The SHORT WAVE Magazine

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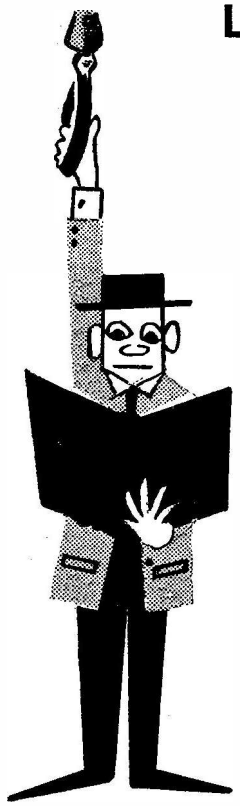
VOL. XVI JULY, 1958 NUMBER 5

FOR THE RADIO AMATEUR AND AMATEUR RADIO



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The SHORT WAVE Magazine

EDITORIAL

Summary *In the last few issues we have discussed here matters which are of importance for the well-being of radio amateurs, and of Amateur Radio itself, in the future. These discussions have been called the Argument for Amateur Radio in face of the Pressure on Ether Space.*

It has been shown that while the ether must be regarded as free for all to use, that can only be with reasonable safeguards in the interests of all users — with whom radio amateurs must have full consideration, if only by reason of their numbers and world-wide organisation. It has been brought out that amateurs are quite capable of holding their own on shared bands (should more sharing be necessary) and that any serious curtailment of frequency areas in the HF range would be quite unacceptable — because radio amateurs are, primarily, communicators on a world-wide basis. Further, it has been suggested that, commercially, a great deal of ether space is being wasted because frequency allocations are not always made with due regard to the time-space-location factor, and that commercials can no longer expect exclusive frequencies in their bands, any more than amateurs can in theirs. A proposal is that amateurs (in the European zone, at least) could well be allocated frequencies in the medium-wave broadcast and TV/VHF bands for operation during those periods in the 24-hour cycle when broadcast stations are normally off the air — that is, mainly midnight to early morning. On the general theme of the usefulness of radio amateurs it has been shown (without by any means covering all the ground) that Amateur Radio is a very important educative influence in this electronic age, and for that reason alone is a national asset of great value; and this with the additional virtue of costing the taxpayer nothing.

It is not to be supposed that the views put forward in the last four issues — though they are based not only upon more than 30 years' active experience of Amateur Radio as a developing art but also on the manoeuvrings of war-time frequency allocation committees — will find universal acceptance. There are plenty of people who would, for various reasons of their own, be glad to see radio amateurs off the air altogether.

This means that the amateur case must be pressed with vigour and be supported by facts, and not bolstered up by any appeals to sentiment. Almost anybody in authority can be persuaded to "express sympathy with the amateur cause" — but what has got to be impressed on them is what may be the result if there is any unfair or unacceptable curtailment of amateur liberties.

Austin Forbes G6FO.

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Hundred Watts on Three Bands

ANOTHER TA-12 MODIFICATION

J. B. TUKE (G3BST)

There are enough TA-12's still in circulation to justify this interesting article on modifications a good deal simpler than some of those published already. The result is a three-band (80-40-20) Table Topper capable of 100 watts CW output, and a 75-watt carrier for AM phone operation under full modulation. — Editor.

HAVING spoken to a few TA12 owners at various times over the air it is apparent that it is not generally realised how the TA12 can be very simply modified to make an efficient three-band transmitter, running full input, and fully TVI-proof (at the G3BST location, which is in a built-up area). Most TA12 owners seem to be suffering either from some sort of TVI, or keying troubles due to poor modifications—or else they have made extensive modifications similar to those suggested in the October/November, 1956, issues of *Short Wave Magazine*. But there is a very satisfactory middle course.

Those of us who need to watch the £.s.d. can console ourselves with the thought that, electrically, a pair of 807's in parallel is the same in a £100 transmitter as in the humble TA12. In fact, after a few hours' work and very little expense, the latter is the poor man's table-topper—on three bands, anyway.

It must be made quite clear at the outset that the aim of the modifications outlined in this article is to provide an efficient rig with the minimum of expense, and no claim is made to have done all the things possible to the transmitter if expense is not a factor.

The modifications can be divided roughly into four parts:

(1) Providing power supply.

(2) General constructional modifications to make the transmitter conform to amateur requirements as regards circuitry and keying.

(3) Alterations to make the frequency range cover the 7 and 14 mc bands.

(4) Modifications specifically designed to give a high degree of TVI freedom in areas of poor TV signal level.

Power Supply

Power supply can take any conventional form, but in order to save a great deal of constructional work it is recommended that a 24-volt heater transformer be used, thereby saving a very difficult modification to the heater chain. Bias requirements are for 50 volts and this can be supplied either by a small pack, or even a deaf-aid battery. The HT requirements are 500 and 750 volts if full input is to be run—the former feeding the VFO's and buffer, the latter the final anodes. As transformer costs seem to rise very sharply with increasing voltage, it was decided to build a 500 volt supply and a 250 volt supply on one chassis, the two outputs being connected in series for the extra HT. By doing this, normal rectifiers can be used. Again, a saving in cost results—5U4G's or 83's are suitable and both are cheap and easily obtainable. Whether this method can be adopted will also depend upon the insulation of the transformers, and the current capacity of the smaller one—but it is an idea if the right transformers are available. There are only two meters in the complete rig, one 0-15 mA for measuring grid current, and the other 0-250 mA for the anodes, and these can be mounted on the power pack. The 0-15 mA instrument should be wired in series with the bias supply and the 0-250 mA in series with the 750 volt HT supply.

Structural Modifications

There is not a great deal of "ripping apart" to be done to this transmitter, but of course there are a few items not required for amateur work. The first thing to receive attention is the assembly of fixed condensers which form the output portion of the pi-network. These and their mounting should be completely removed. The relay fitted behind the final 807's should likewise be taken out as it serves no purpose. With the exception of the long lead with a red/grey fleck, all wires to the relay should be cut off short and taped up. (The long one has a special use to be described later.) The aerial meter should then be removed and also the terminal marked "REC." In the hole left by the aerial meter a dummy plate should be fitted, behind which is mounted a two-, or preferably three-, gang 500 $\mu\mu$F condenser pack, of the ordinary receiving type. These sections are strapped in parallel to form the aerial capacity of the pi-output network. In place of the terminal marked "REC," fit a Belling-Lee chassis mounting co-axial socket of the type commonly used on television receivers; this is to be the aerial output point.

Table of Values

Fig. 1. The VFO/Doubler conversion for Ranges 3-4

C1 = Range 4 VFO tuning	C10 = 100 $\mu\mu$F
C2 = Range 4 VFO padder	R1, R2 = As fitted
C3 = Range 3 VFO tuning, used as doubler	R3, R4 = As fitted
C4 = .001 μF	R5 = 500 ohms, ½-w.
C5, C6 = As fitted	L1 = As fitted
C7, C8 = As fitted	L2 = To resonate at 3.5 mc with C3
C9 = *see text*	L3 = As fitted (*see text*)
	L4 = To resonate at 7 mc with C9 (*see text*)

Circuit Modifications

Now to circuit details. Ensure that all the fixed loading condensers mounted on the sides of the roller inductances are disconnected—all that has to be done is to see that the finger switches are in one of the positions where there is no back connection. Next remove the PA bias resistor from its position under the chassis and replace it by a small RF choke which can be supported in the wiring. Full bias is to be supplied externally and no use is made of grid leak bias because of the type of keying circuit adopted.

It has been found advantageous to use a stabilised screen supply for the final, so two VR150's, series connected, are mounted in the space vacated by the relay. For simplicity it was also decided to use simple anode modulation, with floating screens, and the small low-frequency choke required is also mounted nearby. (In the writer's transmitter, this is simply the primary of a midget speaker transformer.) The circuit modification to incorporate the stabilisers and choke is as follows: The red flecked lead coming from the screens of the final comes up from its connection to the valveholders through a hole by the 807 bases and is connected (in the unmodified transmitter) to the lower end of the screen dropper — a vitreous resistor mounted near the anode RFC in the final stage. This lead is snipped off the RFC and wired to one end of the audio choke, the other end of which is returned to the lower end of the screen dropper, and also to the positive lead of the VR150's (the negative of the VR150's being earthed). The top of the screen dropper is now disconnected from the RFC and joined instead to the red/grey flecked lead off the relay mentioned earlier, this being in fact the 500 volt HT positive line. The original screen-dropping resistor is of too high a value for the new type circuit and it is necessary to lower its value either by replacing it entirely, or in a much simpler manner by strapping another resistor in parallel with it. The total

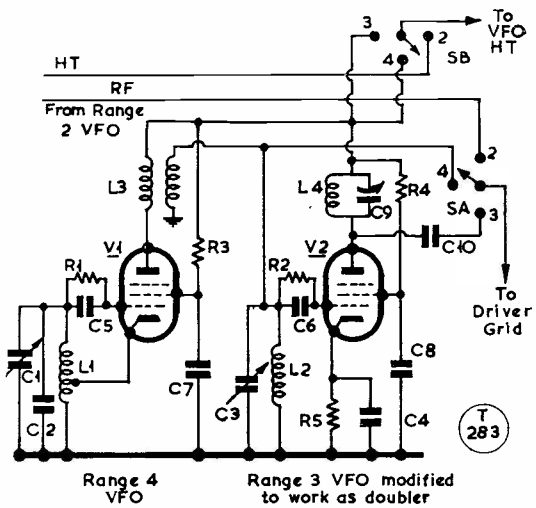


Fig. 1. This diagram shows the circuit of the VFO/doubler combination used on Ranges 3 and 4, in G3BST's TA-12 modification. Considerable simplification is achieved by converting the Range 3 VFO to work as a doubler, as explained in the text.

value required is of the order of 6500 ohms, being dependent on the voltage of the nominal 500-volt line and the grid bias.

The output section of the pi-circuit is the next to receive attention. It will be seen that there are two four-position wave-change switches working in the PA circuit—one connects the anode of the final (after its isolating capacity) to the appropriate coil and tuning condenser and the other the fixed capacity network (which has now been removed) to the cold end of the appropriate anode coil.

The anode set-up is left alone, but the moving contact of the wafer which switches the "cold" end of the tuning coils previously going to the fixed capacity network is connected instead to the fixed vanes of the ganged 500 $\mu\mu$F variable, and also to the co-axial output socket. In effect, what we have done is to replace the fixed capacity network by a ·0015 μF variable condenser enabling the transmitter to load easily into almost any impedance, though direct loading into the aerial is to be deprecated for many reasons—see the notes on "Setting Up."

Certain TA12's have parasitic chokes in the PA anodes, others just have resistors. If chokes are fitted, they should be replaced, either by chokes of much lower inductance or just by 50-ohm resistors. The original chokes simply burn up when operation is attempted on 14 mc, probably due to some self-resonance. No fears need be felt about

fitting 50-ohm resistors as the TA12 is remarkably free from parasitics and " birdies " of all sorts.

One more item requires attention before going on to the keying circuit. It has been found necessary to do away with the long leads from the cathodes of the PA's to the " P.A.P." socket on the front of the transmitter, originally fitted for metering. Although by-passed, it has been found that these leads, together with their by-pass condenser, resonate around 35 mc (!) and give rise to violent harmonic accentuation and severe TVI. These leads are therefore snipped off (there is no need to extract them physically and disturb all the wiring) and a piece of copper braid is soldered direct from the cathode pins of the valveholders of the 807's to the chassis. Even in areas of good TV signal strength this modification is essential, as otherwise trouble is almost certain to arise. Local tests with the writer's TA12 prior to this modification showed a powerful 35 mc harmonic at several hundred yards range, even though an aerial tuning unit was in use. This simple modification, however, completely cured the trouble.

Turning now to the keying circuit, tests have shown that the simplest place to key for good results is in the cathode of the driver stage. This *can* be done simply by inserting the key into the " I.P.A.P." socket on the front of the transmitter, but is not to be recommended for two reasons: First, the key contacts will be live to the tune of 600 volts or so, and secondly the cathode leads of the driver-doubler stage, even though by-passed, are still carrying some RF and are therefore a source of TVI.

The whole secret of TVI suppression is to eliminate all the small sources of interference throughout the whole transmitter. It is strongly recommended, therefore, that a miniature 24-volt keying relay be fitted. There is room for this item in several different parts of the set. In the writer's transmitter it is mounted on one side of the VFO box, but it could be fitted in one of several other positions. It can draw its power from the heater circuit *via* a miniature rectifier. The contacts should be connected between the " cold " end of the driver cathode bias resistor (to be found on the tag board by the wavechange switch under the driver 807) and the lead to the " I.P.A.P. " socket. A key-click filter is necessary and should consist of a 0·1 μF capacity and a 100-ohm resistor in series across the contacts. One other item comes into this circuit—a 2,000-ohm variable resistor wired in the driver cathode lead to act as a drive control. The " P.A.P." socket can be removed and a miniature variable resistor mounted in this hole.

Frequency Coverage Modifications

The transmitter should now function normally on 3·5 mc (Range 2) and in some cases on 7 mc (Range 4) as well. However, most users will find that the highest frequency obtainable on Range 4 is around 6950 kc. The little extra bit of " lift " to about 7150 kc can be easily obtained by fitting one small *brass* slug in the centre of the Range 4 VFO coil, and another in the centre of the PA grid coil. If threaded slugs of just the right size are used they can be gently screwed into the wax coating on the inside of the coil formers until the required reduction of inductance is obtained. (The writer is not responsible for this excellent tip, but had it passed to him by G3KNW.)

The next step is to get the transmitter functioning on 14 mc. Although there must of necessity be a bit more work attached to this modification it is not in the least difficult. One instrument only is essential—a grid dip oscillator. So if you haven't already got one of these indispensable items, beg, borrow or steal one forthwith, for only then will you be able to proceed !

Before commencing the actual circuit modifications, two coil-and-capacity combinations should be made up, using small iron-dust cored coils and fixed silver mica condensers. One combination, with about 150 $\mu\mu$F in parallel, should resonate at 7 mc, the other with 50 $\mu\mu$F, at 14 mc, in both cases with the cores fully in, so that some reduction of inductance can be obtained when the coils are fitted into place to compensate for added stray capacities. Having made up these resonant units, modification to the transmitter circuits can commence.

The circuitry—*see* Fig. 1—is such that the Range 4 VFO, V1 in this circuit, is used *as* the VFO, the output of which is doubled by the Range 3 " VFO," V2 for the purpose of this description, suitably modified to act as a doubler, doubled again in the 807 driver stage, and then fed to the final amplifier. The output from the Range 4 VFO is actually at 3·5 mc, and when on Range 4 is transformer-coupled, as shown in Fig. 1 at L3, by a miniature untuned transformer (to be found in the corner of the Range 4 VFO box) to the 807 driver, on 80 metres.

A small hole is drilled near the top of the partition between the Range 4 and Range 3 VFO boxes, and a lead made from the inner section of a small piece of TV co-axial cable

is used to convey the output from the secondary of the transformer in the Range 4 box into the Range 3 compartment. The resistor shunting the secondary of the L3 transformer should be removed.

The Range 3 VFO is modified into a doubler as follows: The grid coil is first taken out (it is only secured with a central screw) and rewound to resonate at 3·5 mc in conjunction with the Range 3 tuning condenser, C3, using the grid dip oscillator. The lead coming from the output of the Range 4 VFO coil (*see* Fig. 1) is then connected to the top of this modified coil, thus feeding the 3·5 mc output of the Range 4 VFO to the grid of the Range 3 12SK7 valve, V2. The components associated with this valve remain unchanged, although a 500 ohm cathode bias resistor, R5, by-passed by a ·001 μF capacity, C4, should be fitted. The valveholder may be temporarily removed simply by undoing its two fixing screws—there is plenty of slack in the wiring underneath.

Turning next to the anode section of the Range 3 12SK7, here it is necessary to be a little more ruthless. The little RF coupling transformer is removed and the coil and capacity combination, L4,C9, which resonates at 7 mc, is fitted in its place—this forms the load for the valve. The lead to the wavechange switch and so to the grid of the doubler 807 which has been removed from the transformer is capacity coupled by a 100 $\mu\mu$F condenser, C10, to the anode of the 12SK7, V2. To preserve DC continuity, a small RFC should be wired between the lead to the wavechange switch and earth.

In order that Range 3 and Range 4 valves will both receive HT together, the appropriate contacts on the HT wafer of the wavechange switch should be strapped. Although this results in the 12SK7 doubler running even when Range 4 only is in use, this has no ill-effects in practice.

Turning now to the grid coil of the PA's, it is hardly practical to remove the original Range 3 grid coil without major structural work, so the lead to it is simply snipped off with a pair of long tin-snips, and then soldered to the coil and condenser combination which resonates at 14 mc, which will be small enough to be self-supporting in the wiring.

Finally, to the anode of the PA stage. The Range 3 roller inductance is useless for 20 metres, so it is disconnected and a small coil consisting of 4 turns of 16 g. enam. wound to 1½in. diameter is used in its place. This can be self-supporting and is connected to the appropriate tags of the wavechange switch and also to the fixed vanes of the Range 3 variable condenser, which is retained.

It may at first be thought that on Range 3 (14 mc) because there are three tuned circuits, two of which are pre-set, it might not be possible to get sufficient drive over the whole of the band. This is not the case, however. It has been found best to align the two pre-set coils for maximum drive near opposite ends of the band, and the Range 3 " VFO " control,

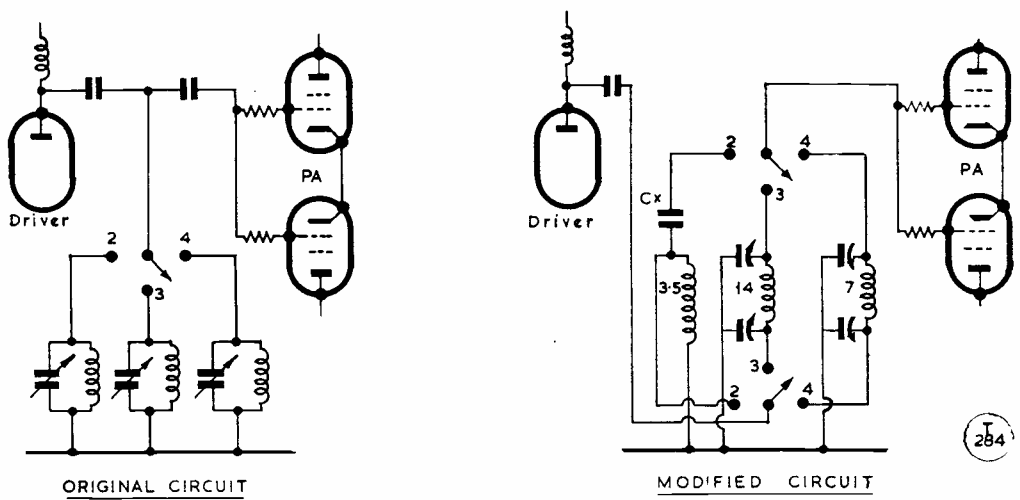


Fig. 2. The recommended modifications for the PA grid stage of the TA-12, to ensure TVI-proofing. If this is not a problem, the grid side can remain as in the original (at left above) except that certain coil changes are desirable, as explained in the text. The value of the condenser Cx in the right-hand circuit is 25 $\mu\mu$F, and for 7 mc the pi-tank capacities are 80 $\mu\mu$F each; for 14 mc they are 40 $\mu\mu$F.

C3 (which is now the doubler grid, V2 in Fig. 1) can be swung up and down the band to increase or decrease the drive at any particular frequency. In the writer's TA12, as well as in two others similarly modified, 10-12 mA of drive is available throughout the entire band, which is more than enough, as the correct figure is only about 6 mA.

Setting Up

Having checked wiring, first apply heater and bias supplies. Check that heaters are coming on and the keying relay, if fitted, is functioning satisfactorily. Then apply 500 volts to both HT points with the transmitter on Range 2 (80 metres). Without any further adjustment about 6-8 mA of grid drive should appear. The PA should then be matched into the load as for the normal pi-network. On switching to Range 4 the desired frequency should first be set up on that VFO, making adjustments as necessary to the brass slug in the VFO coil. It may be found that there is little or no drive to the PA grid, in which case the Range 3 " VFO " control, *i.e.*, the first doubler grid, V2 in Fig. 1, should be adjusted. This circuit is continuously connected and must be brought to resonance, even though when the transmitter is on Range 4 it is not driving. The brass slug in the 7 mc PA grid coil should now be set for maximum drive, by which time the grid current meter should be just about wrapping its needle round the full-scale mark ! The setting for correct drive can be made by altering the cathode bias control on the driver, or detuning on the Range 3 control, C3.

Finally, on setting up Range 3 (14 mc) it may be found that some further adjustment of the first doubler grid condenser is required due to an alteration in stray capacities when changing bands. The only other adjustments are to the 7 mc circuit in the anode of the first doubler, and the 14 mc circuit in the grid of the PA. Providing these circuits were originally set up with the grid dip oscillator there should be some drive when switching on, and only fine adjustments to make up for strays should be required.

Connecting To Aerial

It cannot be too strongly emphasised that the transmitter should not be coupled directly to an aerial. Quite apart from the TVI and key click questions, the pi-output circuit does not discriminate greatly against sub-harmonics, and as the PA is at all times fed from a doubler, the 2nd harmonic component will be considerable. This can even lead to considerable radiation outside our allotted bands. This is nothing to do with the TA12 in particular—it applies to all pi-coupled output stages fed by doublers.

A simple aerial tuning unit is all that is required. This should consist of a link coupled resonant circuit for the band in use—the link being fed by 80 ohm co-axial cable from the TA12. The form of connection to the aerial will then depend on the type of aerial and feeder in use.

Phone Operation

While any conventional modulator system may be employed the writer has strong preference for high-level plate modulation, which has been found very successful with the TA12. The HT on the final should be reduced to 600 volts, but no other modifications are called for ; no doubt clamp or grid modulation could also be used, but the writer has no experience of these methods.

Further TVI-Proofing

While the foregoing completes the list of essential modifications, it may be found that some extra TVI-proofing is necessary. The writer's own experience was that the transmitter modified as already described was entirely satisfactory on 3·5 mc, satisfactory on 7 mc when using a low-pass filter in the coupling to the aerial tuning unit, but was not so good on 14 mc. A bit of experimenting has shown that the main trouble is the single capacity coupling between driver and PA, which of course accentuates the higher frequencies, and it was consequently decided to replace this by a pi-network—*see* Fig. 2. This is quite a simple job, and anyone who lives in an area of weak TV signals might well decide to do this modification anyway. The procedure is as follows :

First of all take out the grid coupling condenser to the PA. This is a (physically) large moulded item mounted under the wavechange switch, and it has a capacity of 25 $\mu\mu$F. Removing it is not as difficult as it might at first seem and can be done by getting the two holding screws out and unsoldering the leads using a very thin iron. Having removed this item, the junction of the two 50-ohm grid stopper resistors is then taken to the moving contact of the wavechange switch to which the grid side of the condenser was originally connected.

The pi-coupling circuits are arranged by making use of the spare wafer on the wavechange switch—the one next to that connect-

ing the three PA grid coils as required. This spare wafer has two wires on it which may be removed and taped up (they were originally for applying 24 volts to an external circuit on Range 1 only). This new wafer is to be the driver anode switching wafer, and the original one the PA grid switching wafer, and they will be referred to as such below.

The lead from the 807 driver isolating capacity should now be connected to the moving contact of the anode wafer. The 7 mc grid coil should be removed (it is, of course, the top one) and its self-earthing tag connected, the coil then being replaced. The home-made 14 mc coil should likewise have its earthy end isolated. The 3·5 mc coil should not be touched. The earthy ends of the 7 and 14 mc coils should now be connected to the appropriate contacts on the anode wafer.

From each end of the 7 mc coil a 50 $\mu\mu$F fixed capacity should be connected to earth, shunted by a 30 $\mu\mu$F disc trimmer. Similarly, from each end of the 14 mc coil a 10 $\mu\mu$F fixed condenser, also shunted by a 30 $\mu\mu$F disc trimmer, should be connected to earth. Although with the values given it ought to be found that the 7 mc coil will resonate on Forty as before, it may be necessary to add a few turns to the 14 mc coil due to the large reduction in stray capacity. (The grid dip oscillator, once again, provides the individual answers for each case.) The final arrangement is as the right hand circuit in Fig. 2.

It was not thought worth modifying the 3·5 mc range to a pi-circuit—to begin with it does not cause TVI and one could not get at the PA grid coil anyway. Consequently, a 25 $\mu\mu$F condenser Cx should be connected between the 3·5 mc contacts on the grid and anode wafers, and the thick wire which connects the 80-metre coil to the grid wafer should be transferred to the same contact on the anode wafer. This leaves the circuit as it was originally on this band, except for a little extra wiring which has no effect.

In order to prevent shorting of the bias supply the back contacts on the anode and grid wafers which short out unused coils should be disconnected—again, no ill-effects have been found.

Lining-Up Pi-Coupling

Setting up after completing the modification shown in Fig. 2 is similar to the initial setting up. Starting on 7 mc Range 4, the condenser connected to the grid side of the pi-intervalve coupling coil should be set to maximum capacity. The trimmer on the anode side is now resonated for maximum drive, and if this is insufficient the grid trimmer is decreased a little while the anode trimmer is increased slightly, just in the same manner as one would load up any other pi-coupling network. The operation on 14 mc is exactly the same providing the first doubler has already been aligned, and as before more than enough drive is available.

Conclusion

The writer's TA12, and another modified by him, have been in continuous use for over a year, during which no snags have come to light. Although things run pretty warm in the box when it is operating for long periods, none of the components shows any signs of fatigue. 807's are notoriously tough and will take the full input without complaint—probably due to the fact that the screen supply is stabilised.

As modified, the transmitter will give around 100 watts RF output on all three bands, with a DC input (to two good 807's) of 200 mA at 750 volts on the plates, and a stabilised 300 v. on the PA screens.

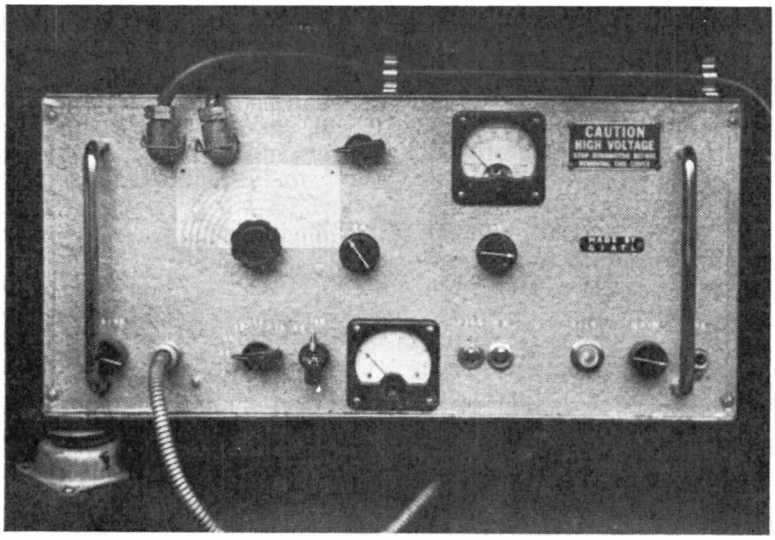
Since no faults have arisen, no hints and tips on curing them can be given! However, if anyone should have any trouble with a TA12 similarly modified, the writer will be pleased to help, but please don't forget that stamped envelope! Letters should be addressed to G3BST, c/o The Editor.

TRIUMPH FOR G3MUM

We were very interested to have a letter from Mrs. Odell, of Redcar, Yorks., writing for her son Peter, who is a spastic. It was to tell us that he had passed his R.A.E. and Morse Test successfully, and had just been issued with his call-sign, G3MUM. Nothing very unusual about this, you might think—but there is, because the only controlled movement Peter Odell has is in the toes of his right foot. So if you hear CW from G3MUM, you will probably listen to it with more than usual interest. Good luck to him, and to his gallant mother . . . She learnt Morse herself, so that she could teach it to him.

CARDS FOR THE QSL BUREAU

Those readers who, being direct subscribers and users of our QSL Bureau for their cards outwards, should note that the full, and only, address to which packets of cards should be sent is: *BCM/QSL, London, W.C.1.* This is all that is necessary. Increasing quantities of cards are being sent to our office address in Victoria Street; this involves us in double-handling and extra postage charges and also delays delivery of the cards. Our QSL Bureau is not, and never has been, operated from the Victoria Street office.



This is the mobile transmitter designed and built by G3ATL and discussed in the article With an adjustable aerial system (see Fig. 2), all bands from 10 to 160 metres can be used. DX phone has been worked successfully on the HF bands, the best contact so far being with a VS1 in Singapore, while actually motoring.

