broomhall, Bicknacre, Chelmsford, Essex. (Tel. Woodham Ferrers 267).

WANTED: KW-2000, with DC PSU. Selling Crystals! Large selection, 27 kc to 142.56 mc; example 4300 and 6815 kc at 3s. 6d. each, dozen for 30s.; send s.a.e. for full list. Pair 28.5 mc Transceivers, £10.—G3LYK, QTHR.

FOR SALE: Receivers R.1475, coverage 2.0 to 20 mc, complete with PSU, £12 10s., carriage 12s. 6d. Without power pack and in working order, £8 10s., carriage 10s. Money order only, please.—Goble, 115 Dyas Road, Great Barr, Birmingham 22A.

OFFERING: Compact Communication Receiver. 12v. transistor PSU 300v. 150 mA, plug-in coils, S-meter, new, £24.—Stevenson, 48 Woodgrange Drive, Southend-on-Sea (62237), Essex.

SALE: Transistorised SSB Exciter, all-same G3JGJ, 90 per cent built, working from audio to last mixer, with Brush-Clevite mechanical filter, all new xtals and components, internal PSU for running 6146 PA to 90 watts p.e.p., coverage 1.8 to 30 mc, price £39 10s. Valve IF strip for 9.5 m.c. with NL, AVC and audio, 40s. Modulator, 7-watt, pair EF91, 12AX7 zero bias Class-B, for 10K load, 20s. Carriage extra, or can deliver to reasonable distance.—Youngs, G3JIE, Homefield, Westfield Road, Dereham, Norfolk.

SELLING: G. & D. two-metre converter, £6. Astro compass, £5. B.44 Mk. II, £5. Top Band Tx, £8. Complete mobile station, 12-volt, for Top Band, £12. Carriage extra.—Haines, G3OSH, QTHR.

FOR QUICK SALE: Modernised HRO, miniaturised, with Jap 2-1 kc mechanical filter, 7360 product detector, 80m. bandspread coil pack, xtal controlled converter for 10-15-20m., complete with stabilised PSU, £25. Labgear LG.300 Tx, 813 PA, with modulator and PSU, bargain at £35. Heathkit Comanche and Cheyenne 90-watt AM mobile rig, covering 10 to 80m., with transistor PSU, £50, or near offer. Top Band rig, with modulator and PSU, £7 10s. 3/813, with bases, 30s. each.—Martin, G3UDR, Round Down, Gomshall, Guildford, Surrey (Tel.: Shere 2443).

SALE: R.C.A. AR88LF, works FB, price £30. Also Pye Ranger QV03-20A PA, with RF-27 converter and 4-ele beam, complete and working for 4 metres, £8 10s. the lot.—Foster, G3VOF, 48 Prospect Road, Hornchurch, Essex. (Tel.: Ingrebourne 40881).

WANTED: At a reasonable price, a good quality Communications Receiver in mint condition, such as AR88D or similar. Price and details.—Bennett, 98 Queens Road, Whitley Bay (25879), Northumberland. (Ring after 6.0 p.m.).

WANTED: Labgear Top Bander Transmitter; full particulars and price, pse.—Garner, G2BGG, Barbon, Aigburth Hall Road, Liverpool, 19.

AMATEUR Television Equipment and Components for Sale: Includes transistorised 625-line sync. pulse generator. Further details on request.—G3MEH, QTHR.

PERIODICALS Sale: "Short Wave Magazine," 40 copies 1960-63, 30s.; thirty other copies, various dates, 15s. "Practical Wireless," 13 copies 1961-62, 8s. Postage extra. Details s.a.e. (Somerset area).—Box No. 4467, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

S.S.B PRODUCTS

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"SPHINX" Transmitter. Latest model with refinements The Tx that has what other makes leave out—an audio freq. response that gives readability and talk-power! Each of our filters (Scarab) are aligned most carefully. Every Tx has a most careful inspection and is "air" tested. 75-80 watts P.E.P. 160m., 80m. (40m.), 20m. (with O/P socket to feed 15/10m. adaptor). Built-in power unit, most modern in appearance £78 std., £84 de-luxe. Terms and part exchanges.

"HA350" Receiver. 160-10m. xtal controlled front end. Covers bands in 500-600 Kc/s. steps. Very stable and easily the best buy for the amateur looking for a new receiver which is value for money! Has mech. filter, etc., etc. Write for details, £64. (6-Band latest version). Terms and part exchanges.

"SCARAB" Filter Kit (xtal) with carr. xtal, £6/19/6 (2/-).

"SCARAB" Xtal Filter. "Aligned," inc. carr., £8/7/6 (2/-).

"DELTA" Co-ax Relay Unit. Controls Tx and Rx. Robust and excellent value at £7/5/- (6/-).

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SMALL ADVERTISEMENTS, READERS—continued

SALE: Z-Match aerial coupler unit, with built-in SWR bridge, coax aerial relay, 80-ohm dummy load, in screened case, price £4 10s., carriage 5s.—Edwards, G3KGN, 126 Danescroft Drive, Leigh-on-Sea, Essex.

FOR SALE: Complete Codar station, consisting of CR-66 Rx with PR-30, RQ-10 and PSU; A.T.5 with PSU, and control unit; ATU, and Class-D Wave-meter, price £38 10s. Buyer inspec's and collects, and also gets an 18 Set, R.105 receiver and other oddments.—Squance, G3HTB, 57 The Drive, Leeds 17, Yorkshire.

WANTED: HRO coil packs for 10-15-40-160m., preferably bandspread.—McCallum, GM3UCI, 1 Burnbrae Street, Fairley, Clydebank, Dunbartonshire, Scotland.

SALE: A ZC1, at £5.—Ring Lee, G3GYK, Ferndown (Dorset) 3603.

AMENDMENT! The 25-watt four-metre Transmitter described on p.61, March issue, should have been priced at £20, and not as given. Any reasonable offer considered.—G3SEV, QTHR.

SALE: Two-metre 40-watt Tx, including modulator, with four PSU's and aerial relay, in two units, all contained on metal shelving, £12. H.D. Variac, £5. Solartron stabilised PSSU, 0-500v. 300 mA, 0-117v. bias, and LT's, £10.—Rawlings, G5RS, 20 Hedgeway, Guildford, Surrey.

ODD EXCHANGE! Kelvin Hughes Mk. IX bubble sextant, recently overhauled and recalibrated, with almanac, parallel rules, dividers, protractor, etc., all in FB condition, FOR Good Frequency Meter or AVO-8.—Tuite, 26 Hawford Avenue, Comberton, Kidderminster, Worcs.

FOR SALE: Hallicrafters HT-41 Linear, brand new 7094's, price £80.—Allaway, G3FKM, 10 Knightlow Road, Birmingham, 17.

OFFERING: Redifon C.F.S. Adaptor ZA.39384, power unit, handbook and cables, in mint condition. Simplex 2B printers, with cover, fork and tape. Both units for 240v. AC Offers?—Gray, 225 Longton Road, Trentham, Stoke-on-Trent, Staffs.

SALE: New transformers and chokes, 380-0-380v. 200 mA, 6-3v. 12 amp., 30s. post free. Condensers, 8 mF 800v., 5s. post free. Stabilised PSU, 300v, 250 mA, —75v., —150v., 6-3v. 12 amp., with mains filter, £5 plus carriage. New BC-221, complete, £12 10s. plus carriage. Circular chart recorder, 50 micro-amp. FSD, £5 plus carriage. Crystals: 100 kc. 500 kc. 1000 kc. 2000 kc, 10s. Silicon rectifiers, 1N2379, 4000 p.i.v. 100 mA, 7s. 6d. Tested Valves: QQV03-20, 20s.; 5763, 3s. 6d.; 5U4, 12AU7, EL81, 2s. 6d.; 5Z4, 2s.; 6X4, 1s. 6d.; 6J6, EF91, 12AT7, at 9d. each. Constant voltage transformer, 240/6v., 20s. Imhof rack, 19in. x 34in., 30s. plus carriage. Pair 4X150, 20s.—Bos, 7 Fairview Drive, Higham, Kent (Tel. Shorne 2720).

WANTED: Urgently, RF and IF chassis units for R.107 receiver, in new condition, or a scrap R.107. All letters answered.—Giddings, 14 Warren Road, Blundellsands, Liverpool, 23.

WANTED: Bandspread coil packs for HRO, 15 and 40 metres.—Wilkinson, 25 St. Helen's Drive, Leicester.

WANTED: Bases for 813 and 4X150; also part built or parts for, G3RRK or G3BDQ or similar type of Rx. SELLING: Trio 9R-59, £20. BC-312 with PSU. £10. Transistor two-metre converter, £5. OFFERS invited for: New Eimac 2C39A, also ex-Equip Valves 813, 866A, 3-20, 5U4, 807 and TT-15. Pair Telefunken RS-237 with bases. PSU rated 1200v. BC-455. PSU for HRO, and a Wilcox-Gav VFO.—Johnson, G3MPN, 3 Folly Gardens, Wymondham (3382), Norfolk.

FOR SALE: K.W. Viceroy Mk. III, with extra filter, in first-class condition, £105. Triangular-section tower, 30ft., with 2-inch mast adaptor, £15. Home-built transistor bug key, 60s.—Sykes, G3NFV, 8 Uplands, Ashstead (2546), Surrey. (Ring after 7 p.m.).

SMALL ADVERTISEMENTS, READERS—continued

WANTED: K.W. Valiant, DC/PSU, mobile antenna, small SSB HF Tx/Rx, also "QST" 1965-'66. **SELLING: K.W. Viceroy Mk. 1**, with separate PSU, and looks good; go SSB and work the world for only £75.—Knight, G2FUU, QTHR or ring Nazeing (Essex) 2274.

FOR SALE: Crystals, three Ch.48, Ch.49, Ch.52, Ch. 53; four Ch.50, Ch.54, all at 8s. 6d. each. Items for G2DAF Rx: Tuning condenser, set Electronics coils, less FR53, Q47, SFG80. £3. 829B with base, 12s. 6d. 2/813, 3/805, 10s. each. 4/830B, 4/1625, 3s. each. Valve cans, 12/B7G, 36/B9A, 20s. the lot. Mica condensers, ex-TU, 16/2.5 kV, 19/3 kV, 6/1.2 kV, 2s. 6d. each. Two 50 mmF var. condensers, 5s. each. Twelve assorted speakers, 2s. each. HRO chassis, less case and coils, £5. Heater transformer, 2/813, 15s. HRO dial and gearbox, 20s. Set bamboos for Quad, 50s. All postage extra. Send s.a.e. for lists, valves, etc.—Box No. 4468, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Tone Rx, transistorised, for model control. Also modern mobile equipment, preferably SSB transceiver with 160m. coverage. **SELLING:** AR88D in case, perfect condition, £38; also AR88LF with case, at £35; will deliver either to 50 miles. AVO Model 7, mint condition, £10 Cossor Type 339 'Scope, needs attention, with companion wobbulator, £11. Eddystone S.640 Rx, with manual, £17. BC-221 frequency meter, in carrying case, brand new with charts and spares, £20. AVO all wave signal generator, coverage 80 kc to 80 mc, £9. R.1155 receiver and PSU, £3.—Lord, G3PHN, Newfield House, Moira, Burton-on-Trent, Staffs (Tel. Swadlincote 7537).

WANTED: K.W. Vanguard or similar transmitter, also HRO manual, preferably MX model. Price and details, pse.—Sketch, GW3DDY, 30 Dan-yr-Heol, Cyncoed, Cardiff, Glam., South Wales.

COMPLETE VHF Station, comprising Heathkit Two-er, J-Beam halo, auto-transformer and microphone, all as new, £20. Heathkit RA-1 receiver, late model, hardly used, with Heathkit Calibrator, £35. Two-metre 8-element Yagi J-Beam, 25s. Woden UMØ, 25s.; UMI, 30s. Xformer 350-0-350v. 150 mA, 25s. BX3 microphone, new, 20s. Londex coax relay, 12/24v., 15s. Geloso 4/103 2m. VFO/Xtal driver, 40s. or offer? Also valves, meters, crystals. (Birmingham area).—Box No. 4469, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Keyboard suitable for small electronic organ. Faulty solo organ might do if keys OK.—Wozencroft, GW3GIN, 50 Romilly Road, Cardiff, Glam., South Wales.

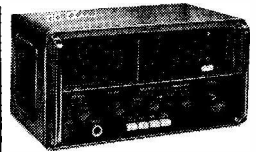
SALE: Drake 2B receiver, with 2BQ and Xtal Calibrator, 160-metre conversion, £95. Professionally built CW Tx for 3.5 to 28 mc bands, pair 807 PA, and many refinements, price £28 or near offer?—Graham, GW3OAY, Little Began, Began Road, St. Mellons, Mon., South Wales.

WANTED: Mosley TA-33Jr. "E" Beam (with 2-inch mast fitting) and CDR22 rotator, complete with indicator. Both must be in first-class order and within reasonable distance for collection (or delivery).—Chambers, G2FYT, 25 The Crescent, Henleaze, Bristol.

REQUIRED: In perfect working order and complete with all accessories, W/T Set No. 58 (suitcase type), with vibrator PSU; also R/T No. 18 and No. 38 Sets.—Box No. 4470, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Pye Ranger Transceiver—pse give details of model, price, etc.; all letters answered. **SALE:** McCoy Silver Sentinel crystal filter, with carrier crystals, £12 10s. Complete set to date Newnes "Radio & Television Servicing," in 16 volumes, price £24. Offers invited for B2 Tx/Rx, mains/battery PSU, several crystals and handbook.—Joslin, G3NPY, 13 Talbot Road, Skegness (4185), Lincs.

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K.W. Corner

Dartford, Kent

Dear OM,

I am afraid some printing errors crept in last month, and for those interested in NFD the replacement for the 6146 should have been 2E26 (not 2E28), and this valve will of course run at 50 watts D.C. input (not 500 watts). We are getting 2E26's from U.S.A., but remember the heater current is different from the 6146. In the KW2000 a parallel ballast resistor is necessary to balance up the 6-volt section of the 12-volt rail. Many readers will be interested to learn how we got along with the Hustler 48TV vertical aerial. This aerial covers 10-40 metres and 80 metres with a top loaded whip extension. On the whole it worked very well without radials, but it is necessary to drive in a good 1½ in. dia. earth stake which can be used to mount the aerial on with the "U" clamps provided. This stake should be about 6ft. long and driven about 4ft. into the ground. If this aerial is mounted on a roof or pole or above ground it is advisable to fit radials. Always use 52 ohm co-axial cable for the feed. Mentioning feeders, reminds me that we are meeting with a fair amount of success in our KW Balun. This is designed to be fitted on the aerial or Beam at the end of the co-ax feeder to provide a satisfactory match (10-80 metres) from unbalanced feed to a balanced system. It certainly helps with the TVI problem. We can also supply a balun for the TV Aerial which, when fitted, provides a step forward in the elimination of TVI by "shock excitation." Then there is the High Pass Filter, the E-2 Match ATU, the Low Pass Filter and the KW Match SWR Indicator. If you need advice drop us a line. Exports from KW are improving again and last month we shipped no less than 25 KW2000A to Canada, plus some KW201 Receivers and KW Vespa transmitters, and we continue to receive unsolicited testimonials. "The KW201 meets and surpasses all your claim for it—an excellent RX"—G3RDU. "The KW2000A excellent appearance and finish—DX stations were worked with remarkable ease. I was complimented on the signal quality and strength"—G3IDW. See you next month after my trip to U.S.A. and Canada.

Yours faithfully,
ROWLEY SHEARS,
Managing Director, G8KW,
KW ELECTRONICS LIMITED,
1, Heath Street, Dartford, Kent.

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Geloso VFO unit and S.640 receiver, or similar.—Hodgson, G2ABK, Hundlesbury, Spilisbury, Lines.

WANTED: Sideband Transceiver, single or multi-band, with or without PSU, would consider separate Tx and Rx, but commercial only. (Yorkshire).—Box No. 4471, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Labgear LG.300, with companion Modulator and PSU, and spare valves, price £55.—Welsh, G3NQW, 16 Lloyd Road, Worcester Park, Surrey. (Tel. 01-337-0720).