Six-Band Mobile

VFO/PHONE TRANSMITTER FOR 10-160 METRES

From Notes by **G3ATL**

THE great majority of mobiles work one band only—which is not to be wondered at when the equipment is entirely home-constructed and true /M operation is the objective. The circuitry and photograph herewith will therefore be of considerable interest because they show a VFO-controlled mobile phone transmitter covering *all six bands,* with an aerial system to match. The whole installation has been designed and built by D. I. Wiggans, G3ATL, and very satisfactory results are being obtained with it, as fitted in his Consul.

As suggested by the photograph, a neat and compact transmitter design has been achieved, while the aerial system is an arrangement of tapped coils and variable inductances to obtain resonance at the desired frequency in any band.

The basis of the transmitter is the ubiquitous Geloso VFO unit, which is itself modified to cover Top Band as well as the 10-80 metre range for which it is designed. The general circuit arrangement is shown in Fig. 1. Band changing is by switching on the transmitter panel, the aerial then being resonated on the new band by the inductance network shown in Fig. 2, for which full details are given in the Table.

Taking the transmitter in detail, the first point to note is that the oscillator in the Geloso VFO is fed from a VR-150/30 controlled

Table of Values

Fig. 1. Circuit of the Six-Band Mobile

C1 = .01 μF, 450v.
C2 = 8 μF, 450v.
C3 = 10 μF, 25v.
C4 = 50 μF, 50v.
C5 = .01 μF, 1,500v.
C6, C8 = .004 μF, 1,000v.
C7 = .002 μF, 1,500v.
C9 = 150-250 μμF
C10 = 500/500 μμF
C11 = .005 μF, 350v.
R1 = 0.5 megohm potentiometer
R2 = 47,000 ohms, ½w.
R3 = 1,000 ohms, ½w.
R4 = 15,000 ohms, 1w.
R5 = 2,000 ohms, 20w.
R6 = 15,000 ohms, 2w.
R7 = 250 ohms, 5w.
R8 = 22,000 ohms, 1w.
R9, R16 = 22,000 ohms, 2w.
R10 = 1,500 ohms, 20w.
R11, R12 = 15,000 ohms, 5w.
R13 = 2,200 ohms, 1w.
R14 = 1,000 ohms, 1w.
R15 = 10,000 ohms, 1w.
R17 = 50,000 ohm w/w pot'meter, 5w.
R18 = 3,500 ohms, 20w.
J1 = Double-circuitjack
J2 = Drive meter jack
RFC1 = 2.5 mH, 200 mA
RFC2 = 2.5 mH, 50 mA
RLA1 = DPDT relay, 12v.
S1 = On-off, and relay control
S2 = 160m. power reduction
S3 = Send-receive
T1 = Driver xformer
T2 = Mod. xformer, Woden UM1
PL1 = 12v. 0.3w. panel lamp
APC = Anti-parasitic

COIL DATA

L1 = 160m. coil for pi-tank, 25 turns 18g. enam. on 1¼in. diam. former at right angles to main coil.
L2 = Geloso 50-watt pi-tank coil with HF taps removed.
L3 = HF addition to pi-tank, at right angles to L1, L2; 4 turns 18g. enam. on ¾in. former, spaced to occupy 1½ins., tapped at 2¼ turns for 10-metre band.

(NOTE: Coils L4, L5 and switch S4 incorporated in VFO modification for 160-metre band.)

HT supply, which gives the improved stability so necessary for /M working. The PA is an 807, which means that the input, up to about 40 watts, is limited only by the capacity of the available power supply. Modulation is on plate-and-screen by a pair of 6L6's in Class-AB1, the speech amplifier being a 12AX7 connected for a carbon microphone in the cathode of the first half. This arrangement gives full modulation of the carrier, and with a good microphone, speech quality is reported as " ideal for cutting through the QRM "; change-over control is at the microphone handle. A Woden UM1 is used to match the 9,000 ohms of the 6L6's to the 5,600 ohms of the PA—any other transformer giving this sort of match and capable of handling the power would do as well.

The pi-tank circuit in the PA is arranged for 75-ohm output on all bands 10-160 metres, the aerial system being designed accordingly, with coil A in Fig. 2 as the 75-ohm termination.

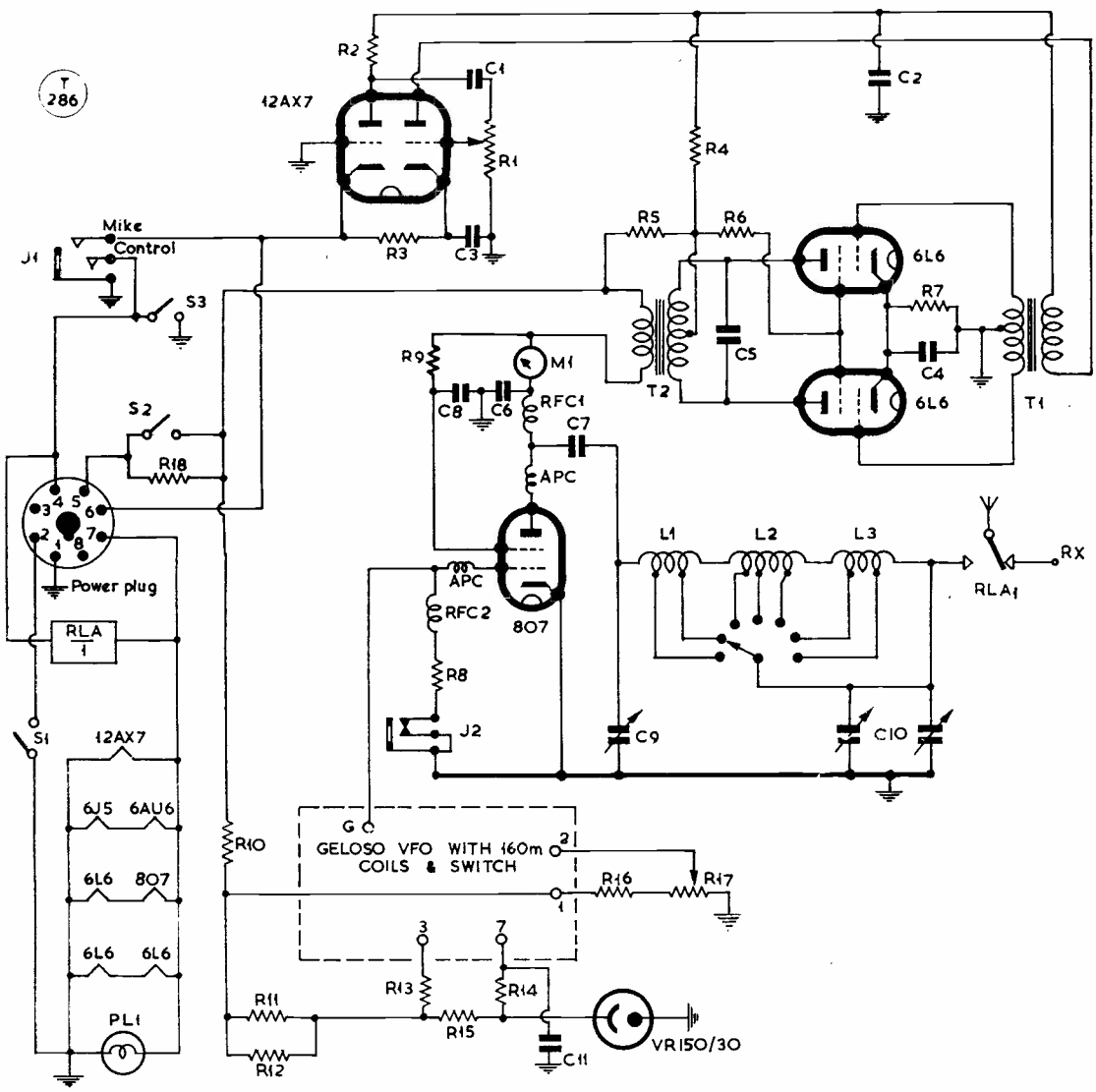


Fig. 1. Circuit of the G3ATL all-band mobile transmitter, based on a Geloso VFO unit, which is itself modified for Top Band. With an 807 in the PA, fully modulated by a pair of 6L6's, more talk-power is achieved than is usual with mobile rigs. The coil L2 in the PA is the Geloso 50-watt tank inductance, somewhat modified; L1 and L3 are additional coils (see table) and a Geloso band-change switch is used for the whole tank assembly. Change-over control is on one switch, S3, which can be in the microphone handle.

(Note: In this circuit, there should be a ·001 μF fixed condenser shown between the 6L6 screens and earth).

AERIAL COIL DATA

(Refer Fig. 2.)

COIL A - 75-ohm termination. 10 turns 18g. enam. on 1¼in. diam. former, turns spaced two diameters, tapped every two turns, with switch for adjusting coupling.

COIL B - 25 turns on 2in. diameter former, off Command Set roller-type inductance; could be of 16g. enam., same diameter, with continuous tapping.

COIL C - *For 40 metres*, 12 turns; *80 metres*, 59 turns; *160 metres* 150 turns, all selected by taps and using 22g. enam. on 1in. diam. former. For 10, 15 and 20 metres, Coil C is shorted out, and the aerial used as an 8ft. rod resonated by Coil B, with adjustment on Coil A.

An octal socket on the rear chassis drop of the transmitter provides for remote control from the front of the car when the required band has been set up. Band change and transmitter and aerial tuning for that band are done with the car stationary, but coil B is motor-controlled for adjustment within the band.

The whole transmitter unit has been built into a case measuring only 17 ins. by 7½ ins. by 7½ ins. deep and, in the G3ATL installation, is fitted on a shock-absorbing mounting in the car boot, with the power supply in a separate cabinet alongside.

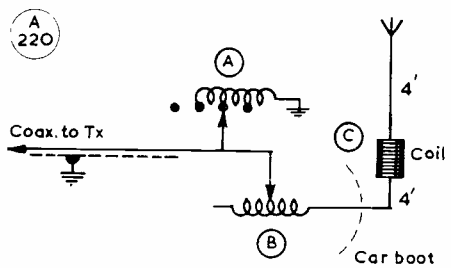


Fig. 2. The aerial layout evolved by G3ATL for six-band (10 to 160 metre) mobile working. Details for the coil arrangement are given in the table; it will be noted that combinations are changed for the different bands.

G3ATL reports many hundreds of contacts, made while actually motoring, with the transmitter and aerial as shown here. His best DX so far is a VS1 on 21 mc, with a "5 and 9" report.

"THE RF-24 UNIT ON SIX METRES"

We had an article, by VQ4EV, on this topic in the April issue of SHORT WAVE MAGAZINE. He now writes to say that if CW notes sound worse than T9 with the circuit suggested, a cure can usually be effected by decoupling the oscillator stage HT supply by a large-capacity condenser. In the circuit on p.97 of the April issue, anything from 8 to 16 μF should be connected in parallel with the capacity C in the plate of V3—that is, from the junction of R8,RFC2 to earth. A word of caution is, however, needed: If a neon stabiliser is already in use for the main HT supply, the addition of a large condenser may trigger off some form of saw-tooth oscillation at near-audio frequencies. Hence, some experiment may be necessory with the value of the additional condenser.

BBC COLOUR TV TEST RESULTS

The BBC has issued a report on the series of colour television tests carried out in co-operation with the Radio Industry. It describes the results as "promising," though further experimental work will be needed to resolve outstanding problems concerning mainly the design of equipment. The BBC has formed the opinion that the system used (an adaptation of the American N.T.S.C. system) is capable of giving acceptable results.

The field trials on which the BBC now reports extended over a total period of seventeen months and involved the analysis of over a thousand questionnaires, filled in by members of the BBC staff and others who watched the results on special sets. So far as reception of the colour picture is concerned, the BBC's verdict is that the colour pictures produced by the N.T.S.C. system as adapted to 405 lines, with the picture sources and display tubes that are at present available, are satisfactory. The problem of registration with the three-tube colour camera requires attention and certain features of the display tube could with advantage be improved, but the technical performance of the system is adequate for a satisfactory colour television service in the frequency bands at present in use. The tests radiated from Crystal Palace included live studio performances, film and slides. Of the observers, 89% regarded the reception of the live scenes as satisfactory. The 35 mm film was considered adequate by 100% of the observers, the 16 mm film by 93% and the slides by 98%.

The quality of ordinary black and white television, when received in black-and-white on ordinary television sets, was also carefully examined; 94% of technical observers found the pictures completely acceptable.

The BBC will carry out further experimental transmissions from time to time. It is pointed out that there are many other problems to be solved: For example, the production of a reasonably-priced colour receiving set, and agreement on the future standards to be applied to the development of television in the United Kingdom. The decision whether or not there is to be a public service of colour television, and if so the system to be used, rests with the Postmaster-General.

The report, BBC Engineering Division Monograph No. 18, *The BBC Colour Television Tests: An Appraisal of Results*, is published at 5s.

Conversions for the BC-312/342 Receivers

IMPROVING GAIN AND SELECTIVITY—FITTING A NOISE LIMITER AND SIGNAL LEVEL INDICATOR

B. HAYES (G3JBU)

Though the BC series of receivers is beginning to fade into the past, large numbers are still in use, and they are to be found in amateur stations all over the world. The BC-312N and BC-342N discussed in this article are identical except for their power supply requirements. Both cover a tuning range of 1500-18000 kc, in six bands, which means that the 160 to 20 metre amateur channels are included in the coverage. The amateur range can easily be extended to 15 and 10 metres by the use of converters.—Editor.

THE BC342 and BC312 receivers were and still are very popular amongst the amateur fraternity. They were, when on the "surplus" market, very reasonably priced, considering the line-up, *i.e.*, two RF, Mixer Osc., two IF, 2nd Det., Audio. These receivers are still being advertised and by carrying out the modifications discussed here, either can be made into a very fine receiver. They were designed and manufactured in the U.S.A. for the use of the Allied Forces, for both mobile and fixed stations. The only difference between the BC312 and the BC342 is that the former had a dynamotor for a 12 volt DC supply and the latter has a mains power unit for operation from 110 volts AC. The later models with the suffix "N" after the number have *crystal filters* fitted, and, of course, are the type required for use in an amateur station.

Front End Changes

Dealing with the modifications in order, starting from the aerial end, the first thing to do is to remove the large aerial socket and in its place fit a Belling-Lee coax socket; this makes it easier to use the receiver with a converter when one wishes to listen on 21 and 28 mc. Next, the small neon that was fitted between the aerial and earth, held by a clip on the change-over relay cover, should be taken out. It was found that this neon had a tendency to conduct quite a large portion of the signal down to earth! It was originally fitted so that when the receiver was operated alongside a high-power transmitter, such as the BC610, it would by-pass to earth any RF should the operator forget to use the send-receive switch! The circuits of the first RF, second RF and mixer stages are very nearly identical, all obtaining their screen potentials from a potential divider between HT positive and chassis. The cathode bias for the first two RF valves is by means of fixed resistors of 500 ohms each. These resistors were changed for one of 300 ohms, as the bias was too high for the 6K7's. The recommended bias for a 6K7 is -3 volts, whereas in the original circuits the bias was -5 volts, so reducing the sensitivity of the RF stages. Other valves were considered for use in the first RF stage, such as the 6SH7 and EF54 which, of course, will give a much higher gain. But as the stability of this stage is so important, because on it depends the signal-to-noise ratio, the 6K7 was retained; it gives just sufficient gain for the first detector to handle.

The next stage reached is the mixer, and 1st and 2nd IF's; and if not already replaced, the two ·01 μF by-pass condensers on the mixer anode and the 1st IF anode should be changed for English ·01 μF mica condensers. All the American Aerovox type seem to be leaky, in some cases developing a dead short; these condensers are located in the IF cans and can be reached quite easily. This fault showed itself after only two weeks' operation with a brand-new receiver, and of course placed a heavy load across the rectifier, blowing the 2 amp fuse fitted in the HT circuit. It seems to be a common failing in all BC342 and BC312 receivers, and it is believed that after several hundreds had been manufactured the fault was discovered and a new type of condenser was fitted in later models. Should you be unlucky enough to have the by-pass condensers in the RF stages break down, these are located in the coil boxes—and what a job! All the coils have to be removed before you can get to the condenser connections. It is very difficult to get the old condensers out, so the only solution is to leave them there and by just cutting the connection on the HT side, solder the new ·01 μF condenser in position on top. As the coils are removed from the box it is advisable to mark each one, so as to ensure correct replacement, otherwise you will get some very queer results! After replacing the coils the trimmers can be peaked up quite easily without

a signal generator, merely by using a strong signal on each band.

Selectivity Adjustment

Whilst dealing with IF transformers, the bandwidth of these is rather wide ; unless one is prepared to rebuild them completely, there is very little that can be done in this direction. However, a very simple device, suggested by W4KZF, and used with success, is to fit a ring of 18 g. enamelled copper wire round the coil former of each IF transformer, soldering the two ends of the wire ring together. The cans of the IFT's can be removed quite easily and the ring of wire fitted midway between the two IF coils. The writer did this in each of the IF transformers and the difference in selectivity is really amazing.

The next operation was to reverse the connections of the crystal phasing condenser, which it was found did not reduce the gain quite so much when using the crystal, and slightly improved the filter characteristics. The ideal solution to crystal filter selectivity is, of course, to build up a band-pass circuit.

Noise Limiter

As no noise limiter was fitted to the receiver, it was thought very desirable to have one, due to ignition noise at this QTH and also Loran interference on 1·9 mc. As no suitable circuit was available, various systems were tried, and the one shown is the result of a few tests—*see* Fig. 1. The 3-pin diode valveholders were fitted on the back on the front panel directly underneath the power unit. The spare fuse holder was removed from the front panel, and in its place was fitted a toggle switch, to cut the limiter in and out of circuit. Another type of diode, such as a 6H6, could be used, but this idea was discarded due to the difficulty of finding a suitable place to mount the valve. The great advantage of the EA50's is their small physical size—and they are so cheap. The heaters of the EA50's are wired in series, and the two leads taken to the 2nd detector and audio output valve, so as to obtain 12 volts. It is essential to do this so as to maintain the correct heater current.

The noise limiter gives a very small loss of audio when in circuit, as compared with others tried—in fact, some of the NL circuits tested actually reduced the audio when the limiter was out of circuit.

The limiter is very effective against ignition interference and also Loran. The ignition interference at this QTH can be very heavy on the 14 mc band due to the location being alongside a main road, yet this limiter has made it possible to read the weakest DX.

The only effect that the limiter has on the audio when in circuit is slightly to cut the top of the speech peaks on an S9 signal. However, this effect is absent on weak signals. It has been found that with a phone signal directly under the Loran interference, it is possible to eliminate the QRM and read the signal 100%.

The original 2nd detector valve, 6R7, was replaced by a 6B8 as this does give a considerable increase in gain. Another valve, the 6Q7, was also tried in this position, but the 6B8 proved to be the best. The coupling employed from the 2nd detector to the audio output was originally a transformer, but this was removed and resistance-capacity coupling substituted with anode-to-anode negative feedback using a 680,000-ohm $\frac{1}{2}$-watt resistance. A tone control was thought desirable because with the crystal filter in the " sharp " position, the tone is likely to be on the high side. A suitable tone control was found to be a 50,000-ohm carbon potentiometer and a ·01 μF paper tubular condenser connected between the anode of the audio output and chassis. The rather ugly-looking socket was removed from the front panel and in this position was fitted the tone control potentiometer. The 6F6 output valve was not changed for a 6V6, though this will give a

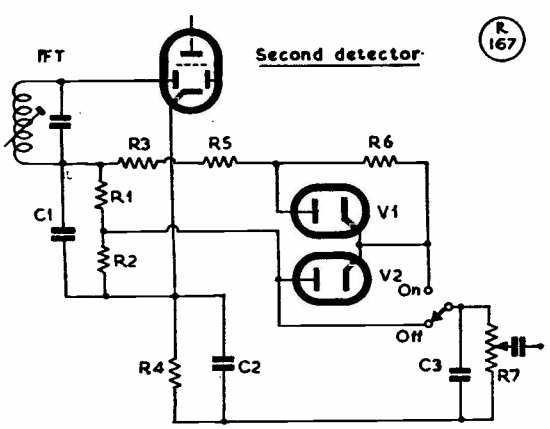


Fig. 1. The noise limiter circuit suggested by G3JBU for incorporation in a BC-342 (or BC-312, which is the same thing except for the power supply). Good results are claimed for this limiter under practical operating conditions.

Table of Values

Fig. 1. Circuit for the BC-342 Noise Limiter

C1 = 150 $\mu\mu$F, silver mica
C2 = .05 μF, tub.
C3 = 500 $\mu\mu$F, silver mica
R1 = 68,000 ohms
R2 = 47,000 ohms
R3 = 470,000 ohms
R4 = 750 ohms
R5 = 200,000 ohms
R6 = 560,000 ohms
R7 = 0.5 megohm audio gain (as fitted, R34 in original circuit)
V1, V2 = EA50

slight increase in audio. The existing output transformer was removed from the chassis and a standard one was fitted, so as to match the 3-ohm speaker. Should that little extra audio be required, then a 6V6 can be used, but the 60-ohm resistor (R47 in the original circuit) fitted across the 2nd detector must be removed so as to maintain a correct balance of current.

Signal Level Meter

An S-meter is very useful with any amateur-band receiver for giving comparative signal reports, so one was fitted to the BC342. A small 0-500 μA meter was obtained and a hole cut directly above the two fuseholders on the front panel. The arrangement is shown in Fig. 2, and it is worth mentioning that an 0-1 mA meter can be used quite successfully in this position.

The S-meter is connected in parallel with the cathode of the first RF valve, as this was found to be the most sensitive position. Other methods of connecting the meter in the receiver were tried, but the circuit shown gave the most linear reading of all.

To calibrate the 500 microamp. scale, signals were received on another receiver fitted with an S-meter and its reading compared with the reading on the meter in the BC342. This method is the most satisfactory, but any other system can be used, such as the aural method of calibration where signal strengths are estimated and marked accordingly on the scale. To calibrate the meter, the original scale was painted out with black indian ink and then the S-point readings were marked on with white drawing ink.

Other Modifications

The change-over relay fitted in the receiver under the aerial peaking condenser was removed, as its operation was to short the grid of the 2nd detector and the aerial to the chassis on the " transmit " position of the switch. The relay requires a 12 volt DC supply to operate it and as no such supply was available, it was taken off. However, the switch was left in position and from it two wires were taken to operate the other change-over relays in the station. Should a 12 volt DC supply be available, then the relay can be used for the purpose it was intended. The connections for the relay can be found on the tag strip directly under the mains power unit.

The last job to be done on the receiver is the " clean up " of the front panel, because after the various parts had been removed it left rather a lot of holes. The panel was taken off after carefully noting the correct position of the tuning dial. The various unwanted holes were filled in with aluminium rod of mainly $\frac{3}{8}$in. diameter. (This rod can be obtained from most metal merchants quite cheaply.) After all the holes have been plugged, the panel should be stripped of all its old paint by means of emery cloth. The panel can then be re-crackled either by a firm who specialise in this work, or at home with the crackle finish paints now obtainable. The various switch designations and knob titles can then be replaced by paint transfers.

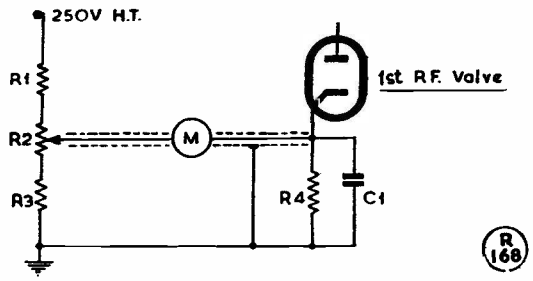


Fig. 2. By using this circuit, the meter needle moves when a carrier of reasonable level is received. It can thus be regarded as a simple type of carrier-level indicator, and the scale can be calibrated in terms of S-points either aurally (by estimating the loudness of a range of received signals) or against another receiver which is fitted with an S-meter, and tuned to the same signals. This scale will be non-linear and whatever its failings as an S-meter in the accepted sense, it will always be useful for comparative readings.

Table of Values

Fig. 2. Signal level indicator for BC-342

C1 = .05 μF	R3 = 2,200 ohms, $\frac{1}{2}$w.
R1 = 68,000 ohms, $\frac{1}{2}$w.	R4 = 300 ohms
R2 = 500-ohm,w/wound	M = 0-500 μA, or 0-1 mA (see text)

After all this work has been completed, you will have a fine receiver, which will compare very favourably indeed with the higher priced sets on the market, both from the point of view of selectivity and sensitivity. The only serious disadvantage with the BC342/312 is the fact that their upper frequency limit is 18 mc.

This can, however, be overcome by using converters—such as modified RF Units, as described in *Short Wave Magazine*—to bring in the 15- and 10-metre amateur bands.

In conclusion, it is suggested that when these modifications are being carried out, careful notes be kept of each step, so as to simplify any future servicing that may be required.

(EDITORIAL NOTE: Some other ideas and suggestions for BC312/342 modifications are given in Vol. I of the *Surplus Conversion Manual*, which devotes some 17 pages to these receivers, including full circuit diagrams and parts lists.)

CONTEST CRAFT

READY-RECKONER FOR COMPETITIVE OPERATING

D. E. C. Lockyer (G3HCL)

IN motor racing one object can be to win a race at the lowest possible speed. The same philosophy applies to DX contests—to take the honours with least wear and tear on equipment and operator. Racing drivers have the advantage that they can keep informed of the progress of rivals. Conditions usually deny that information to the contest operator, who is thus compelled to concentrate on amassing the highest number of points that he can and hope it will be enough.

Serious entrants in contests are faced many times with the decision whether to try for a high point-value contact or to work instead more stations giving low points. In contests where the rare contact earns a fixed bonus it is easy to determine the relative value, in units of "normal QSO's," of such contacts. For example, if the rules state that each QSO is worth 5 points and each new country worked earns a bonus of 20 points, then a QSO qualifying for a bonus will earn 25 points (5 for QSO + 20 bonus) and is thus the equivalent of 5 ordinary QSO's. This relative value remains constant throughout the contest and is easily remembered.

Not so easy to determine is the QSO value of contacts which earn multipliers, *i.e.* where the rules allow so many points per contact and the total of contact points is multiplied by the number of countries (or prefix areas) worked. Practical testing of the extremist views, "Work 'em all—never mind the multipliers" and "Make every contact a multiplier," has proved to the author that neither provides the answer. As usual, compromise is required. The successful contestant is he who can readily assess the relative values of quick QSO's and hard-fought multipliers—relative values which are changing continually as the contest progresses. With this in mind, thought was given to the derivation of a simple method of assessing such relative values at any time. It seemed obvious that mathematics would somehow provide the answer. Consultation of forgotten algebra books led to a solution so simple as to be worth remembering.

The score of a station at any time during a contest is the product of the number of QSO's (represented by x) and the total multiplier (y), or algebraically xy. If the next contact gives an additional multiplier, the score is increased to $(x + 1)$, $(y + 1)$, *i.e.* by an extra QSO and an extra multiplier. The same increase in score could have been obtained by making a certain number (a) of QSO's, none of which was a multiplier, in which case the score could be expressed as $(a + x)y$. Since the new score can be represented by either formula, then these expressions must be equal. A QSO value for each multiplier can thus be determined by solving for a, thus:

$$(a + x)y = (x + 1)(y + 1)$$
$$\therefore ay + xy = xy + x + y + 1$$
$$\therefore ay = x + y + 1$$
$$\therefore a = \frac{x + y + 1}{y}$$

To consider the application: G9FB in the ARRL DX contest has made 300 QSO's and has gained 40 multipliers. His problem is whether to stay on 14 mc working strings of stations in call areas already worked, or to change to 7 mc with the chance of gaining another multiplier. Substituting his achievements for x and y, the formula becomes:—

$$a = \frac{300 + 40 + 1}{40} = \frac{341}{40} = 8\tfrac{1}{2}.$$

In other words, he will get the same benefit in score from 8½ QSO's on 14 mc as he will from a single multiplier on 7 mc. Say his current rate of QSO's on 14 mc is 33 per hour, then 8½ QSO's take about 15-20 minutes. Thus, unless he can expect one multiplier on 7 mc *in this time*, it is not worth while changing.