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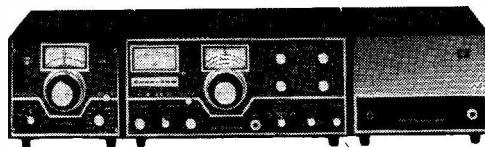
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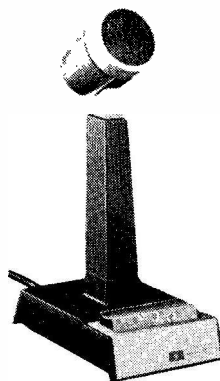
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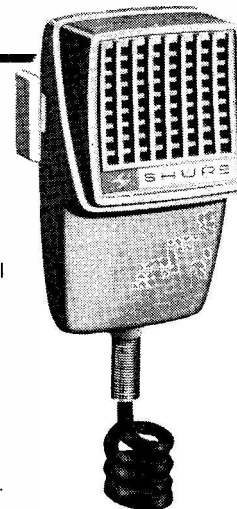
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| Sommerkamp Mobile TS-600-G Transceiver (10m.) | 50 | 0 | 0 |
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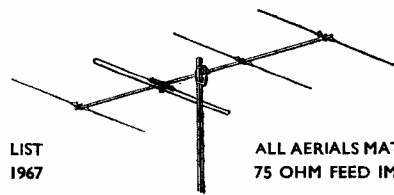
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	2/6Y	6 Element folded dipole Yagi with 1" boom	8-7	44/-
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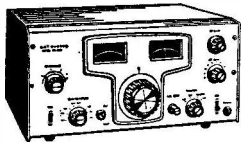
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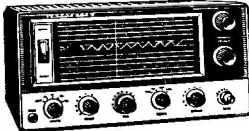
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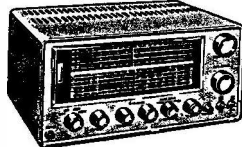
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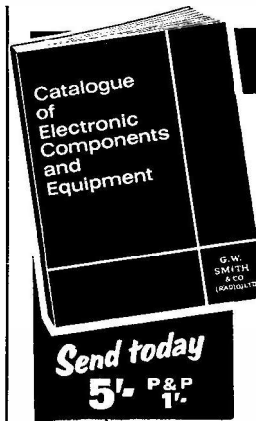
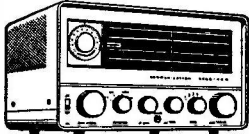
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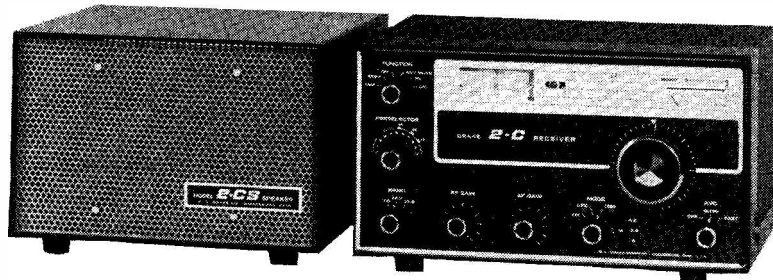
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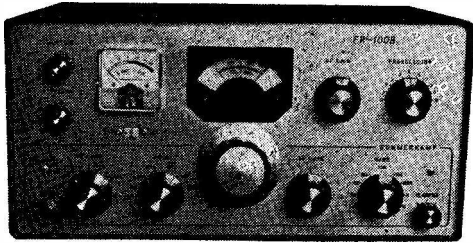
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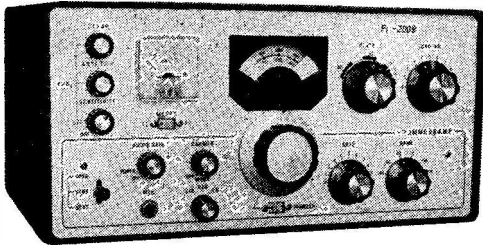
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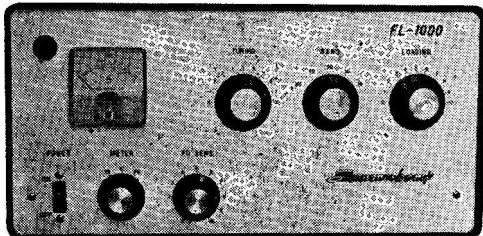
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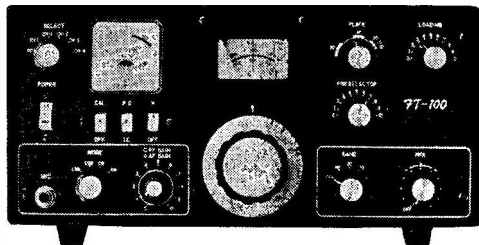
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The word's getting around! Hold off till later in the month, lads, we're up to the eyes. I'm not so sure this servicing bit is doing me any good—all my Customers say they were on the point of buying a new receiver until John breathed on the old 'un. Now they wouldn't dream of changing! Once again I just missed a golden opportunity of keeping my big mouth shut.

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NOTE:—I usually carry a much larger stock than advertised, but there is not much point advertising something I know very well I can sell tomorrow. What a lot of the boys do is to drop me a line saying what they want—if I haven't got it, I keep my eyes and ears open and inform the chap concerned when I've got something. So, if you want a particular piece of gear, give me a yell! Incidentally, I'm always interested in the more exotic stuff such as 51J's, 75A's, etc., and will guarantee to offer you a low, low price so that I can get fat on the profits! Anyone wanting such equipment at a high, high price—sing out.

Note my Sommerkamp linear ad.—now say 960W. input. I did this before and sold a lot of them, but since saying 400W. output I haven't sold a single solitary one!! Marvellous!! Incidentally, I suppose I ought to apologise for flogging this Japanese gear, at which a lot of people scream "cheap Jap junk!!" I can't help noting though, the number of owners who are sitting back with a self satisfied smirk on their faces!! I have yet to hear any screams from them!! They said the same about Pentax cameras and Yamaha motor cycles! Ah well, that's the way it goes.

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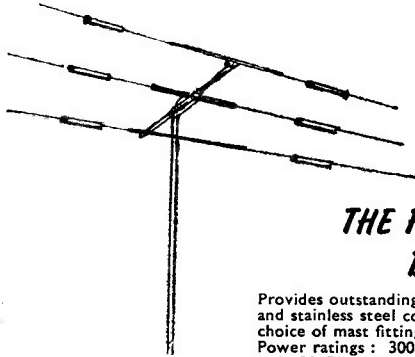
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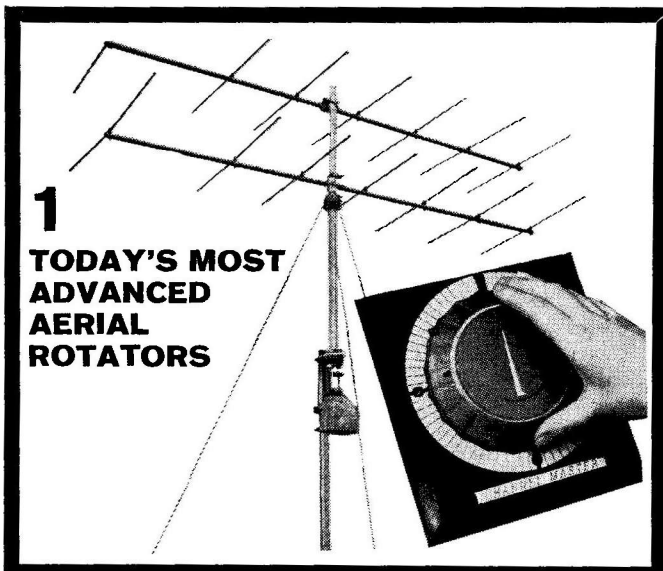
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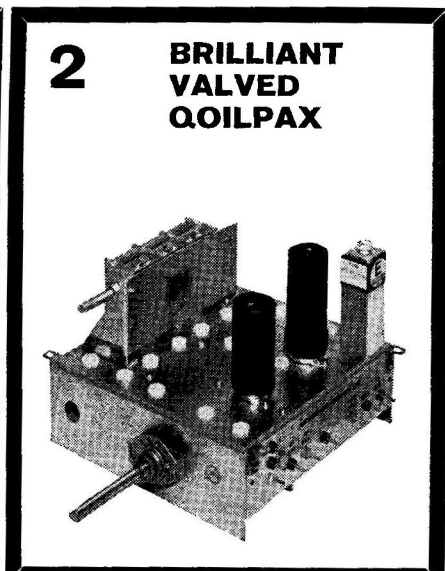
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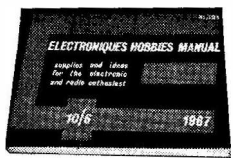
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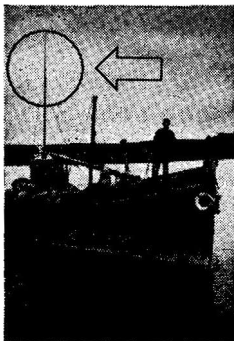
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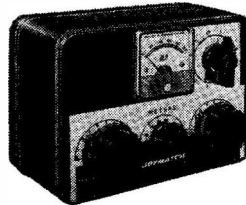
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SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXV

APRIL, 1967

No. 282

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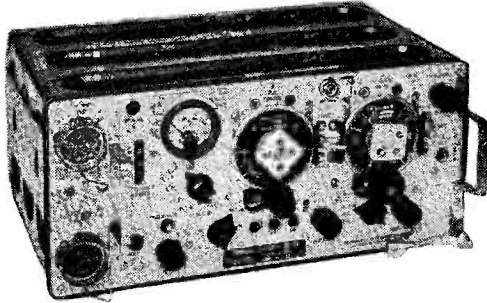
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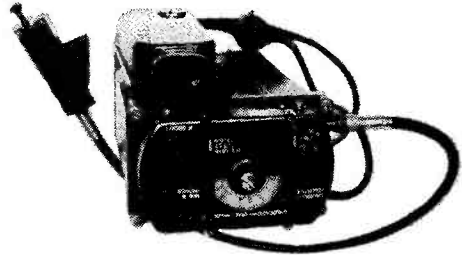
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E D I T O R I A L

Torch *As the time-cycle comes round, we are able once again to discuss the awakening of the DX bands, with the heavy increase it is bringing in amateur traffic across the world. With Ten, Fifteen and Twenty now well open for most of the time, the true pattern of radio amateur activity is becoming clear to many who, though they have held licences for four or five years, have never previously experienced such conditions. For them, it is a matter of making hay while the sun shines — which, in this particular context, it should do for another three years at least.*

On the other hand, there are many experienced AT-station operators who have been through it all before — and more than once. The pattern of DX activity changes as time goes on. For the individual, this is no different from the way the pattern of life changes as the years pass. History goes on repeating itself, in the most astonishingly predictable fashion.

In our world of Amateur Radio, what does this mean? One result will be that during the next two or three years a whole new generation of DX lions will emerge, to take over from those who established the standards of the last two decades. For another result, we shall see that the very pressure on the amateur ether space will encourage a large section of the fraternity to develop an interest in quite different spheres of Amateur Radio activity — experiment, construction, UHF/VHF, to mention only a few. They, too, will gain new experiences and produce new ideas, thus making their own contribution to progress.

And there will also be a large number of happy chaps, in Amateur Radio for the fun of it, who will take things as they come, quite unconscious that they are contributing anything, and certainly with no idea that they are carrying a torch to hand on to anybody. Fortunately, they are in the majority. Indeed, it is they who make — and in the last five or six decades have consistently made — the most important contribution of all.

*Austin Forster,
G6FO.*

VERTICAL RADIATING SYSTEM FOR TOP BAND

RESULTS OF PRACTICAL TESTS, HORIZONTAL AGAINST VERTICAL

It is not often that we can discuss, in connection with such a matter as aerials for 160-metre transmission, experiments carried out under controlled conditions to determine the comparative efficiency of a vertical system. Since the resonating of an aerial like this is as important as its construction, how to get it tuned is also dealt with fully—Editor.

ONE frequently hears, in connection with Top Band activity, that a particular operator is unfortunately placed and is unable to put up a really satisfactory aerial system for this band. Consequently it is felt that the results of some experiments might be of general interest—and of particular interest to those suffering from lack of horizontal space.

For many years practically all transmission had been on a 270ft. end-fed aerial, some 70ft. above ground level, and of course, there is no disputing the fact that for DX and county-chasing, an aerial of this size is very useful indeed on Top Band! There are, however, many amateurs who use this frequency just as much for local and semi-local working, requiring a maximum radius of something in the region of 40 miles.

For a long time the more extreme range contacts—taking about 40 miles as “extreme” in this context—were marred to a greater or lesser extent by fading and phase distortion, and these effects have also been observed over quite local distances. It had been realised that the reason for this was interaction between the horizontal radiation from the flat top and the vertical radiation—or ground wave—from the feeder line. However, matters came to a head when, during some tests with a /M, a station some 30 miles distant, reported *twice* the S-meter reading from the mobile's little whip aerial at ground level to that being received from the magnificent sky-wire, notwithstanding the fact that double the power was going in at the fixed station!

In other words, something quite different was needed to produce a big signal at distances up to 30-40 miles.

Vertical Experiments

Experiments were instituted forthwith, using a fifty-foot vertical wire strung up on to the top of the house mast, loaded to resonance on the Top Band frequency and fed at earth lead level.

Several interesting things happened immediately. All stations on the fringe reported a big improvement, a 30-mile distant control station giving 100%

increase and, what was even more important, both fading and phase distortion disappeared. Moreover, the more local stations, whilst reporting only a moderate increase in strength, considered there to be a definite improvement in speech quality, the inference being that with the long-wire there had always been some degree of phase distortion present which although not marked was enough to put an edge on the quality of the speech, to make it sound “not so good.”

Reception too, improved substantially, the degree of interference from the coastal and fish-phone stations being considerably reduced.

A fresh experiment was then started to determine whether a more modest arrangement could be made to give comparable results. This took the form of a 30ft. vertical assembly which could be erected and dismantled single-handed and in a matter of only a few minutes. It consisted of two ten-foot lengths of *Dexion* steel slotted angle, bolted and electrically bonded together, carrying a further ten-foot length of light bamboo pole. A copper aerial wire runs from the top of the pole down to the *Dexion* girder to which it is electrically bonded.

With small egg insulators and light guy wires, the whole affair stands on an inverted glass jar which serves as a very adequate base insulator. The base of the mast is connected by copper wire to the feed-through insulator in the roof of the shack, about fifteen feet above ground level. The all-up weight of this array is in the region of 20lbs. and it offers very little wind resistance, besides looking neat and unobtrusive.

An alternative way of guying would be to substitute nylon cord for the galvanized iron guys, but even then egg insulators should be employed to

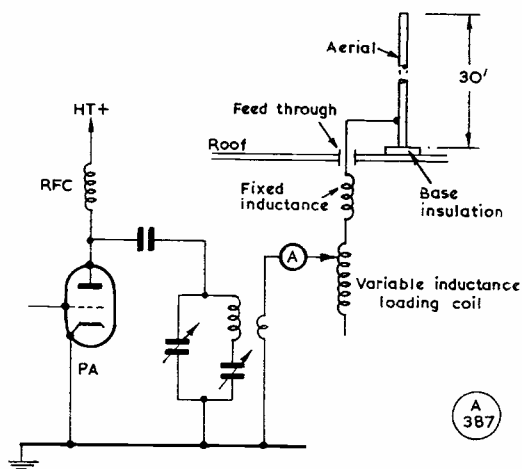


Fig. 1. Electrical arrangement for the vertical Top Band System discussed in the text. Its effectiveness depends upon the correct adjustment of the loading coil, as indicated by a maximum reading in the RF ammeter. While the three inductances connected to A could be combined as one, some part of it must be variable. A roller-coaster type of adjustable coil—such as found in the old Wilcox-Gay VFO unit—is very suitable for the purpose.

prevent chafing and fraying at the tie points. There are also, of course, many alternative methods of general construction. A light timber support for the vertical wire could be substituted for the *Dexion* but might require an additional set of guys, thereby introducing more unnecessary metal into the field. At many locations it would probably be possible simply to hang the wire, with tensioning at the bottom end.

Feeding and Loading

The feed impedance at the base of a quarter-wave vertical aerial is very low—of the order of 35-50 ohms, so that power may be fed in either directly or, if more convenient, by means of co-axial cable of similar characteristics.

The natural resonant frequency of an aerial of the dimensions given here is, of course, quite high, and is in fact in the region of 7 mc, so that for Top Band operation some degree of loading becomes necessary.

At the point of entry into the shack at ceiling level the aerial is connected to a 35-turn space-wound coil on a ceramic former, having a calculated inductance of about $30\mu\text{H}$. This by itself is inadequate but its siting helps to prevent the radiation of stray RF in the region of the transmitter. The second loading coil is of the "infinitely variable" type, as found on slider-tuned screw adjusted tuners in equipment such as the Wilcox-Gay VFO unit, but a tapped coil would serve almost as well. The maximum calculated inductance of this coil is $27\mu\text{H}$.