Such calculations, however, take time, and errors are easily made—especially towards the end of a contest. The formula can fortunately be simplified with very little loss of accuracy. It may be re-written as:—

$$a = \frac{x}{y} + \frac{y}{y} + \frac{1}{y}$$

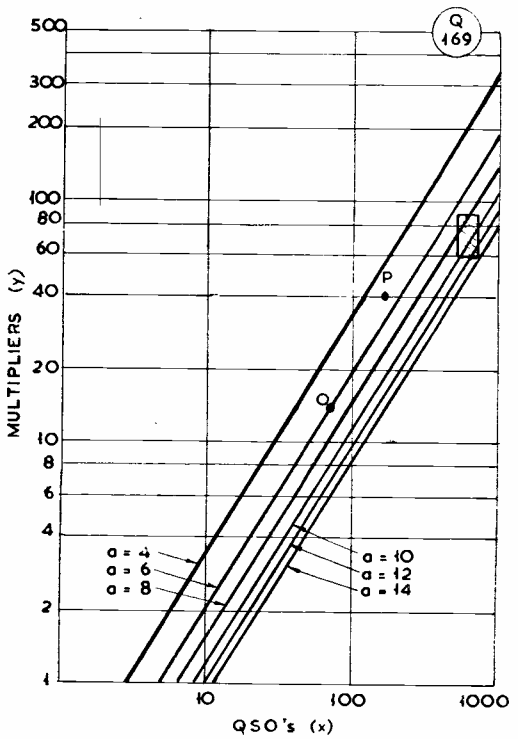
The term $\frac{1}{y}$ can be disregarded, provided the number of multipliers exceeds half a dozen or so; $\frac{y}{y}$ is, of course, 1, so the formula becomes:—

$$a = \frac{x}{y} + 1$$

This can be expressed verbally as the simple rule we were seeking: "*Divide QSO's by multipliers and add one.*"

For those who dislike even this amount of arithmetic, a ready-reckoner is shown by the graph. On this a series of lines presents QSO values (a) of 4, 6, 8, 10, 12 and 14, which cover the QSO/Multiplier ratios usually achieved. To determine a relative QSO value at any time, find the point of intersection of present QSO and multiplier totals and read off the appropriate a value. For example, if a station has 90 QSO's and 15 multipliers, tracing the intersection of 90 on the QSO(x) axis and 15 on the multiplier (y) axis gives point 0, which is the $a = 6$ line. Thus one new multiplier is worth 6 ordinary QSO's. If during the next 25 QSO's 25 multipliers are gained, the new intersection point P shows that the value of a multiplier has fallen somewhat, down to about 5 QSO's.

Of course, values determined in this way only relate to the current state of progress. It is not possible to determine the average value of a multiplier throughout a contest, as one cannot tell how many QSO's will be made—unless one owns a crystal



The graphical ready-reckoner evolved by G3HCL to enable one to check progress in a contest; once his argument is grasped, the whole thing becomes perfectly clear, and it is possible to extract the necessary information merely by laying a straight edge on the graph.

ball! However, an approximation is often possible after considering all factors. Assume a station expects to make between 500 and 700 QSO's and gain 60 to 90 multipliers, then the average value of a multiplier will fall somewhere within the rectangle shown on the graph — say between 8 and 12 QSO's.

BBC EXPERIMENTAL TELEVISION TRANSMISSIONS ON UHF

The BBC is now running a second series of high-power experimental television transmissions on UHF, in Band V (610 mc - 960 mc) from the Crystal Palace. The purpose of these experimental transmissions is to test the suitability of this band of frequencies for television broadcasting. The first series of tests used the normal British 405-line television standards, the same programme being transmitted in Band V as in Band I so as to provide a direct comparison.

The second series of tests, which will continue for three months, will use the Western European standard of 625-lines and the results will be compared with those obtained in the recent 405-line tests. It is hoped that these further tests will throw some light on the problems which would be encountered if it were decided to use the 625-line standard for a television service in Bands IV and V. (There is, of course, no intention of making any change in the 405-line standard now used by the BBC in Band I.)

The experimental transmissions are on frequencies of 654·25 mc (vision) and 659·75 mc (sound). As in the first series the transmissions will be in black-and-white only. The tests have been planned by the BBC in co-operation with the Television Advisory Committee and the Radio Industry. A number of experimental receivers are being used and the BBC, the Post Office, the D.S.I.R., the I.T.A., and the Radio Industry will make a comprehensive study of the received pictures.

THE FRENCH AMATEUR QRT

As a Late Flash on p.208 of the June issue, we announced that (consequent upon the internal political difficulties in France) all French amateurs had been closed down w.e.f. May 22. The ban was lifted on June 2, by which time we were committed to press—so our note had actually become non-effective before the June issue was published. Our French colleagues had their liberties curtailed for about ten days only, and for that we may all be very glad.

SUBMARINE POWER CABLE FOR NEW ZEALAND

In March, 1956, the BICC Group were instructed to investigate the practicability of linking the rich electric power resources of New Zealand's South Island with the supply network of the industrial North Island. This investigation resulted in an announcement in April 1958 that the BICC Group are to lay, test and recover a trial length of cable in order to provide data for the ultimate installation of a submarine power cable across Cook Strait.

The trial cable, half-a-mile in length and with an overall diameter of 5 inches, was manufactured at the Trafford Park Works of British Insulated Callender's (Submarine Cables) Limited; it is of the single-core, pre-impregnated, high-pressure, gas-filled type, and is to operate at 250,000 volts DC. It has a hollow copper conductor, is paper insulated and lead sheathed, and is suitably reinforced with steel tapes and wire armouring to withstand the particular conditions of the sea bed under Cook Strait.

This trial cable was not of sufficient length to warrant transport by a cable-ship, as would be the case for the continuous length required for the complete crossing. The cable was, therefore, coiled on a large drum, believed to be the biggest ever produced. This drum was 15 feet 8 inches in diameter and 7 feet 6 inches across, and, with the cable, weighed about 45 tons. Under the supervision of engineers from British Insulated Callender's Construction Company Limited, the trial length will be laid by the New Zealand Post and Telegraph Department's cable-ship H.M.T.S. *Matai* seawards from Oteranga Bay, which is on the North Island shore of Cook Strait south of Cape Terawhiti. After the ends have been sealed, the cable will be anchored and allowed to remain on the sea bed for as long as possible. For the full-length cable the projected Cook Strait crossing route is a distance of some 25 miles with a maximum depth of 150 fathoms.

HISTORY IN A SHOE-BOX

Part II

EUROPEAN SCENE IN THE EARLY DAYS

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

THOSE whose memories of "DX" go back as far as 1923 will agree that not much was heard from outside the U.K. until the French stations started up in force. U.K. stations were all 2's and 5's, with no prefix, and the French were 8's, so there was no confusion. Leon Deloy, 8AB, was the best-known, if only for his 25-cycle AC note, which to-day we would take for someone sending dashes by holding the dot contact of his bug!

The first French QSL's to appear were copies of the almost standard form of the British ones, except that they ran to a "montage" described as a Hartley, used "deux lampes" and boasted an "intensité" of 25 watts or so. Both the gear and the aerials seemed similar to the British pattern, except that there was less enthusiasm about such details as rectifying the AC power supply.

A 1925 card from F8TK mentions a "Cage, 6 fils, 22m. de long, 32 m. haut, Hartley-Tesla . . . DX emission, USA avec 80 watts." F8WAL, also in 1925, used a "Four-coil Meissner" on 102 metres, and F8MJM (same year) worked on 100 metres with "Antenne: Type Tour Eiffel, terre et contrepoids."

F8BA described his *montage* as "Hartley fashion," *lampe* as 150 watts and *intensité* as "none on the meter"! F8PA, in 1924, gave his input as "2000 volts, 50 cycles, no milliammeter." F8SG was one of many who sent their QSL direct as a post-card, not even in an envelope, and said on it "Pse QSL under cover." (One has the suspicion that only about one Frenchman in twenty was licensed in those days.)

F8BF, in Orleans, must have been in advance of his time, with a "super-heterodyne, 8 lampes," in 1927; transmitters were "100 watts and also 1 kW, 25-cycles." In general, the cards show the pattern to have been what one would expect — Hartley oscillators for transmitters, 0-V-0 or 0-V-1 receivers, and weird-and-wonderful aerials.

The Italians started up as plain 1's, then became I1's and later EI1's (E for Europe). In the batch is a card from I1ER (April 1924), worked from G6QB less than a year ago on 21 mc. In 1924 days he used a "Schnell (1MO)" receiver, and a one-valve transmitter running 100 watts in a "modified 1XAR circuit." His best DX at the time was FN2NM in Finland, 2000 km. away.

I1FO was following the strictly American fashion, using a UX-210 in a Hartley circuit—the beating those '210's took, all over the world, was phenomenal. Put one in the socket and screw up the input until it is not *quite* white-hot . . . and then run it for years. That was the usual thing. I1BK was a high-power man even in 1926, and he had by then worked Brazil, Porto Rico, Uruguay and U.S.A. with 150 watts or so.

Incredible calls like EAR42 emanated from Spain at this time, and when the two-letter prefixes came into force they became EE-EAR42 and so on! EAR59 and EAR62 were in Majorca, but "country-status" didn't matter then. Just to confuse matters, the prefix for Austria was EA, and they had no figure at all, but calls like EA-KL, EA-RI, EA-FK, all of whom are in the file. EA-RI, in 1927, had an aerial 13 metres long for transmission (on 46 metres!) with a 15-metre counterpoise, while for reception he had a separate cage aerial 11 metres long. On his card DX was claimed to be "world-wide," with the usual Hartley and 0-V-1.

In the early 1920's a very large and active group of Belgians emerged with calls like B-P2, B-Y8 and B-V33, but later they assumed the figure 4 that they still use, and were B-4AA, B-4AU and so on. B-P7, later 4AA, was worked from 6QB in 1925, when he was using 5 watts on 95 metres. B-P2 ran 30 watts of ICW, with 1600 volts of 600-cycle AC, and was quite a DX'er. A little later, in 1927, EB-4QQ had worked 24 countries with 20 watts; and by 1928 EB-4CK, with 15 watts input, had raised New Zealand, Australia, Uruguay, Venezuela and all.

The Scandinavians

The Swedish amateurs began with a most peculiar system of call-signs. They simply started with SMZZ and worked backwards! Around 1929 they divided up into districts and inserted a figure between the SM and the other letters (to indicate the district) and have stayed thus ever since. SMZZ himself was using 40 watts of ICW in 1924, on 100, 125 and 175 metres. SMYY had a transmitter with "four R valves in parallel, 20 watts," and SMUA was the "grand old man" of Amateur Radio, with lots of DX to his credit by 1926.

Around the 1924-25 period, the best DX for most of the low-powered G's (the writer included) was Finland, where a group of very active and enthusiastic amateurs kept the flag flying. Their prefix had a very rough time, for they started off as "FN," later became "S" (for Suomi), turned into "ES" when the Europeon prefix was introduced, and then finally assumed the OH that they have kept ever since. FN2NM in Helsinki was a choice piece of DX for many a G with less than 5 watts and a most indifferent aerial. In 1925 he was telling us on his QSL that the 6QB signal was "much easier to read on ICW than pure CW—congrats for your input"! By 1928 he was running 100 watts and his DX extended from Japan to the U.S.A., and from Jan Mayen to Antarctica.

ES-2NS, in 1926, was running 3000 volts (mA unstated!) to a "Philips Z.IV tube," and seemed to have worked practically everything. And in 1928 we find 2NM again (now ES-2NM) with 140 volts of dry cells, working "all waves from 40 to 120 metres."

Norwegians signed LA from the first, although they had the prefix EL in front of it for a while; the Swiss were H9's to start with, becoming HB9's with the rationalisation. The Danish amateurs were

just plain 7's at first, then D7's and ED7's before becoming OZ's. The earliest card we can find is from "Danish 7BJ," reporting on our signals in 1924 but inscribed "no licence"! 7MT, in 1926, seems to have worked half the world with 1-5 watts input, chiefly on 45 metres. 7QF, 7JS, ED-7JS and OZ2Q were all the same James Steffensen, very well known over here and, as far as we know, still active. His transmitter, in 1925, was powered by 1200 volts of "full cycle chemically-rectified AC" — doubtless unsmoothed!

Germany and Poland

The German stations were K4's, then EK's, and finally D's. (DJ's and DL's are entirely a post-war phenomenon.) One of the first we can trace was K-I8, with K-Q5 running him close. KPL, despite the call, was an amateur in 1925, and had worked U.S.A. on 36, 47 and 80 metres by then; according to the card, his receiver covered 15-4000 metres.

K-4CL was a well-known type who went through the successive stages of EK-4CL and D4CL. One cannot, however, remember any outstanding German operators or DX men in the pre-war years.

Poland had a chequered career, prefix-wise, beginning with calls like TPAI, later becoming ET-TPAI and eventually SP's. The said TPAI was on 45 metres in 1926 with the inevitable Reinartz receiver and Hartley transmitter — the Rodgers-and-Hammerstein of those years! TPAK, TPJU and TPZZ are all in the box, too, and TPAR, in 1928, was using 250 watts and had his WAC and 50 countries.

Other smaller packets reveal EC's (Czecho-Slovakians), EP's (Portugal) and a solitary EJ-7QQ in Jugoslavia. ED-7JO was no ordinary Dane, but was in the Faroes. L-1AG (later EX) was one of the very first in Luxembourg. A sizable batch of plain Zeroes, then changing to NØ's, ENØ's and finally PAØ's, became the fellows we now know in the Netherlands.

The last assortment comes up with TLA-2XA in Latvia (later to become EL and then YL); ET-1F in Lithuania, later to sign LY; EW's in Hungary; and a welter of Russians with the most extraordinary calls of all. They started with combinations like EU-09RA, EU-12RA and so forth; became even more complex for a while, and then settled down to rational calls like EU2BD, 3BN, 8RW, 9AC, to mention only a few.

By 1928-29 the present series of prefixes, more or less as we know them, came into use. The unofficial "E for Europe" disappeared and U.K. stations became G's, Russians just U's, Italians plain I's, and so on—but many of the old combinations went for ever. For instance, countries like EB, EN, ED, EP became ON, PA, OZ and CT, and one had quite a lot of learning to do. Up till then, OZ had meant New Zealand, and OA Australia—now they became Denmark and Peru!

(To be continued)

MESSAGES FOR POLICE

According to the *London Gazette* of May 9, 1958, radio amateurs in the U.K. are now permitted to pass traffic for the police, when officially requested. Normally, this would only be under conditions of emergency, or a serious failure of the "usual channels."

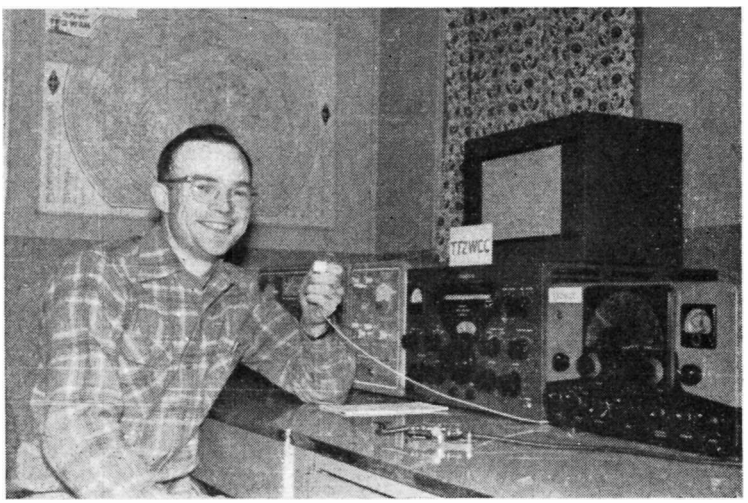
CAPESTHORNE MOBILE RALLY

Talk-in stations for the Mobile Rally to be held at Capesthorne Hall, Wilmslow, Cheshire, on Sunday, July 13—*see* p.208, June issue for further details—will be: Top Band, G3FVA/P; 80 metres, G3FYE/P; and two metres, G3AYT/M, all opening from about 11.00 a.m.

Group photograph taken on the occasion of the Rally and get-together held at Spilsby, Lincs. on May 18. The total attendance was about 120, a record for this meeting, which included a most successful junk sale — and an unscheduled auction of useful surplus equipment. The talk-in station was G3ANM/A, who was kept busy working the mobiles in from about 11.00 a.m. onwards, and last visitors did not leave till 9.00 p.m. The organiser of the event was G2ABK.

DX COMMENTARY

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



TF2WCC

CALLS HEARD, WORKED and QSL'd

LAST month's discussion of the anomalies in the List of Countries produced a good crop of replies. The significant fact that emerges seems to be that no one is satisfied with the present situation. We are all agreed, it seems, that the accepted list of countries is full of absurdities ; but nobody wants *another* list drawn up, to make confusion worse confounded.

The nicest suggestion received was that those who are keen on these things should describe their score as "184 ARRL Countries Worked," or whatever the figure is. If they have a private idea of their own about country counting, they can then keep a separate score for themselves, based on their own particular list. So one of these days we shall be carrying two columns, headed "Countries Worked" and "ARRL Countries Worked" . . . or shall we?

Arising out of all this is another discussion on "What, after all, *is* DX?", that celebrated question to which there is no answer. For the purposes of this Commentary, we can, however, make it clear once more that DX is *not* just the working of rare ones. If this column's clients consisted solely of those types who have already worked 200 or more, and now spend all their operating time lying doggo and waiting for new ones. we doubt whether we could claim more than a hundred readers.

As always, we shall do our best to cater for those who maintain a sensible and balanced outlook on these matters ; those who are not too *blasé* to get a kick from a mere W6 or VK contact (still DX to about 90% of operators) ; those who would rather QRP to 25 watts and have fun by working semi-DX on Forty and Eighty with it than wind up to full power and ignore all except the most exotic prefixes.

On this theme. one was interested to see a letter in the June *QST* from a well-known W2 DX'er, pointing out that the present rat-race tactics drive many amateurs in remote spots completely off the air, since they can no longer talk to whom they wish. at their leisure, thanks to "hungry DX'ers completely ignoring all ethics of being gentlemen and good radio operators." One could not agree more ; if "DX" is simply a matter of continually collecting new ones, with all the pain and strain associated with that pursuit, we ought to find a new title for this Commentary. However. that step is unnecessary, because it would certainly not represent the interests of the great majority of our readers, whose own DX is exactly what they choose to make it.

Not So Good

Summer conditions have caught up with us properly ; and they always seem worse during a good year. The high level of DX achieved in the spring has been considerably reduced, and Ten and Fifteen have been especially hopeless at times. Morning sessions which, a month ago, were pulling in Pacific rarities, now mean listening to a lot of short-skip stuff and not even bothering to put the Tx on the air.

But don't be despondent at these remarks . . . we shall probably have another month like this, and then we should be plunging into peak conditions again. Of course, there are those who say "Bad conditions are better than good ones" — meaning that you can at least do some gentle DX'ing without fighting your way through four-deep QRM all the time. One certainly quite looks forward to a few years of poorish conditions in which the short-skippers are no longer with us— but shall we get that this time round?

Meanwhile, Twenty yields some good DX late at nights and in the early mornings ; Fifteen is almost unpredictable ; and Ten is pretty

uniform in its dullness. Despite all this, our regular 'chasers have plenty of interesting stuff to report.

Ten Metres

There is not a great deal to discuss for Ten, which is in its normal state of summer doldrums, with a few bright patches for which you can only sit and wait. G3DNR (Broadstairs) collected CR7AD on phone for a new one, and G3DNF (ex-GW3DNF and now in Wembley) raised CR6CK. G3GQK (London, S.E.23), whose letter harks back to the previous month, reports working W5, 6, 7 and 9, 9K2AP and FB8ZZ on the band. He also heard, but did not work, EL1C and VKØAT; the latter was on at about 1100, 28350 kc. And G3DO (Sutton Coldfield) mentions ZD7SA for a new country, and also worked PYØNA (Trinidade Is.) on phone.

Fifteen Metres

This band is flourishing, compared with Ten! More and more 'chasers are becoming thoroughly tired of the short-skip and general clottery on Twenty, and are migrating to Fifteen. As long as the causes of the trouble don't follow them, happiness should prevail.

G3BHJ (Norwich), in a "phone-only" report, mentions contacts with CT2AH, FE8AP, FF8AP, MP4BCJ, OA4GR, OX3WE, VP4MM, VP6's, VP8CQ, VQ4FK, VS1JF, VS9O, SVØWN/Crete, ZB2A, ZS8I and 9G1BF. VS9O's QSL was personally delivered by MP4BBL just prior to his return Middle-Eastwards. G3BHJ hopes to be in WØ shortly, where he will try to listen to some of his locals from a DX location.

G3FPK (London, E.10) says the Far East openings have continued with VR2DA and VK9XK doing a roaring trade. After Twenty and the short-skip, he finds it quite weird to hear KH6, JA, VK, FB8 and JT1AA coming in—with nothing else on the band. Late at night, OA, PY and LU are good, but often swiped by inaudible W's. New ones included CR7BN, JT1AA, KH6AH, 4S7DT and 9K2AQ. 4S7DT hails from Burnley and would like a QSO with that area. 9K2AQ is G3FJU and is probably in G-land by now.

G3DNF worked PY7AFN, and the PY gave his QTH as Fernando de Noronhas—no suffix or anything. G3DNR stuck mainly to this band, and collected three all-time new ones—OA4IGY, TI2JA and VP9G on phone; KG1CK on CW was new for the band.

EI4X (Limerick) quotes 4S7GD, VP8DG, HR2MT, KZ5RH, AP2AD and VS2DW. GW3HXX (Rhondda) is ex-VS6BO, reporting for the first time. On Fifteen he raised FF8AF, LU3ZQ, OQØHQ, PY2NA and ZS3B on CW, but most of his time was spent elsewhere.

G2DC (Ringwood), on the other hand, spent practically all of his time on this band, much of it being used for thrice-daily skeds with VP2VB/MM, who should be in KV4-land long before you read this *(see* p.255). General DX work, apart from these skeds, brought him loads of South Americans from 2000 GMT onwards, including OA, YV, HC, ZP, YN as well as the more usual ones. VP7BT turned out to be a W6 on tour; others were VP8CC, JT1AA, JA1CBO, and four new ones—GC3AAE, ZS3BC, UF6KAC and FQ8AY.

G3DO comes in with two new ones—PYØNA (Trinidade) and VS9O (Oman), both on phone, another interesting telephony contact being OR4VN, also on 21 mc.

Twenty Metres

The brave spirits who have defied the short-skip, the strange operating habits of the Lids (about whom we really must compose a zoological treatise one day) and the general discomfort of this band have pulled off quite a few pieces of DX for their pains.

GW3HXX, for instance, reports working CE4BP, ZP5JX, ZD7SA, LX1AA, SVØWN, HE9LAA and 9LAC, TG9AL and 9MB (0615), XE3AF, OQ5AT and CR6BX—all on phone. Operating times were mostly between 2000 and 2330. Incidentally, we thought that ZD7SA was on Ten CW only—we hope this one wasn't a pirate.

EI4X was lucky with the latest

FIVE BAND DX TABLE

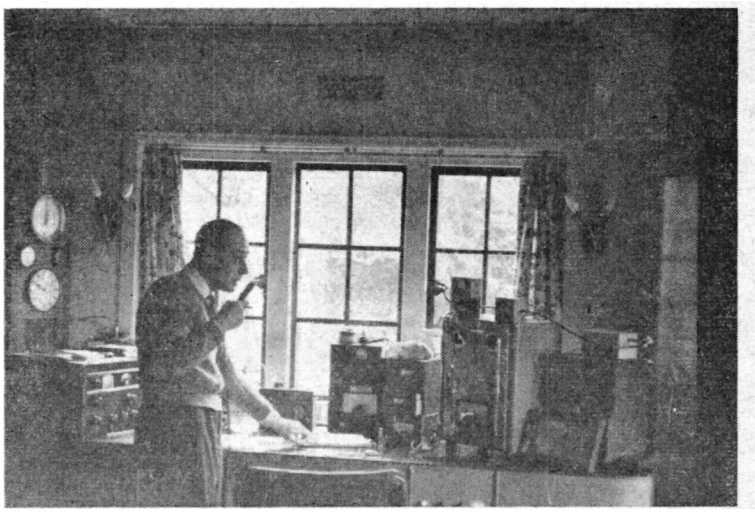
(POST-WAR)

Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries
DL7AA	884	113	170	238	190	173	254
W8KIA	802	68	148	271	171	144	271
G3FXB	761	73	131	213	194	150	243
G5BZ	733	64	118	252	178	121	259
G3FPQ	695	70	101	201	189	134	223
G2DC	673	77	101	205	152	138	223
G3DO	641	24	46	238	164	169	258
W1VG	604	25	120	204	139	116	209
W2EQS	577	79	118	177	114	89	193
G3WL	514	41	87	172	123	91	199
W6AM	511	30	58	280	86	57	280
G2YS	489	71	87	160	109	62	178
G3ABG	483	45	84	170	99	85	190
G3BHW	468	15	32	171	136	114	203
GM2DBX (Phone)	425	34	31	160	102	98	176
G6VC	387	34	49	146	90	68	164
W6AM (Phone)	359	13	32	254	39	21	254
G3FPK	311	30	69	115	67	30	137
G3IGW	311	44	65	88	66	48	121
G3JZK	296	15	54	64	101	62	148
G6TC	293	17	66	126	53	31	141
G2YV (Phone)	267	12	26	83	93	53	137
G2BLA	267	32	48	66	67	54	110
G3JJG	265	38	45	94	53	35	113
G8DI	254	25	56	70	59	44	108
G3LET	252	11	49	125	50	17	135
G3DNR	226	10	21	84	51	60	108
G2DHV	226	20	27	125	40	14	133
UR2BU	217	12	24	71	50	60	?
VO2NA	157	13	17	82	34	11	86
G3IDG	105	11	15	24	23	32	46
G3DNF	100	5	29	38	21	7	48
W3HQO	61	3	5	12	32	9	?

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

Trinidade Island expedition, and he worked PYØNA on phone. G3DNR is one of those who have dropped the band owing to short-skip, and G2DC gave up his skeds with VP2VB on Twenty because of the mauling they were getting.

G3FPK managed three new ones — KR6AO, VQ4AQ and ET2TO, the latter at 1720, CW; QSL to him *via* WØWET. Around 1800 GMT, says G3FPK, one can often hear KG1, VS6, ZK2, ZS, W7 and UA1KAE/6. The latter was heard working UL7KAR and giving him a report of "552"—which was generous! KW6CE and I5LV were gotaways at this time of day. And on this band, G3DO did get FO8AC (phone) and KP6AL (CW).



Having moved, G3HCU is now set up at his new QTH at Peaslake, Surrey. Visible are the beam direction indicator and 24-hour clock, and the AR88, at left, next the Top Band and two-metre gear, then the LG.300 transmitter and BC-221 frequency metre. The aerial system includes beams for 10, 15 and 20 metres (under construction) a G8KW multi-band, and a 256 ft. wire for 160 metres. All the equipment is relay-controlled by switches on the desk panels.

Miscellany

Under this heading we will include the only Forty-metre reports received this month. G3LPS (Blackburn) stuck to this band with 70 watts and a half-wave aerial for a while, and wasn't too pleased, W5 and WØ being the best DX. Recently, however, he put up a vertical, and during a few late and early sessions raised UA9, 4X, PY's, VE2 and 3, LU9CK and plenty of W's.

G3FPK collected CT2AI (new one), GC3AAE, PY4AO, 4ATJ and 7ADR. The "H22 Contest" caught him unawares, but though he didn't come on until it was nearly over, he made 38 contacts with HB stations.

Last month we alluded to VP8CY as "ex-G3LWY at Halley Bay." Although this was passed on just as received by us, it seems now that it should have read "ex-G3LWS." G3LWY, who is a YL, writes to say that she has never been to Antarctica, and "delightful though the experience would be for a YL op., I doubt if I ever shall." Thanks, 'LWY, and sorry there was some confusion.

EI4X is in for a spell of rebuilding to both transmitter and receiver, after which he hopes to rotate his Cubical Quad through a system of chains, wires and pulleys from the shack; he has collected DXCC on phone and is chasing several other awards.

G3DO, who worked KM6EVK and VK9AD (Norfolk Is.) on phone, has already had their cards —by airmail.

G3DNF, now installed at Wembley with his "very new XYL," has come to the conclusion that the former GW prefix was worth at least 100 watts to him! He is still QRP (15 watts on all bands), but he has lost his 200-ft. wire, his low-resistance earth, his low noise level and his GW prefix! However, he enters the 5-Band Table once more, despite the 100-ft. aerial with *ten* sharp bends in it, partly indoors and partly outdoors, in among steel-framed buildings. (It all goes to show what we've known for years —that you can't keep a keen 'chaser down.)

". . . . he says signals would be stronger if we could get a bit higher . . . ."

Top Band Topics

The season of static and non-DX is decidedly with us on One-

Sixty, but the county-chasers are still there in the background. G3LIQ (Hull) has just claimed and collected his WABC, which is the second ever to be awarded for Phone (G2CZU had the first). G3LIQ tells us that he has now started all over again and worked 40 counties a second time.

G3IDG (London, S.W.12) suggests that the reported hearing of OZ on the band was due to the old phenomenon of "sub-harmonics"—in other words, the second harmonic of your receiver oscillator beating with a strong signal on Eighty. As an SWL he heard PA, ON, DL, SM, LA and F in this manner during 1950-51.

G3ABM (Ellesmere Port) reports that he will be touring Scotland with a Top Band mobile between June 29 and July 11, so you still have time to look out for him. G2NJ says that this summer he will be on regularly from Peterborough, which counts for Northants.—but there is to be no G2NJ/A from Huntingdon this year.