Coupling

A pi-section PA plate circuit or Collins coupler is the most satisfactory way in which to match the PA output to the very low impedance of the aerial. In some cases it may be found that the pi-section constants are such that it is not possible to get down low enough to obtain a correct match. In such cases a three or four turn loop wound over the earthy end of the PA coil and connected in series with aerial and earth will prove entirely satisfactory.

Resonating the System

It is most important that this aerial system be resonated correctly into the mid-portion of the range of frequencies over which it desired to operate. If, for example, normal Top Band operation is at frequencies between 1800 and 1900 kc, then the system should be brought into resonance at about 1850 kc. This may be achieved in a number of different ways.

If the aerial system in disconnected from the tuning unit and coupled by a few turns of wire to the pick-up probe of a GDO, it should be possible with careful tuning to see the slight flick as the GDO goes through the resonant point. Alternatively, the transmitter itself can be put on lowest power—just sufficient to give an aerial current reading—and the aerial loading coil and PA tuning condenser varied together in step, whilst keeping an eye on the thermo-couple for maximum reading in terms of RF current into the

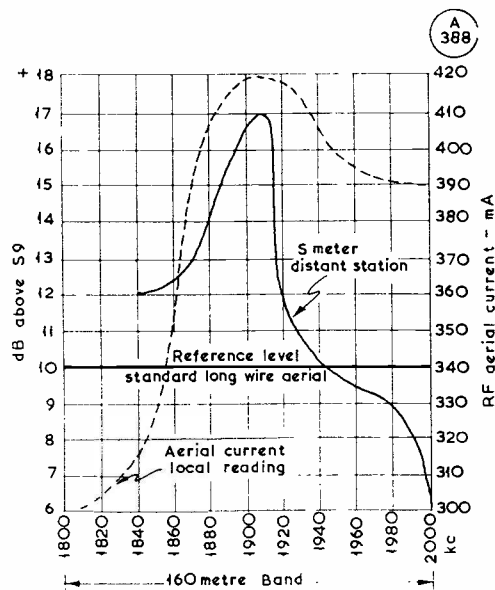


Fig. 2. With the arrangement shown in Fig. 1, resonated at a suitable Top Band frequency, these curves were plotted under practical test conditions, in co-operation with another 160m. station 15 miles away. With the system resonated at 1900 kc, the bandwidth for VFO operation would be good enough over 1880-1920 kc. The dotted line shows how closely the Tx aerial current followed the S-meter reading at the distant station.

system. The loading coil setting is quite critical—a turn or two either way making a measurable difference in the aerial current reading. When correctly tuned the PA loading condenser is quite flat; similar aerial current readings can be obtained with very little loading condenser in circuit, but under these conditions the setting is very sharp. This condition is to be avoided as the results at a distance will be much inferior. Fig. 1 shows the electrical layout for the experimental system. Other arrangements are, of course, practicable, the only provision being that it must be possible to resonate the system correctly.

Results by Test

Of course, the results are what matter. To check performance, a test programme was gone through with a station some 15 miles away, with the aerial resonated at exactly mid-band, i.e., 1900 kc. Test transmissions were made at about 20 kc intervals; at each point the degree of grid drive and the power input were adjusted to levels obtained on 1900 kc. Comparative readings were then taken on the aerial ammeter and on the S-meter at the distant station.

The results of this test are shown in graph form in Fig. 2. (The reference level of S9 + 10 dB is the normal signal received by the collaborating station when a 200ft. long-wire aerial some 70ft. high at the open end tapering down to 15ft. at the input end is used for txm.) It will be seen that for a bandwidth of 140 kc—from 1800 to 1940 kc—the results obtained with the vertical are better than those from

the long wire; that for a narrow band about 20 kc either side of resonance they are much better; and that there is a marked peak at actual resonance. The aerial current curve follows substantially the same shape.

It can be said that this vertical system tuned against ground shows a worthwhile gain, over quite a wide tuning range in comparison with the standard long-wire, quite apart from other advantages already enumerated. The chief of these is that the system calls only for height vertically, with enough space on the flat simply to peg out the guys.

Effect of Top Capacity

The next phase was to examine the effect of a capacity hat. This consisted of a copper wire hoop two feet in diameter, stiffened with six radial spokes, which was attached to the aerial at the 20ft. point. This had the interesting effect of lowering the resonant frequency by about 25 kc. A further series of measurements was then taken over the whole band and the results are shown in graph form in Fig. 3. It will be seen that the effect of the hat has been to flatten the resonant peak quite considerably and to improve slightly the general signal level as received at the distant station, over almost the whole

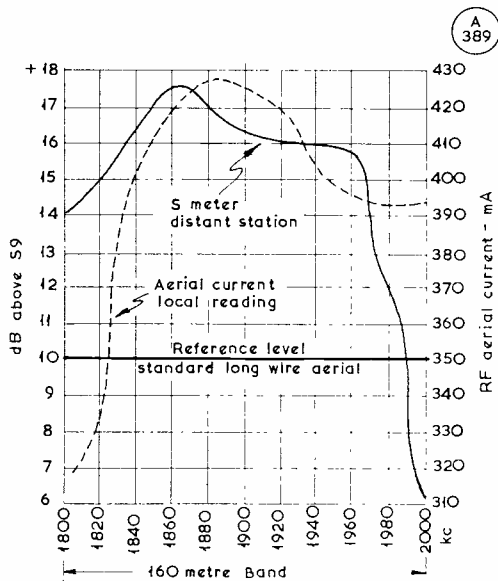


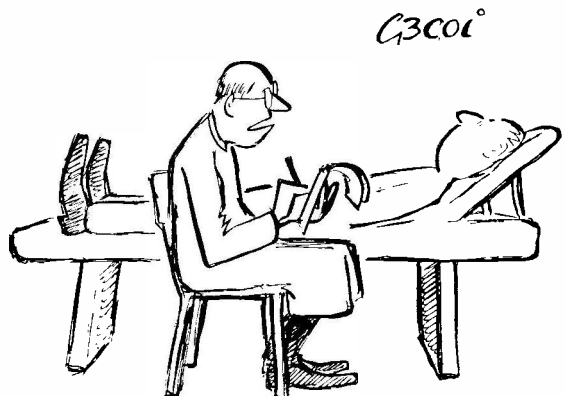
Fig. 3. The test result illustrated in Fig. 2 when modified by the use of a capacity hat (top loading capacity) at the transmitting end, as explained in the text. The significance of this curve, obviously, is that the bandwidth of the transmitting system is much greater, making VFO operation practicable over a frequency range of at least 120 kc in the 160m. band. (The upward kick at 1860 kc may be disregarded, as probably being due to some local re-radiation effect.) The point of particular interest is that the 30ft. vertical system, correctly loaded and resonated, gives a better signal, at the test point 15 miles away, than a 200ft. aerial coupled in the conventional manner! Reception is similarly improved, over distances of up to 40 miles at least. It should be emphasised that all tests, for the investigations illustrated by Figs. 2 and 3, were carried out in daylight.

of the band. Again, the aerial current curve follows the distant S-meter plot very closely and is at a slightly higher level. The 6 dB gain above reference signal level which covers 20 kc without the hat has now been extended to 120 kc with the hat—a very worthwhile gain where VFO operation is intended. The peak signal level also appears to be slightly better when a hat is connected.

It should be added that all test observations were made with the long wire aerial disconnected and lowered to the ground.

Conclusions

In cases where Top Band ranges of the order of 40 miles radius are envisaged, it would seem that compared with a long horizontal aerial much *steadier* and appreciably *stronger* signals can be expected by the use of a vertical array. The addition of a small capacity hat will give slightly better peak signals and somewhat more consistent results over almost the whole of the Top Band, without the necessity of having to re-resonate when making any normal change of frequency. Extensive tests have not been carried out at night over longer distances but a number of random contacts made at distances in the region of 200 miles have given reports about one or two S-points down as compared with the long horizontal wire.



"... I would conclude that you are suffering from an inferiority complex brought on by running QRP to a badly-screened dipole ..."

AMATEUR RADIO IN GHANA

According to the latest issue of *9G1 News*, there are 44 licensed amateurs in Ghana. As the last licence allotted, to 9G1UB, is No. 156, it means that there has been a considerable turn-over of Ghanaian amateurs since Gold Coast permits were first issued. The two earliest still in force are No. 12, 9G1AQ (Kumasi), and No. 13, 9G1BF (Nsuta-Wassaw). The hon. secretary of the Ghana Amateur Radio Society is 9G1ED, who is G3BQH, and at present home on leave in St. Helens, Lancs.

DELAY CIRCUIT WITH LONG CLOCK-OFF

FORTY-SECOND PAUSE, FOR
RELAY CONTROL

THE circuit shown here can be adjusted for a delay from milliseconds to seconds, depending upon the time constants used. Basically it consists of a standard Miller time base with the addition of a relay in the anode line, having hand-switched bias on the suppressor to take the place of the synchronising pulse and DC restorer. The grid is returned to earth instead of HT, as a very linear fall of anode voltage is not required.

Operation

With S1 open, the suppressor is heavily biased negative, causing the anode current to be at zero and the anode voltage at maximum. The screen takes heavy current and the voltage is therefore low; cathode and grid are at earth potential. The relay is de-energised and the contacts are open.

When S1 is closed, the suppressor is earthed, removing the bias, and anode current starts to flow. The anode voltage falls and transfers the drop *via* C1 to the grid. This slides the grid back along the grid base and so reduces the anode and screen currents. The charge on C1 starts to leak away and allows the anode current to increase again. The anode voltage drops once more. The action is cumulative until the anode voltage falls to a low level and the valve takes full current. This is the normal Miller action. During this period the relay is steadily energised until it closes at a current depending upon the type of relay used.

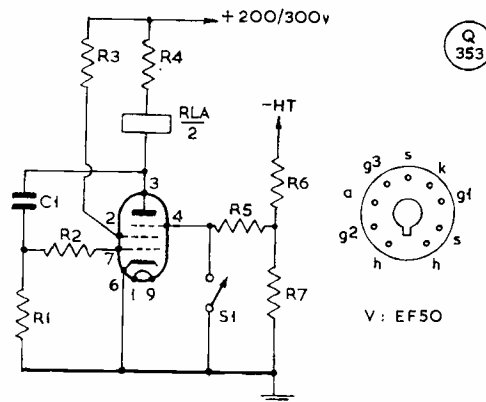
The time that the valve takes to assume full anode current is controlled by the time constant of C1, R1 and changing these values will alter the delay time.

Practical Circuit

The values given with the circuit were found to be suitable for the EF50 and result in a delay of about 40 seconds. Any other valve can be used providing its maximum safe anode current is sufficient to close whatever relay is used. The anode load and bias may have to be altered to obtain correct operation. The bias value need not always be as high as shown, but it must be sufficient to cut the anode current off. The relay in the circuit as shown here is a Post Office Type 3000 with a pair of heavy-duty contacts added. The DC resistance is 1,650 ohms and it closes at just over 6.0 mA, with a hold-on current of 1.5 mA.

PSU Application

This circuit was worked out for a power pack feeding a universal supply panel. Its use is to delay the HT supply until the rectifier heaters are



As explained in the text, with the values given here a 40-second pause can be obtained before the relay answers. Since the delay is controlled by C1, R1, it is variable over wide limits—see text.

Table of Values

Delay Circuit Arrangement

R1 = 500,000 ohms	S1 = SPST Toggle switch
R2 = 1,000 ohms	C1 = 0.1 μ F
R3 = 27,000 ohms	V1 = Mullard EF50
R4 = 6,800 ohms	Relay = Ex-GPO Type 3000, or as required
R5 = 470,000 ohms	
R6 = 100,000 ohms	
R7 = 100,000 ohms	

warmed up. Overload contacts could be inserted in series with S1 to cut HT if a fault should develop, so safeguarding the PSU. If S1 is tripped either accidentally or on purpose, the full delay time is effected and so the HT would flick on and off if the overload persisted. In an amateur station layout, S1 could be one set of contacts on the stand-by on-off switch, or main change-over relay.

This circuit, is an adaptation, not generally known or used, of a standard commercial arrangement. It can be applied to a variety of control circuits. For those who are experimentally minded, a power transistor could be adapted for a similar requirement.

POINT TO NOTE

We can accept single-copy orders for any forthcoming issue—for posting the day before publication—if they are received two days in advance. What this means is that for the May issue, due out on April 28, we should have your remittance for 4s. by Wednesday 26th. Posting is on the Thursday, and after that we are in the hands of the Post Office, though it should ensure delivery in most parts of the U.K. by Friday 28th. A large number of readers make use of this facility—mainly, they tell us, to see the Small Advertisements soon enough for effective action. And just see what there is on pp.118-128 this month!

Annual (direct subscriber) copies are likewise posted on the Thursday morning. For a year of 12 issues, this costs 42s. post free. Orders, with remittance, to: Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

QRP TRANSMITTER FOR FOUR METRES

SIMPLE TWO-VALVE DESIGN

R. S. HEWES (G3TDR)

As in the case of the four-metre converter described in our February issue, this article also is based on material appearing in the Echelford Amateur Radio Society "Newsletter." The two units, Rx and Tx, together enable a start to be made on the 70 mc band, on which there is now a high level of activity, especially in the more populated areas of the country. It is an ideal band for local net working (with everybody involved having a crystal of the same frequency), and for mobile operation. Frequency changing is easy by the use of switched crystals.—Editor.

THIS transmitter is the companion to the 4-metre Rx converter described in the February issue of *SHORT WAVE MAGAZINE*. It is a low-power job, involving only two valves, an ECF82 and an EL85 as PA. Physically, it is similar in size to the Rx unit. By crystal switching, a choice of operating frequency is possible. The EL85 in the PA can be run comfortably at 6 watts input, with plate-and-screen modulation using an external modulator (such as that you use for Top Band).

Circuit Points

V1, with either X1 or X2 and associated circuitry, functions as an overtone oscillator, with a capacity tap for the adjustment of feed-back (values as given). Crystals X1 and X2 can be either FT-243 types in the 7-8 mc region, or an HC6U miniature 3rd harmonic (overtone) crystal for some specified frequency for net working.

The V1B section of the ECF82 is inductively coupled into the neutralised PA stage V2, via L2/L3, wound on separate formers and spaced to just under an inch between centres. Test point TP2 is included in the grid circuit for setting up L2/C9 and L3/C12 to obtain optimum grid drive, which is about 1.1 mA.

On the PA side, the tank L4 consists of a centre-tapped coil with associated split-stator capacitor C14, to enable a neutralising condenser NC to be fitted. (This neut. device is no more than a pair of parallel wires—see table of values). Anti-phase voltages with respect to the PA anode are applied to its grid, through NC. It should be noted that the "hot method" of neutralising (with the PA on) can be used and the neut. adjustment can be made effective over the whole 600 kc of the 70 mc band.

The aerial coupling coil L5 is positioned in the centre of L4 (not quite as suggested by the diagram), and aerial reactance is tuned out by C16, 75-ohm coax being used to feed out to the beam.

For continuous monitoring of anode current, an 0-50 mA meter is included in the PA plate; this should read about 25 mA when L5 is adjusted for optimum coupling with L4. Modulation, plate-and-screen, is

applied to the PA, about 5 watts of audio power being required for really full control of the carrier; for this, your Top Band modulator will do, or probably could be adapted. Total HT load is about 50 mA at 250v. maximum, and LT current 0.65 amp. for heaters parallel-fed at 6.3v.

Setting Up

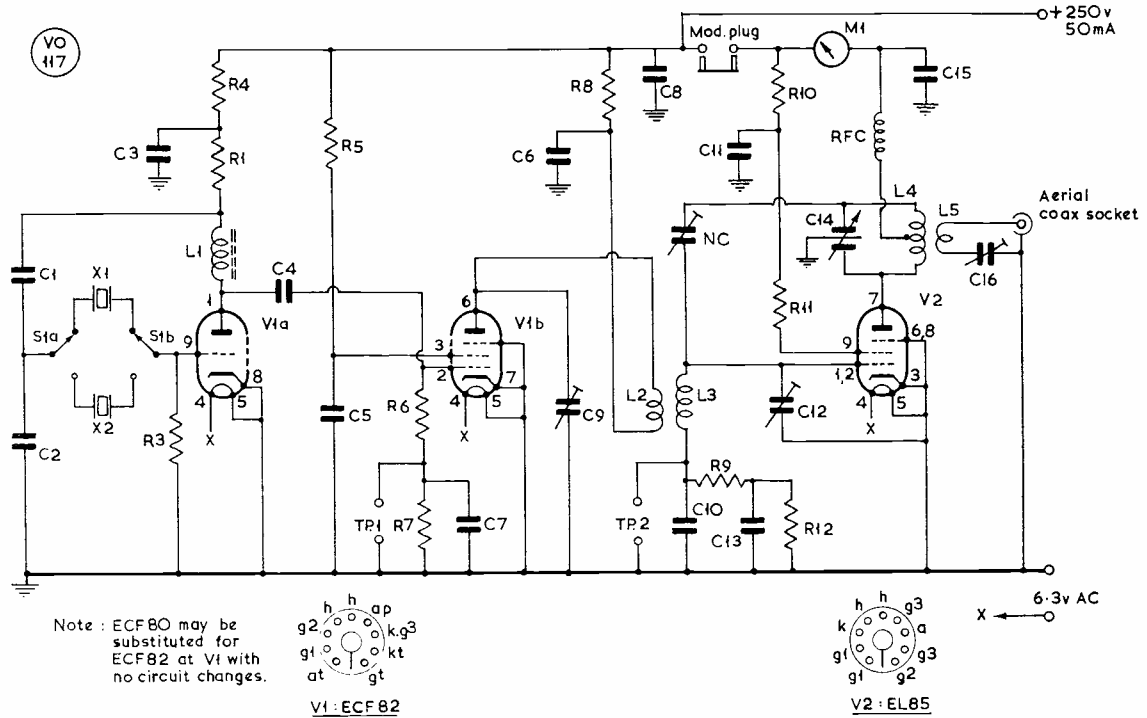
Apply heater voltage and check that the valves are lighting up. With a crystal inserted in one of the switched sockets, apply HT at 250v. maximum to the ECF82 only. (The modulator socket can be left open at this stage, thus conveniently disconnecting the PA to HT). With a high-resistance voltmeter—preferably something like a 20K o.p.v. instrument on its 2.5v. range—across TP1, with its + side to chassis, adjust L1 core till a voltmeter reading of 0.75v. is obtained, corresponding to 0.75 mA through the 1K resistor, R7. Now check that when the HT is switched off and on the circuit always oscillates, i.e., that the crystal goes off easily and with certainty; if it does not, the core of L1 will have to be moved gently till correct functioning is ensured.

Now transfer the voltmeter to TP2, across R9, R12. Provided that L2/C9 and L3/C12 have been resonated near-enough by GDO, the voltmeter should indicate some grid current flow. With the coils at the recommended displacement (see coil table), touch up on C9 and C12 till the meter reads about 1.1v., indicating grid drive of 1.1 mA into the EL85.

Then apply HT to the PA (by shorting the modulator plug) having previously connected a 6v. pea-lamp across the aerial socket, as a dummy-load for tune-up purposes. With L5 inserted about one-third into L4, adjust to resonance with C14. Plate current to the EL85 should read about 20-25 mA, with the load-lamp lighting to full brilliance. Then check on the neutralising. With the neutralising capacity NC adjusted as given with the coil data, the anode current should be *minimum* when grid drive is *maximum* (1.1v. on the meter at TP2). It is when this condition is achieved that neutralising is correct. If these readings are wildly out, adjust NC by bending the grid wire side either nearer to or further from the anode end—this can be done, and it needs to be done very gently, with a pencil or a plastic trimming tool, *not* an insulated screwdriver—until the correct condition is obtained.

This same operation can be carried out "cold" (no HT on the PA) by swinging C14 carefully and watching the grid current, which in this case means the voltmeter across TP2. If a sensitive meter is being used, such as a Heathkit V-7AU Valve Voltmeter on the 1.5v. range, a flick of the meter needle may be seen as C14 goes through resonance. The objective is so to position the NC wires that *no* movement of the meter needle can be discerned as C14 goes through resonance. The PA can then be regarded as being perfectly neutralised.

Now, with HT on the PA via the modulator and the pea-lamp still acting as the dummy load, apply (about 5 watts of) modulating power. Whistling into the microphone should produce a brightening of the bulb, indicating incremental modulation. If you get decrement ("downwards") modulation, either C16 needs adjusting or you have not achieved correct neutralising of the EL85. All motions will then have to be gone through



Circuit of the Transmitter

Table of Values

Circuit of the Four-Metre Transmitter

C1 = 470 $\mu\mu\text{F}$	R1 = 33,000 ohms, $\frac{1}{2}$ -w.
C2 = 39 $\mu\mu\text{F}$	R3 = 10,000 ohms
C3, C5, C7, C8 = .003 μF	R4 = 12,000 ohms
C4 = 47 $\mu\mu\text{F}$	R5 = 56,000 ohms
C6, C10, C11, C13 = .002 μF	R6 = 47,000 ohms
C9, C12, C16 = 30 $\mu\mu\text{F}$, var.	R7, R12 = 1,000 ohms
C14 = 25 $\mu\mu\text{F}$, split stator	R8 = 2,200 ohms
C15 = .001 μF	R9 = 22,000 ohms
NC = see Table	R10 = 27,000 ohms, $\frac{1}{2}$ -w.
	R11 = 100 ohms
	V1 = ECF82
	V2 = EL85

Note: All resistors rated $\frac{1}{2}$ -watt except where stated.

TABLE OF COIL DATA

L1	— 35 turns 28g. enam. on 0.3in. former, with grade-500 iron-dust core.
L2, L3	— Each 5 turns 18g., turns spaced one wire diam., half-inch i.d., placed opposite at 7/8th inch between centres.
L4	— 4 turns + 4 turns 18g. enam., half-inch i.d., centre-tapped, with about 1/8th inch between sections for insertion L5.
L5	— 2 turns p.v.c. 24g. inserted at centre L4, mounted to be adjustable.
RFC	— 40 inches of 38g. on quarter-inch polystyrene former one inch long.
NC	— PA neutralising capacity: Formed by two parallel lengths 18g. enam., each $1\frac{1}{4}$ in. long, spaced about 3/8ths inch apart (see text).

again, as what you have to see is a brightening of the pea-lamp under modulation. The books say "a 25 per cent increase is a measure of 100 per cent modulation." If your Top Band modulator is giving the required 4-5 watts of audio output, there should be no difficulty about getting increment modulation when the PA is correctly neutralised.

(Incidentally, in case somebody is saying, "Why do I need 4-5 watts of audio for a 6-watt carrier input," the answer is that on VHF it is found that in practice rather more audio power

than the usually-accepted "50 per cent of DC input" is required for full modulation. Though it has never been fully explained, this is probably due to the fact that as the frequency goes up, it begins to relate to electron speed within the valve and its associated circuitry. In the present context we need take it no further than saying that by the time you get to 145 mc, the two-metre band, something like 80 watts of audio is needed to swing 100 watts of DC carrier to give the appearance of full modulation at that power input. Whatever the theory may propose, this is the fact.—Editor.)

[cont'd. p.84

Air Testing

While correct procedure is to use a reflected power meter to make sure that full RF is going into the aerial, if you have a resonant array outside—such as a 4-ele Yagi proportioned for the four-metre band—you should be able to take it that reasonable radiating efficiency is being achieved.

The transmitter as described here has been in use at G3TDR for some months, and many favourable reports have been received, with contacts up to 25 miles or so. The beam at G3TDR (Staines, Middx.) is a 4-ele Yagi at 34ft. This Tx is now being used as it stands to drive a 6146 RF amplifier to 50 watts. The EL85 will push this PA hard enough to produce with ease 4 mA through 22K in the 6146 grid, representing 88v. r.m.s. The advantages of this approach are obvious—bags of drive without having to fight for it, two more tuned circuits at 70 mc helping to reduce unwanted harmonic radiation,

and of course a much bigger signal.

Finally

While construction can be in any reasonable form or shape, the G3TDR version of the QRP rig described here is built on a chassis about 7in. by 4in. with a 2in. sub-space. Front and rear panels 7½in. by 3in. enable the whole thing to be turned upside down without damaging anything in the upper-chassis space. The front panel carries the meter, centrally mounted, the crystal switch and the PA tank. The rear panel has the aerial socket in line with the tank coil, and L5 is connected directly to the Ae. socket and C16. On the rear drop of the chassis are the heater and HT supply inputs and the modulator socket. All other components are accommodated sub-chassis. If these general principles are followed, the circuit can be built up in the sequence suggested by the circuit layout.

USEFUL CW ABBREVIATIONS

While CW operating procedures have an established catalogue of abbreviations well known to all who are competent on the key, there are still a number of shortenings which are hardly ever listed and are seldom used. Two examples are "C," for "Yes" (C=Si=Yes), and "SN" for "Understood" (which is a little different, in exact shade of meaning, from "R"). These abbreviations and others like them were freely used among the telegraphists of earlier days, when large volumes of traffic were moved by hand keying. There seems no reason why such abbreviations should not be adopted in amateur CW communication today, so it would be interesting if our telegraphist-readers could fill the list out for us. (Note: Need it be said that we know the Q-Code and the Z-Code and all the commonly-used shortenings. What we want are more like "C" and "SN.")

CHICHESTER—AND HIS RADIO

With the attention of the world on Sir Francis Chichester and his *Gypsy Moth IV*, naturally among radio men there is also keen interest in his arrangements for communication. For that part of his voyage from Sydney to Cape Horn, he kept a regular two-weekly schedule (when it was possible) with ZLW, Wellington, New Zealand, which has 5 kW radio-telephony transmitting channels in the 8, 13 and 17 mc marine bands. Choice of frequency would depend upon the position of *Gypsy Moth IV* and the time of day, and the necessary transmit-receive channels would be pre-set.

This all *sounds* easy enough. But the distances between Sydney and the Horn are considerable, radio conditions have not been too good in the Southern Hemisphere—and, apart from all that, it can too often happen that when sked time comes round, the boat is in heavy weather, with everything on the move, and the radio has to be operated "upside down," with one hand for the rig and the other for oneself. A sudden lurch and you can be flung across the cabin, with the gear on top of you. (It has happened to your A.J.F., often enough, even if not under quite such strenuous circumstances!)

The South American coast stations—though

nearer to Chichester's last reported position—are difficult to work from seaward in the Cape Horn area because of the peculiar screening effects caused by the Andes, to say nothing of the language difficulty. (Could you talk coherent Spanish while everything about you was in turmoil?)

For the Atlantic leg, he would probably do best with Cape Town Radio, ZSL, also with 5 kW R/T frequencies in the 8, 13 and 17 mc marine bands. Later, he might be able to work Rugby Radio direct, on the long-range HF R/T service *via* Baldock or Bearley, for which purpose several suitable frequencies are available.

ARMY R.209 Mk.I/Mk.II—FM RECEPTION

We are informed by a reader, just out of Royal Signals, that, being very familiar with the Army's range of receivers, he can say that the Mk. II version was never actually manufactured with the FM facility, though this is (somewhat misleadingly) engraved against the function switch. The R.209/Mk. II operates from 12v. DC. On the other hand, the R.209 Mk. I, designed for 6v. DC input, does have the FM facility.

"CALL BOOK" AND

"RADIO AMATEUR HANDBOOK"

By about the time this appears we should have in stock the Spring Edn. of the *Radio Amateur Call Book*, in the U.S.-only version at 51s. 6d., and DX Listing, 31s. 6d.—or the two together, covering some 400,000 of the world's known amateurs (by country, with call-sign, name and address) at £3 18s. 6d. post free. The U.K. section in the Spring "DX Listings" version will be the latest and most up-to-date available in print.

Also in stock any time now will be the latest, 1967, edition of the ARRL *Radio Amateur Handbook*, the recognised guide to the subject, which for more than 40 years has been the radio amateur's standard reference and *vade-mecum*. It costs 44s. in the paper-cover version and 54s. in the hard-back "library edition," post free (contents are the same in both). Orders, with remittance, should be put in right away for the *Call Book* and the *ARRL Handbook*, as stocks are necessarily limited to the estimated demand. Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CONVERTING TO LINEAR AMPLIFICATION

FROM A PARALLEL 807 PA

THOSE who, going in for SSB, already have an existing PA which may consist of a pair of 807's in parallel (a very popular type of RF final amplifier) might be interested in this "conversion" of just such a PA stage to work on either SSB, CW or AM phone.

Assuming the usual 600-700 volts HT and the need to economise in construction time and parts (to say nothing of avoiding duplication on the PA side), the only additional power items required for this conversion are a 300-volt stabilised supply (this is not a "must," but it is desirable) and a source of fixed bias; this is necessary for the SSB linear amplifier circuit considered here.

Considerations

It was thought desirable that CW working and high-level AM operation should continue to be available on the existing PA (in case the SSB approach was not a success!). Because a separate speech amplifier and VFO-driver unit were already in use, the SSB exciter would have to replace these as the drive source. As an additional economy, the speech amplifier stages in the SSB exciter are also used for the modulator drive when on AM phone.

The transmitter can now be visualised as a band-switched PA using a pair of 807's in parallel, with clamper control plus external grid bias, driven by a multiplier unit which in this case happens to use Labgear wide-band couplers—see Fig. 3. For AM, this PA is modulated in the usual way by two 807's

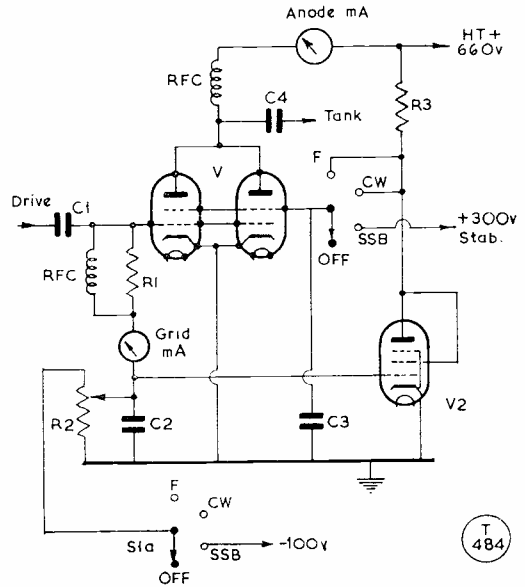


Fig. 2. Modified 807 PA, as Fig. 1, for CW, SSB or AM working at will. C1 is as normally used on the PA grid side; C2, 0.1 μF; C3, C4, as normally used; R1, 10K; R2, 10K control potentiometer, see text; R3, as for screen dropper under AM/CW conditions; switching can be by using a ganged Yaxley-type arrangement.

in zero bias Class-B, with appropriate power supply. The additional item on the PA unit itself is the "function" switch, connected as shown in Fig. 2. This can be a surplus item and should have plenty of contacts.

What was required was that this PA should be either (a) driven AM or CW, or (b) driven SSB.

Circuit Arrangement

The circuit of Fig. 1 is representative of almost any parallel-807 arrangement, whatever form of grid exciting connection may be used. This is modified to Fig. 2, in which the negative grid voltage is applied in the SSB position of the "function" switch, and set by the 10,000-ohm potentiometer R2. This adjustment should be such that standing current in the 807 PA is 35 mA when undriven. (When switching over to CW or AM phone, R2 must be readjusted to give the correct grid current under normal operating conditions.)

Resistor R1 helps to stabilise the input impedance when working in the SSB mode and has no significant effect when using CW or AM phone.

The Labgear wide-band coupler unit was itself modified to the arrangement shown overleaf—by winding link turns on the cold end of the grid coil for each band and fitting an additional wafer at the end of the existing band-change switch. These links are brought out to a socket into which the SSB exciter can be plugged; when it is removed,

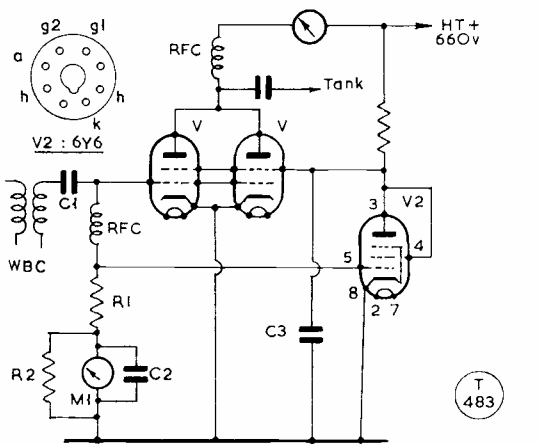


Fig. 1. A typical RF power amplifier circuit using a pair of 807's in parallel, with V2 as the clamper. The usual pi-network tank is assumed.