SWL Corner

M. J. Prestidge (Birmingham) heard PYØNA (Trinidade) and ZD7SA on *Twenty* phone—so probably the latter is genuine (on this band) after all, and has emerged from his CW-only state on Ten. Best on *Fifteen* were ZD1EO, PYØNA, OR4VN, SVØWN/Crete, and VS9O (Oman); the latter is G3IRQ, and is a member of International Aeradio's staff at Salalah.

S. R. Smith (Crewe) winkled out CR6CA, CR6DA, CR7BB, ZS8O and ZD7SA on *Ten*; HC1PJ and 2OA, HS1E, KL7's, KH6's, VP4TO, VP8CH, VK9LE, YN1FS, ZD1EO and ZD9AF on *Fifteen*. Finally, *Twenty* brought him HC1DT and 1FG, VK9AD, XE1DU and 3AF, ZD7SA and ZK1BS.

L. D. Strange (Sutton Coldfield) has noted short-skip even on *Fifteen*, on which band he has been getting S9 signals from G's and GM's in the evenings. Best DX on 21 mc included FP8AU, HI8GA, OR4VN, PYØNA, VP1EE, VP2LB, VP7RV, VS9O and ZD1EO—all phone. *Forty* CW gave him GC3AAE, TI2LA and VO1AU, and a very nice one on Top Band CW was UB5KAT.

B. Griffiths (Ventnor) has logged 239 countries in 40 Zones since January 1 this year. Best DX this month was ZD7SA on *Ten*; DU6IV, HS1MF, OR4VN, PYØNA, VS9O, ZD8JP on *Fifteen* phone; FM7WN, KC4USB, XE2KW and ZK1BS on *Twenty* phone; and FO8AC on *Twenty* CW. M. Marment (Birmingham) reports KA6HP as a new U.S. Forces station in Japan (21 mc), and heard ET3XY say he would be in *Ethiopia* for some time yet.

P. Day (Sheffield) logged CR4AD and HC1FL on *Ten* phone; KM6BK, VS9O, VK9LE, VP8CN and DU6IV (*Fifteen* phone); VR3A and JT1YL (*Fifteen* CW); KM6EVK, KW6CE, CR4AH and UM8KAA (*Twenty* CW); CT2AI, UP2AA and ZC4AP (*Forty* CW). He is also our only SWL to report frequently on six metres, on which band he heard and tape-recorded HB9BZ on phone during sporadic-E conditions. Around the same frequency he has been logging Continental TV sound at S9 plus. Another comment from P.D. is that VS2DW's "fantastic phone" on *Fifteen* blocks his receiver!

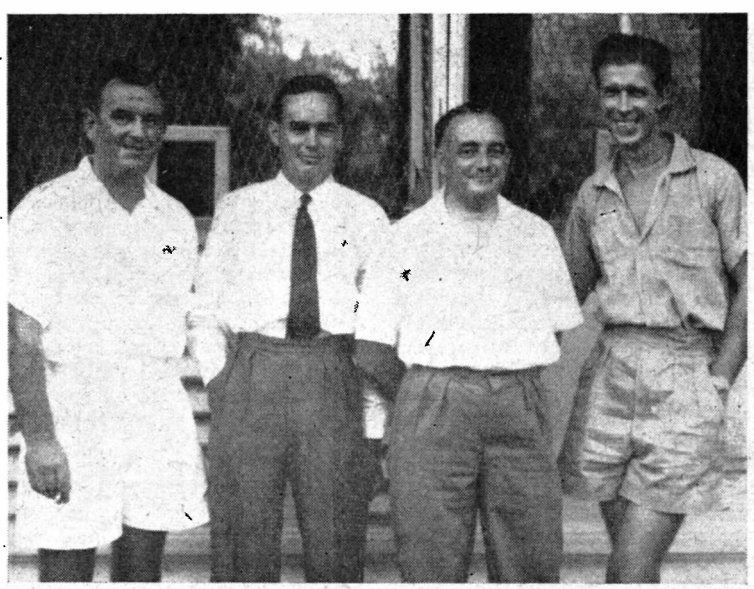
V. Porter (Loughton) heard PYØNA on his first session on the air (*Twenty* phone), and also mentions VS1BB/VS9, XE1XE and XQ8AG among interesting phones logged on *Fifteen*. He now has 175C heard in 38Z.

Congratulations to our SWL's this month on the very high standard of DX they have logged. Please keep it this way, and continue watching out for even better things!

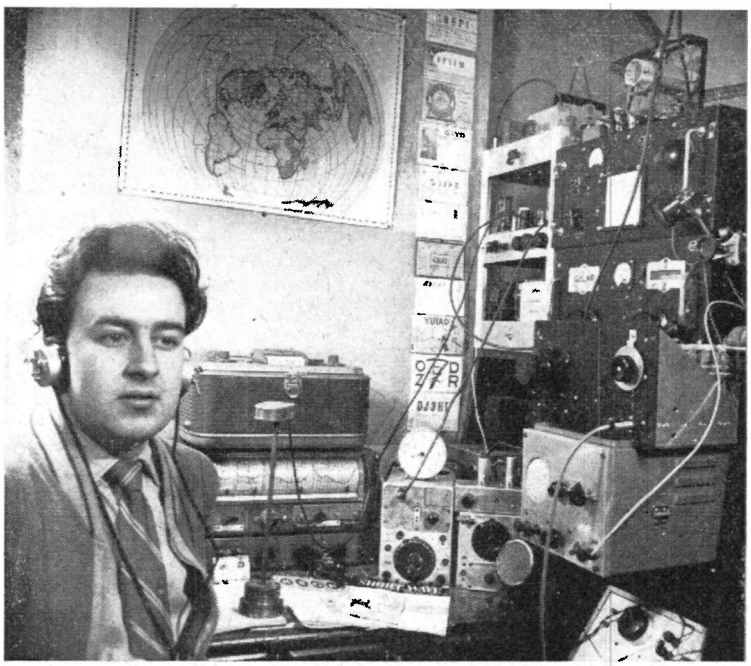
News from Overseas

VS1HU's bulletin from Kranji tells us that his own score is now up to 174 countries, some of the latest being ET3PRS, GC3AAE, OY7ML, VS1BB/VS9, ZD3G, VQ8AJC, VR3A, KB6BJ and HE9LAC. Several other rarities were raised, but they had been worked before. The club hopes shortly to own a "Vanguard" and will then be active on 21 and 28 mc—all their work so far has been on 20 metres only.

VS1BB/VS9 is now back in Singapore, but he has left the gear behind, and a newly-formed club on the Maldives awaits its call-sign . . . VR2AP, who visited VS1 recently, continues his tour *via* FU8-land . . . VS1HQ, 1HZ



Left to right in this photograph we see: VR2AP, VS1HU/G3JFF, VK3DU and VS1FJ/G3IDC. It was taken when VR2AP and VK3DU were visiting the Singapore boys recently.



G3LNP of awley, Salop, operates SSB only, his sideband exciter unit being based on that described in the October 1955 issue of "Short Wave Magazine." This gives SSB drive on all bands Top to Fifteen, into either of two linear PA's; one is an 813 connected grounded grid, and the other a pair of 807's in parallel. The VFO is a modified Command unit, with a BC-453 arranged as a selectable sideband adaptor. The main receiver is an R.1475, with a CC converter for the 21 mc band. Ancillary equipment includes an oscilloscope, a crystal-heterodyne VFO, and a Grundig TK5 tape recorder. On the wall is our Great Circle DX Zone Map, with the tabular matter giving the Zone data trimmed off.

and 1JK have now left VS1; the first two are G3LCS and GW3KGD.

Buzzes from Singapore — that VK2AIR will soon be on from Lord Howe Island; that ZL1ABZ (Kermadecs) will shortly be on 14 mc instead of 3·5 mc only. VS2DQ made history with the first VS2/JA contact on 50 mc; he has also been hearing VK's on six metres and hopes to work them soon.

VE3BWY(Ham Whyte, *ex*-G6WY and, of course, our predecessor with this column) writes from Toronto to say that his new Viking Valiant has worked 135 countries in a year of operation, and that he hopes to get across on Top Band next winter. He uses a 134-ft. wire for all bands, but a three-band Quad will shortly be going 50 feet up. Bob Kenny, VE3AYE, is second op. and chases Pacific DX early in the mornings. DX on 7 mc has been good, including CT2, FA9, SP, OK, HB, DL and the U.K. VE3BWY particularly likes working G's on Forty, but the hours are a bit tough for them, 0100-0500 GMT being best.

UR2BU is Karl Kallemaa, pre-war ES5C. He built the three-band Cubical Quad described in the December 1957 issue of SHORT WAVE MAGAZINE and likes it well; since then he has been busy giving a surprising number of countries their first UR2 contact, and on 21 mc he made WAC in an hour and forty minutes. Karl enters the Five-Band Table with his score for the first six months of operation (he was QRT from 1940 until 1957).

Reg. Tibbetts, who signs W6ITH/FS7RT/PJ2MC/ VPØRT, etc., tells us that Anguilla, the island he put on the map with VPØRT, will score officially as a country under the new West Indies count. Now, as a result of this same re-shuffle, Reg has made arrangements to secure licences and to operate from Montserrat, Grenada, St. Vincent and Dominica, as well as keeping FS7RT and PJ2MC active!

DL7AA (Berlin) puts his top-scoring Five-Band figure even higher, thanks to UR2BU, ZS8O and ZD7SA on *Ten*, VR3A, KM6BK, ZS8O, FB8XX and VP5WS on *Fifteen*, and KP6AL, 9G1CR and VS1BB/VS9 on *Twenty*. Many of them were worked both on phone and CW.

VO2NA (Goose Bay) was the winner of their Amateur Radio club's QSO party in May; VO2AB was runner-up. Recent DX for VO2NA has included XE on *Ten;* KG4AS on *Fifteen* CW; KH6, KL7, OY7 and YV on *Twenty* CW; VP9 and VQ4 on *Twenty* phone; and a large bunch of Europeans on *Forty* CW. We don't quote his Europeans on the other bands — they are quite numerous!

OY7ML is in pretty constant demand himself, for there are still plenty who haven't worked the Faeroes on all bands. The pile-ups don't prevent him from working some nice DX, though, and in the past few weeks he has collected AC5PN, LA1VC/G, VR3A, VS1BB/VS9, ZC5AL,

TOP BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
G2NJ	98	98
G3JEQ	96	96
G6VC	96	96
G3JHH	92	93
G3FNV	91	92
G3AKX	89	90
G2AYG	88	88
G2CZU	78	78
G3DO	75	75
GM3COV	68	70
G2CZU (Phone)	60	60
G3LBQ	58	65
G3JSN	49	62
G3LEV (Phone)	39	47
G3LNR	35	46
GW3HFG (Phone)	30	40
G3LNO	23	41

ZK1AK and ZL5AC. His one lament is the absence of a card from VQ6LQ, so if this should catch his eye . . .

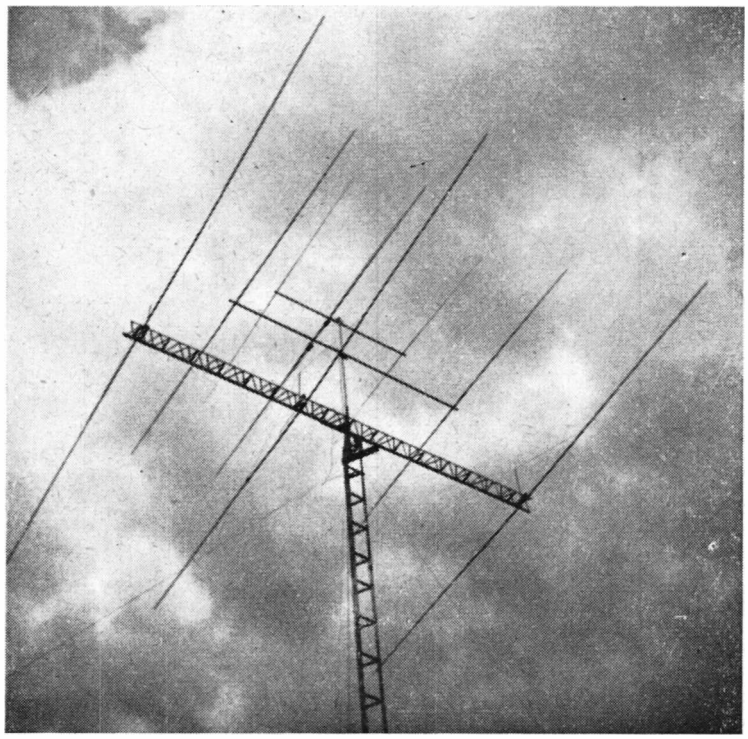
The AHC

It had to happen in the end! First you collect sheepskins, and then you collect an award for collecting them . . . The "AHC" is the abbreviation for The Award Hunters' Club, membership of which is open to those holding 25 different Awards or Certificates, which must include at least one from each of four continents. Stickers will be available for "AHC 50" and "AHC 100."

If you are interested, send a list of your awards to the hon. sec. of AHC, who is OH2YV, Isokaari 4-B-30, Lauttasaari, Helsinki, Finland. The membership fee is one US dollar or the equivalent—12 IRC's also accepted.

Membership of organisations like FOC, RCC or the A1 Ops. Club all count—not necessarily just DX awards.

On the subject of awards generally, now almost as numerous and confusing as "new countries"—and about as meaningless, since so many of them are private ventures designed primarily to increase the popularity on the air of small local groups—it should be noted that no list published is up-to-date, and most are inaccurate. It seems to us that the first definition for any serious DX award should be that it is open to all amateurs able to work some given *prefix* area, or areas. It is perfectly ridiculous to offer a sheepskin for working, say, any ten of the 16 transmitting members of the Brummapool and District Amateur Radio Club—which is about all that some of these new "diplomas" amount to when you look into them. So far as we are concerned, we have enough to do keeping abreast of the claims for the various DX Awards and Operating Certificates sponsored by SHORT WAVE MAGAZINE. All these are designed to be strictly general-interest on a world-wide basis, *i.e.* to benefit the many rather than the few. Indeed, this applies to nearly all the established and recognised DX awards, wherever they may originate.



W8QGE of Detroit, Mich., has a three-band beam array, for 10, 15 and 20 metres. The tower, which is 50ft. high, is footed in a ton of concrete. All three beams are full size, and the input at the bottom end is 200 watts.

Operating Notes

We make no apologies for returning to the theme that, despite all the weird commercial noises, most of the QRM on the bands is of our own making. Now, to our way of thinking, one could halve it by *(a)* halving the number of stations using the bands, or *(b)* having the number of hours' activity of every station. Now, to sub-divide *(b)*, this could be achieved by *(c)* halving the number of QSO's, or by *(d)* making the same number of QSO's but taking half as long over them.

At last we reach the point, which is this: That the average QSO of the "bread-and-butter" type lasts roughly ten minutes. During such a QSO very little information is exchanged except QTH, RST and name. Now why on earth should it take ten minutes to do that? Mainly because, as our private research reveals, each station, in order to do just that, sends the other fellow's call-sign not less than *twenty* times (in some cases many more) and his own fifteen to eighteen times!

This is something that we have all accepted for years—but why should we go on with this absurd waste of time and band-space? The rubber-stamp QSO referred to above would be no less friendly for cutting out some of the time-wasting procedure, surely? On CW, we could use break-in technique, and on phone we could surely cut out some of the blabber?

Contest QSO's take thirty seconds or one minute at most; long, friendly natters take half-an-hour or more. Both are excellent in their own way. It's this in-between business, in which more time is spent on sending call-signs than in exchanging any information, which is the monumental time-waster. What can we do about it? For if we *can* do something about it, there will be room for many more QSO's. The Order of the Quicker QSO is ready and waiting for the most sensible suggestion.

VP2LB is on St. Lucia in the B.W.I. and is a keen exponent of the art of 10-metre phone.

Of course, we are not even thinking of the Lids and the Klots in connection with the foregoing, since they can easily take thirty minutes over exchanging nothing but RST and name. The sensible, medium-to-fast operators are the chaps who average that ten-minutes-per-QSO, and our only beef about it is that five to six minutes of that time must be spent in calling-up and signing-off. If some technical scheme were shown to halve the QRM, we would all adopt it in a great rush, and even spend some money on it; the same thing could be done without altering the gear or spending a penny—but will anybody act?

DX Strays

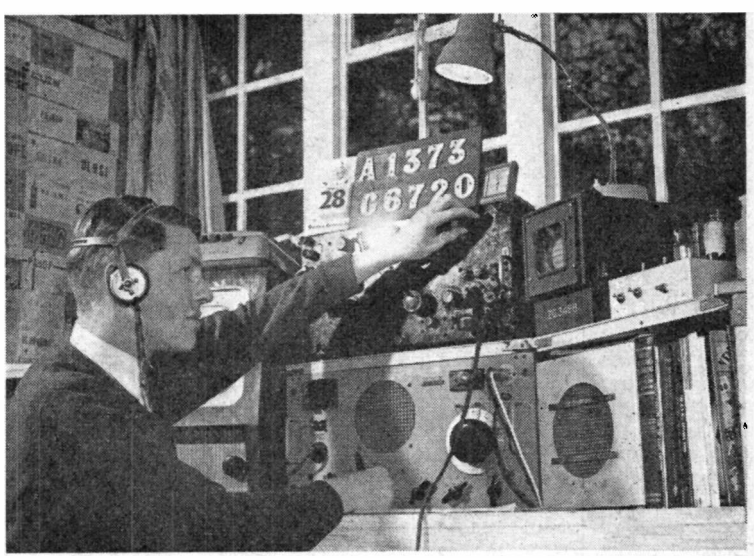
One of the first of the "new 'uns" from the Caribbean is VP2DA (Dominica), working phone on 14200 kc . . . CR10AA has had a little burst of activity (14050 kc) . . . VR3GA was a pirate, and a very obvious one—there aren't *that* number of VR3's yet!

BV1US on Formosa has now been joined by BV1TC — phone only . . . VS5JL (Brunei) is on 14097 kc phone, and pretty active . . . ZC5AL keeps to the CW end of the same band . . . ZD7SA seems to be on *Ten* mainly —look for his CW on 28060 kc or thereabouts . . . Macquare Island is still available, thanks to VKØTC and ØKT — *Twenty* and *Fifteen*, phone and CW.

HS1B and HS1C are both now on *Twenty* CW . . . Future Maldives activity is promised by VS1JF, who expects to be there for six months in the near future . . . HL1SK seems to be genuinely in Korea . . . ET3PRS has been very active on 14050 kc CW . . . VQ8's (three countries) are now represented by VQ8AQ, 8ASR and 8AJC. W6YY is sending the latter a new VFO "to replace his present Rate 4 drift"!

Spitzbergen is still available, thanks to LA2JE/P and SM8AQT/LA/P . . . VQ3HD is *ex*-ZD6BX, VS1BX and other well-known calls formerly held by Vic Thorne . . . Laos is back on the air with XW8AJ on 14020 kc CW . . . LA6CF may be going to Bear Island next year, but his hoped-for trip to Jan Mayen this summer is off.

An even earlier trip to Lord Howe Island than the promised VK2AIR affair is likely—VK2AYY proposes to visit the island shortly for one week only, and he will sign VK2AYY/LH. Sydney stations will monitor the frequency and attend to the QSL chores, and (praise be!) they will black-list any station calling within 20 kc up or down, breaking-in, tail-ending, requesting sked, saying "Pse listen for my phone" (or "my friend"); in fact, indulging in any of the many forms of Clottery. In other words, if you want VK2AYY's QSL you'd better behave yourself—which means no more than conforming to good operating practice.



SWL Cheadle, of Mill Hill, London, S.W.7, has logged more than 140 countries on this equipment, and has nearly the 100C confirmed. His HF receiver is an R.208, on which he finds it possible to take 20-metre SSB phone, stations like VQ4EO/MM and W7QES having been logged recently. He also reports UAØLA and ZD3BFC on 10-metre AM phone, and the Antarctic SSB stations on Ten.

VK9SS is now licensed for Cocos-Keeling Is. . . . VK9JF is still active thence . . . VK9KM is licensed on Christmas Island (the *other* one, in the Indian Ocean). Harking back to Lord Howe Island, VK2FR *lives* there; he, too, hopes to be active soon.

Another projected new one is the Nicobar Islands, where about thirty Indian nationals are stationed. VS1 boys hope to stir up some activity, either by getting a licence for themselves or by prodding some of the inhabitants! Meanwhile, VQ8AQ, who was on Rodriguez and is now back in Mauritius, seems to be bound for Seychelles with the call VQ9AQ (or 9AQS). Stand back, there . . .

VR1C appears to have been on *Twenty* phone and CW with about 65 watts . . . A possible expedition to Ifni is mentioned by EA2CA—some time in the near future . . . CR8AC should have a respectable receiver shortly, thanks to W6UOU and CR9AH.

Official gen. on the new ARRL credits for countries in the West Indies — all the following VP2's will count separately: Anguilla; Antigua and Barbuda; British Virgin Is.; Dominica; Grenada; Montserrat; St. Kitts and Nevis; St. Lucia; St. Vincent. Whichever of these nine "countries" have been used already to count as credit for the Leewards and Windwards cannot be used again. In the other direction, Jamaica and Cayman Is. now count as one and the same. If you have already worked Cayman and been credited for it, all well and good. If not, you've had it!

PYØNA is on Trinidade Is., as you will know if you've read from the beginning . . . XV5A (Saigon) has been back to the States but is now returning to Saigon; his call is not "legal" for the U.S. 'chasers to work.

One of the shortest DX-peditions in history must have been that of SM8BYG, who operated /MP4T on May 1 and 2, but only made a few QSO's (two on phone). In any case, he was anchored one mile off shore, so doesn't count as MP4T after all!

Some stray ones heard, called or worked in recent weeks: KM6BK (14022), FB8XX (14040 and 21070), CR10AA (14050), VQ8AM (14076), KW6CE (14300), MP4BBW (21400), TG9AM (14120), ZK2AB (14190), VKØKT (14200), FU8AD (14230), ZA5NO *(ouch!)*, VK9AD (14180), VK9AA (14190). The first three on CW, all others phone.

When W1BB was in Northern Ireland, during his European tour last year, he took this photograph of GI3IOS, who is at Kilkeel, Co. Down.

Those who have heard or worked VR1A on *Fifteen* have encountered a pirate—he's never been on the band . . . VR1C is legit, but on *Twenty* phone only . . . PJ5CB, operating from Curacao in April, was G3EIX.

Stations located on Crete at present are SVØWK, ØWN, ØWT and ØWZ; SVØWB and ØWE are both on Rhodes; these calls change hands a lot and are frequently re-issued, so if you're short of either country you ought to keep a sharp watch on any SVØ arriving on the bands.

9C2AM, active for a day or so recently, claimed to be in Oman . . . HND9A is genuinely in Iraq (he's a national) . . . ZD7SB is now licensed on St. Helena, making two of 'em!

G2DC tells us that there is a possibility that VP2VB and W6ITH will join forces for a tour of the Caribbean area, as W6ITH already has licences lined up for some of the new ones. Incidentally, G2DC reports that it now appears that the new ARRL pronouncement will produce *nine* new ones out of the hat; so, if this is true, our earlier statement must be incorrect. We await further news. G2DC also says that VK2FR/2AIR should be on *by now* from Lord Howe Island; we certainly hope he is.

VR2AP was on as a VR4 around May 26, having previously been active from CR10 . . . KC6ZD has been heard on 14 mc CW . . . ZD9AF is on 21 mc . . . CR10AA, if you can find him, is on 14055 kc CW . . . VS9O, *ex*-G3IRQ, runs a Collins 35K5, is CC on 21339 kc, and looks for the U.K. from 1600 GMT.

VQ9HAY is said to be active already from the Seychelles, with VQ9AQS also expected to show up . . . G3BFC/ZD3BFC is now on as MP4BFC, and will be there for three months.

Acknowledgments and thanks for many of the above items to the *OVARA* and *West Gulf DX Bulletins*, to W6YY, to SWL P. Day and to many of our regular correspondents.

VP2VB/MM at KV4

Just as this issue was going down, we heard that VP2VB got

into KV4 on June 16, and would be opening up as YVØAB from July 3—so he should be on from there *now*. Thanks, G2DC.

For Newcomers

Five-Band Table: This is intended to encourage multi-band working—which is not possible at all stations, by any means, and is not even attempted by many. Hence, to get into the Table is something of a distinction. Your points score (1st col.) is made up of the sum of countries worked on each of the five bands, taken separately. This is not your total of countries worked (shown in col. 7) because for your points score you count a country once for each band, whereas for your total of countries worked you can only count each country once. The Table order is determined always by the points total. Countries can be scored CW-and-Phone, or Phone-only, the latter being shown separately, as indicated in the Table on p.249. To make a start, you must have some score (however small) on each of the five bands, though afterwards you may be scoring mainly on one or two bands only. Having started, you must keep your score up-to-date at not less than 3-monthly intervals; during any period of inactivity, this simply means reclaiming the old score. Failure to claim at least once every three months means that your call-sign is dropped from the Table.

Top Band Counties: This is self-explanatory. Claims can be made at any time, based on the List of U.K. Counties given on p.82 of the April 1958 issue of SHORT WAVE MAGAZINE. As before, the score can be derived from CW-and-Phone contacts, or Phone-only, which are annotated separately. Call-signs are deleted if no claims are made after three months.

And, once again, places like Bristol, Glasgow, Newport-Mon., Newcastle or Liverpool (and some hundreds more like them) are *not* counties in the geographical sense. Cities and most of the larger towns are given "county status" purely for local administrative purposes. But for our purpose, which is geographical, they score only for the counties they are in, *e.g.* Cardiff for Glamorgan, and Southampton for Hampshire.

The number of times we are asked if "The City and County of Bristol," or "The County of Southampton," can be accepted as a separate county . . . *No!* Work to the Counties List only. Actually, Bristol has the distinction of giving either Gloucestershire or Somerset, depending on which side of the Avon the station worked is situated!

That concludes this month's offering, slightly truncated because of holidays and the very early deadline. Next month the calendar is more accommodating, and since publication date is not until August 8, the deadline is **first post on Friday, July 18,** which should give you plenty of time to sort out the news and write that letter. For the month after, it will be *August 15* — overseas readers, please note. Address everything, as always, to "DX Commentary," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. Until then, 73, Good Hunting, and if you're off on holiday — Good WX. BCNU!

WORKING A CONTEST

PSYCHOLOGY FOR BEGINNERS

With acknowledgments to VQ4KPB and the Radio Society of East Africa's "Circular Letter" for May, 1958.—Editor.

CONTESTS, particularly the CW variety, are great fun. They need not be the grim marathons that some of the hard-boiled dyed-in-the-wool fraternity make of them. There is no need to lay in benzedrine beforehand, although afterwards you may well be favourably inclined to lay on an outing, or even a new hat, for the XYL who nobly provided tea-and-cakes after those furious bouts of activity when you had been shelling 'em like peas and probably felt like the pile of empty pods.

Now then, if you've read so far, you must have at least a sneaking interest in the proceedings, so let us examine and kill bogy number one — CW.

Just think back to those dim and far-off days when *you,* a Young Squirt, (never mind your actual *age),* took your Morse test. Ponder awhile on how your hot hand juddered on the Post Office key, and you shuffled in agony on that frightful bed of nails listed in the Post Office stores ledger as a chair. Remember that enormous room, devoid of any furniture, with cunningly designed walls which resonated with, and amplified alarmingly, the test oscillator note each time you produced that "V"? Throughout the entire and ghastly proceedings the Examiner seemed to be quite oblivious to the world —let alone you.

Well, you passed, didn't you?

Remember back now how your hair stood on end when someone actually answered your first CQ! However, you coped and subsequently became quite proficient, although you have since saved your pennies and now have a phone rig.

The fact is you *can* cope even now.

It is all so delightfully simple. Just remember that everybody is most interested in making sure that *you* have their call-sign and number correctly, and therefore will be only too pleased to send slowly or quickly as *you* require. Rest assured that if you can't quite read the other fellow's call-sign, all you have to do is send QRZ and he will be charmed to repeat his call several times especially for *your* benefit. Hurrah! you have the call correct. The mysterious exchange of numbers which has doubtless baffled you completely in the past is also simple enough. All of these code numbers start with three figures which represent the RST report; that is easy enough, isn't it? The figures following the report invariably fall into three different systems, according to the particular contest. We will deal only with Type One, so as not to confuse you unduly at this stage: A good teething exercise in this category is the *CQ* contest held each October and which requires the RST report to be followed by your World Zone

number—that's all—and furthermore you can find it by checking up this Zone number in your *Call Book*. That has given you confidence, hasn't it?

"My dear fellow, I have only 50 watts and a bit of wire slung up—I haven't a chance against those Californian kilowatts and beam things."

You may be quite surprised to learn that these not so miniature broadcast station set-ups make up a remarkably small percentage of entrants in these contests. In fact, the average power used is probably in the region of under 100 watts. You have an 813? Your chances are excellent! Multi-element high-gain beams can be a dead loss in contests, as owners of impossibly narrow-angle systems have discovered to their disgust. Ground planes and long-wire aerials are popular and simple; more important, for all practical purposes, they seem to give good all-round coverage despite what it says in the *Handbook*. For sheer joy and ease of operation, try a multi-band, centre-fed doublet with traps.

"My dear chap, I have to work on Saturday mornings and I can't possibly sit up all night."

You don't have to. A little selective listening on your part at odd times through the week preceding the contest will give you a pretty shrewd idea what to expect and when to expect it. Thus, if you consider that early mornings are good for the Far East on 14 mc but conditions in the afternoons are noisy and devoid of activity, then plan your feet-up hours accordingly and your complexion won't suffer.

So what it all comes to is that the CW is easy, because you've a good idea what is coming, anyway; the gear can be low-powered; the aerial need only be quite simple to be surprisingly effective; and your operating periods can fit in between your commitments and at the most convenient times of your own choosing.

Try it; you will like it!

SHF SYSTEMS FOR MALAYA

Microwave radio telephone links are eminently suited to such difficult terrain as that to be found in Malaya. Thick jungle areas and rugged country, which may be difficult to cross with cable or open-wire lines, are no obstacle to line-of-sight beamed transmission once suitable sites for the equipment have been found.

The contract awarded to Standard Telephones and Cables Limited in the latter part of 1957 calls for a main route between Singapore and Kuala Lumpur with several spur routes, including one to Malacca. The 4000 mc SHF radio links, capable of providing up to 600 telephone circuits, will form the main network between Singapore and Kuala Lumpur and the spur route from Tampin to Malacca. Other spur routes. between G.Lambak and Johore and between Tampin and Seramban, will be covered by 7000 mc SHF radio circuits with a capacity of up to 240 telephone circuits.

At G.Lambak and Tampin on the main route the equipment will comprise back-to-back terminals and, as at all the other terminal stations in this network, will be supplied with S.T.C. "frequency translation equipment." This converts the speech frequencies to the radio channel frequencies and *vice-versa* and also allows the re-routing of groups of circuits on to the spur routes or to any other system which employs the standard 12-circuit grouping. The main route includes four repeater stations. Each station will be equipped with S.T.C. 5-watt repeaters which may be operated on an automatic unattended basis.

Coaxial cable will be used to connect the telephone exchanges at Kuala Lumpur, Malacca and Seramban with their respective radio terminals, and a multi-pair carrier cable will perform the same function between the G.Lambak radio terminal and the Kluang exchange.

Each of the SHF radio systems will provide two radio channels, one of which will act as the working channel and the other as a standby. A comprehensive supervisory and alarm system will be incorporated throughout and will give immediate warning of any faults that may develop either at the terminals or the repeaters. The frequencies used for this purpose lie within the transmitted bandwidth, thus avoiding the use of a separate VHF aerial system.

When planning any route for this type of radio link there are a number of factors to be taken into account. For instance the location of the repeater stations, approximately 30 miles (45 km) apart, should be such as to avoid "over reach" interference from the transmitted signal of one repeater section with another; atmospheric conditions can also have an effect on performance; the line-of-sight paths between aerials must be sufficiently clear of obstacles to give first "Fresnal-zone" clearance, therefore the growth of trees and the possible erection of high buildings must be taken into account. To prove the suitability of the planned route it is therefore necessary to conduct preparatory propagation tests.

In Malaya a complete survey was carried out by S.T.C. engineers and station sites were chosen to obtain the maximum efficiency. Every route has its own peculiar characteristics and the work of conducting a ground survey and carrying out propagation tests calls for considerable experience on the part of the engineers engaged on the task if a satisfactory result is to be obtained. A high standard of physical fitness is also required, for, although in most countries access to suitable sites is comparatively easy, in tropical and semi-tropical districts strenuous efforts may be required in order to penetrate areas of jungle such as are found in Malaya.

The Singapore to Kuala Lumpur link crosses some very difficult terrain. Quite a large quantity of equipment is required for the tests, including a sectional steel mast with a 4ft. diameter paraboloid reflector aerial, transmitter and receiver equipment, and a quantity of measuring apparatus. Often it is necessary to have a portable motor generator as well. Where there is no road to the site, it follows that all this equipment must be manhandled to its destination. Usually the site must be cleared before the technical work can commence. To facilitate the tests, the aerial is secured to the mast in such a way as to allow it to be raised or lowered to the required height above the ground. The relative effectiveness of the aerial system at different heights can thus be checked.

THE MOBILE REGISTER — First List

IN response to the notes on p.159 of the May and p.208 of the June issues of SHORT WAVE MAGAZINE, following is the first entry for the new Mobile Register. It is hoped that this will assist in identification at rallies, and on the road. It will certainly be useful for statistical purposes. In this connection, we are informed by the G.P.O. that there were no less than 550 U.K. /M amateur licences in issue as at May 31 last! While it is probable that for one reason or another at least half this number are not yet actually fitted for or operating mobile, it still means that there are a great many entries yet to come for the Register.

If you are active /M, just send in your QSL card, endorsed " Mobile," with a note of the band(s) worked, and the make and registration number of your car. Address the card " Mobile," attention Editor, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

Details published will be as below.

Callsign & Home QTH	*Band(s) Worked*	*Vehicle & Regn. No.*
G2AUC, Manchester	?	Ford Escort UVM-895
G2BCX, London, E.18	160m.	Morris BMD-711
G2BVN, Romford	160, 10m.	Hillman PXK-383
G2CUZ, Southport	All, 160-10m.	CKB-855
G2DHV, London, S.E.13	160, 40m.	AHM-18
G2DQX, Southport	?	DKM-15
G2FOS, Manchester	?	Ford Popular TMB-19
G2FPM, Manchester	160, 80, 40m.	Ford Popular TNB-183
G3ABM, Ellesmere Port	160m.	Austin EVM-145
G3AOS, Hale Barn, Ches.	160, 2m.	Hillman LRX-749
G3ATL, Hugglescote, Leics.	All, 160-10m.	Ford Consul PUT-800
G3BG, Derby	?	938-ATO
G3BJF, Birmingham	?	KOE-685
G3CIM, Romford	160m.	Hillman 2716-NO
G3COJ, Maidenhead	160m.	Javelin XMG-557
G3DMK, Catterick Camp	160, 80, 40m.	Ford Prefect NGB-116
G3FGY, Ripley	All, 160-10m.	Austin A40 LDG-907
G3GWG, Maidstone	?	EYH-46
G3GXZ, South Wigston, Leics.	160, 80, 2m.	Morris Estate LNU-918
G3GXZ, South Wigston, Leics.	2m.	Ford Zephyr PNB-554
G3GYK, Ferndown, Dorset	160m.	Austin LLJ-935
G3HLI, Coventry	160m.	Austin A30 OAC-594
G3HTC, Sunbury-on-Thames	160m.	Ford Anglia 460-FPL
G3IGK, Wolverhampton	160, 80m.	Vauxhall Cresta OJW-480
G3IIO, Lewes	160m.	Ford AXF-805
G3IJC, Leeds	160m.	Ford Prefect SXK-648
G3JEQ, Great Bookham, Surrey	160, 80m.	Ford Anglia SPK-876
G3JQP, Ilford	160m.	Ford Van 6004-F
G3JTQ, Feltham, Middx.	160m.	Ford Escort 429-DBH
G3KAY, Worthydown, Hants.	160, 80, 40m.	Wolseley CSF-363
G3KDK, Plympton, Devon	160, 80, 40m.	EAF-986
G3KHE, Birmingham	All, 160-10m.	Vauxhall Cresta KHE-599
G3KLL, Manchester	15, 10m.	Morris BV-8293
G3KXT, Croydon	160m.	Morris Traveller UUV-383
G3LB, Ripon, Yorks.	80, 20, 15, 10m.	Morris Isis PWW-440
G3LIS, Liverpool	160m.	Ford Anglia TME-812
G3WW, Wimblington, Cambs.	160, 80m.	Volkswagen RFG-555
G4FO, Leicester	160, 80, 40m.	Ford Consul ONR-469
G4GB, Ruislip, Middx.	?	JPD-476
G4HH, Fleetwood, Lancs.	?	CCW-942
GM4PW, Prestwick	80m.	Humber Hawk DAG-891
G5CP, Chesterfield	80-10m.	Vanguard XRB-781
G5PW, Leeds	?	KWR-574
G5VS, Maidenhead	?	Morris MJB-567
G6AU, Blackburn, Lancs.	?	KXC-782
G6DN, Manchester	160, 40, 20m.	Ford Anglia UND-44
G6MN, Worksop	160, 10m.	Vauxhall Victor XNN-344
G6SN, Birmingham	2m.	Rover GJW-708

NOTE: When a sufficient number of cards has been received, the Second List will be published.

G2FIX, of Salisbury, with the mobile rig on his Triumph motor-cycle. The aerial is fitted to the carrier bracket. G2FIX is a familiar visitor at the mobile rallies.

FATHER, MOTHER AND SON

In the "New QTH" page in this issue will be found G3MER, G3MGL and G3MSK—respectively a mother, son and father, all operating from the same address at Gillingham, Kent. Appropriately enough, this is in Trinity Road. We wish this family good fortune, and good DX, in their enterprising approach to Amateur Radio.

BBC's NORWICH TV STATION ON FULL POWER

The BBC announces that its Norwich television station has gone on full power. The transmitter has been working on reduced power in order to avoid interference with the Belgian low-power station at Liege, which shares the same frequency channel, and under international agreement has a right to protection against such interference. A higher power transmitter is now in use at Liege, and the Norwich transmitter power has been increased accordingly, by agreement between the British Post Office and the Belgian authorities. The Norwich station has a directional aerial, and the effective radiated power will vary between about 1·3 kW and 15 kW depending on direction.

BIRTHDAY HONOURS LIST

In the Honours List issued on the occasion of the Official Birthday of Her Majesty, the following distinctions were conferred in the field of radio and electronics:

K.C.M.G.: J. B. Clark, Esq., Director of External Services, BBC. *C.B.:* F. I. Ray, Esq., Director, Inland Telecommunications, GPO. *C.B.E.:* E. K. Cole, Esq., of the famous firm of radio manufacturers. *O.B.E.:* W. T. Ash, Esq., secretary, R.E.C.M.F.; W/Cdr. R. C. Lawes, International Aeradio; L. M. Simpson, Esq., Telegraph Division, Automatic Telephone and Electric Co., Ltd.; H. A. Tunstall, Esq., W. T. Henley's Telegraph Works; and D. S. Watson, Esq., Admiralty Signal and Radar Establishment.

The *M.B.E.* was awarded to: W. M. Adams, Govt. Communications Hq.; W. G. DeBoo, Cathodeon Electronic; H. Finch, Signals, Min. of Transport; H. V. Griffiths, i/c Tatsfield Receiving Station, BBC; and E. G. Kirby, Signals, Min. of Transport. The *B.E.M.* went to J. N. Pain, Govt. Communications Hq.

SCOUT JAMBOREE ON-THE-AIR

Some 40 overseas Scout stations are known to have been on for the First International Scout Jamboree on-the-Air, which took place during the week-end May 10-11. As it turned out, conditions on the DX bands were poor, and not many of the overseas groups were workable from the U.K. About twenty U.K. Scout stations joined in, and worked one another, mainly on 80 metres. Scouts operating under G prefixes were successful in raising other Scout groups in DJ, F, OE, OH, ON, SM, ZE, ZS, W and ZL—and a JA with a YL (Girl Guide) in the station.

The most consistent and successful of the U.K. participants were GB3SP, Sutton Park, and G3BHK/A, Reading. In connection with the event, G2NS undertook a long monitoring session, his own location being within six miles of the site of Lord Baden-Powell's very first Scout Camp on Brownsea Island, Poole Harbour, in 1907.

It is hoped to make this an annual event as, in spite of the disappointing DX conditions, a great many interesting Scout contacts were made.

AMATEUR RADIO ON SAFARI

Every year, East African amateurs take part in what is known as the Coronation Safari. This is by way of being a competitive motoring event, in connection with which long distances are covered through Kenya, Uganda and Tanganyika. The VQ4's make themselves responsible for the communications organisation for the Safari, the main requirement being point-to-point working between controls. This involves long hours of operating under difficult conditions, and the accurate passing of traffic so that the Hq. Control can be kept informed of progress.

VHF BANDS

A. J. DEVON

FA9VN/G5MR QSO on Four Metres, June 10—

Mechanism of Propagation—

General Conditions Still Disappointing—

Notes, News, Tabular Matter and VHFCC Elections—

IT cannot be said that there has yet been anything of an opening on the VHF Bands, though there have been a few bright spots, and there are some interesting occurrences to report. So far as EDX and real GDX are concerned, it will not be until we get a good spell of hot, settled weather over the U.K. and most of Northern Europe that the bands will really open in the exciting way they did about this time last year—*see* "VHF Bands," July 1957, p.260.

As hardly needs saying, so far this year we have just not had the weather; the same is true for practically the whole of Europe. "Pockets" of bright, warm weather—like the week-end June 14/15—will produce short-term temporary improvements, but for anything lasting we must get a belt of fine, hot weather extending over a great area. This gives time for the inversion processes to develop, when almost anything is possible within European limits. The propagation mechanism involved is well understood, and has been proved time and again by the practical results obtained over the years. All the factual data can be found by reading up back numbers of SHORT WAVE MAGAZINE over the last ten years; every noteworthy incident, with the weather conditions at the time, has been fully reported.

There is, of course, yet time (but not much!) for the required summer conditions to come along—it can't go on raining and blowing for ever. Remember that though *you* may be in a pocket of fine weather for a day or two, conditions will not be much affected until that weather becomes pretty general. As soon as it does, look out for EDX/GDX, depending on the area covered by the fine weather; this is easily checked by reference to the excellent weather maps shown on TV, and the charts published every day in the more sensible newspapers.

However, on the theme of the mechanism of propagation, we have reports on some interesting phenomena during the month. There was a short Aurora opening during the night of May 31-June 1, lasting from about 0010 to 0145 GMT—a pretty awkward time for most people, and therefore somewhat unrewarding. However, G3JZG, G3KUH, G3LLE, GM3EGW and GM3HLH/A were "among those present," and worked one another; as G3KUH puts it, "this was a nice worm for the night owls." Aurora was also noticed at odd times during the month, usually week-day afternoons when there is no two-metre activity to check by, the evidence being given by the behaviour of the FM/BC stations on Band II. All sorts of funny noises start coming in, from all over Europe. This does not necessarily mean that the reflecting curtain would be effective on two metres, but it is always worth trying—and PE1PL is usually scouting the band for contacts when Aurora manifestations are present.

Spor-E on Four

But it is for Four Metres that we have the most interesting

BRITISH ISLES TWO-METRE ZONE PLAN

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

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

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1957

Starting Figure, 14

From Home QTH Only

Worked	Station
51	G5MA
50	G3KEQ
43	G3HBW
41	G3GHO
36	G8VZ
35	G2CIW
30	G3JWQ
27	G3KUH, GM3DIQ
26	G3GSO
25	G3KHA
24	G2AHY
23	G3KQF
17	G3DLU, G3KPT
16	G3MAX
15	G2HDR, G3CKQ, G3MLS

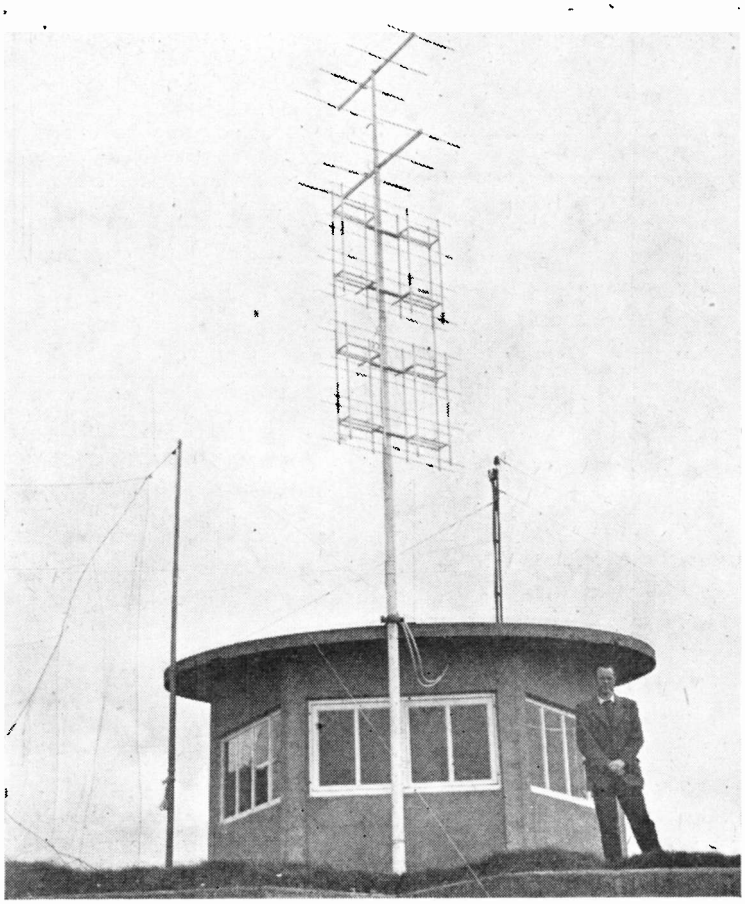
This Annual Counties Worked Table opened on September 1st, 1957, and will run till August 31st, 1958. All operators who work 14 or more Counties on Two Metres in the year are eligible for entry in the Table. The first claim should show a list of counties, with stations worked for them, as soon as 14C have been achieved. Thereafter, the list can be added to as more counties accrue.

reports this month, yet another propagation mechanism being involved—known as Sporadic-E, which, though it may be unfamiliar to many new readers of this piece, will be well remembered by all who spent any time on the old five-metre band (58 mc). What happens is that during periods of intense solar activity densely ionised patches, or clouds, appear at random in the lower atmosphere. These ionised layers, which are quite small in area, are inclined to drift about and are quite unpredictable; they appear in northern latitudes mainly during the summer months, and have a high "co-efficient of reflection"; that is, while VHF waves normally penetrate the E-layers, they are turned back by these areas of high-density ionisation—so much so, that single-hop communication is possible over what for VHF are relatively great distances. This particular manifestation is known as sporadic-E because of the random nature of the phenomenon.

Many years ago, amateurs proved—by their DX results on five metres—that a sporadic-E layer positioned, say, over Northern France, was capable of efficient reflection of CW and phone signals on frequencies up to 60 mc to distances like HB, I and FA, from the U.K. Many good EDX contacts were frequently made *via* Spor-E (as we called it), using very little power. Indeed, it was found that signals were either S9+ or not there at all.

Though the influence of Spor-E has sometimes been suspected on two metres (145 mc), it has never been proved; it is reasonable to suppose that as the frequency goes up, so the efficiency of the sporadic-E reflecting layer decreases; 60 mc is one thing, but 145 mc is quite another.

All this brings us down to the present, and our 70 mc (4-metre) band. It will be noted that the frequency is near enough 60 mc to be significant in terms of Spor-E. We were therefore very interested to have a report from G5MR (Hythe), a consistent operator on four metres, that he worked FA9VN (Oran) at RST-599 both ways on June 10 at 1716 GMT—and, incidentally, unless some other G further north than G5MR has also worked FA9VN, this breaks the distance record for the band, held by FA3JR/G5KW. G5MR also worked FA3JR on June 10, and heard FA8BG; on June 16, FA3JR was raised again, but faded out before reports could be exchanged. G5MR has had FA9VN's QSL to confirm; his frequency is given as 72·48 mc.



One of the best-known Europeans on two metres is F8MX, who operates /A during the summer from this fine site at St: Valery-en-Caux, overlooking the Channel. The two-metre beam is a 4-over-4, and the 70-centimetre array a 64-element stack; he also has a 70 cm horn, to the left, but not visible here. F8MX/F9CQ are brothers and have been very successful on VHF; both were present at the recent London VHF convention.

A somewhat similar tale comes from G3JHM (Worthing), who heard FA3JR (RS-58, QSB RS-45) but could not raise him, by which time G5MR was in QSO, some F's then following on with contacts with FA3JR, who by then was listening only in the French 72 mc band. For U.K. stations, this 4-metre DX means cross-banding 70/72 mc—it also means that the Europeans must remember to look across 70 mc when these conditions occur. G3JHM reports several other F's heard and (at other times during the period) four G stations worked.

The DX noted above must have been by sporadic-E, as the reports put in by G3JHM and G5MR show that the signal characteristics to be expected by this mode were present, while the record of the sun's activity for the period given also fits in. So we can congratulate them both on a very interesting result, which must have

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH Only

Worked	Station
78	G5YV (787)
73	G6NB
71	G3CCH
70	G6XM
68	G3BW, G3GHO
66	EI2W (286), G3IUD (302), G5BD
65	G5MA
64	G3BLP
63	G2FJR (542)
62	G3KEQ
61	G3HBW
60	G2OI (402), G3DMU
59	G3EHY, G4SA
58	G3FAN (637), G3IOO, G8OU
57	G8SB
56	G3WW (770), G5DS (654)
55	G2HDZ (495), G2HIF, G5BM, GW5MQ
53	G2AJ (519), G4CI, GM3EGW (196)
52	G2NH, G6RH, G6XX, G8VZ, GW2ADZ
50	G3ABA, G3GSE (518)
49	G3HAZ (358)
48	G3FIH, G5ML, G6TA (487)
47	G2CIW(264)*, G3DKF, G3JWQ (357), G5WP
46	G3LHA, G4HT (476), G5BY, G6YU (205)
45	G2AHP (647), G2DVD (362), G2XC, G3BJQ, G5JU
44	G3BK, G8DA
43	G2DDD, G3BA, G3COJ, G3DLU,* G3HWJ, G3KHA (262), G4RO, G5DF
42	G2HOP, G3BNC, G3IER, G6CI (220)
41	G2CZS (282), G2FQP, G3DO, G3WS (255)
40	G3CGQ, G3KUH, G8KL
39	G2IQ, G3DVK (208), G3GBO (434), G3VM, G5MR (358), G8IL (325)
38	G2FCL (234), G3APY, G3CKQ, G3HTY, G8VN (190)
37	G2FNW, G2FZU (180), G3DLU, GC3EBK (260)
36	G2DCI(155), G3CXD, G3DLU* G3IIT, G6CB (312), G8IP
35	G3FZL, G3FYY (235), G3HCU (224)

been most exciting while it lasted.

As a foot-note to these discussions on VHF DX by Aurora and Sporadic-E, it is worth mentioning that though nowadays the professional propagation boys have all sorts of apparatus ticking away and recording continuously over a wide area of the VHF's, it was the amateurs who first correctly deduced these propagation mechanisms from their own observed results. In the case of reflection by Aurora and Sporadic-E, the way it happened, and why, was worked out and buttoned up some 2-3 years before the professionals got round to any serious long-term study of the behaviour of VHF waves in terms of ionisation density, refractive indices, and so on.

Indeed, it may fairly be claimed (if it matters to anybody) that it was in "VHF Bands" in SHORT WAVE MAGAZINE many years ago that the basic theory was first advanced from the results obtained by U.K. amateurs interested in using the VHF bands for *communication*. It's all in the record, if you care to look it up.

What it means now is that we should all be paying a good deal more attention to our much-neglected four-metre band. In 1946, there were about 250 G's busy on five metres, all looking for every opportunity to make use of anomalous propagation effects for EDX/GDX working. At the moment, there are probably less than a dozen U.K. stations active on four metres—the only thing that is still there is the anomalous propagation. And we are right in the season for that.

Worked	Station
34	G3AEP, G3CKQ (162), G8IC
33	G3FUR, G3GFD, G3HHY(125)
32	G3GSO, G3HIL, G3KQF, G8QY, G8VR, GC2FZC
31	G3HXO, G3KPT (108), G5RP, GM3DIQ
30	G2AHY, G3FRY, G3GOP(208), G3GVF (129), G3IRA, G3KEF (110), G5NF, GW8UH
29	G3AGS, G3AKU, G3FIJ (194)
28	G3ITF, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160), G6GR, GI3GQB, GW3GWA
26	G2BRR, G3CFR (125), G3SM (211), G3YH, G4LX, G4MR (189)
25	G3JMA, G3JXN (220), G5SK, G6PJ
24	G3FD, G3FXG, G3FXR, G3JHM
23	G3CWW (260), G3HSD, G4JJ/A G5PY
22	G2DRA, G3AGR (135), G3ASG (150), G3BPM, G5AM, G8NM
21	G2AOL (110), G3DVQ, G3IOE, G3IWJ, G6XY
20	G3EYV
19	G3FEX (118), G3GCX, G5LQ (176)
18	G3DBP, G3JGY, GC2CNC
17	G3EGG, G3KPT*
16	G3FRE, G3MAX, G3MLS
15	G2HDR, G3IWA
14	G2DHV, G3CYY

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

* New QTH

Two-Metre News

G3KUH (Rotherham) remarks that during the period conditions appear to have been better after midnight than before; he still "keeps to his regular habit" of calling CQ to the south at 2315 BST every evening, heading west at 2320 if the first call is not answered. The local two-metre net takes place on Tuesday evenings, stations usually on being G2LG, G3DVK, G3ELG, G3KUH, G3LLE and G4BD, with G3EHK out /M sometimes.

G3JGJ (Paignton) finds his new QTH at 450 ft. a.s.l. is "up to expectations"; he works G8DA (Exeter) at 0700 and 1800 BST on a daily schedule. G3GSO (Derby) is startled by the difference his new slot-fed 5/5 is making, with its improved driving gear; he has done away with the bicycle chains and the nest of sprockets he used previously. One result of this refurbishing is a QSO, at long last, with PE1PL during a lunch-time session; other stations worked, new at G3GSO, have been G3ATM, G3DVK, G3HYH,

G3MED and G4BD to the north, and G2DSP and G3NR to the south—the latter QSO is a good one for them both under prevailing conditions.

For PE1PL (The Hague), the period has not been unfruitful, as the Activity Report shows; most of these contacts were non-schedule, in the sense that they were snap QSO's either during the lunch-time session or when the PE1PL beam was headed on the U.K. during spells of good conditions. We are glad to notice that so many G's are now looking out for PE1PL, without exception the most consistent and reliable station on the two-metre band—if you can get on during what are known as "normal working hours." G3JWQ is on a schedule basis, and is doing very well; G3IRS has been worked on phone on several occasions (which is good DX by any reckoning), while G5WW's results are particularly noteworthy for the reason that he uses a plain 4-ele Yagi *indoors*. G2NY remains PE1PL's best GDX, with G2HCG a consistent phone contact; for G6FO, who runs a shaky 60w. into a standard J-Beam array consisting of a pair of slots with reflectors, the daily PE1PL schedule has now produced some 140 QSO's in a row—in the sense of premeditated contacts, as PE1PL is not worked over week-ends, and G6FO cannot be there every morning at 0815 GMT. The G6FO/PE1PL path distance is 233 miles.

If you happen to be at home any week-day, look for PE1PL on 144.00 mc at 0930 BST, and during the lunch-hour; he searches the whole band, and if your signal is getting there, you can be sure of a QSO. And practically everybody who reads this will be astonished to know that one reason why the PE1PL boys like working the U.K. is because so many G's use CW, whereas most of their EU contacts are phone only . . .

From G8VZ's usual interesting summary we gather that with him at Princes Risborough the best part of the period was the week-end June 14/15; this was that fine one, when cars were leaving London at the rate of 40K an hour — you remember? (A.J.D. does; it happens to have been the only w/e this year that he has been out, and 39K of these cars were on the Portsmouth Road, seemingly.) On June 13, G3CCH (Scunthorpe) was a good signal at G8VZ, and on the Sunday morning, 15th, G6XX (Goole, Yorks.) was coming through well.

G3KQF (Derby) reports that he now has 95 cards for 158 stations worked, so hopes soon to be able to claim his VHFCC; he also has a slot-fed 5/5, with a 12-ele stack above it for 70 centimetres. Results on two metres have improved accordingly, and G3KQF hopes to have a solid QSO with PE1PL before long—he has been trying during the lunch-hour sessions.

Running a Morris Traveller (which might almost have been designed for /P or /M working), G3JAZ of Stoke-on-Trent is doing a lot of portable operating at week-ends — *see* Activity Report. The /P Tx has a QQVO3-10 in the PA, taking 3½w. only, and the beam is a 4-ele Yagi, which can be pushed up to 18 ft. Since June last year, G3JAZ has worked 101 stations in 21 counties. The locals in the Stoke area are reported to be G3DML, G3HIV, G3HVI, G3IDQ, G3MGG and G3UD; all are members of the Stoke club group, the hon. secretary of which sends us these notes.

From West Bromwich, G3KPT is able to claim for the Tables, and is now keeping a schedule

TWO-METRE ACTIVITY REPORT

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

G8VZ, Princes Risborough, Bucks.
WORKED: G3DJJ, 3DKF, 3ENY, 3FGT, 3GSO, 3IRS, 3JWQ, 3JZG, 3KHA, 3LGJ, 3LHA, 5DW, 5SK, 5YV, 6SN, 6XX. (*Over* 50 *miles only; May* 19 *to June* 15).