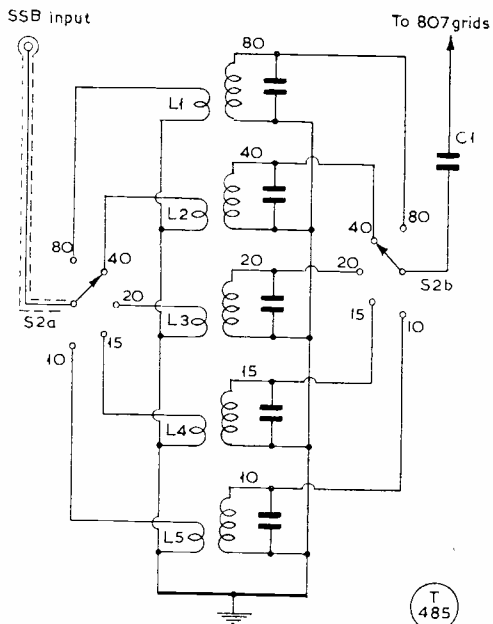
Fig. 3. If a Labgear wideband coupler is being used in the Tx, it can be modified as shown here for the injection of SSB drive. With a single-pole 5-way wafer switch for S2, the link windings, made of p.v.c. insulated wire, can be: L1, four turns; L2, three turns; L3, two turns; L4, two turns; and L5, one turn.

the PA can be used for CW or AM operation in the ordinary way, with the "function" switch in the appropriate position.

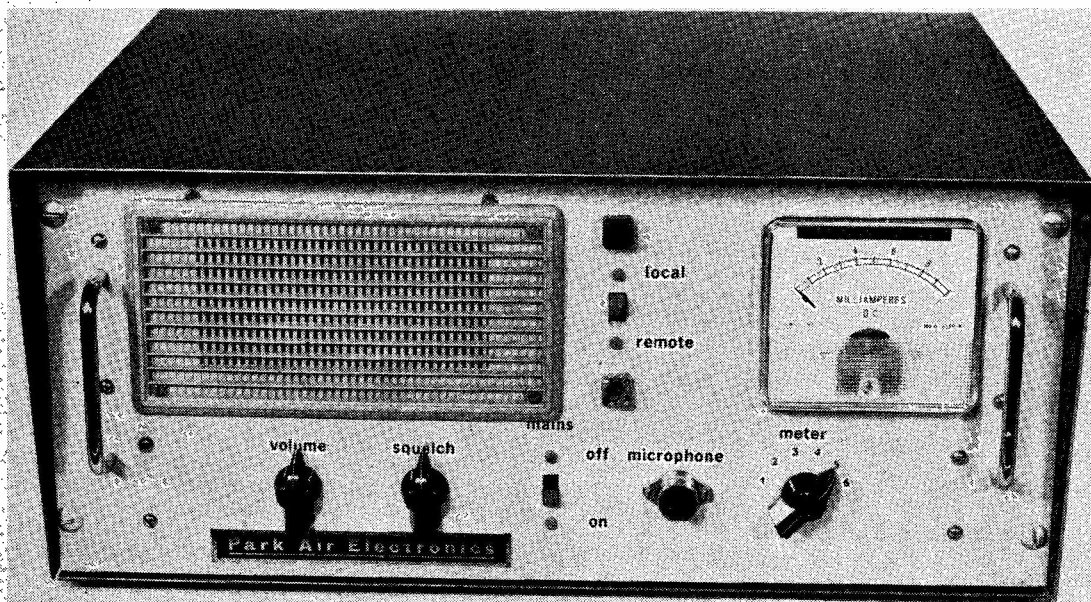
Under SSB conditions, the 35 mA standing plate current in the 807 PA increases to 200 mA or so with full SSB drive. The HT unit should be capable of supplying this order of current with good regulation.

LONDON SSB DINNER

Further to the note on p.739 of the February issue of SHORT WAVE MAGAZINE, those interested in this function—which takes place on Saturday, May 20, at the Royal Garden Hotel, Kensington High Street, London, W.8—are reminded that their bookings, at 75s. per head, should be made with: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10. (Tel. LEYtonstone 6700.)



T
485



This is the Park Air Electronics Model 50Z VHF transmitter-receiver, designed and introduced by F. K. Parker, G3FUR, a newcomer to the commercial field in this particular sphere—that of ground-air communication. His 50Z Tx/Rx covers the 118-136 mc aircraft band, single-channel by choice of xtal frequency, and gives 8 watts RF power out. The receiver side is double-conversion, also operating single-channel. The Rx features include variable squelch control, the squelch lifting off with a signal input of one microvolt, and a signal-to-noise ratio of better than 10 dB at 2 microvolts input over the whole tuning range. The 50Z is a complete ground-station installation for direct or remote control and meets all requirements of the official specification for such equipment intended for aircraft working. It is supplied complete with aerial system and p-t-t microphone.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

ONCE in every few years it becomes necessary to report on activities of a nature which make one wonder if the game of chasing DX is becoming a mania. Older followers of this piece will remember the sordid affair of the "ST2UU" calls, which ended up with some folk losing as many as 14 countries from their "confirmed" score overnight. Now the problem seems to be coming up again, this time in connection with the much-heralded ZA expedition. It seems clear that 11 stn. and his "expedition" to Albania were no more than QRM. A pirate is one thing—after all the poor boob is probably a pirate because he lacks the wit to obtain a legitimate call, and hence one can at least understand his frustration coming out as piracy, or even plain QRM—but the owner of a perfectly legitimate call who, out of sheer exhibitionism, comes up from the home QTH using a rare DX prefix, is one stage lower than a pest.

And now, just to cap it all, we hear that ARRL have put out a nine-page report regarding the operations of W9WNV from various places; lack of authorisation for operation from K1IMP/KC4, and VU2WNV, and log discrepancies in respect of FR7ZP, VQ9AA/A, VQ9AA/D, and 1M4A are alleged, and until further notice no further credit will be given by ARRL for any DX-pedition by Don.

To be fair, it has to be said that the problem would seem to be one of unprincipled operators trying to "fiddle" rather than there being much wrong with Miller's own activities, at least as far as the last four mentioned operations are concerned, but it does make one wonder whether the present system of "QSL managers" may not have a lot to do with this sort of situation, with so many eager-beavers after cards. When an operator has accumulated an immense number of QSO's—if such they can be called—and has to go through the chore of checking the cards and QSL'ing the good ones, it must be very easy

to take the incoming cards on trust rather than check them; and in any case where the logs are retransmitted from the DX station to his QSL manager, there is more than a likelihood of errors creeping in, to say nothing of the inevitable misloggings at the DX-station end, the optimists' one-way QSO's and the general liddery that lives around the outskirts of any real DX pile-up. The only real check against all this is the vigilance of the DX-station operator and his manager when the cards come to be written out. Perhaps the solution is a *general* tightening-up in the definition of a QSO, to slow the pace of operations down to a rate where the errors are greatly reduced. After all, as we have said before, the lids are always with us, and most of them can't help it—poor souls!—but the presence of the lids is no reason for letting the Wide Boys get away with it. (Now, has anyone got a Good Book?)

Around the Bands—Ten Metres

At the top of the pile this month is G2DC (Ringwood) who makes a welcome reappearance after a period of relative inactivity. As Jack says, since he has been able to look over the bands again, conditions have been pretty fair all round, with abundant DX. As far as Ten is concerned, and indeed all the bands, the period 0700 to 0830z has been distinctly forthcoming on most mornings. Jack mentions a couple of "dud" days, one on the morning of the CQ Top Band Contest, and the other, also a Sunday morning, was during the first leg of the ARRL CW contest. As for the results of his efforts, nothing too exotic, but VE7EH is considered worth a mention.

A user of both CW and AM Phone on 10 metres is G3VDW (Coalville), who seems to have been enjoying himself. On CW, Terry mentions UA9's, TA2AC, OD5LX, ZS1 and 2, UL7's, EL2Y, LU3EX, 9J2RO, and VU2WB, with YA3TNC coming under the heading of "escaped." As for the telephony

side of things, VE1 to 7, all W call areas, including the first W6 and W7 contacts for G3VDW on this particular band; 5N2's, CR6, UI8AGG, UA9, and a contact with VE3DRD/AM over Lake Ontario as a savoury. First 10-metre contacts for him with Alabama and Delaware in addition seem to suggest that, all in all, Terry is having fun.

Up there in Inverness, GM3IAA has also been giving Ten a going-over, and remarks that on March 5 the band was still holding up as late as 2100; Jim himself got a W2 and W3 back to CQ calls after 2045. Oddly enough DM3IGY (the beacon on 28-000 mc) was only just readable at 1900. The previous day, Jim worked one of the best "drifters" to be reported this side of the Iron Curtain, in the form of a ZS who started each over on 28003, slid down past DM3IGY and clean out of the band to 27999 kc, returning to the higher frequency at the commencement of each over! This was followed by a batch of W's and VS9AR, who reported him as the strongest G on the band. An interesting one among the W's was 3C2AKQ/W7, located in Seattle, and ex-G3DHF.

G3PQF makes a welcome reappearance in this piece, and says he has now received his garden, with a suitable set of radials duly built-in. As a result, Dave has been having a little dabble on 10 metres, particularly during the contests, and on March 11 his breakfast was completely ruined by VK2FU, JA1OYT, and 9V1NY eluding him in quick succession—what an *awful* way to start the day! (But it shows what is about on 28 mc these days.)

Misfortunes never come singly, and the second one in the chain befell G3GIQ (London, W.5) who arose one morning to find the beam and mast splattered all over the garden—no mechanical failure, but merely a guy-wire not strained up tight enough, and the gale did the rest. Henry is therefore reduced to a 95-foot wire with tuned feeders for all bands, which in turn means only

the exciter can be fired up, and hence he is not getting quite the reports he used to; but on the other hand, he has been agreeably surprised to find out just how well he *has* been doing! The pick of the month on Ten was TG9EP.

As far as G3NOF (Yeovil) was concerned, things seemed to be looking up last month, with the band opening as early as 0730, and going on until as late as 2130. HR1KS, VK6EK, all U.S. call areas including W7AYY in Arizona, and ZD8RD, all get special mention by Don. During the ARRL Phone Contest, he called "CQ Contest" a couple of times and was almost overwhelmed in the avalanche of responses; as he says "No wonder the DX stations have trouble copying call signs!"

That renegade from the VHF's—A. J. Devon, no other—was heard lining up his victims on the Sunday of the ARRL CW Contest, and shooting them down at the rate of about seven to a CQ call at odd times between 1100 and 1900z. Interesting, because A.J.D. is an exponent of the half-size version of the G5RV, and this aerial—which is so often adopted by people who say they "have no room for anything better"—is used, in conjunction with another identical one at about right-angles, to give world-wide coverage and a fine signal.

Eighty Metres

G2DC took a distinctly good view of this one when he said that on some occasions during the period under review he was not sure which of the bands between 3.5 and 28 mc he would say was "giving" best. As he says, admittedly most of the stuff has been W, but mainly Middle West and Western areas, and hence, classifiable as DX; the occasional ZL has also been heard.

GM3KLA (Haroldswick, Unst, Shetland) has been digging quite deeply and has excavated much of interest. Bill quotes such items as VK5KO (3502 kc, 2008 GMT), ZL4IE (3503 kc at 0800), UF6, OY2H, ZB2AM, 4X4MR, VO1AW, LX2BQ, and OH2NL, all as a result of pounding brass.

Also in Haroldswick is GM3SVK, who remarks on the signal from VK5KO, and ZL4BO, but Fred considers his "catch of the month"

to have been 6W8CD.

GM3IAA (Inverness) does not seem to have spent a lot of time on 80m., but nevertheless has a contact with W2 and UV3 to show for his efforts.

Coming down South, we hear from G3VOK (Luton), who has been deserting his old stamping ground on 160m. since he acquired a Heathkit DX-40U, which has been set to work on the same 300-foot wire; many W stations (and VE's, of course) have been brought to book, with PY2CHM as the best DX on the band in the three weeks between firing up the transmitter and the date of his letter—not bad going for Eighty, and with a small Tx, too.

A man who counts his blessings is G4OU, who regards himself as being lucky insofar as a disability restricts his operating to between 1000 and 1400 GMT, when the QRM is not so heavy as at, say, weekends. He uses a half-sized G5RV aerial for his forays on the HF bands, to which he has recently returned after a long period.

Eighty is a band that has provided its full quota of interest for G3VWC (Bishops Stortford); Andrew mentions a weirdie signing HRA7GA/MM, name of Frank, and said to be in the m.v. "Laissez Faire," using an HQ-170 receiver and an 807 PA stage. In the way of "good" stuff, he had VE8MA.

A new correspondent to this piece (who forgot to give his QTH) is G3VYF, who lives in a flat somewhere in North London, we gather from our spies, and hence has to go to various odd expedients to get his RF out to the world at large. Nevertheless the Codar A.T.5 transmitter, coupled to the trusty old AR88 and this odd aerial, seems to have been doing it's stuff. On 80m., the pick of the crop for his QRP was WA1CCT, and many Europeans.

Although G3VPS (Wartling) has worked his fair share of the DX he has been spending more of his time preparing for a change, not too far distant, when G3MOJ returns to the fold and reclaims the Viceroy transmitter. To that end G3VPS has acquired a 19 Set, and so far it has been persuaded to cover the whole of Top Band, and to produce 30 watts of power on 80 and 40 metres, from a separate AC power-

pack. The corollary to the proposition is, of course, that aerials for the LF bands have now to be erected.

A late report from G3TLX (Edgware) arrived just too late for incorporation in last month's piece; Ron has been spending quite a bit of time on Eighty, and found thereon 5A1TY, W's and VE's, plus UD6, UJ8, UA9, all on the key.

Some nice DX on the band is reported by G3TWW (Newark), who used SSB for his contacts. In particular, George mentions 3C3JFZ/SU, EP2BQ, K7UIT/9A1, ZC4AK, VE's, VS9's, and ZD3G as being worthy of note.

The Tabular Matter

This is up to date, and the Tables are being shown as space permits; however, we have only four entries for the Five-Band Table (*New Cycle*) which is a little disappointing, and as low as three entries for the Zones-and-Countries affairs, which does not seem to be very popular, as yet.

TOP BAND LADDER

(G3U-- and G3V-- stations only)

Starting Date, January 1, 1966

Station	Counties	Countries
G3UTS	89	10
G3VMW	83	16
GM3UVL	78	13
G3UBW	76	18
G3VES	63	16
GW3UUZ	63	14
G3VMK	61	10
G3VOK	60	14
G3VLT	57	10
G3UXP	56	9
GW3VPL	55	13
G3VGR	54	12
G3VMQ	51	14
G3UJS	51	12
G3USE	50	12
G3UVT	50	10
G3UGK	43	13
G3VSL	43	9
G3UGF	43	8
G3UMK	39	7
G3UCS	36	?
G3VLX	32	5
G3VYF	?	13

The Five-Band Table will be retained for the moment, but as for the other one, we will replace it with a different effort, still based on Zones for the scoring.

Looking at the panel on p.92, the Zones are given a points-rating in accordance with the distance each Zone is from Zone 14, in which the U.K. is situated. To find which country is in what Zone, the SHORT WAVE MAGAZINE DX Zone Map, and the associated list (which appeared in our November, 1966, issue) will be taken as the standard.

The bands will be 7/14/21 mc; on each band add up the points for each Zone until you have the lot, when you will have a score of 872 points per band (See Zone scoring system) and then you can start again. Each Zone can be scored only once in each "set" of Zones, and each band will be scored separately. In addition, the Countries Total since the starting date for each band will be shown, so that the final Table will have headings as given at foot here (which is how you show your score). Thus we can see that this (mythical!) G3KFE score implies that on 21 mc we have hooked all the Zones and are part-way towards a second lot and it took about ten weeks for the first WAZ to be completed so that we could start the second one. Starting date will be January 1, 1967—and as many entries as possible, please, as soon as possible.

Forty Metres

Quite a pile of letters to sort through and comment on this time. G3VPS, with the Viceroy has had contacts on CW with TA, UA9, HI, YV, and W5. Particularly noteworthy was an encounter with W4JCI, who has a beautiful fist and very rarely slips up with his keying—makes you feel ashamed of your own fist when you realise this chap is 80 years old. Long may W4JCI be around on the bands.