G3JGJ, Paignton, S. Devon.
WORKED: F3LP, G2RY, 3BDL, 3GHI, 3GRA, 3GVC, 3IBI, 3KHA, 3KSR/P, 3LOK, 3LTF, 4DC, 4PS, 5MA, 8DA, GC2FZC, GW3MFY, 8SU. *HEARD:* G2JF, 3FIH, 3FKO/P, 3HIF, 3JMA, 3NR, 5BM, 6WU, GB3IGY. (*May* 4 *to June* 18).

PE1PL, The Hague.
WORKED: G2DUS/M, 2HCG, 2NY, 3BVU/A, 3DKF, 3EVV, 3GSO, 3IRS, 3JMA, 3JWQ, 3LHA, 3LTH, 5WW, 5YV, 6FO.
HEARD: G3KQF. (*May* 20 *to June* 17).

G3JAZ/P, Staffordshire.
WORKED: G3HIV, 3JZN 3MAX, 3UD. (*May* 25; *6m. S. Stoke*).
WORKED: G3DJJ, 3FUJ/P, 3HZK/M, 3IRS, 3IWJ, 3JZG, 3JZN, 3KPT, 3MAX, GW3GWA. (*May* 26; *3m. S. Buxton*).
WORKED: G2JT, 3AOS, 3BA, 3DJJ, 3FI, 3GYC, 3HWC, 3HYH, 3IKR, 3IOB, 3IRS, 3JZG, 3JZN/P, 3KMT, 3KPT, 3LEE, 3MGG, 3MNM/A, 3UD, 4DK, GW3GWA. (*June* 1*st; 6m. N. Stoke*).
WORKED: G3ATZ, 3GGR, 3GYC, 3HZK/M, 3JZG, 3KMT, 3KPT, 3MGG, GW3GWA/P. (*June* 5; *S. Stoke*).
WORKED: G3AOS, 3AYT/M, 3GGR, 3HA, 3HWC, 3HYH, 3IKV, 3JZN, 3MAX, 6NI, GW3GWA. (*June* 8; *6m. N. Stoke*).

G3KUH, Rotherham, Yorks.
WORKED: G2ANT, 2FJR, 2FMO, 2FNW, 2LG, 3APY, 3APY/M, 3APY/P, 3BA, 3CCH, 3DJJ, 3DLU/A, 3DVK, 3EHK/M, 3ELG, 3FKO/P, 3GFD, 3GSO, 3HBW, 3HXN, 3IKV, 3IRS, 3IWJ, 3JMA/M, 3JWQ, 3JWQ/M, 3JWQ/P, 3JZG, 3KQF, 3LLE, 3LSA, 3MED, 3NR, 4BD, 4JJ/A, 5CP/A, 5CP/M, 5LL, 5MA, 5SK, 5YV, 5YV/M, 6JS, GI3GXP, GM3HLH/A, GW3APY/P (Radnor) GW3APY/P (Montgomery). (*May* 20 *to June* 16).

SWL Tomlin, Malvern, Worcs.
HEARD: G2AHL/M, 2ATK, 2DIV/P, 2DSW/P, 2FNW, 2JF, 2NY, 2XV/P, 3APY/P, 3ARK, 3AYJ, 3AYT/P, 3BA, 3CGQ/P, 3DJJ, 3EEO/P, 3EIV/P, 3EJO, 3ENY, 3ERD/P, 3FAN, 3FGT, 3FTN, 3GGR, 3GGR/P, 3GHI, 3GNS, 3GPW/P, 3GSO, 3GTN, 3GZJ/P, 3GZM, 3HAZ, 3HBW, 3HTY, 3HXN, 3IER, 3IOO, 3IRA/P, 3IRA/M, 3IRS, 3JAZ/P, 3JBN/P, 3JGY, 3JWQ/P, 3JZG, 3JZN, 3JZN/P, 3KBA, 3KEF, 3KFT/M, 3KMT/P, 3KPT, 3KQF, 3KSR/P, 3LAY, 3LDW, 3LGJ, 3LHA, 3LZP, 3MA, 3MAR/P, 3MGR, 3MNM/P, 3MPS, 3NL, 3YZ/P, 5BM, 5BM/P, 5DW, 5GN, 5JU, 5LJ/M, 5MA, 5ML/M, 5PP/P, 5YV, 6AG/P, 6JK/P, 6NB, 6PO/P, 6SN/P, 6XM/P, 8QY/P, 8SB/P, 8VZ, GB2RS, 3IGY, GI3GXP, GW2HCJ/M, 3ATZ/P, 3GWA, 8UH/P. (*May* 1 *to* 31, *weekends only*).

G3KQF, Derby.
WORKED: G2CDB, 2CRL, 2FNW, 2XV, 3AGS, 3APY/M, 3BA, 3DJJ, 3DKF, 3EJO, 3FGT, 3FUJ/P, 3GSO, 3HA, 3HYH, 3IIT, 3IUD/M, 3IUK, 3JMA, 3JWQ, 3JZN, 3KAG, 3KPT, 3KUH, 3LAY, 3LCV, 3LGJ, 3LHA, 3LHW, 3MAX, 3MED, 3MNQ, 3MPS, 4PS, 5LJ, 8FI.
HEARD: G2BVW, 2FMO, 3ATM, 3DVK, 3GFD, 3GGR, 3HBW, 3HWC, 3HZK/M, 3IKV, 3JXN, 3JZG, 3KHA, 3LZH, 4BD, 4DC, 4MK, 5CP/M, 5MA, 5YV, 6JS, 6NB, 6XM, 8VZ, GM3EGW, PE1PL. (*May* 17 *to June* 16).

SWL Winters, Melton Mowbray, Leics.
PHONE: G2BVW, 2CDB, 2CRL, 2FMO, 2FNW, 2HCG, 3APY, 3APY/M, 3BA, 3DJJ, 3DKF, 3EVV, 3FAN, 3FGT, 3FUW, 3GSO, 3HAN, 3HBW, 3HWC, 3HYH, 3IKV, 3IRS, 3JAZ/P, 3JWQ, 3JWQ/M, 3JWQ/P, 3JWU/A, 3JXN, 3JZG, 3JZN, 3KQF, 3KUH, 3LGJ, 3LHA, 3MNQ, 3MPS, 4MK 5CP/M, 5ML, 5SK, 5YV, 6JS, 6PO, 6XM, 6YU, 8VZ, GB2RS, GW3APY/P, PE1PL.
CW: G2FNW, 3APY, 3APY/M, 3ENS, 3GSO, 3JSQ, 3JZG, 3KQF, 3KUH, 5CP/M, 5YV, 6XM, GB3IGY, GI3GXP, PE1PL. (*May* 12 *to June* 14).

G3KPT, West Bromwich, Staffs.
WORKED: G2AK/M, 2ACV, 2AUD, 2CDB, 2FNW, 2HDF, 2YM, 3APY, 3AYJ, 3BA, 3CRH, 3DJJ, 3DKF, 3EJO, 3ENY, 3FGT, 3FTN, 3FZL, 3GGR, 3GKZ, 3GSO, 3GTN, 3GZM, 3HAZ, 3HXN, 3HZK/M, 3IKR, 3IOB, 3IOO, 3IRS, 3IVF, 3JAZ, 3JBN/P, 3JGY/A, 3JWQ, 3JYZ/A, 3JZG, 3KEF, 3KEQ, 3KFD, 3KMT, 3KQF, 3LAY, 3LDW, 3LDY/P, 3LGJ, 3LHA, 3LHW, 3MGR, 3MNQ, 4LU, 5BM/M, 5DW, 5LJ, 5MA, 5ML/M, 5SK, 5YV, 6SN/M, 6XM, 6YU, 8BP/M, 8MZ. (*May* 1 *to May* 31).

with his old sparring partner, G3KHA of Bristol; G3KPT runs 25w. to an aerial consisting of crossed slots, each slot being fed independently for N/S or E/W coverage.

G2CIW makes a *nil* return because he writes from Montreal, where he has met Mike Barlow, ex-G3CVO; Jack himself will be away about three months, after which he returns to Cambridge to take up the cudgels again. SWL Winters (Melton Mowbray) has heard GI3GXP, for his 5th country and 33rd county; he has been reading up "VHF Bands" of five years ago to see what things were like then — and has noted that we used to run 8/10 pages on the subject in those days, while among the call-signs mentioned only the real stalwarts are left . . . SWL Winters says he will probably be reading this in Rome or Naples, "so VHF conditions are bound to be good during this coming period." Could well be!

The Tabular Matter

By an immense effort, your A.J.D. has squeezed enough space to show all the Tables this time. Whether they are up-to-date is another matter—that depends on *you*. So far as we know, at least, every claim made during the last few months has been included. If you are not in the right place, please let us know, so that the matter can be rectified.

VHFCC Elections

VHF Century Club Certificates have been awarded as follows: No. 221, to DL1UW (Osnabruck); No. 222, to DJ1VK (Dortmund); and No. 223 to G3KUH (Rotherham). Rules and procedure for VHFCC membership appeared on p.376 of the September 1957 issue—and we now have a new printing of Certificates ready for all who can satisfy those conditions.

Finally——

Closing date for this feature in the August issue is **July 23,** which gives you ample time to get your claims sorted out. Address all your VHF gen to: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. So, till August 8, 73 and get cracking on Four!

TWO-METRE FIRSTS

G/DL	G3DIV/A-DL4XS/3KE	5/6/50
G/EI	G8SB-EI8G	23/4/51
G/F	G6DH-F8OL	10/11/48
G/GC	G8IL-GC2CNC	24/5/51
G/GD	G3GMX-GD3DA/P	29/7/51
G/GI	G3DA-GI2HML	29/6/49
G/GM	G3BW-GM3OL	13/2/49
G/GW	G5MQ-GW5UO	22/10/48
G/HB	G6OU-HB1IV	12/9/53
G/LA	G6NB-LA8RB	29/6/53
G/LX	G5MR-LX1AS	23/7/55
G/ON	G6DH-ON4FG	25/9/48
G/OZ	G3WW-OZ2FR	1/6/51
G/PA	G6DH-PAØPN	14/9/48
G/SM	G5YV-SM7BE	1/6/51
GC/DL	GC3EBK-DL3VJ/P	22/3/53
GC/EI	GC2CNC-EI2W	8/10/51
GC/F	GC2CNC-F9OK	17/11/53
GC/GI	GC3EBK-GI3GXP	14/9/56
GC/GW	GC2FZC-GW8SU	16/6/54
GC/ON	GC3EBK-ON4BZ	4/3/53
GC/OZ	GC3EBK-OZ2FR	2/3/53
GC/PA	GC3EBK-PAØHA	16/7/55
GD/EI	GD3DA/P-EI2W	30/7/51
GD/GM	GD3DA/P-GM3DA/P	29/7/51
GD/GW	GD3DA/P-GW5MQ	28/7/51
GI/DL	GI3GXP-DL1SE	5/1/56
GI/EI	GI3GQB-EI2W	13/6/51
GI/GD	GI2FHN-GD3DA/P	29/7/51
GI/GM	GI2FHN-GM3OL	1/7/49
GI/GW	GI2FHN-GW3ELM	8/7/49
GI/ON	GI3GXP-ON4BZ	5/1/56
GM/DL	GM2FHH-DJ1XX	29/5/55
GM/EI	GM3BDA-EI2W	12/6/51
GM/HB	GM3HLH-HB1RG	4/8/57
GM/ON	GM3EGW-ON4BZ	21/11/53
GM/OZ	GM2FHH-OZ2IZ	18/6/57
GM/PA	GM3EGW-PE1PL	22/4/53
GM/SM	GM2FHH-SM6ANR	22/7/55
GW/DL	GW5MQ-DL4XS	22/9/51
GW/EI	GW2ADZ-EI8G	19/4/51
GW/F	GW2ADZ-F3LQ	14/5/50
GW/HB	GW2ADZ-HB1IV	14/9/53
GW/ON	GW2ADZ-ON4YV	13/5/50
GW/PA	GW2ADZ-PAØHA	13/5/50
GW/SM	GW2ADZ-SM6QP	1/7/53
CN2/CN8	CN2AO-CN8MB	26/6/55
DL/OZ	DL6SW-OZ2FR	4/3/51
DL/SM	DL2DV-SM7BE	10/3/51
EI/DL	EI2W-DL3VJ/P	29/8/52
EI/F	EI2W-F8MX	9/8/56
EI/ON	EI2W-ON4BZ	21/9/51
EI/PA	EI2W-PAØFC	10/10/53
ON/LA	ON4BZ-LA1KB	4/7/53
ON/LX	ON4TR-LX1MS	? ?
ON/OZ	ON4BZ-OZ2FR	3/6/51
ON/SM	ON4BZ-SM7BE	2/3/53
ON/9S4	ON4UD-9S4BS	19/8/56

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

16 ON4BZ (DL, EI, F, G, GC, GI, GM, GW, HB, LA, LX, ON, OZ, PA, SM, 9S4)

16 G3GHO, G5YV, G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, ON, OZ, PA, SM)

15 G4MW

14 G2FJR, G2HDZ, G3IOO, G5BD, G5MA, G8OU

13 G2XV, G3BLP, G3CCH, G3DMU, G3GPT, G5DS, G6XM, G6XX, PAØFB

12 F8MX, G2HIF, G3FAN, G3GHI, G3JWQ, G3KEQ, G3WW, G6LI, G6RH

11 EI2W, G2AJ, G3ABA, G3DVK, G3GFD, G3HAZ, G4RO, G4SA, G5UD, GM3EGW

10 G2AHP, G2FQP, G2HOP, G3BK, G3BNC, G3DLU, G3EHY, G3GSE, G3JZN, G3KUH, G3WS, G5MR, G8IC, GW5MQ

9 G2CZS, G2DVD, G3DKF, G3FIJ, G3FUR, G3IUD, G3LHA, G5ML, GC3EBK

8 G2CIW, G2DDD, G2XC, G3AEP, G3AGS, G3BOC, G3GBO, G3HCU, G3HWJ, G3KHA, G3VM, G5BM, G5BY, G8SB, GC2FZC

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
29	G2XV
26	GW2ADZ
24	G3HBW
23	G3BKQ, G6NB
21	G3KEQ
18	G2CIW, G3IOO
16	G6NF
15	G4RO, G5YV
14	G2HDZ
12	G5BD
10	G2OI, G3IRW
9	G2DDD, G3LHA, G5DS
7	G2HDY, G3JHM
6	G3FAN, G3JMA, G3KHA, G3WW
5	G3FUL, G3IRA, G3IUD, G5ML
4	G3JGY

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

AMATEUR RADIO ASTRONOMY

SOME NOTES ON A PRACTICAL INSTALLATION

A PARAGRAPH in p.152 of the May issue of SHORT WAVE MAGAZINE mentioned the radio telescope at Stowe School, Buckingham. This installation has been devised by J. M. Osborne, M.A., G3HMO, of Stowe, and is actually mounted on the flat roof of the School physics laboratory.

Since the equipment could quite easily be duplicated, and is well within amateur scope, these notes may serve to stimulate further practical interest in the subject of Radio Astronomy.

The Beam System

The Stowe telescope works on about 200 mc (1½ metres), the aerial consisting of a 32-element array based on a standard Band III design manufactured by J-Beams, Ltd., of Northampton. This is made up of two slot-fed 16-element sections working in phase; each section comprises an 8-element pair. The two 16-element sections thus formed are connected through a phasing unit to give "additive" matching of the two sections into a single coax feed-line to the receiver.

Fixed about two wavelengths apart, the two sections of the array are mounted on a boom secured to a short, rotatable mast, which is itself set on the equatorial axis *(see* photograph) —that is to say, it is held parallel to the polar axis of the earth, so that rotation of the mast keeps the array headed on the sun, without any adjustment in elevation being needed. The mast was easily set up on the correct alignment by aiming it straight at the Pole Star (which for this purpose can be taken as a fixed point bearing true north).

Since the system itself does not call for mounting at any great height, the mast can be quite short, and the mechanics of supporting it at a steep angle are much simplified; in this case, the mast is actually a length of piping held in position by a few items of tubular scaffolding. Being on a flat roof, all parts of the telescope are readily accessible — indeed, one of the advantages of any aerial system used for Radio Astronomy is that it can be as near ground level as the "dimensions of movement" will permit.

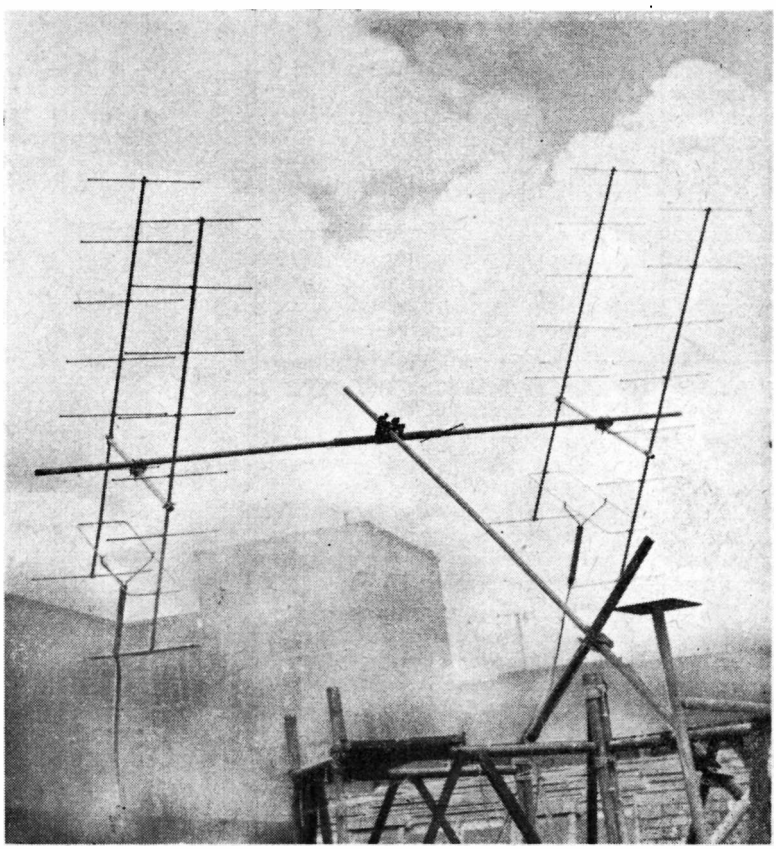
The beam width of the system is estimated at about 5° in azimuth, and 15° in elevation. Thus, though it has no great resolving power, noise sources in the heavens can be located with a degree of accuracy to make them at least interesting.

Receiving Equipment

The single coax feed-line goes to a modified commercial Band III converter made by Rainbow Radio, Ltd., which incorporates an ECC84 cascode RF stage and is adjusted to have an IF of 45 mc; so the converter feeds into a well-known item of "surplus"—a Pye 45 mc IF strip, which has five stages using EF50's. The receiver side was lined up with a noise generator, the circuit being as on p.700 of the *Radio Handbook,* 14th Edn.

Indication

From the IF strip, the output is taken directly to a Cossor valve voltmeter (built from their 1044K kit). With the aerial disconnected, the V/VM is zero'd on a scale convenient for observing maximum



General impression of the radio telescope at Stowe School, Bucks., built up by G3HMO for operation on 200 mc. The array is set on an equatorial mounting, so that the sun can be followed round without any adjustment in elevation being necessary. The aerial system itself is described in the article. Very good results are being obtained, and large "noise signals" have been recorded when the sun is normally active. Noise has also been received from the Milky Way.

deflection—say, 1.5 volts, backed off—which will be the inherent "steady noise level" of the receiving system alone, without the aerial; on switching in the aerial, there is a change in noise, producing a deflection to a new level on the scale; and on aiming the telescope at the sun, further change and irregular deflections are obtained, depending, of course, upon the sun's activity.

The general sensitivity of the whole set-up is such that noise of some sort can be "read" off the sun at almost any time; in fact, the meter can only be zero'd with accuracy by making sure the beam is pointing away from the sun. Periods of high activity give very good deflections, some noise peaks being sufficient to drive the meter needle off-scale. The deflection obtained on the Stowe telescope is of the order of 0·2 volts on the 0-1·5v. scale during periods of average activity; this is, of course, not an absolute figure, as it takes no account of the gain of the system; it is quoted merely to indicate the sort of meter reading that might be expected with a comparable system.

Apart from the sun, indications of noise have also been traced from the Milky Way.

Future Development

So much for the essentials of the installation as at present in being. For any regular or serious work, however, an obvious requirement is continuous operation of the telescope. For this a drive mechanism, rather like a piece of clockwork, is being developed which will keep the beam headed on the sun all the time it is above our horizon; this mechanism will simply move the beam against the rotation of the earth; for reasons already explained, no controlled movement in elevation is necessary. Secondly, since nobody has time to sit watching a meter needle all day, a pen recorder will take the place of the valve voltmeter, operated from a suitable amplifier following the IF unit. The recording instrument is being provided through the good offices of the appropriate committee of the Royal Society. It is hoped, in a later article, to discuss the results obtained in greater detail.

From what has been said, it is clear that there is ample scope for interesting amateur work in Radio Astronomy, either individually or on a group basis. Indeed, radio amateurs, particularly those experienced in VHF techniques, are very well qualified to join in the exploration of this fascinating new field. The practical limitation of aerial size, combined with the desirability of using valve receiving systems of the accepted VHF types, suggest that the useful frequency range for amateur investigation of noise from outer space—whether from the sun, the Milky Way, or other noise sources—is about 60-400 mc. A start could, in fact, be made by anyone who, having two-metre receiving equipment, can instal a beam with a tiltable head—which, as we have already seen in another context, could be very useful for normal reception on that band!

Bibliography

For those who would like to know more about the problems involved in Radio Astronomy, their importance in widening the field of human knowledge, and the scientific approach to their solution, the following books can be recommended:

The Space Encyclopædia (Artemis Press, 35s.); *The Exploration of Space by Radio* (reviewed on p.212 of the June 1958 issue of SHORT WAVE MAGAZINE); and the January 1958 issue of the American *Proceedings of the Institute of Radio Engineers*, which is a special number devoted to the subject.

A.J.F.

RADIO RESEARCH BOARD TO OBSERVE EARTH SATELLITES

Observational work on artificial earth satellites has recently been added to the research programme of the Radio Research Station of the Department of Scientific and Industrial Research at Slough, Bucks. It introduces a new technique for research on the propagation of radio waves and the study of physical conditions in the outer atmosphere.

The Station will carry out a programme of work in this field and will also act as an international centre to collect the results of observations made by other scientists. As a result of its past work in the field of international scientific radio, the Station is well placed and equipped to conduct this new project.

But a nucleus of existing staff will have to be enlarged by the recruitment of further scientific and experimental personnel—so that more intensive observations can be carried out either at the Station's headquarters at Slough or at its sub-station in Singapore, where an ionospheric observatory has been in operation for the last ten years.

While this work involving rockets and satellites was started as part of the programme of the IGY, it is expected that it will develop considerably in the future. In fact, it is likely to become a permanent part of the Radio Research Laboratory's programme. To this end, additional technical staff is now being recruited.

The Station is in very close touch with corresponding laboratories in the U.S.A. and the U.S.S.R., and an exchange of information on an international basis takes place every month. Artificial earth satellites have made it possible for the first time to measure the various types of radiation from the sun above the earth's atmosphere—and this knowledge is vitally important to an understanding of the characteristics of the ionosphere.

OLD-TIMER BACK AGAIN

On June 5, the call-sign G4JA was re-issued by the Post Office *(see* "New QTH's"). It went to ex-G2JA, who relinquished that call (since re-allocated) more than 22 years ago! G4JA says that he has yet to assemble equipment and build his station, but he hopes to be renewing old acquaintances during the next six months—he also remarks that techniques appear to have changed somewhat since the early 1930's!

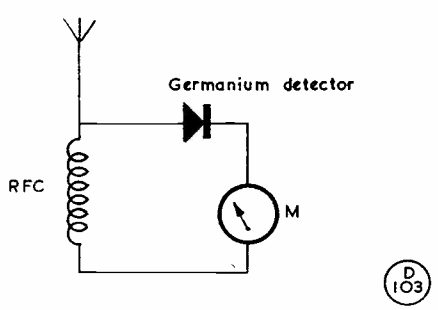
Simple Radiation Meter

AN RF TESTER AND ITS APPLICATIONS

B. Wardman (G5GQ)

IT'S an extraordinary thing, yet true — the simplest and probably most useful piece of test equipment for amateur transmitters is the very item missing from most stations. Of course, in pre-war days when we had to depend upon our own construction for most of our gear, we had to use every simple device possible. But nowadays, with all the commercial gear available, many of these things seem to have been forgotten. Indeed, it has been staggering to hear the comments of the many visitors to this station. "Whatever is that?" they will demand, looking at the radiation meter standing on the transmitter cabinet or desk. And when they are invited to pick it up and wander round the room with it, they become quite amazed and enthusiastic and demand the circuit. Yet it has been in existence in various forms for years, decades most likely. Maybe because of that, it has become too obvious, and being obvious has been overlooked.

First, why does it attract the attention of visitors to G5GQ? Well, it so happens that, being in a block of flats, G5GQ is not allowed to erect an aerial. So we have an "invisible" one! Outside the flat, about a foot away from the wall, some twelve feet of wire is strung up between two windows—about 22g., which can't be spotted from more than a few feet away. This is loaded up to act as an end-fed dipole on 14, 21, and 28 mc. Not much of an aerial, is it? Yet during week-ends, when the ten-metre band is open and the week-end QRM at its worst, G5GQ can reckon on having a dozen contacts per afternoon with the States, running an average of S9 + 15 dB on NBFM from a pair of 807's in pi-parallel. That's the aerial, and comparable results are obtained on both 21 and 14 mc as well. It means that every bit of power produced must be pushed into the aerial, which must radiate it out; there's no margin for losses in feeder systems and tuning units which have to be adjusted right on the edge the whole time.



Circuit of the aperiodic radiation meter which, by its very simplicity, can become one of those indispensable items of test gear. The germanium detector and the RF choke are standard items, and can be wired in behind the meter itself (like a shunt).

Initial Procedure

Naturally, the aerial is not just tapped on to the transmitter PA—though it could be, with very poor results! In fact, the PA is pi-output to reduce harmonics, going through a low impedance co-axial line to a matching and tuning unit which loads the wire up to a half-wave and matches the transmitter low impedance to the high impedance required. When this was first lined-up to go on the air, the actual RF performance was checked at every stage. For example, a lamp load was matched across the actual PA coil and, with 100 watts input, the transmitter was checked and modified until it would light a 75-watt lamp to full brilliance. When that was right, the low-impedance cable was connected, and a check made to see that the 75-watt lamp lit up properly at the other end. This was followed up at the actual aerial tuning unit, and finally on a simulated version of the aerial itself. In other words, in the initial setting up, everything was checked through to make certain that a definite 75 watts was actually in the aerial itself. For this, the readings on the various transmitter feed meters were recorded, together with the line current read on the normal thermo-couples.

To re-iterate, that was the *initial* setting-up operation; one just couldn't do that every day in normal use—life is not long enough. But, particularly with pi-tank circuits and matching units, there are all sorts of settings which may produce similar feed current readings but which can give quite different power outputs in the actual aerial. What was wanted was a steady comparison of aerial radiation and this is what the radiation meter is used for in this case. It also has many other applications all around the transmitter (and also for receiving gear), but it is this initial one which is the most spectacular. When satisfied that every drop of available "soup" was going into the aerial,

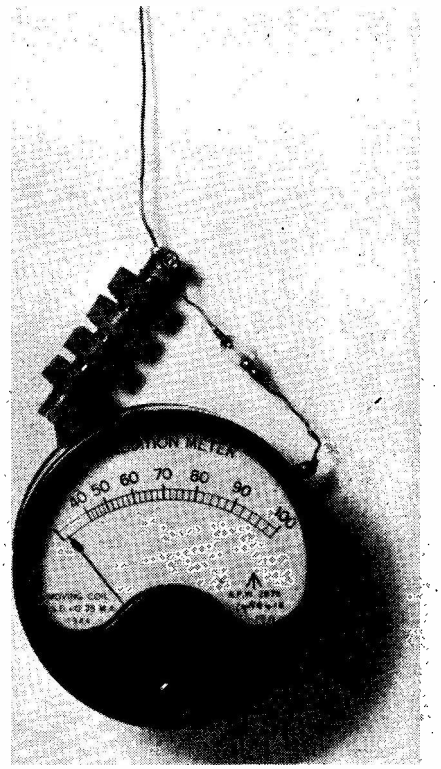
the radiation meter was placed on top of the transmitter cabinet, and its reading noted. If it read "70" with about 100 watts input, that was the figure to try for every time the rig was re-tuned, such as for changing frequency or even band. Often, when tuning up just on the normal transmitter meters, the correct adjustment would appear to have been obtained —but the radiation meter would be down to some absurd figure like "30" and it was obvious that 90% of the power was being lost somewhere. Again, as one moves over the band, the variations in peak tuning show up immediately and, indeed, even slight movements of the aerial in a gentle breeze can be followed on the meter. Power input changes can also be checked; at G5GQ, it is possible to switch instantaneously from 10 to 100 watts, and, if things are running properly, the meter will jump from say "30" to just over "90."