G3VWC has now managed 22 countries on 7 mc CW in the month under review; thanks to the Idiots' Lantern, the HF bands are out for him in TV hours, but at least a



Picture full of significance. In the background the Eddystone Light, and on the right Arthur Edwards, G6XJ, director of the well-known firm of (need we say it) Eddystone Radio, for many years a leading manufacturer of specialised communication receivers. Since the early days, they have used the Lighthouse as their trade-mark. On the occasion shown here, G6XJ (who has been a principal of the firm since its inception) was presenting the keepers of the Light with an EB35—one of the latest Eddystone receivers, which covers all BC frequencies in the LW/MW/SW and FM bands. The Eddystone, located 14 miles south south-west of Plymouth, and one of the most famous lighthouses round the coasts of Britain, had to be built four times before the present structure, completed in 1882, stood against wind and sea. (The remains of one of the previous erections, known as Smeaton's Stump, can also be seen here.) And we might add that G6XJ had quite a hazardous trip in the Trinity House vessel "Stella" before he was able to hand the Eddystone EB35 over to Principal Keeper Emerson.

taste of the DX can be found on Forty!

G4OU (Sheerness) has found the 7 mc band quite rewarding, and booked JA6YB, VK3MO, VK2AVA, VP6KL, PY7ACS, CN8BV, CN8AW, OX3BX, and ZB2AJ. On the other hand GM3IAA only offers one contact on this band other than W, namely 7X0.

One supposes that the lads in Shetland, GM3SVK and GM3KLA, must have come to some amicable form of "band planning"—any way they both report on 7 mc! Taking Bill, GM3KLA first, we find

VP9BY, HI3PC, 6W8CD, UA0TD, UF6VA, and KV4CI. GM3SVK was on the band for a short time, but contrived to find CM2QN, TF5TP, VK7SM, W7SFA, VP2's, VP9's, with HI8, HK, and JA getting away. Fred admits the VK7SM contact was not a chance one on the band, but the result of a series of skeds—nevertheless it is a good contact.

One suspects that G3TLX has not been working them as easily as usual during the month covered in his report—he castigates the band as "useless, especially the first 20 kc, and often the whole allocation." Nevertheless, his contacts on the useless band are worth mentioning: W, VE, YN1CJD, 5A1ITY, HI7, CN8, TAISK, 4X4, VQ9AR, (which Ron regards as the best of the

	7 mc		14 mc		21 mc	
	Zone Pts.	Countries	Zone Pts.	Countries	Zone Pts.	Countries
G3KFE	2	1	104	15	999	199

bunch), and KØLUZ/KV4.

General DX is the opinion of G2DC; he mentions W6's as being two a penny in the mornings; VK2, 3, and 4, all at good strength; and the star of the band—KH6GEW, who has been peaking to S7 around 0800z.

Twenty Metres

G3VPS is reporting the odd contact on SSB as well as CW, XE, VE5 and VE7 being the best on the former mode and VS9 on the latter. On the other hand, G4OU is all on Phone, and reports a crop of such length that we can only select—but *how* to select, that's the rub!—as they are all goodies. VP8AO/P/OX in Greenland, sitting on a glacier which they calculated to be 1500 feet thick; 3C8RCS, at Alert, 400 miles from the North Pole; VR's, ZL's, PY's and YV's, JX5, W's and much of interest besides, all on the $\frac{1}{2}$ -G5RV, at a height of 20 feet. To get the power into this, G4OU has it balun-matched into a Z-match aerial coupler, with the usual items such as SWR meter around, to ensure that everything that can be done is done to make up for what might be any lack of potency of his skywire—and the policy appears to be paying dividends!

It is the early bird that catches the worm, and on February 14, GM3IAA was looking for "worms" on Twenty; as a result of the unaccustomed early rising VK2IC fell into the crop, and gave Jim his first VK contact from GM3IAA. This has enabled him to acquire his fourth lot of the only certificates he considers worth keeping, namely WAC and WBE, the others having been gained when signing VS2AF, VS1AA, and VS2AA; two former were claimed 'way back in the early thirties. For the book, Jim mentions a station signing SP4KDM, calling a WD2RD (!) with a genuine, real-McCoy-type *spark* signal. Another one that gave him the shudders, with the most fiendish chirp heard since World War One, was from YO2KCB. Your E.P.E. heard this one, too, and would fully agree—he could not even be sure that his reading of the call was correct until about the fourth time of trying.

GM3SVK has contrived to spend quite a lot of time on CW on Twenty, particularly during the latter part

of the period, and found something at just about any time of the day or night. The period 0500-0700 would bring in the UAØ and Eastern Zones, then up to lunchtime Europe waking up, with DX lurking underneath. Afternoons brought in such things as VK, JA, 9V1, VR2, W6 and W7, followed a little later by KL7, HK, YV, ZP, LU, and VP8 until about 2100z, with W6 and W7 still there and the East Coast W's easy. Nevertheless, Fred offers his prize of the month as UA1KED in Franz Josef Land, right inside the Arctic Circle. Other relatively choice specimens included CR7IZ, HK3AVK, HL9KB, JA's, KH6, KP4, KL7, OX3ZO, PZ, TF5TP, TI2PZ, UAØKAE (North Pole station, in Zone 19), VE8ZZ in Zone 1, VU's, VK2BRJ/9 and others. Nothing to get excited about, the man says!

Another who reports Twenty open whenever he tried was G3NOF (Yeovil) who found it giving as early as 0700 and as late as 0100. Don says that although the long path to VK-ZL-JA-KR6 is open around 0800, the European signals from DL, SM, LA and OH were also strong, which phenomenon he does not recall having occurred at the same period in the last sunspot cycle. This your scribe would dispute, as he remembers well the same comment being made then—one would suspect that everyone who has seen a sunspot cycle right through and is on his second or third one tends to remember the good and forget the bad. In addition, one would suspect that the number of the European stations who are classifiable as DX-QRM has increased proportionately to the number of G's and DX stations. (Clearly, the best

thing to do is blame it all on the Government!). Among the DX worked, Don mentions several VS9A's; it will not be long ere this part of the world gains the status of "rare DX" by the look of things political. Others mentioned by G3NOF are VKØCR on 14180 kc SSB, VK8OX, VK9XI (Christmas Is.), and VP5AB.

In spite of the problem of the aerial, G3GIQ seems to have kept up with the hunt, both on Sideband and CW; the latter mode yielded UI8LC, while the former produced KV4, PZ1CF, VP2AA and 'GAI, also 9M2PO (Malacca).

Although G2DC has been on 20 metres, and agrees with the general view as to the good conditions, he makes very little comment in the way of mentioning specific contacts, other than VK8HA, also a QSO with 6W8CD on all *five* bands—6W8CD being, of course, our old friends Lloyd and Iris Colvin, who have been on from the QTH or 6W8DX at the top of a six-storey building. Their programme at present seems to call for operation from TZ and ZD3 after a call at 5T5. All QSL cards must be sent to the *Yasme* QSL Bureau.

G3VOK (Luton) has been sampling the joys of DX on the HF bands, using a ground-plane to hook CM2, VU2, VK, ZL, and JA, all of which were new countries—not so dusty for the first three weeks on Twenty!

The activity from G3VDW (Coalville) shows that Terry has not lost his touch with the brass yet—he is now up to 116C overall with 80 of these countries on 20 metres. During the period he reviews in his letter he mentions 5A2, UA9's, ZL, YV5, G5FMP/W1, DU1OR (for

FIVE-BAND DX TABLE

(New Cycle)

Starting date: January 1, 1967

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc
G3IAR	115	24	51	76	35	48
GM3SVK	98	5	55	7	23	10
GM3JDR	50	—	50	30	—	—
GI3GTR	44	1	12	35	12	9

Note: Placings this month are based on the "Countries" column.

a new country and Zone) and VU2FN, which also represented a new one.

Both Phone and CW are used by GM3JDR (Golspie) who says that SSB yielded QSO's with HV3SJ, MP4TBO, VU2WNV, VK and ZS, while his longer list for CW includes ZS's, 9H1AE, VS9APB, VU2WNV, OY7ML (nice to hear Martin around) UJ8, UM8, UI8, UW9GU, 6W8CQ and others.

Straight from two years of the relative peace and quiet—his description!—to the rat-race on Twenty, is the story G3TKN (Wirral) has to relate. In the process Vincent had more than a fair share of gremlins in the rig, by way of power supplies blowing up (my, don't those electrolytics *pong!*), parasitics in the PA, an aerial that would not show a decent VSWR, and, to cap it all, the receiver went on strike. Incidentally, the rig is 30 watts into a Command transmitter, to a ground-plane, receiving on a Command Rx used as a converter into the CR-100 as a tunable IF strip.

Just to round off the story comes G3UOL, who is very much in favour of *contests* as a means of working DX for the less-potent station—such as he himself claims to own!—his point being that in a contest, people do not pile-up so much on to the rare DX, whose points-value is very rarely as high as his DX value. Even if he is, people finding a queue waiting for a QSO will tend to go away and earn a few bread-and-butter points, meanwhile keeping an eye on the DX frequency to see when the time is opportune for a contact without too much lost time. G3UOL has FG7XL, FH8CE, FR7ZD, XW8BS to offer this month—no prizes for guessing which ones came to the surface in the R.E.F. Contest!

Fifteen Metres

The fifteen-metre allocation has also received its fair share of attention this month, and again the general consensus seems to be that business has been distinctly brisk, to put it mildly.

G4OU opens the batting this time, and mentions VK9DJ, JA2HYA, and 9M6NQ. Taking it all in all, that aerial certainly does get out on all the bands on which it is set to work. Similarly, in the

“short report” fashion on this particular band, is GM3IAA who mentions only SVØWLL, unusual up there, W6 and W7.

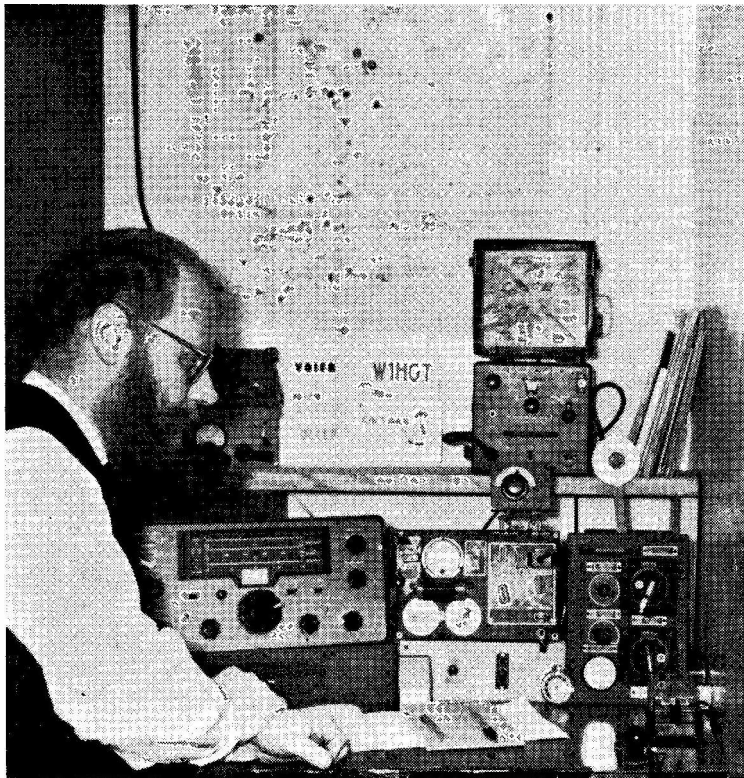
On the other hand GM3SVK has a long list of CW on Fifteen. He found that the period to about 1000z gave JA's, with VK's from then till noon. After lunch a few Africans, followed by the East Coast W's, until by early evening one would find W6 and W7, giving way to stations in South America and the Caribbean. For a sample of the brew, consider F8TT/FC, FL8RA, EP2HB, KR6, KV4, MP4MAW, PY, UAØ, UM8, VK's, VP2, VS6, 6W8CD, 9V1NV.

A pity that TVI afflicts G3NOF, but in spite of this Don was able to

get across the pond many times, and also to latch on to JA's and 9G1DY; frustrating it is to know that the DX is on the band and all one can expect to work is the TV set, with a report of S9!

Henry of G3GIQ seems always to offer a list of SSB stations and one CW item for each band. This month is no exception, and the solitary CW offering is UL7NH, with FH8CD, HK3ABI and 'AXW, JA's, KR6's, HS1NO, KL7, VK9, UH8AE, 9G1DY, all booked in with the microphone. Not so G2DC, who uses just the one mode, CW, and this month mentions only one call-sign—HM5BZ.

On now to G3TWV, who has a regular sked with MP4TBO; in



By sheer chance, another lighthouse picture this time! Here we see GW3UUZ, “Andy the Light,” of Nash Point Lighthouse, Llantwit Major, Glamorganshire, between Barry and Porthcawl. Andy, who remarks that the contract for trimming his ginger beard is given out twice a year (!), first became interested in Amateur Radio in 1960, whilst on a posting to the Longships Lighthouse off Land's End, where one of the other keepers was a keen SWL. Andy started with nothing but enthusiasm and, by study during his off-watch periods, got his R.A.E. pass and through the Morse test by August 1965, having been entirely self-taught. Because nobody previously had applied to operate from a lighthouse, much paper-work and negotiation had to be gone through before the GPO would issue the licence. As we all now know, the LF bands are the main interest at GW3UUZ, and Andy has done very well with the DX on 160 metres. He uses the 130ft. lighthouse tower for one end of his aerial!

addition, on February 19, XW8BJ, a couple of KR6's, and a brace of VK's were all raised in short order. Long and short paths were open simultaneously at the time, yet oddly enough, locals as near as 12 miles away heard nothing, due to rain static on all bands.

As far as 21 mc is concerned, not much escaped the eagle ear of GM3JDR, although his SSB list is admittedly a bit shorter than the CW one. To take the latter first, just about all the important stuff mentioned by everyone else is to be seen, plus FB8XX, WB2PXZ/VP9, VS9HRV, KH6FRI at 1918z, and a couple of W7's, W7JKP and K7QCO, both in Montana, who were found at 2100z. As for the SSB: EP2GH, YA5RG, PJ5BC, CR4, JA's, ZC4's, UW9's, VK's, and EA8FG.

Nice to hear again from G3UOL (Coventry), who believes that "a shy call from the wings during a contest" is the way to hook the rare stuff that normally would not be other with him—but your E.P.E. is ready to take a small bet that the majority of Bill's DX was won the hard way! For the month under review, he mentions VK2's, VS6FS, and 9Q5FV, all found during the lunch-time period.

Top Band Doings

Always lots and lots of correspondence here, and this month is no exception, so we will have to be as brief and to the point.

It is a trifle unexpected to think of G3IAR (Sevenoaks) in the 160-metre context, but Mike takes up GM3IAA's comment last month regarding his GM-9H1 contact. Mike was ZBIAR in March 1950, and at that time he worked GM3ATV and G3NT—both on March 12, 1950. Mike also says he is not sure whether these two were in fact all-time firsts. In his turn, GM3IAA points out an error last month, where your scribe tried to make, in

the penultimate paragraph of col. 3 on p.22, January 5 into a Sunday—we *should* have said February 5!

The letter from GM3SVK makes only a brief mention of 160 metres, in connection with both W1BB/1 and WIHGT roaring in at 589, but both Gotaway. However it is fair comment that in the London area quite a few people have been amazed at the strength of the signal Fred lays down of late—that inverted-Vee is doing a good job.

Another rarity on Top Band to report, albeit very briefly, is G2DC, who came on for the CQ Top Band Contest and worked three W's, a VO1, and a total of fourteen countries, during the event.

A most interesting report card came in during the month from UA6AJ (Armavir). Using an AR88, Yuri heard, in November, GD3TNS at 589 on the 15th, G3RPB at 589 on the 19th, and GD3TNS again on the 21st, this time at 569. On December 6, between 0105 and 0225 MSK, the following U.K. stations were logged:—G3RRJ (569), G3RVM (599), G3UGK (579), G3UMB (559), G3SWW (569), G3TKF (579), G3RPB (589), G3SZA (599), G3MYI (589) and G3VOK (559). Just for the record, Armavir is about 1900 miles from London, due east, and the path is virtually all over land, so it is pretty fair going for Top Band. MSK time is four hours ahead of GMT, so the reports were all on transmissions made between about 2000 and 2230 GMT.

As already mentioned, G3VOK was heard by UA6AJ; since then Brian has worked VO1FB, and pushed his score to 60 countries and 14 Countries, before he got on the HF bands.

A quick starter off the mark is G3VYF—Mike started on December 20, and has already 13 countries, including VO1FB, and W1BB, and has the QSL cards to prove it! As for countries, he is not sure of his total, but 26 are confirmed so far.

Andy the Light—(GW3UUZ)—is a little cross this month, because he missed out on 6W8CD and 5H3KK, both of whom were coming in at good strength to him. However, his biggest gripe is that, as a result of his duties at Nash Point Lighthouse, he is on most days from 1400, calling CQ, and only working the odd mobile or semi-locals like G3SED or G3BEC, although he can often hear G stations obviously working their locals with the gain controls turned down.