The Device

The entire instrument is shown in the photograph and the circuit in the sketch — what could be simpler! Sometimes these devices are known as "Field Strength Meters," sometimes as "Radiation Meters." All it amounts to is an aperiodic receiving set, *i.e.* one which does not require tuning and whose fixed inductance is adequate for the frequency ranges involved. It comprises an ordinary germanium crystal detector, an RF choke (to give the fixed tuning) and a meter having a full scale deflection of between 0·5 and 1 milliamp. Assembly time, two minutes. The actual meter came from an ex-Service "Radiation Meter," is completely unmodified, and has a full scale deflection of 0·75 mA (750 micro-amps). The purpose of the meter is to read the current rectified by the germanium crystal detector, and for this a meter of the full scale deflection mentioned is perfectly suitable. It may be a bit of an overload on the germanium crystal from time to time, but they are cheap enough to replace. Therefore, the more robust and cheaper $\frac{1}{2}$ to 1 milliamp. full scale deflection meter is recommended in preference to the more delicate and expensive 100 microamp. instrument. A pick-up "aerial" about 10 ins. long, made of 16g., can be seen attached to the unit.

The instrument is, of course, absolutely instantaneous in action, having none of the sluggishness one gets with thermo-couples or hot wire instruments. So, when adjusting a transmitter, it reacts immediately to the tuning and shows every difference.

For transmitting use, the meter is not normally connected to the actual transmitter or feeder system; it just "floats," picking-up its signal from the actual radiation going out. With 100 watts, on ten metres a reading can usually be obtained inside the station with the small pick-up aerial. It will vary all over the room, because it will pick up additional reflections from walls or metal wiring, shelves, and so on. In fact, the pick-up effect of the hand holding it makes quite an appreciable addition to the normal reading. So it is best to find some convenient place in the room where the normal reading on the band concerned gives about $\frac{3}{4}$-scale deflection, and then any variation is readily apparent. If there is not sufficient signal to give this, then an additional length of wire can be clipped on to the small pick-up aerial; this will certainly be necessary on Top Band where, with lower inputs and generally less volts on the aerial pick-up, it may be necessary to add as much as 3 feet of extra wire.



There is virtually no construction involved in the indicating device discussed by G5GQ — but he shows that it has many useful practical applications. The circuit is given in the diagram; it is simpler even than a crystal set, as there is nothing to tune.

Other Applications

Resonance-hunting is one of the many uses

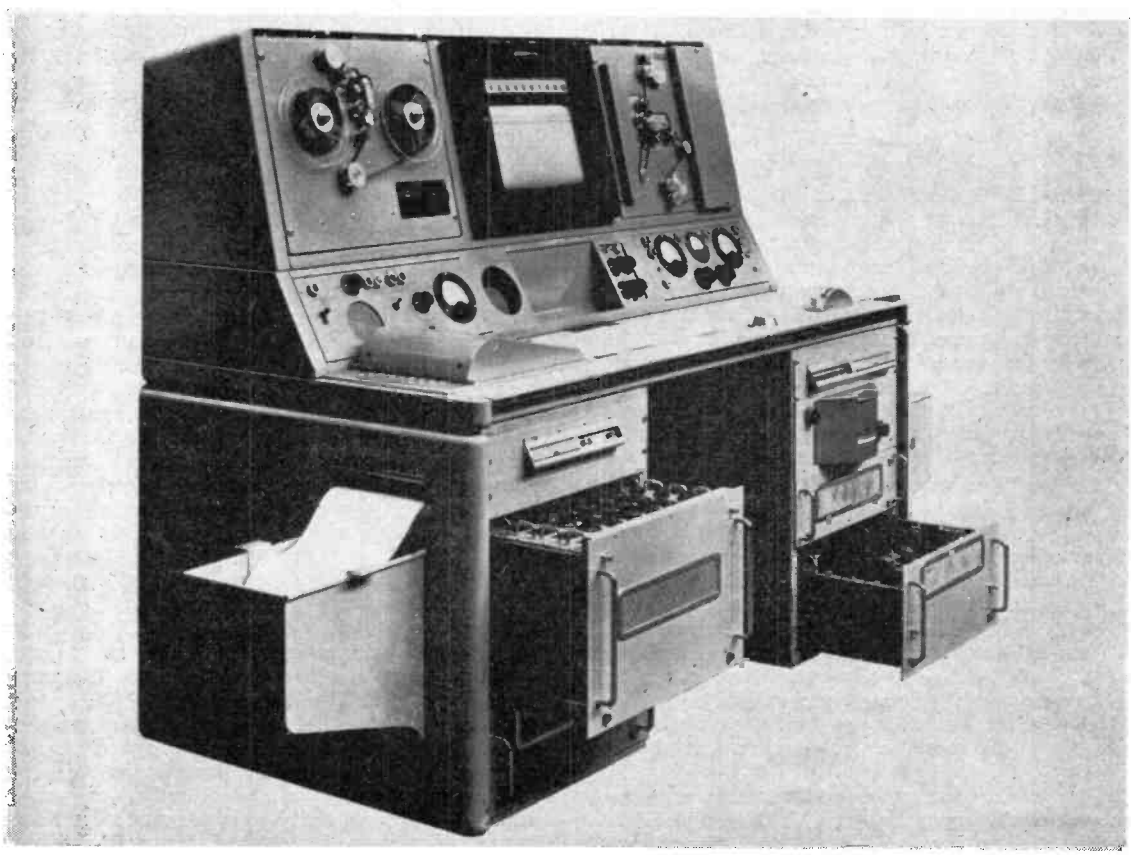
to which it can be put. There may be an odd length of wire, maybe used for a receiving aerial for one's own use or by the family for BC reception ; just touch the pick-up wire on that when the transmitter is switched on and any RF this odd length of wire is picking up will be seen, and the resonance got rid of by shortening or lengthening. Touching it on water pipes, gas pipes, or the lead covering of the telephone leads into the house will show if any substantial amount of RF is being lost that way and, more important, perhaps being pumped into other people's television sets.

In exciter units, this little instrument is again indispensable, since one can check up that each stage is oscillating (if a VFO) or giving power (if a multiplier)—it just indicates the presence of RF, that's all. One annoying thing that always seems to happen at G5GQ is the breaking of the centre core of co-axial cables, because they are always being taken off units and put back again. Just touching the centre with this indicator soon shows whether any RF is coming through, and can even be made to show where the break is — which is far quicker than getting out a flashlamp bulb and wiring that across.

Anywhere, even in receivers (where there is RF) it has its uses. It has been tried successfully on a 90 mc BC FM adaptor, checking up whether the first oscillator was actually working. The pick-up was pushed inside the oscillator coil (not touching) and although there was only a small deflection on the meter, it was quite sufficient for the purpose.

TELLUX, LTD.—TELEFUNKEN AGENCY

We are asked to announce that the new address of Tellux, Ltd., is 146 New Cavendish Street, London, W.1 (*LANgham 2411-3*), for many years sole distributors of Telefunken products, and also agents for a number of other Continental manufacturers.



A data recorder, the Mervyn Midas, in which the usual mirror galvanometer with photo-sensitive recording paper are replaced by a tape medium. In this case, "Scotch Boy," made by Minnesota Mining & Manufacturing Co., is used. Tape recording ensures a wider frequency response, a higher system accuracy and produces a record more suitable for analysis.

STORY OF AC4YN

THE LHASA EXPEDITION, 1936

Sir Evan Nepean, Bt. (G5YN)

The first DXpedition of all was undoubtedly that of Lieut. E. Y. Nepean (as he then was) who, as a young Royal Signals officer, was a member of a political mission to Tibet in 1936. It happened that he was also G5YN, so it was only natural that a station signing the mysterious and exotic call AC4YN began to be heard on the 20-metre amateur band towards the end of 1936. This station came to be, in its day, the most sought-after DX contact in the world. Here G5YN himself, still active and as keen as ever on Amateur Radio, tells something of his experiences in Tibet just 20 years ago.—Editor.

THE British Political Mission to Lhasa went to Tibet in 1936 at the invitation of the Tibetan Government. At that time, there was no Dalai Lhama, the previous one having died and his reincarnation not having yet been found. The Tashi Lhama, or spiritual ruler, was in China and very much under Chinese influence. The objects of the British Mission were to get the Tashi Lhama back to Tibet, and to advise the Tibetan Government on the improvement of their Army, since at that time it was British policy to maintain Tibet as a buffer state on the north-east frontier of India.

In 1936, there were two methods of communication between Lhasa and India. The first was a postal service, by pony runner; the second was a single galvanized-iron wire supported on light wooden poles which carried a single-current earth return simplex DC telegraph system—over a distance of more than 100 miles. This, and the pony mail, joined with the Indian Posts and Telegraphs terminal at the British Trade Agency at Gyantse. Neither facility could be made available anywhere outside or beyond Lhasa itself. It was therefore decided that what we would now call portable radio equipment should be taken.

Responsibility for producing the signals organisation was placed upon Lieuts. S. J. Dagg and E. Y. Nepean, Royal Signals, and both these officers were seconded to the Mission, whose leader was the late Sir Basil Gould, Political Officer for Sikkim.

The main items of radio equipment were as follows: 100-watt transmitter consisting of two AT50 triodes in a push-pull Hartley oscillator circuit; aerial coupling unit; an Eddystone "All World Four" battery receiver; a home-built 1-V-1 receiver; a 12v./1000v. DC rotary transformer; a 550-watt Stuart-Turner charging set; accumulators; sectional aerial masts and wire, insulators and a small "junk box," which also contained the writer's own key. There were various other items, such as a Philips record-player and amplifier, with large speakers, to give concerts to the Tibetans, and a carbon microphone.

Official traffic was to be worked through what was known as the "VV Group," which meant Army Hq., India. The Mission set out from the Residency at Gangtok, Sikkim, and here all the equipment was tested, including the radio link back to Army Hq., under call-sign VUQ. The gear was sorted into suitable loads for transport by pack animal; the charging set had, however, to be slung on two bamboo poles carried by coolies, as there was no pack saddlery available for it. The charging set never was a popular load.

During the journey up into Tibet, the charging engine was tested; as height was gained, its power output fell off, till at 10,000 feet it produced nothing at all. This caused considerable consternation, as much depended on that charging set. Lieut. Dagg therefore returned post-haste to Calcutta, to have a gear-driven hand charger designed and built. A most successful machine, based on a Ford 12-volt dynamo, was produced; with four coolies on the crank, about 6 amps. could be pushed through a 12-volt accumulator. In the meantime, Stuart-Turner's had been airmailed, and a pair of variable-jet carburettors were sent out for the 550-watt generator engine, which then ran as it never had before, even at 12,000 feet.

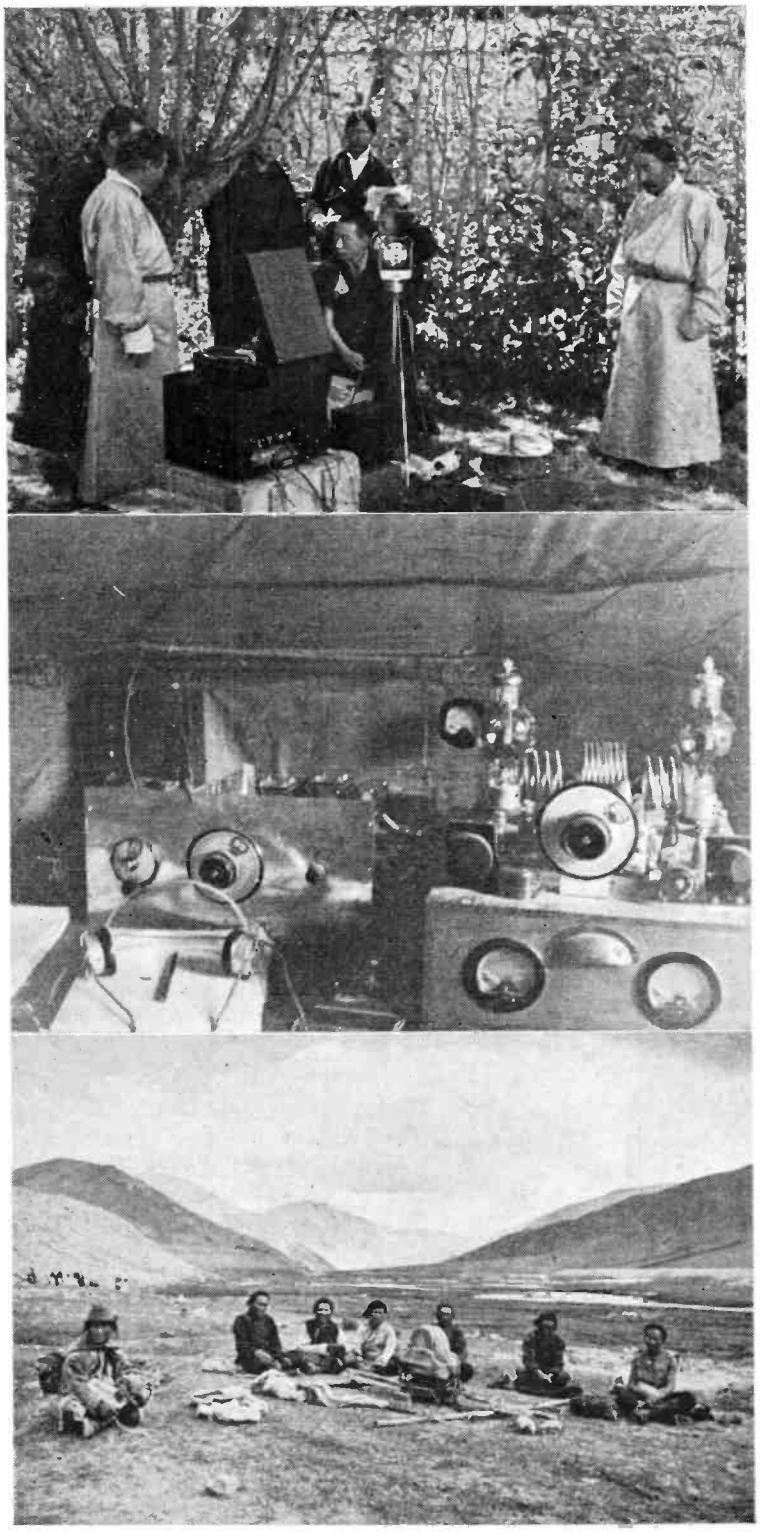
On arrival at Lhasa, the radio equipment was set up in the writer's tent, and a dipole slung up for the 30-metre band, this being the VUQ operating channel. It was found that Lhasa had an "electric lighting plant" consisting of 440 volts of accumulators providing 220 volts on the three-wire system; this was run from a hydro-electric station some three miles away; as the insulation was somewhat rudimentary, the leakage loss was most impressive.

Regular schedules for official traffic were started on the VV Group and the Army stations at Simla, Rawalpindi, Quetta, Peshawar, Calcutta, Karachi and Hong Kong were all easily worked on 30 metres. When not thus engaged, it was natural that the writer's thoughts should turn to the amateur

bands. The 100-watt Hartley SEO transmitter was therefore tuned into the 20-metre band—located by listening round on the Eddystone receiver—and the first "*CQ de AC4YN*" went out. VU2 amateurs were the first to b e raised, with excellent signals both ways. The first DX worked was VK and ZL, and these contacts became so reliable that they were regarded as locals!

Then amateur signals from the west started to come through and, as the year advanced, the further west did AC4YN's signals reach—till at last, early in the winter of 1936, the U.K. was raised. To the very first G worked an effort was made to explain AC4YN, and he was asked if he would accept messages for QSP home (which, in the circumstances, would not in those days have been regarded as "a serious breach of the regulations"). However, this must have frightened him off, for he failed to respond to repeated calls!

Unfortunately, the original log of AC4YN is no longer in existence; it was left with Reg. Fox (who took over AC4YN in the spring of 1937) and was, presumably, impounded by the Chinese when they got to Lhasa some time after the British Mission left. At this distance in time, more than 20 years, it is not possible to mention, from memory, the G calls worked—but one at least of the original AC4YN cards is in the possession of G6QB, of "DX Commentary" in SHORT WAVE MAGAZINE.



These photographs are from a large number of interesting original prints in the possession of G5YN, who was on the 1936 Lhasa Expedition, and put AC4YN on the air. *Above:* **Some high-placed Tibetan personages listening to a portable record amplifier.** *Centre:* **The original AC4YN 20-metre transmitter, set up in a tent, which radiated the first amateur signals ever to go out from Tibet; it was a 100-watt SEO rig. The receiver, on the left, was an Eddystone "All World Four," and the aerial a dipole.** *Below:* **The power supply for AC4YN. This was a PE generator set, humped by a gang of Tibetan coolies, seen here on "tea break." The background gives a good impression of the desolate and inhospitable Tibetan landscape, though the charming inhabitants of the country are themselves anything but inhospitable.**

NEW QTH's

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

G2AMN, E. W. Rogers, 17 Eccleshall Road, Stone, Staffs. *(Tel.: Stone 5.)*

G2FLY, G. Edwards, 17 Harrison Road, Erdington, Birmingham, 24.

GI3GPE, Sgt. K. Smethurst *(ex-DL2UY),* 13 Andover Avenue, Nr. Crumlin, Co. Antrim, N.I.

G3KCT, D. W. Blythe, 217 Brighton Road, Purley, Surrey.

G3LBJ, T. J. Stacey, 24 Granville Street, Swindon, Wilts.

G3LNC, J. A. Batham, 174 Woodseer Street, London, E.1.

G3MER, J. D. Davis (Mrs.), 24 Trinity Road, Gillingham, Kent.

G3MGL, A. V. H. Davis, 24 Trinity Road, Gillingham, Kent.

G3MNO, D. L. Lisney, 17 Pickett Croft, Stanmore, Middlesex.

G3MNU, J. I. Hirst, 51 Loughborough Road, Mountsorrel, Loughborough, Leics.

G3MOT, C. J. Lambert, 327 Parkway, Iver Heath, Iver, Bucks. *(Tel.: Iver 1214.)*

G3MOT/A, J/T Lambert, C. J., R.A.F. Station, Treleaver, nr. Helston, Cornwall.

GW3MOV, C. L. Smith, 56 Old Church Road, Whitchurch, Cardiff, Glam.

G3MQT, W. E. Thompson, 8 Coventry Road, St. Leonards-on-Sea, Sussex. *(Tel.: Hastings 3681.)*

G3MSK, V. H. C. Davis, 24 Trinity Road, Gillingham, Kent.

G3MTB, G. W. B. Parish, 2a Pasture Road, Barton-on-Humber, Lincs. *(Tel.: Barton-on-Humber 2169.)*

G3MTE, A. N. Mackay, 23 Ellesmere Avenue, Mill Hill, London, N.W.7.

G3MUF, J. Owens *(ex-EI6I),* 26 Gladwell Road, London, N.8.

G3MUM, P. S. Odell, 20 St. John's Grove, Redcar, Yorkshire.

G4JA, A. D. Stenning, New Inn, Baschurch, nr. Shrewsbury, Shropshire. *(Tel.: Baschurch 335.) Re-issue.*

CHANGE OF ADDRESS

G3BMV, A. Shaw, 10 Perth Street, Burnley, Lancs. *(Re-issue.)*

G3BNI, D. L. K. Coppendale, 55 Marlow Avenue, Wolcot, Swindon, Wilts.

G3BRQ, K. B. Tackley *(ex-XAGA/SVØAC),* 70 Connaught Road, Fleet, Hants. *(Tel.: Fleet 1588.)*

G3FFL, J. H. Oxby Parker, Ll.B., 71 Mount Road, Bexleyheath, Kent.

G3GBH, J. H. Jones, 18 Vernon Road, Bridlington, Yorkshire.

G3GMK, K. W. May, 247 Brownhill Road, Millbrook, Southampton, Hants.

G3HCL, S/Ldr. D. E. C. Lockyer, The Old Vicarage, Hordle, Lymington, Hants.

GI3IGB, C. T. Rylatt *(ex-GM3IGB),* 22 Andover Avenue, A.M.Q., R.A.F. Station, Aldergrove, Crumlin, Co. Antrim.

G3IVB, L. R. Beeson, c/o Belchers (Radio Services) Ltd., Ford Green Road, Smallthorne, Stoke-on-Trent, Staffs.

G3JEA, J. E. Alban, 172 Droop Street, Kensal Green, London, W.10.

G3JEA/A, J. E. Alban, 17 East Street, Newtown, Huntingdon, Hunts.

G3JMH, V. Callaghan, 54 Reva Road, Bowring Park, Liverpool, 14.

G3JQJ, G. Moore *(ex-DL2WM),* 16 Joffre Avenue, Glasshoughton, Castleford, Yorkshire.

G3KBD, J. G. Lambert, Lynwood, 257 Durham Road, Stockton-on-Tees, Co. Durham.

G3KBQ, P. H. Huntsman, 16 Crescent Avenue, Hexham, Northumberland.

G3KPN, Sgt. W. M. Nicholson, No. 1 A.M.Q., R.A.F. Station, Compton Bassett, Calne, Wilts.

G3KZQ, G. Goddard, Arundel Kennels, Cemetery Road, Glossop, Derbyshire. *(Tel.: Glossop 642.)*

G3MEU, R. A. Hudson, 50 Warwick Road, Upton, Wirral, Cheshire.

G4QU, F. C. Mason, 16 Gorse Hill Lane, Virginia Water, Surrey.

VP6WD, G. MacLean Wilford *(ex-G2WD),* 20 Pavilion Court, Hastings, Barbados, B.W.I.

CORRECTION

G3GDI, P. Sollom (Mrs.), Casa Maria, Pigeonhouse Lane, Rustington, Sussex.

G3GNV, H. W. Sollom, Casa Maria, Pigeonhouse Lane, Rustington, Sussex.

G8MD, J. A. Drinkall, 25 Garstang Road North, Wesham, nr. Kirkham, Lancs.

THE MAY AMATEUR EXAMINATION

The Radio Amateur Examination held in May last was quite straightforward for those who had done the necessary reading and, generally speaking, appears to have been regarded as "easy" by those who took it. Incidentally, with their *How to Become a Radio Amateur* leaflet, the G.P.O. now issues a list of the subjects covered by the ten questions set — which makes the reading for the Examination a good deal easier. Full details of the regulations and conditions for the issue of radio amateur transmitting licences can be obtained on application to: Radio and Accommodation Dept. (Wireless Section), Post Office Headquarters, London, E.C.1.

THE OTHER MAN'S STATION

G3ISX

WHEN sending in his piece for this series, G3ISX —C. J. Leal, 1 Deepdene Road, Welling, Kent —remarked that "you do not very often review a real amateur rig." *Well!* Anyway, he describes his as climbing half-way up the wall, and undergoing a modification of some sort about once a week. (This, as we well know, is the sort of thing that happens at most amateur stations—which is just as it should be.)

G3ISX was first licensed in December, 1952, some previous radio experience having been obtained in "signals" in the Grenadier Guards; while this taught him basic theory and Morse, G3ISX says that what really got him on the air as an amateur was the assistance he had from the North Kent Radio Society—his own words are "I cannot speak too highly of the advantages of belonging to a club when one has teething problems."

The gear at G3ISX (at present!) consists, on the table, of an AR77 receiver and a Top Band transmitter, while in the home-constructed rack on the right, from the bottom up, are: Power supply unit; the VFO, which is a Franklin using 2/6C4's with a 6AG7 as BA; next up is the 7-28 mc transmitter, consisting of 6AG7's in the intermediate stages, into an 807 as PA, clamped by a 6L6, the input being 40 watts on phone and 50w. on CW; and on the top shelf of the rack is the speech amplifier-modulator, running 6BR7-6SL7 driving push-pull 807's in Class-AB1 for plate-and-screen control; his crystal microphone is a deaf-aid insert.

Aerials are 7 and 14 mc dipoles for the 7-14-21 mc bands, and a "ZL Special" for 10 metres; all are coupled through an aerial tuning unit. Main interests at G3ISX are in CW DX on 21 and 28 mc, and Top Band phone. The station record stands at 113 countries and 41 states worked, and several DX awards are held.

G3ISX remarks that he is also interested in photography, while the little cup visible in the picture was gained for prowess at—archery! Finally, he says that because he rides a motor-cycle, it can be inferred that he is still in the "blessed state of singleness." Well, it gives him time to work the DX, anyway!

AMATEUR LICENCE TOTALS

We are officially informed by the Post Office that the total of U.K. radio amateur licences in issue as at May 31 last was 8,162. Additional facilities for mobile (/M) working were held by 550 licensees, and by 65 amateurs for television transmission (/T). Interesting figures!

SATELLITE VI STILL TICKING

As reported on p.205 of the June issue of SHORT WAVE MAGAZINE, the Russians launched their third space vehicle on May 15; the last reception recorded on 20·550 mc (before going to press with this issue) was during 0914-0925 GMT on June 21, when the signal was S7. Though the Russians have not said so, it is now thought that the interrogation—for the release of the recorded data when the satellite is over Russia—may be taking place on 70 mc. This is not necessarily the frequency on which S.VI transmits, and a ground station in Russia on 70 mc is not likely to be easily heard in this country.

THE MONTH WITH THE CLUBS

By *"Club Secretary"*

(Deadline for August Issue : JULY 18)

AFTER all our years of collating Club reports and trying to make them into a readable and interesting whole, we are still mystified by the vast differences between the various organisations who write to us, and their different outlooks on Club publicity.

We do realise that not many Clubs actually depend on this feature as a means of notifying their members of the next few meetings, but we have always imagined that it would be a good plan to publicise coming meetings rather than those which are over and done with. Non-members might chance to see the announcement; visitors to the district might be grateful for the opportunity to meet the local amateurs. So it still seems to us that Club announcements should give some details of forthcoming events.

There are *some* scribes and secretaries who are either hopelessly mixed up with their dates, or think that "going to press" is a kind of instantaneous operation. They think nothing of writing to us on the 15th of May with full details of meetings taking place on the 22nd and 29th of the same month! What are we to do? As our June issue (for which their letters are barely in time) is published during the first week in June, we can only refer to those meetings in the past tense, and, for all we know, they may never have happened!

So may we appeal, once more, to all concerned to look at the heading of this feature for the next deadline; to realise that it concerns an issue which appears *three weeks* after the date quoted; and to give us some news of meetings which are planned for dates after our own publication date.

Duplicated News Letters are always welcomed and read with interest but we can't extract much from them except notices of meetings which have already been held, or are to be held before our publication date.

CLUB FIELD DAY?

It has been suggested—indeed, we have been asked to organise it—that a Club Field Day run as a competitive event would be welcomed. While we are quite agreeable to making the necessary arrangements, we would first like to know whether other Clubs (the suggestion comes from Pontefract) would be willing to support it. The factors to be borne in mind are: Time of year (September?), and any clash there might be with MCC, which is an established Club contest in November. October is getting a bit late for outdoor activities, and (thinking of next year), one cannot be sure of the weather in the early spring. July and August are bad months, due to holidays, and September is now close upon us, if we are to try a field week-end this year.

Hon. secretaries are specially asked to discuss this proposal with their members, and to let us know whether they would like to take part in such an event this coming September.

CLUB REPORTS

Aberdeen meet on July 4 for a Junk Sale, and on July 11 for a talk on Mobile Operation by GM3FKS. To quote their own publication, "'FKS has had much experience in the Mobile field, and much will be gleaned from his discourse." The meeting is at the Clubroom, 6 Blenheim Lane, Aberdeen.

Bradford are down for an "Informal Meeting" on July 29, and another on August 26, from which we infer that they are more or less holiday-bound. **Bury** are holding another "Natter Night" on July 8, and the title for August 12 is "Gimmicks for the Shack," by G3JAG. Both meetings at the George Hotel, Kay Gardens, Bury at 8 p.m.

Liverpool will be operating a station on August 4, at a Fête organised by the Independent Order of Oddfellows, in aid of the Spastic Fellowship. They hope to have several more active members as a result of the recent R.A.E. Club membership is now up to 60.

Plymouth recently held their AGM, at which there were sundry changes of officials, including the secretary (*see* panel for new QTH). The competition for the G5ZT Trophy, which followed the meeting, was won by G3MPC with a miniature oscilloscope. Second was SWL Roger Smith, with a two-valve TRF receiver and power pack. Meetings continue every Tuesday, 7.30 p.m. at the Virginia House Settlement.

Worthing held their annual "Bucket and Spade Party" on the beach on Sunday, June 22, with G3GVM/A standing by to guide in visiting mobiles. The event included the usual raffle with numerous consolation prizes, and "something for the ladies and the kiddies," as always. Full details next month.