G3VSL (Southampton) has an amendment to his Table entry to make, which gives him quite a lift in both Counties and Countries; so also does G3VLT (Orpington), who rises mainly as a result of a careful realignment of his TCS receiver and the addition of a Q-multiplier.

On the Countries front we hear from G3RPB (London, N.3) that he has, since the last time he wrote, raised 9V1LP, ZD8J, HI8XAL, W1FZJ/KP4, 5H3KK; also all W districts with the exception of 5, 6, and 7, albeit K5JVF and W5MCO were heard.

Incidentally, our statistician G3IDG says that according to his records 96 countries are, or have been, possible on Top Band. And this allows for changes of prefix, *i.e.*, whether you have Malta as ZB1 or 9H1, it still counts as one country.

After last month's lack of success, the tide seems to have turned for G3VLX (Sidcup), although nothing startling is made in the way of claims. Deryck missed out on his sked with 9H1AE, and was called by an HB9, who he ignored; this he now regrets as he thinks the HB9, who was heard by, and hearing 9H1AE, was trying to QSP.

GM3UVL (Dunbartonshire) wants to know where the county of Herefordshire is hiding—he only lacks this and Rutland to close the book on G counties.

A sufferer in last month's gentle

Zone 14 Score Card — Points for Working any Zone from U.K. (Zone 14)

Zone Worked ...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Score points ...	21	12	26	19	18	27	26	22	23	31	26	35	33	2	3	6	10	14	18	7
Zone Worked ...	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Score points ...	14	21	19	25	27	27	30	32	42	49	34	55	5	10	15	19	21	26	26	6

breezes was G3UJS, who lost one leg of his V-beam. Dave had a contact with an "HB9AIM" one afternoon about which he is vastly suspicious. However, the details quoted agree exactly with the *Call Book*, so either it is a genuine daylight QSO or some joker is a rather more thorough pirate than usual.

From GW3PMR we hear the sad news that he is now QRT, working for his Ph.D., and when that is over Alan hopes to go to VK-land, about this time next year, and will be back on the air from there.

A strictly 10-watt man is Howard of G3VES (Luton), and he mentions what a great thrill it was to work VO1FB with his 6BW6 PA and HRO receiver running into an inverted-Vee with the apex at 35 feet. However, he is helped somewhat by being on a high hill at 550 feet a.s.l. with a nice clear take-off.

This month's letter from G3VMQ (Burgess Hill) commences by admitting that the earlier prediction in last month's piece that things would be quieter did *not* come true! Phil then goes on to note some of the Top Band DX heard from his place. Comparing the various lists that have come to hand, it seems that this season all the W call areas were heard in this country. Phil's own contribution is a report on the reception of WA6ATY (San Francisco) heard at 0616 on the morning of March 5, which was followed at 0625 by reception of W6STR who was working various W's and receiving 559 reports from them. Both the W6's were getting over here at the 229 mark. Just three minutes later W7DOL (Scottsdale, Arizona) appeared, at RST-339. Adding to this the daylight QSO with GM3SVK on the morning of February 26, and sundry other W and European hearings and workings, Phil seems to have had a fine month.

Here and There

A defender of the UA/UB merchants has come to light in the person of G3ING. Most of those he has heard are either good, reasonable, or obviously learners! As for their manners when *in* a QSO, they are very good, and no-one can deny they do QSL very promptly. As he says, in a lot of cases the business of

calling on frequency is probably a result of almost all of them being forced to use equipment which, by the standards of the rest of the world, is inadequate, particularly on the receiving side, and has to be home-constructed. After all it must be admitted that many of the G's who scrape through the R.A.E. could not build a 10-metre transmitter—let alone a receiver capable of coping with 1967 conditions.

On the subject of short gardens and long wires (anent G3NUA, last month), G3IDG says he fits 150ft. of wire W-shaped into a garden 42ft. on the longest run, with a maximum height of about 30ft. One end finishes at the shack window, and by end-feeding through suitable resonating devices, he is able to work all bands from Top to Ten.

And we might also add that one operator we know of is getting interesting results with a large indoor *frame* aerial on *Top Band!* It gives directivity, too, on Tx as well as Rx. (More about this in due course.—*Editor.*)

On a rather different tack, we hear from W6AM (Long Beach, California) that he is now up to 345 Countries *confirmed*, with 341 confirmed in the Phone-only category. Don enclosed a colour photograph of his aerial farm, as now reduced to 25 acres (it used to be 120 acres!).

QSL Matters

G13PLL was until a few months ago at Gibraltar, from where he was to be heard as ZB2AO. Dick says he still has *hundreds* of ZB2AO cards, so if anyone wants one, drop a line to G13PLL, Dick Moore, 1 Club Road, Ballykelly, Limavady, Co. Derry.

A second note comes in from G13HXV, to report that G13CDF is now in Tehran and is on with the call EP2GI. QSL's for EP2GI are being handled for Les by G13HXV (*QTHR*).

As regards QSL's, a comment from G3IDG: "The only solution is to adopt a 100 per cent-via-bureaux policy, and stick to it. Ignore all s.a.e.'s and IRC's (they're only a subtle form of blackmail, anyway) and if the conscience pricks, denote 'em to the RAIBC..."

DX-Peditions

The Luton Lot—G3USE, G3VES, G3VOK, G3VMK—are going to La Rochelle, Guernsey, Channel

Islands, with a KW-2000A and new HF Joystick Aerial, and will be on all HF bands, and possibly 160 metres as well, signing with their own calls, during April 5-12.

Contests

A final reminder about the Grafton Contest, details of which were given last time out in this piece; logs should go to G3SIL, to arrive not later than April 17.

Don't forget the *CQ* World-Wide SSB DX Contest, which is on from 0001 on April 8 until 2359 on April 9, times GMT. Out of the period of 48 hours, not more than thirty may be used for contest scoring, the rest time of 18 hours being taken as desired but in not more than three periods. The exchange will be the usual 5-digit thing, RS plus serial number starting from 001. Contacts in the home country are permissible for gaining a multiplier but scores no points; countries other than the home one, but in the same continent, are one point apiece; while contacts with other continents rate three points each. The multiplier is determined by the total number of different prefixes worked, each prefix being counted in *once* only. Logs are to be sent on the correct type of form, or if none are to hand use the WW DX Contest forms (or make your own to a size of 8½ by 11 inches, 40 contacts to the page) postmarked no later than May 15, 1967, to *CQ Magazine*, 14 Vandeventer Avenue, Port Washington, New York 11050, U.S.A., marked "attention WW SSB Contest."

Acknowledgements

Apart from the old and new contributors, we must specially say thanks to W6AM, W1WY, Geoff Watts and his *DX News Sheet*, UA6AJ, and of course the jungle telegraph, for the background information from which the story has been written; we hope to hear from everyone again next time, the deadline for your letters being **Monday, April 10**, addressed as usual to: CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM, ENGLAND. (For the overseas types wanting to catch the June issue, closing date will be *May 8*.) And please, *please*, don't drop us the most important news of the month a day after the deadline—if you do your poor old scribe has no time to eat! *73 and BCNU*.

VHF BANDS

A. J. DEVON

IT has been another month of conditions varying much as the weather—the succession of “highs” and “lows,” with the occasional anti-cyclone situation stabilised for short periods in the Channel area, have produced the expected results: Flashes of GDX at times, and a certain amount of EDX for the southern part of the country.

The Region I two-metre contest over the weekend March 4/5 was interesting—probably the memorable feature for the portables out was the almost perfect weather. It was like a fine weekend in June! Calm, with an almost clear sky, high thin cloud in the evening after a warm day, and the barometer well up and steady. This condition was fairly general over Northern Europe, bringing in EU's as far to the east as DM, with many of the nearer Continentals being worked fairly easily from the Midlands down to the South Coast. However, QSB was a factor and an EDX station at RS-57 on one “over” would be in the noise on the next, resulting in many contacts being uncompleted. Activity was high—for instance, by 2350z on Saturday 4th, PAØZM/P had already worked 70 stations. At 1215z on Sunday 5th, G3LAS (Berkhamsted) was giving 106S. Looking further north, by 1640z, G3RXX/P, in the Clee Hills of Salop, had worked 133 stations.

Another good signal came from GW3RUF/P, near Abergavenny, in the lovely hills of Monmouthshire, and they were using CW at times. On the whole, there was not much to

be heard on the key, though the occasional CW signal did pop up at the LF end. Quite a number of call signs new to two metres were to be heard—which is always encouraging—as well as the odd comment, either interesting or amusing, such as “Tuning from 144 decimal 9 down”—why *decimal*? And “Well, cheerio then, see you further down the log”—instead of the hackneyed (and not always very sincere) “See you after the contest.” And when your A.J.D. finally found G6CW he was so high in the band that it seemed that A.J.D.'s calibration had gone screwy. Never mind—John was knocking them off quite comfortably up there.

A point on which your A.J.D. has been intending to touch in connection with AM working on two metres—triggered off again by what was heard during the contest—is that most stations sound very under-modulated, particularly those who have only come on VHF in the last year or three. There is quite a good reason for this: The operators concerned have not realised that in practice far more modulating power is required on VHF compared with the HF bands, where the rule

is “50 watts of audio for a 100-watt DC carrier”—to put out an effective signal on two metres, it is nearer 80 watts. (This phenomenon is discussed briefly elsewhere in this issue.—*Editor*.) A low-power signal properly modulated will give a much better result than a big carrier with not enough mod. on it. A striking example of a QRP station with full modulation, and hence good penetrating power, is G8VZ (Princes Risboro', Bucks.), who runs 12 watts only—he would not be able to maintain his remarkable sked with G3JWQ (Ripley, Derbys., 100 miles), now counting in the region of 2,300 contacts (*yes!*), unless he was able to penetrate. And G8VZ is not even well located as regards height a.s.l. Another very well modulated station is G5DF (Reading)—when he is on Phone, it is only possible just to hear the “edges of the carrier” with the BFO in. With many other stations, under the same conditions it is mainly carrier and very little speech. (They are the ones that ought to be using CW!). To get things right, it is no use asking a local “Do I sound fully modulated?” (The answer is always “Yes”). What you

THREE-BAND ANNUAL VHF TABLE

September 1966 to August 1967

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL pts.
	Counties	Countries	Counties	Countries	Counties	Countries	
G3EDD	27	3	47	9	32	5	123
G3LAS	28	3	38	8	14	2	93
G3FIJ	26	5	36	8	6	3	84
G3BNL	15	2	16	3	28	2	66
G5FK	26	3	13	4	13	2	61
G2AXI	15	2	29	10	—	—	56
G3TLB	9	2	39	6	—	—	56
G3EKP	20	6	12	4	8	3	53
G5UM	9	1	25	2	8	1	46
EI6AS	13	6	17	5	3	2	46
EI2A	5	2	31	7	—	—	45
G3AHB	—	—	26	4	12	2	44
G3KQF	—	—	15	6	10	2	33
GW3CBY	3	2	17	4	5	2	33

Scores are since September 1, 1966, and will accrue until August 31, 1967. Position is shown by last-column total as aggregate of all scores. Own county and country score as one each. Entries may be made for a single band any two or all three. Claims should be sent in as often as possible, to keep the Table up-to-date.

Raising the slot-fed 6/6 for the Cymdeithas Radio Amatur station GW3UCB (Bangor Univ.) on a recent two-metre contest occasion. It was a day of gale and ice at a site 2,500ft. a.s.l. in West Wales, and practically everything went wrong for the 15 intrepid adventurers involved—but they thoroughly enjoyed the whole experience and learnt a lot about the practicalities of /P working. This picture gives a good idea of the Wx conditions on Mt. Drum.



have to do is to get a more distant station to listen for you with his gains down and his BFO in. Your speech should sound to be filling the carrier, without causing splatter locally.

* * *

As mentioned in February, during April 3-23 G8APX (Bushey, Herts.) will be touring the west of Scotland and the Islands with his 70 cm. mobile station, for which trip he has skeds fixed with a number of GM's. The results should be interesting, because by taking 70 cm. /M seriously, G8APX has been able to show that very satisfactory contacts can be obtained. Recently, he has had mobile QSO's with eight different fixed stations, and among his findings are that, while rapid QSB can be troublesome (due to reflections off buildings, etc.), a very slight movement either way can make all the difference between a good signal and no-signal. It seems that one should think not of a single direct ray but a sort of interference pattern of nodes and antinodes, with many reflections of comparable strength—anyway, that's the thinking at the moment, and the fact remains that with the set-up pictured on p.735, February, G8APX/M is

doing very well.

Then on April 8, G8AHE/P (with G3OVA, *QTHR*) will be in Westmorland, starting up at 1900z on 433.26 mc and keeping at it till activity ceases on the band. During last year, these two went 70 cm. /P in several of the rarer counties, with considerable success. Being well organised for portable work on the 430 mc band, they are always glad to have suggestions as to where they could usefully go, and to fix skeds.

* * *

We also draw your attention to the VHF conventions announced here last time (p.24, *March*)—the Midlands in Wolverhampton on April 29, and the London at Twickenham on May 13. For many of the visitors, these also will be DX-peditions of great VHF interest.

* * *

Among those writing in this month is Gaby Felix, ON4FG, who brings us up-to-date on his meteor shower results. Using the *Leonids*, he worked UB5KDO and SV1AB—two very nice "Firsts" for Belgium. Then, on the *Geminids* appearance, ON4FG received YO7VS complete but it is not yet clear whether the YO got Gaby's final RRR, so this

is not a claimed contact. A particularly interesting comment from ON4FG is about a recent "Artob" balloon test when carrying *Oscar V* (the amateur VHF satellite for Europe, built by DJ4ZC). According to Gaby, all modes could be copied without any trouble and there was no sign of Rx over-load at any time.

These balloon flights (for testing the *Oscar V* package) are very difficult to pre-ordain as regards date and time of flight, because neither the Wx nor the wind direction, a very important factor, can be forecast more than 24 hours or so in advance, so that it is not possible to alert more than a few of the VHF operators who are fully *au fait* with what is being attempted. Anyway, what it all comes to is that *Oscar V* has been successfully tested under flight conditions and is giving as he should.

Looking at some of the other reports, we hear from G3SZX (Corsham) with a claim for the Annual, saying that he is on every evening after 7.30 p.m. and "would be only too pleased to give anyone a contact for Wilts." He runs a QQV06-40A in the PA, with a pair of 807's modulating, and the Rx is a transistor converter into an R.107,

with a slot-fed 8/8 outside. G3SZX is a bit disappointed about the apparent lack of activity on two metres—but perhaps he has been happier about that recently.

GW3CBY (Swansea) is still showing steady progress and it will be noted that he is represented in all columns of the Three-Band Annual. We might also say (with respect!) that G5UM (Leicester) is likewise making steady progress from the new QTH. Jack has started a new play—he is /P on both 2m. and 4m. and is keeping separate scores for these bands, when working under portable conditions. G3AHH (Slough) got five more counties for the Annual during the March contest, but missed out on the DL's offering. G3FIJ (Colchester) claims for all three bands and has a nice score for four metres.

The 4m. gen includes an interesting letter from G3PGJ (Plymouth) who lists six other stations active on 70 mc in that district, with others

TWO METRES

COUNTIES WORKED SINCE
SEPTEMBER 1, 1966

Starting Figure, 14

From Home QTH only

Worked	Station
47	G5NU
42	G3DAH
41	G3COJ
36	G3FIJ (115)
33	G3FNM
31	E12A
29	G2AXI, G3SZX (75)
28	G3TQZ
25	G5UM (131)
22	G2CDX, G3TDL
20	G3IOE
19	G3FVC
17	GW3CBY (65)
15	G3KQF, G8VN (76)

This annual Counties Worked Table will run till August 31, 1967. All two-metre operators who work 14 or more Counties on the band are eligible for entry. QSL cards or other proofs are not required. After the first 14 worked, simply claim from time to time with counties as they accrue, giving callsign and date for the county worked. Total of stations worked in excess of 50S may also be claimed and will be shown in brackets after callsign. To keep the Table up-to-date, claims should be made at frequent intervals.

coming on and several keen SWL's on watch. The gear in use includes: G3PGJ/G3SPI, with identical Tx's running 8w. to a 5763 PA, modulated by a 6BW6, but different Rx arrangements; and G3UBY, 20w. with a 6146 PA, and a CC converter into an S.640. G5ZT, who came on the band when it was first opened, has two Tx's, a QRP rig and a 50-watt job. As a group, the Plymouth boys find 4 metres excellent for local working, with no QRM and low power effective for 'cross-town contacts, using only vertical dipoles.

Another 4-metre report of interest is from G3OHH (Macclesfield). Roger, who runs 50w. with a 4/4, has had a nice (sked) contact with G3VPK (Chelmsford), using only a dipole and 12w. input. G3OHH is now at 62C in the Four-Metre All-Time.

G3EPK (Blackburn), who works all three VHF bands, is keen on 4m. and has a new transistor converter going well—he says "all I need now is the DX"! G13HXV (Belfast) is at 38C in the 4m. All-Time, and keeps steadily at it on this band.

From 70 mc to 70 cm.—G8AAY (Poole, Dorset) sends in a good list of 29 counties; among his best in terms of GDY are G2XV, for Cams., G3ILO (Durham), G8ACQ (Lincs.), G3JQI (Norfolk) and G8ARU (Worcs.)—not bad coverage

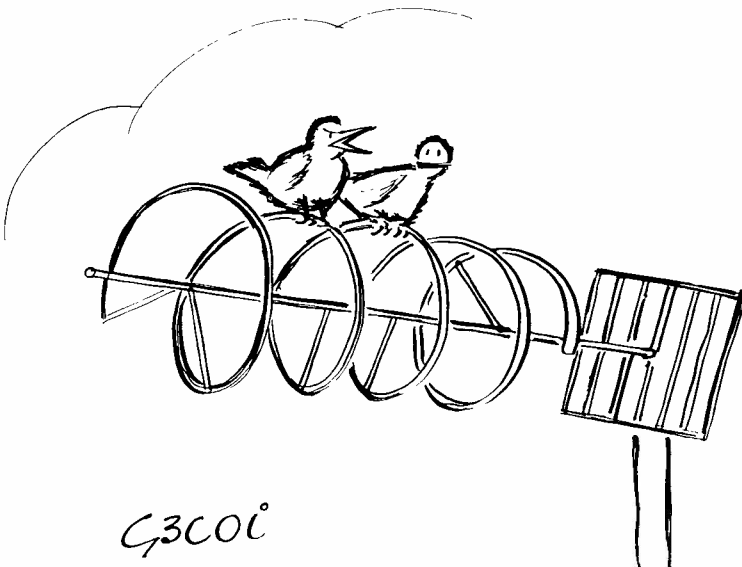
for 430 mc, particularly as he has 24 others besides!

A comprehensive report covering the all-VHF-band activities of G5FK (G.E.C., Wembley) is put in by G3HWR. They have gear for 13 and 23 cm., as well as for the other bands, but a difficulty is that, operating as they do from an industrial site, the local noise level is always about 25 dB up on Rx noise—which makes the reception of weak DX a bit difficult, to say the least! Incidentally, anent that remark last time about the 100S worked by G5FK in the 4m. contest, they had by then actually run out of stations to work!

From G3LAS we get interesting details of his new responsibility—the VHF equipment at G3VZN (see p.32, March). The programme includes gear for 23 cm., so G5FK will have a sparring partner.

Dead-Line

For the May issue will be Monday, April 17, latest—and with the Wx prospects, we could well have had a big EDX opening by then. Keep watching the signs, and let out a CQ even when the band sounds dead. Your news and views to: A.J.D., SHORT WAVE MAGAZINE, BUCKINGHAM. Allah be with you, and if he is with us, CUAGN on April 28. 73 de A.J.D.



“... Wish he'd go back to the Yagi—I don't feel safe on this helix...”

DISCUSSING SINGLE SIDEBAND

RECEIVER CONSIDERATIONS FOR SSB—IMPROVING OLDER MODELS—BFO INJECTION AND AGC FUNCTION— THE PRODUCT DETECTOR— USE OF LF FILTERS —CIRCUIT SUGGESTIONS

Part XI

B. A. WATLING (G3RNL)

MOST amateurs seem to have a "thing" about the home construction of receivers. Of all those who build their own transmitting equipment only a very small proportion produce the receiver. True, it has always been difficult to match the performance of commercial receivers with home-built types. But it can be done and some excellent designs have appeared in the Amateur Radio journals—more so in British journals than American, it appears. Those that come to mind immediately are the G2DAF, G3BDQ, G3RKK and G3HTA.

Some of the older commercial receivers such as the AR88, SX-28, HRO and the like leave a lot to be desired as regards SSB reception. However, they do lend themselves to conversion and modification, which can improve their performance out of all recognition.

What Is Wanted

It is as well first to consider the requirements of an amateur-band receiver. The two most important points are selectivity and sensitivity. Not necessarily in that order—different operators have different ideas on this. The two things are, in the writer's opinion, equally important and in fact do go hand-in-hand to a certain extent.

Dealing first with sensitivity one sees quoted figures such as "1 μ V for 10 dB signal to noise (S/N) ratio." Now, 10 dB is reckoned to be the minimum level over the noise at which a signal can be readable. Therefore, with the figures quoted above, a signal strength of 1 μ V at the aerial terminals will be the lowest strength that can be resolved. This 1 μ V for 10 dB S/N is the thing to aim for. It is fairly easy to achieve on the low frequency bands but gets a little difficult to meet on 10 metres. Some say that perhaps it is not quite so important these days due to the congestion on the bands. A signal of 1 μ V is going to be impossible to hear when signals all around are many times greater than that.

The required sensitivity cannot just be made up by front-end gain. This may improve the handling of weak signals but a strong signal will block and cause cross-modulation. Cross-modulation has been referred to before in this series but under a different name. What is known as "inter modulation distortion of linear

amplifiers" is exactly the same thing. The object is to keep the RF amplifier operating in the linear portion of its characteristics under *all* input conditions. If not, then mixing in the RF amplifier will occur and strange signals will appear over the band.

Why, then, are RF amplifiers used at all? They are intended to achieve the desired signal-to-noise *ratio*. Mixers are extremely noisy stages. A multigrad mixer can generate internally noise which is two or three times greater than the 1 μ V signal we require to copy. The RF stage, which is considerably less noisy than a mixer and introduces noise at somewhat less than half the voltage of our required signal, amplifies the signal to a level sufficient to overcome the mixer noise. Noise can be considered as being equal over the entire spectrum. This means that the wider the bandwidth the greater the noise figure. Hence, as previously stated, selectivity and sensitivity go hand in hand.

Noise Control

Triode valves are much less noisy than multigrad valves. One could in theory use a triode amplifier with less gain than a pentode but still provide the necessary gain to overcome the mixer noise. The disadvantage here is that triodes require neutralising, which complicates matters more than somewhat. Some people have, however, used double-triode cascode RF amplifiers with great success.

An alternative arrangement could be to use a triode mixer with no RF stage. This would seem to offer some advantages. But it isn't used a great deal, for two reasons. The first is the problem of radiation of the VFO signal into the aerial. This can be avoided to a great extent by injecting the VFO into the cathode of the mixer. The other disadvantage is that with only one tuned circuit at signal frequency the second-channel rejection is not too good. Again, this can be overcome by using a high IF, *e.g.*, 5 mc where the unwanted signals will be 10 mc away. In fact, there are commercial receivers which do not use an RF stage at all. For instance, in one type, on 80m. it's a single conversion with a double tuned input coil, while on the other bands



"... Oh, I don't play the thing—I use it as a two-tone oscillator..."

it becomes a double-conversion receiver having a crystal controlled front end with 80m. as the tunable IF. Both mixers are triodes thereby minimising the noise.

Further Considerations

Getting back to more conventional receivers there are obvious advantages in using only one conversion in that there is only one mixer to generate the high noise. Thinking back on our earlier learnings the text books say that more than one conversion is almost mandatory. This learning is now a little out of date. The reason for wanting two conversions was the choice of IF channels. A low IF is required in order to achieve good selectivity and high gain. A high IF is needed to give better rejection of the unwanted second channel. A final argument for multiple conversion was that with a tunable first IF and a crystal-controlled front end the same stability could be achieved on each band along with the same tuning rate.

The reasons just do not hold water now. The required selectivity can be achieved at high frequencies with suitable crystal filters. The advantages of one VFO to maintain equal stability and tuning rate on all bands can be achieved by using a crystal-mixer VFO. This then provides the advantages of double conversion yet one of the conversions is done in the VFO chain rather than the signal chain, thereby reducing the overall receiver noise.

Cross-Modulation

On the problem of cross-modulation, this can occur in IF stages as well as in RF amplifiers. If the incoming signals are amplified to a level such as to drive the IF amplifier into non-linearity, then there is trouble. On strong wanted signals the RF gain can be reduced to avoid blocking. The problems arise when the wanted signal is only this elusive $1 \mu\text{V}$ at the aerial, and not many kc away there appears an S9+ signal. If this signal splatters over your DX signal it's just as likely to be your receiver as his transmitter. You can determine which by attenuating the input signal and noting whether the "splatter" reduces. If it does, then your receiver is at fault. In order to be able to copy weak signals in the face of such opposition then one must prevent cross-modulation occurring. To prevent it happening in IF stages the high-selectivity filter must be put in at the earliest position possible in the signal chain—in fact, immediately following the mixer. These problems once again point to a single conversion receiver having at most only two stages—one RF amplifier and one mixer—before the filter.

One pointer to all this is what the commercials are now doing. The latest receiver from the Hallicrafters stable is a single-conversion design using a crystal-mixer VFO and a 9 mc IF. *Verb. sap.*, as they say!

Transistors Tricky

It is as well at this point to consider transistor receivers. These are notoriously bad for cross-modulation, being basically non-linear devices. To add to this problem one must have some protection in the form of a diode limiter at the input to prevent large signals received (or picked up from the Tx when transmitting) from blowing up the front-end transistor. The answer

seems to be Field Effect Transistors (FET's) as used in the recent *Davco* design. Unfortunately, experimental work with these at G3RNL is still under way, so no first-hand information can be passed on at this stage.

So much for the front end. We see that the overall gain of this section is determined by the mixer noise, and needs to be just enough to overcome this with a $1 \mu\text{V}$ signal input. The overall gain of the receiver itself must be in the order of 150 dB to provide an output from the speaker at a level sufficient to hear this $1 \mu\text{V}$ signal. About half this gain should come from the IF strip, some more can come from a product detector and the final dB's made up in the audio stages.

Product Detectors and AGC

The preceding discussion has been with SSB reception in mind. Exactly the same argument applies to CW or AM reception, the only basic differences being the bandwidth required and, in the case of AM, the type of detector. A product detector for SSB or CW reception can make an *enormous difference* to the performance of a receiver. Extra gain can be achieved in this stage if a valve is used, providing much more audio output than a diode envelope or diode product detector. One other important factor when using product detectors is the isolation of the BFO (or carrier insertion oscillator, or CIO, as it is sometimes called) from the IF strip. This means that the AGC system on the IF strip can still be operative—providing of course the BFO can be screened sufficiently to prevent stray radiation. Some designs have gone to the extreme of building the BFO in a separate screened box to prevent this radiation. If BFO leakage does occur with an IF AGC system, there could be a standing bias on the AGC line due to this pick-up, thereby reducing the overall gain of the receiver to the point where weak signals are even weaker! The complete answer is a system of AGC which is derived from the *audio* section rather than the IF stages.

The characteristics of the AGC system must be different on SSB compared to AM. SSB signals are continuously changing, which means that the attack-time of the AGC must be fast to prevent the first syllable received overloading the receiver and the operator's eardrums. The release-time should be relatively slow so that the background noise does not come up too strongly between syllables. Audio AGC systems do tend to be a little more complicated than IF-derived types and this does put some people off incorporating them. However, there has been some interesting and successful experimenting at G3RNL on this point, to be covered later when discussing modification to existing receivers.

Another factor regarding stray pick-up in the IF strip which can introduce a standing bias on the AGC line is VFO break-through. In experiments at G3RNL using triode mixers with cathode injection of the VFO such break-through was found to occur. This was due mainly to the high injection level required by this type of mixer. The complete answer is to use a double-triode *balanced* mixer which attenuates the VFO signal at the output sufficiently to prevent it getting into the IF strip. A suitable circuit for this type of mixer giving good conversion gain is shown in Fig. 1. The VFO injection required is around 1 volt. .

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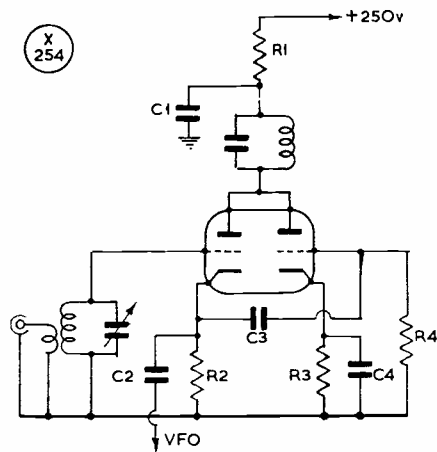


Fig. 1. Circuit of a balanced-mixer arrangement suitable for preventing VFO break-through into the IF strip. Values are: C1, C4, .01 μ F; C2, .001 μ F; C3, 220 μ F; R1, R4, 100K; R2, 2.2K; R3, one megohm. See text for discussion.

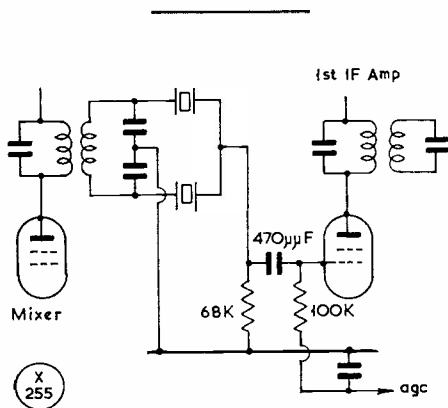


Fig. 2. Method of connecting a half-lattice filter into a receiver. Several sections can be cascaded to give better rejection of unwanted signals.

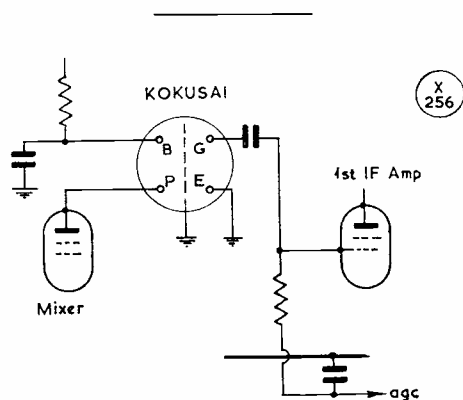


Fig. 3. Circuit for replacing an IF transformer with the Kokusai mechanical filter.

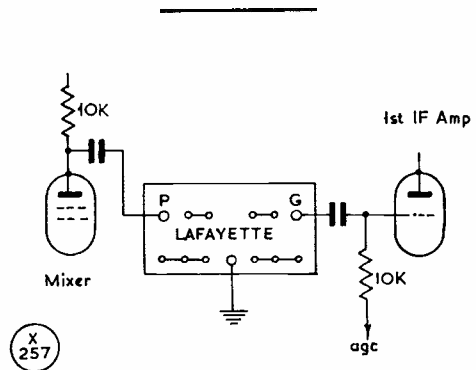


Fig. 4. Showing the connections when using the Lafayette mechanical filter in a receiver.

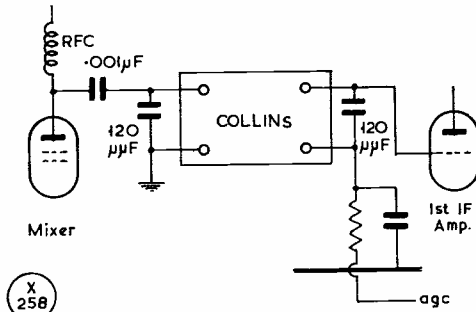


Fig. 5. The Collins mechanical filter can be applied to a receiver to give a high degree of built-in selectivity.

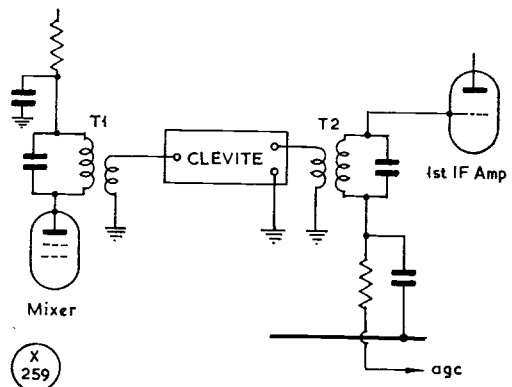


Fig. 6. The Brush-Clevite ceramic filter can be used with a valve receiver to achieve better selectivity. If plenty of gain is already available, T2 can be omitted—see text.