Aldershot discussed the two-metre band at a recent meeting; VHF is becoming increasingly popular among the members. More contacts in the area would be welcomed, to help them check their progress. Meetings are held fortnightly at The Cannon, in Victoria Road, Aldershot.

Clifton had a talk on May 23 by Mr. C. A. Pratt of Measuring Instruments Ltd., and on June 6 G3FBR gave his second talk on Communications Receivers. Five teams took part in the May D-F Contest, and all located the hidden transmitter. A Field Day is

arranged for July 13 and a further D-F Contest for August 10. Normal meetings every Friday, 7.30 p.m. at 225 New Cross Road, London, S.E.14.

Harrow report many new call-signs among their members, and they are preparing for the Wembley Hobbies Exhibition, in which they are taking part once more. July 11 is fixed for a Junk Sale, and July 25 for Propagation Predictions. The 4th and 18th are Practical Nights. Meeting place is the Science Room, Roxeth Manor Secondary School, Eastcote Lane, South Harrow.

Lincoln continue to meet at 7.30 p.m. on alternate Wednesdays in Room 19, Lincoln Technical College, Cathedral Street, and all interested visitors will talk on Transistor Markings, and on September 21 the Club will be welcome. On July 16 Mr. Peter Scholey will talk on Transistor Markings, and on September 21 the Club will be holding a Hamfest and Mobile Rally *(see* full details in separate panel).

Station of the Liverpool and District Amateur Radio Society during the recent Field Day, with G3JMH operating. We gather that all who took part in the event thoroughly enjoyed themselves !

North Kent send a copy of their *News Letter,* containing very full details of their recent researches into the Jennings electronic organ. On July 10 they have a Film Show, including the Mullard film "Mirror in the Sky." On August Bank Holiday, they will, by invitation, provide GB3ENT for the annual show in the Recreation Ground, Erith ; an all-band station is to be installed, with a special QSL card.

Romford hold a Junk Sale on the first Tuesday of every month, and their programme for July and August also provides for two Mobile Evenings each month. Meetings are on Tuesdays, 8.15 p.m. at R.A.F.A. House, 18 Carlton Road, Romford.

Southgate, Finchley & District report a good attendance at their May meeting (despite the bus strike), at which G2AFB gave a lecture on the Design of Modern Components. On June 12, they had a talk by G3BWQ on the 36 Set, and what is described as " a grand junk sale." Next meeting is on July 10 at Arnos School, Wilmer Way, London, N.14.

South Shields announce the results of three Club Competitions. The Transmitting event was won by G3LKZ, with G8AO as runner-up. The SWL affair went to K. Sketheway, with N. Reed in second place ; and the Constructional Competition was won by G2BCY with his GDO and Wavemeter. June events included a Junk Sale and a visit to the BBC station at Stagshaw. On July 30 G3LLI will be giving a talk on his experiences since being licensed. Meetings are on the last Wednesday of the month, at Trinity House Social Centre, Laygate, South Shields.

Stockport are getting busy on the Rally fixed for July 13 at Capesthorne Hall, near Macclesfield, of which full details were given in our last issue—*see* p.208, June. On July 16, at a normal meeting, G3AYT will talk on Receiver Alignment.

Stoke-on-Trent held their AGM and re-elected their officers ; they also reported that despite increased costs, the growing membership had put them in a sound financial position. Activity is mostly on Two Metres, with several members making regular local contacts. G3JAZ operates a portable most Sundays, using a 4-element beam. The Club Tx, G3GBU, will be looking for contacts on Thursday evenings.

Tees-Side also had an AGM, and elected new

LINCOLN HAMFEST & MOBILE RALLY

Lincoln Short Wave Club are organising a Hamfest and Mobile Rally on Sunday, September 21, at the Technical College. There will be a junk sale, high tea, competition for the best mobile, and a conducted tour of the City. Tickets, price 8s., from R. W. Sadler, 14 Hainton Road, Lincoln.

SOUTHGATE MOBILE MEETING

The next informal meeting for mobiles and portables, organised by the Southgate Group, will be on Sunday, July 13, at Wheathampstead Common, Herts., starting at 2.00 p.m. The site is reached by taking the A.1 to Hatfield, turning off near de Havilland's factory on to the road sign-posted Lemsford-Wheathampstead ; follow the sign-posting to Wheathampstead, and turn on to the road immediately beside the cricket field ; the site is about ½-mile along this road. Talk-in facilities will be available and " canteen refreshment " can be obtained nearby. An O.S. map will be helpful in finding the site, for those unfamiliar with the neighbourhood.

officers (*see* panel for hon. sec.'s QTH). They meet on alternate Fridays throughout the year at Settlement House, Newport Road, Middlesbrough. A high proportion of members are licensed, and more would-be amateurs will be heartily welcomed.

Yeovil continues to meet every Wednesday, but the Club Tx, G3CMH, has not been very active because of a shortage of operators. Members have visited many Mobile rallies, and other outside events have taken them to the GPO Station, Dorchester, and the BBC Overseas station at Rampisham. On July 9 they go to the GPO station at Somerton, and on August 23 to the GPO at Highbridge. Monthly tape lectures will be a feature from July 2 onwards. Yeovil are decidedly active, although they have only ten members; many more would be welcomed.

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE:

ALDERSHOT: S. E. Hume, 25 Kingsway, Aldershot.
BRADFORD: D. M. Pratt, G3KEP, 27 Woodlands Grove, Cottingley, Bingley.
BURY: L. Robinson, 56 Avondale Avenue, Bury.
CLIFTON: C. H. Bullivant, G3DIC, 25 St. Fillans Road, London, S.E.6.
CORNISH: J. Brown, G3LPB, Marlborough Farm, Falmouth. (*Penryn* 3263)
GRAVESEND: L. C. Bodycombe, 21 Grieves Road, Northfleet, Kent.
HARROW: S. C. J. Phillips, 131 Belmont Road, Harrow Weald.
LINCOLN: F. B. Travis, G3BCA, 202 Monks Road, Lincoln.
LIVERPOOL: W. D. Wardle, G3EWZ, 16 Mendip Road, Liverpool 15.
NORTH KENT: D. W. Wooderson, G3HKX, 39 Woolwich Road, Bexleyheath.
PLYMOUTH: H. Dean, G3KDK, Chaddlewood House, Plympton, Plymouth.
PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley, Surrey.
RINGWOOD: K. Cutler, 10A Moors Close, Hurn, Christchurch, Hants.
ROMFORD: L. S. Owen, G3MDP, 53 Applegarth Drive, Newbury Park, Ilford.
SLADE: C. N. Smart, 110 Woolmore Road, Birmingham, 23.
SOUTHGATE, FINCHLEY & District; A. G. Edwards, G3MBL, 244 Ballards Lane, North Finchley, London, N.12.
SOUTH SHIELDS: K. Sketheway, 51 Baret Road, Walkergate, Newcastle-on-Tyne 6.
STOCKPORT: G. R. Phillips, G3FYE, 7 Germans Buildings, Buxton Road, Stockport.
STOKE-ON-TRENT: W. Luscott, 36 Rothsay Avenue, Sneyd Green, Hanley, Stoke-on-Trent.
TEES SIDE: A. L. Taylor, G3JMO, 12 Endsleigh Drive, Middlesbrough.
WORTHING: J. R. Tootill, 113 Kings Road, Lancing.
YEOVIL: D. L. McLean, 9 Cedar Grove, Yeovil.

All reports for this space, which is made available to any radio club or group wishing to publicise its activities, should be addressed only: "Club Secretary," Short Wave Magazine, 55 Victoria Street, London, S.W.1, and must be received by the date given each month at the head of the article. The club honorary secretary's name (with callsign, if any) and address in full must be included, irrespective of the member who may be responsible for compiling and sending in the report; this is necessary for the name-and-address panel. Reports should give as much information as possible about future meetings, as well as a brief summary of current activities. Good photographs of club interest are always welcome to illustrate this feature.

At **Gravesend,** they go from strength to strength, with new members joining and plenty of activity. Seven members sat the recent R.A.E. and (with G3FST, who did the coaching) are now anxiously awaiting the results; in the meantime, G3JVU is running Morse classes. Meetings are each Thursday at 7.30 p.m., and are now at the Old Sun, Crete Hall Road, Northfleet.

Next meetings for **Slade** are on July 4, when there is a film show, and on July 18, when G3GVN/M will discuss mobile equipment. Club Hq. is at Church House, High Street, Erdington, Birmingham, where G3JBN is operated.

Purley have now started a more ambitious news sheet, tidily typed and bound, from which we get it that July 12 will be a big day, when they take part in the Summer Fair at the Rotary Field, Purley; G3DPW/A will be in operation, and it is hoped that most, if not all, the club members will be rallying round. On July 18, the regular meeting will be on Tape Recorders.

Ringwood are now becoming established, regular meetings being held at 23 Merryweather Estate, with film shows, Morse classes and the usual run of club activities; it is hoped to obtain its own room for the club very shortly.

At a recent meeting **Cornish** had visitors on holiday in Falmouth; as the membership is somewhat scattered, meetings are held in different centres each month, the July event being in Redruth. Visitors are asked to get in touch with the honorary secretary, who will be glad to effect the necessary introductions and give details of meeting places and times.

BBC OSCILLOSCOPE ORDER FOR E.M.I.

The British Broadcasting Corporation has placed contracts and orders valued at over £16,000 with E.M.I. Electronics Ltd., for the Type WM.2 TV Oscilloscopes, line selectors and ancillary units. This version of the WM.2 Oscilloscope has been specially designed for monitoring television waveforms, and will be used by the BBC at transmitting stations, switching centres, studios and outside broadcast units. The instrument meets all essential measurement requirements associated with sine squared pulse and the bar testing techniques which are now being widely accepted as a standard method for rapidly checking the characteristics of video transmission lines and networks.

E.M.I. COMPUTER FOR AIRCRAFT COMPANY

As an additional aid to research into guided missiles and other problems associated with high-speed flight, Sir W. G. Armstrong Whitworth Aircraft Company Ltd., has placed an order with E.M.I. Electronics Ltd. for one of the latest unit construction general-purpose analogue computers.

The computer, which will cost over £55,000, will be one of the most extensive of its type in this country and capable of studying the performance of complete new guided weapon or aircraft systems whilst they are still on the drawing board. The equipment is designed to ensure that it is easily adaptable to meet different types of problems. The various computing units will be interchangeable in a standard rack.

An important feature of the equipment being supplied is its time division, or mark-space ratio multipliers. This system has been developed by E.M.I. Electronics to a point where it compares favourably in accuracy with the conventional servo-driven potentiometer multiplier, and has none of its inherent limitations.

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TRADE

GONSET G66 MOBILE RECEIVER, 12v. DC/115v. AC; Morrow Mobile Transmitter MB560, 60w., all bands; SSB, Type 20A. Exciter, all bands; 10/160m. with VFO, 350w. PEP linear amplifier. Excellent American equipment, in first-class order, with original packings.—S.A.E.: Mortimer, 51 Townhead Road, Dore, Sheffield.

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

QSL CARDS AND ALL TYPES OF PRINTING ENQUIRIES WELCOME. — G2TN, THE NINEVEH PRESS, 116 PELHAM ROAD, GRAVESEND, KENT.

THE NEW "COMMUNICATOR" 50-WATT 2-METRE Tx, COMPLETE WITH VALVES, MODULATOR, POWER SUPPLIES, MIKE, RELAY SWITCHING, ETC., £70. SEND S.A.E. FOR DETAILS. SHORTLY AVAILABLE: 70 cm Tx.—R.E.E. TELECOMMUNICATIONS, LTD., 15a MARKET SQUARE, CREWKERNE, SOMS.

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

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

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

SSB AUDIO PHASE SHIFT NETWORKS Octal base; built with 1% high stability components; 52/6.—Reidhill Electronics, 55 Nithsdale Drive, Glasgow.

SIX-BAND Transmitter Basic Kits, 27 gns.; Geloso VFO extra, 5½ gns.; set valves, 5 gns.; complete wired and tested, 53 gns. Geloso 160m. coils and simple conversion data, 18/6; switch, 6/6. Mobile whips *(plus* carriage).—G3ATL, Hugglescote, Leicester.

READERS' ADVERTISEMENTS

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

EDDYSTONE 750 Receiver, as new, £45.—G2DON, 158 High Street, Quarry Bank, Brierley Hill, Staffs.

SMALL ADVERTISEMENTS. READERS—*continued*

SALE: Eddystone 504 Receiver, re-valved and re-aligned ; in good working order. Offers?—Simpson, 149 Broomhall Crescent, Corstorphine, Edinburgh, 12.

LIONEL BUG-KEY J-36, new, £4 10s.; Class-D Wavemeter, £5 ; 1000-750-0-750-1000v., 250 mA Transformer, £4 10s.; 700-0-700v. 250 mA, £3 ; 832 bases (new), 5/-; Eddystone 30 $\mu\mu$F two-gang HV transmitting condensers, 10/- each. DET12 valves, 10/-; 35T's, 12/6 ; PT15's, 7/6. Canadian No. 9 Set receiver, with built-in Xtal Cal., 1·9 to 5 mc, £4. MK2 Morse keys, 5/-. AVO Valve Tester, needs attention, £3. P/P extra.—G3BLN, 73 Bournemouth Road, Parkstone *(1280)*, Dorset.

SALE: BC221-AA, complete with mains power supply, £30 ; Hallicrafter receiver S-38C (550 kc-30 mc), unmodified, as new, with manual, £10. " Wee Megger," 250v., used but perfect, £5. 832 valve bases, 5/- each.—W. Bloxam, 3 Brynfield Road, Langland, Swansea, Glam.

PANDA " Explorer " Tx, 150w., new March, 1958, hardly used, £80. Exchanges considered (interested mobile gear, 10/15 metres). Lancs.—Box No. 2006, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Eddystone 680x Receiver, very little used, immaculate condition throughout, £85. WANTED: HRO Bandspread Coils.—G. Gade, 45 Belvedere Avenue, Barkingside, Ilford, Essex. *(Valentine 3589.)*

PROFESSIONALLY CONSTRUCTED 60w. CW Transmitter, 10-80m., Woden transformers, chokes, £18 ; B2 Transmitter, home-built power pack, £4 ; Top Band phone/CW Transmitter, in-built power pack (worked 91 counties), £7 ; 10w. Amplifier, 500v. power pack, £3. Buyer collects. All above, plus other equipment, £30 ; s.a.e. for complete list.—G3JKO, 39 Cliff End, Purley, Surrey.

TX TA12G and Power Pack for sale, £8; 80 and 40 metres, 60w.—32 Chestnut Avenue, R.A.F. Topcliffe, Thirsk, Yorks.

AMATEUR wishes to buy complete SSB transmitter, preferably all-band with VOX.—Details and delivery date to Box No. 2007, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

B2 COMPLETE ; PS, coils, etc., in containers ; FB condition ; first £14 secures. — G3BHT, Sandy Lane, Hightown, Liverpool. *(Tel.: Hightoun 182.)*

WANTED: Medium-wave Coils for R.A.10.D.—Price and particulars to J. Boal, 114 Tamar Street, Belfast.

TOP BAND Tx, with built-in Mod., complete with PSU, ATU and xtal mike, £11. Adm. 5G 50w. Tx, £5. R1224A Rx (mint) with PSU, £7 10s. Also valves, transformers, chokes, etc.; s.a.e. for details.—G3LGX, 49 Larch Hill, Odsal, Bradford, Yorks.

£40 AVAILABLE for " 750 " less than 1 year old, with meter.—R. Grain, 15 Waverley Gardens, Grays, Essex.

HRO DIAL, new, 15/-; HRO 6v. Vibrator pack, £2. Battery Tx/Rx, VFO/PA, 7 mc ; first £2 10s.—Loader, Buckley Barn Farm, Castleton, Rochdale, Lancs.

SMALL ADVERTISEMENTS, READERS—*continued*

5-IN. OSCILLOSCOPE, *Radio Constructor*, converted 182A unit; works well; time-base to 100 kc; £8 10s. (o.n.o.?) R1132A, unmodified, £2 10s.—Holley, 152 Leigh Road, Eastleigh, Hants.

WANTED: UM3 Multimeter Crystal Microphone (D104?), Geloso VFO 4/102, HRO coils. 17in. TV. Good price offered for good stuff. Hants.—Box No. 2008, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HALLICRAFTERS S53, as brand-new, in makers' carton, £50.—Surman, Lyncote, Coltsfoot Drive, Guildford. *(Tel.: 3628.)*

ALL-BAND Tx, 200 watts, 813 final, TZ40 mod., fully metered; no ex-Gvt.; totally enclosed. Offers invited on a cash-and-carry basis; must be sold.—G3AO *(SALE 5475).*

SX28, RESPRAYED CABINET, in good condition, nearest £25 (or W.H.Y.?). WANTED: UM2; s.a.e.—G3AAJ, Grangewood (London). *6732.*

BARGAINS (both brand-new): Panda ATU 150, £12; also Geloso 4/102 VFO and dial assy., £6. —Montford. 15 Grosvenor Road, Market Drayton, Shropshire.

WANTED: Cabinet and S-meter for AR77E; also Class-D Wavemeter.—G3BMU, 10 Perth Street, Burnley, Lancs.

HRO, new front end (6BA6's), power supply, S-meter, matching speaker, four coils, 160 to 10 mtrs., £25 (o.n.o.).—B. Watkins, 7/1 Lees Street, Winson Green, Birmingham, 18.

WANTED URGENTLY: "Doorknob" Valves, 703A or 368A.—G3FUL, 18 Newark Road, Luton, Bedfordshire.

SALE OF VALVES.—Some used but good, mostly new, several of each. At 1/6: VT52, 6X5, DK32, 6B7, 43, 78E, VR136, V3137, VT131, 6D6, 6C6, 1C7, EF36, 42, 954, EF50. At 3/-: 12SH7, KT8, 807, 4A10, VS110, CV105, 12SQ7, 6X5GT, 6J7G, 7475, 6AL5, 25SN7GT, 6J7M, 6SL7. At 5/-: 5Z4M, SU4G, 12AU7, 12AT7, 12AX7, 6BA6, ECC91, EF55, 6V6GT, 6SJ7M, VR150/30, VR105/30, OA3/VR75. At 7/6: U19, 35L6, 6K6GT. At 15/-: NU13A, 12E1. At 10/-: E742. Q5'er, less 12K8, 30/-. 0-100 micro-ammeter (Weston), 17/6. Thermo-ammeters (Weston 0-2A), 7/6. 0-500 mA, 0-350 mA, 0-4 amp., at 5/- each. Electrolytics, 100 μF 450v., 32-32 μF 350v., 4/- each. Hundreds of 50- to 120-watt W/W resistors at 12/- dozen. P.O. relays average 5/- each. Hundreds of good components at low prices. Please add postage.—G3FYS, Walcot, Pine Glen Avenue, Ferndown, Dorset.

PARTLY-BUILT Tx, valved, Geloso VFO, pair 807's, 6V6 BA, VR150/30 Stab., PA and grid meters, pi-output, conds., pots., etc., all wired in aluminium cab., chassis cut for modulator, £11. Type 247 power pack, 580v. 200 mA, 6·3 3A, £2 10s. Transformer, 500v., £1. Modified TE-149 Wavemeter, calib. charts for 1·5 mc-7 mc, range 1·5-30 mc, 1000kc xtal, £4.—G3KFY, Old Orchard, King's End, Powick, Worcester.

PANDA EXPLORER, two months old, little used; owner going abroad; nearest £85 secures.—Box No. 2009, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

XTALS, 10x Type, 464 kc, 6/-; dummy loads, 7/6; 365 $\mu\mu$F transmitter condensers, 7/6; Labgear SWR bridge, £2; Xtal marker 10-100-1000 kc, 3 spare valves, no P/S., £3 10s. All above new. Other gear; s.a.e. lists.—G3IDW, 136 Beech Avenue, Swindon, Wilts.

WANTED: Coils for HRO Senior, 1·7-4 mc GC, 14-30 mc GC, 20-metre BS, 10-metre BS. State condition and price to: GM3JQL, 12 Glendevon Road, Perth.

AR88, very good condition, with handbook; ex-G3HCL; nearest £40. You collect or pay carriage.—Apply: G3JAF, Lynwood, Everton Road, Hordle, Lymington, Hants.

WANTED: Spin-wheel tuning drive from Hallicrafter Sky Champion; or would purchase complete receiver in any condition.—York, Square and Compass, Windmill Hill, Illminster, Somerset.

EDDYSTONE 888 for sale, mint condition, £80. Owner bought 888A.—Box No. 2010, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Eddystone, AC-DC, 840A, Communication Receiver, perfect; BBC headphones, whip aerial; prefer buyer collect; £40.—Peach, 8 Mafeking Street, Colwick Road, Nottingham.

PANDA CUB, perfect, press-to-net, £45 (o.n.o.); owner going QRT. Will deliver reasonable distance.—G3HEE, Kynance, Doughty Street, Stamford, Lincs. *(Phone: Stamford 3621.)*

AIRMEC Communications Receiver C864, as new (sealed carton by maker), £70 (o.n.o.).—(MP4BCA), D. McGregor, 57 Colne Road, Brightlinsea, Essex.

SSB EXCITER, complete with linear amplifier, for sale; HRO receiver, complete with bandspread coils; Goodman's twelve-inch in bass reflex cabinet; £5.—*Phone Daventry 351.*

OFFERS? 160/20m. Tx with p/pack and Class-B mod, with p/pack. Army 12 Set. Space required.—Write for particulars to Box No. 2011, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

RF26, 18/-; RF15, 9/-; RF24, 11/-. Brand-new in original cartons. Postage 3/6. — Jay, 69 Church Road, Moseley, Birmingham, 13.

COMPLETE STATION FOR SALE (or will exchange for 500-twin motor-cycle). Panda Explorer, AR88D, with S-meter and speaker, Class-D Wavemeter, 6v. AC; packing cases with above.—Offers to: Cpl. Exra, U.K. Comcan Signals Regiment, Droitwich, Worcs.

EDDYSTONE 750, with matching speaker and S-meter; excellent condition; £45 or offers?—G3FAU, 23 Shackledell, Stevenage, Herts.

BC221 FOR SALE; good condition; with power supply and handbook; £30. Also professional-type Tape Recorder, full facilities, £60.—Box No. 2014, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

LINEAR AMPLIFIER required, 3·5 to 30 mc.—Details to Box No. 2012, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: LG.300, complete companion Power Unit/Modulator and LP Filter, £90. — G3KLL, 9 Epping Street, Hulme, Manchester, 15.

ENTHUSIAST SELLING UP. — Valve-tester (Taylor Model), 45c., still in maker's carton; cost £30; accept £10 10s. Partridge transformer, 400-0-400v. 250 mA, 5v. 2A, 5v. 2A, 6·3v. 4A, 4v. 4A, 30/-. EHT transformers, 5000v. 5 mA, 2v. 2A, 4v. 1A, 25/-. 2·5 kV-0-2·5 kV twice at 15 mA, 30/-. Communication Receiver CR300/1, 15 kc-25 mc continuous in 8 bands, filter and crystal calibration, separate mains power pack, £12. Bendix Transmitter, £2. 0-150v. DC 6in. meter, 12/6. 0-100v. AC 6in. meter, mirror scale, 15/-. Variac Transformer, 0-230 input, 0-270 output at 2 amps. cont., £2 10s. Complete set *Radio and Television Servicing*, 8 vols., unused; cost £14; sell £4 15s. No reasonable offers refused, but please include carriage for heavier articles. Host of components going cheap; s.a.e. for list.—Box No. 2013, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

RX/TX-Type CNY-1, brand-new and unused; 9 valves; £15 (o.n.o.).—Smith, 16 Whittingstall Road, London, S.W.6.

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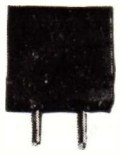

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163.9 Kc/s. 819.6 Kc/s. **15/-** each

CERAMIC 2-PIN BANANA PLUG
15,010 Kc/s.; 16,135 Kc/s.; 16,435 Kc/s.; 18,025 Kcs.; 15,110 Kc/s.; 16,335 Kc/s.; 16,700 Kc/s.; 18,125 Kc/s
7/6 EACH

465 Kc/s. 2 Pin Type 7 12/6 each

MARCONI, S.T.C. 2 PIN 10X FUNDAMENTALS IN KILOCYCLES

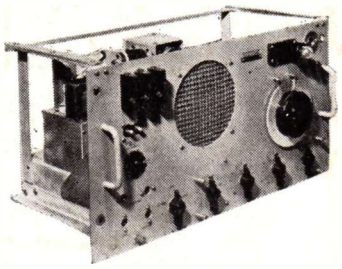
1183	1575		2315	10,233	10,823
1205	1588.68	1875	2430	10,245	10,856
1324.5	1613.25	1930	3270	10,300	10,878
1352.5	1650	1981	3310	10,433	11,437
1384	1668.2	2055	3317.5	10,445	11,501
1405	1674.9	2065.75	3390	10,501	11,526
1408.5	1680	2067.5	3440	10,511	11,587
1550.62	1680.5	2087.5	3630	10,534	11,751
1554.4	1700	2089	3850	10,545	11,788
1561.1	1727	2118.25	3920	10,557	11,814
1565.62	1740	2196	4210	10,567	11,851
1655.75	1764.5	2261	4860	10,622	11,876
1570	1775	2295	10,166	10,755	12,685
1570.75	1780	2312	10,189	10,767	
1572.5	1815				

7/6 each

SHORT-WAVE COMMUNICATION RECEIVER

10-60 Mc/s (5-30 Metres) RECEPTION SET TYPE 208

I.F. FREQUENCY 2 MC'S.



Complete with 6 valves, 2-6K8G, 2-EF89, 6Q7G and 6V6G. Internal mains and 6v. vibrator pack. Built-in 6½" P.M. speaker. Muirhead slow motion drive. B.F.O. and R.F. stage. Provision for 'Phones and Muting and 600 ohms line combined input, 100/250v. A.C. or 6v. D.C. All sets in new condition and air tested.

£6. 19. 6

Carr. 15/6

Size: 24 x 18 x 12. Weight 80 lbs. (including Transit Case)

WALKIE/TALKIE TYPE 38 TRANSMITTER RECEIVER

Complete with 5 Valves. In new condition. With circuit. These Sets are sold without Guarantee, but are serviceable. **22/6** p.p. 2/6

H/Phones 7/6 pair. Junction Box, 2/6. Throat Mike, 4/6. Canvas Bag, 4/-. Aerial Rod, 2/6.

TRANSMITTER/RECEIVER, Army Type 17 Mk. II

Complete with Valves, High Resistance Headphones, Handmike and Instruction Book and circuit. Frequency Range 44.0 to 61 Mc/s. Range Approximately 3 to 8 miles. Power requirements: Standard 120v. H.T. and 2v. L.T. Ideal for Civil Defence and communications.
BRAND NEW
Calibrated Wavemeter for same 10/- extra. **59/6**
(also may be purchased separately)

TEST EQUIPMENT. U.S.A.
R.F. WATTMETER TS/-87/AP
3 position 0-10/15/30 watts

Complete with photo-cell, 2 spare lamps and leads, with transit case.
BRAND NEW £10/10/0. P.P. 7/6.

WAVE-GUIDE WATTMETER

Type W8921 10 cm. Complete in transit case. BRAND NEW, £5/10/-. P.P. 7/6.

RT10/APS-3

3 centimetre Radar Unit complete with 725A Magnetron 2-723A/B's 2-6AC7's. 724A and 1N23 pulse trans, etc. BRAND NEW in carton, £10/10/-.

PYE 45 Mc/s STRIP **TYPE 3583** **39/6**

Complete with 12 valves: 10 EF50, 1 EB34 and 1 EA50. Including modification data. New Condition. **ABSOLUTE BARGAIN!**

RF UNITS

TYPE 25 (switched) Tuning 20 to 30 Mc/s. Includes 3 SP61's. Carriage 2/6 **10/-**

TYPE 26: Variable tuning, 50 to 65 Mc/s. Including 2 EF54's and 1 EC52. Carriage 2/6. **25/-**

INDICATOR UNIT TYPE 247

R.F. POWER WATTMETER. Complete with large 1 MA Meter, Magic Eye indicator; 2 EF50 diodes and rectifiers. Inputs:—12v.; 80v. D.C. or 100/240v. A.C., 50 c/s. **£4. 19. 6**

EVERSHED WEE MEGGERS

500v. Brand New with leather case	£12. 10. 0
500v. New Condition with leather case	£8. 19. 6
100v. New Condition with case	£6. 0. 0

JUST ARRIVED! MIXER UNIT TYPE 79

Frequency Range 172 to 190 Mc/s.
Comprising:—VCR 139A tube; 7, EF50; EF55; 4, EA50; 5U4; VU120; EC52 and 2, EB91. Standard mains input 200-250 volts, 50 c/s. Carriage 5/-. **£5. 10. 0**

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Send for our FREE VALVE LIST which contains many "unobtainable" types. Also ask for the Free Transistor Components List and Suggested Circuits.

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