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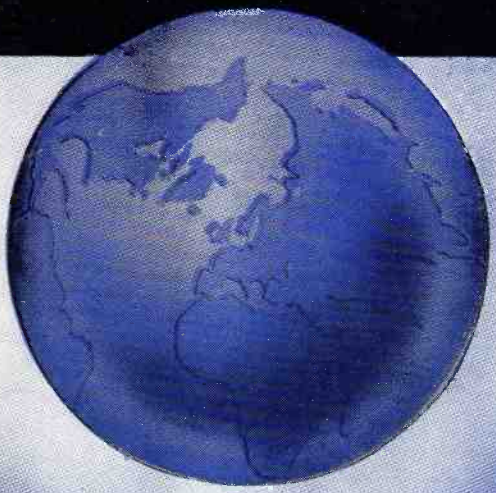
The SHORT WAVE Magazine



EXCLUSIVELY FOR THE RADIO EXPERIMENTER & TRANSMITTING AMATEUR

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The SHORT WAVE Magazine
FOR THE RADIO AMATEUR AND AMATEUR RADIO

EDITORIAL

Progress

It being accepted that amateurs are those who indulge in some hobby or pursuit simply because they are interested in it for its own sake, it follows that their approach is individual and therefore possibly unorthodox. In no instance is this truer than in the amateur approach to radio. It also happens that radio is one of those sciences to which amateurs have made a large, important and lasting contribution.

Progress is largely the result of enquiring minds questioning existing theories, or refusing to be content with established doctrine or practices.

On the other hand, much amateur effort is wasted effort because, unknowingly on the part of the individual, it is directed to re-finding data which is already established. Nevertheless, this is in itself a valuable exercise for the individual, for at least it teaches something which is new to him. The books cannot possibly teach everything, and much must be found out by personal experience and experiment.

In the field of Amateur Radio, there cannot be too much of this process of personal investigation along unorthodox lines, for it is the essential basis of progress. Amateurs are concerned mainly with getting a result, and it is of no great importance if the practical application of their ideas is not in accordance with current theory.

Austin Forbes G6FO.

Modifying the BC-625A for Two Metres

CIRCUIT DETAILS AND WIRING CHANGES

By **F. E. WINGFIELD (G2AO)**

The SCR-522 and its component units, the BC-624A and BC-625A, have always been in good supply, and many of the transmitters are in operation on Two Metres in virtually an unmodified condition. This article gives very complete information on the circuit of the BC-625A — the SCR-522 transmitter section—and describes in detail a number of the changes that can be made to improve it.—Editor.

THIS article is prompted by remarks heard over the air, and in conversation with a number of people, about the BC-625A. It seems to be generally felt that a lot of work is required on these units, that anyway they do not look very neat, and that they are not too efficient.

Not everyone has come across this set, and quite naturally many people will not know very much about it. The equipment now on the market is not a transmitter/receiver, as some have been led to believe. The SCR-522 is a transmitter and receiver, the BC-625A and BC-624A respectively, both units being mounted in one case. What has often been advertised as the SCR-522 is, in fact, the BC-625A.

Description

This equipment covers the frequency band 100-150 mc; this means that the 144 mc band is near the end of the tuning range, and as the condensers have only a 90° rotation, the band is rather cramped.

Four stages are employed in the RF section of the transmitter: a crystal-controlled oscillator (6G6G), first tripler (12A6), second tripler (832) and power amplifier (832).

The oscillator valve is connected in a well-known type of Pierce circuit, in which the grid, screen and cathode are used in the oscillatory circuit and the anode, which is electron-coupled to it, is tuned to any harmonic of the crystal employed. In this case, the fundamental frequency of the crystal is between 8 and 8.111 mc, and the tank circuit, consisting of coil 118 and condenser 114, is tuned to 16 mc. *(Note that in this description, all parts are numbered in accordance with the original circuit diagram).*

The oscillator output is coupled to the first tripler (12A6) by condenser 104. The plate circuit of this valve, consisting of coil 119 and condenser 115, is tuned to 48 mc. Bias is obtained from the bleeder, resistors 146 and 147, across the −150 volt line and should be −40 volts. The plate voltage is taken to the centre tap of coil 119. The RF voltages appearing at the ends of this coil are in correct phase for alternately exciting the grids of the push-pull second tripler.

The output of the 12A6 is coupled to the grids of the 832 second tripler by condensers 109-3 and 109-4. Bias is obtained partly by resistors 132-1, 132-2 and the negative line. The tank circuit consists of coil 120 and condenser 116; it is tuned to 144 mc.

The power amplifier uses another 832 connected in push-pull, and it is coupled to the second tripler through condensers 109-1 and 109-2. The output tank circuit consists of coil 121 and condenser 117; this coil is split in the centre to allow the aerial coupling coil 122 to be inserted.

This completes the RF section and leaves only the speech amplifier, a 6SS7, and the push-pull modulator using two 12A6 valves.

The speech amplifier has a balanced bridge circuit between the microphone transformer and its grid, which is part of the original "intercom" circuitry and can be ignored. The microphone transformer is suitable for a carbon or dynamic microphone; the gain control is across the secondary. The anode of this stage is fed through an LF choke (126) and is coupled to the primary of the interstage transformer by condenser 113. The secondary is connected to the grids of the push-pull modulator valves (12A6's). Grid bias, −13.5 volts, is fed to the centre tap from the negative line. Condenser 109-5 is used to level the frequency response of the amplifier.

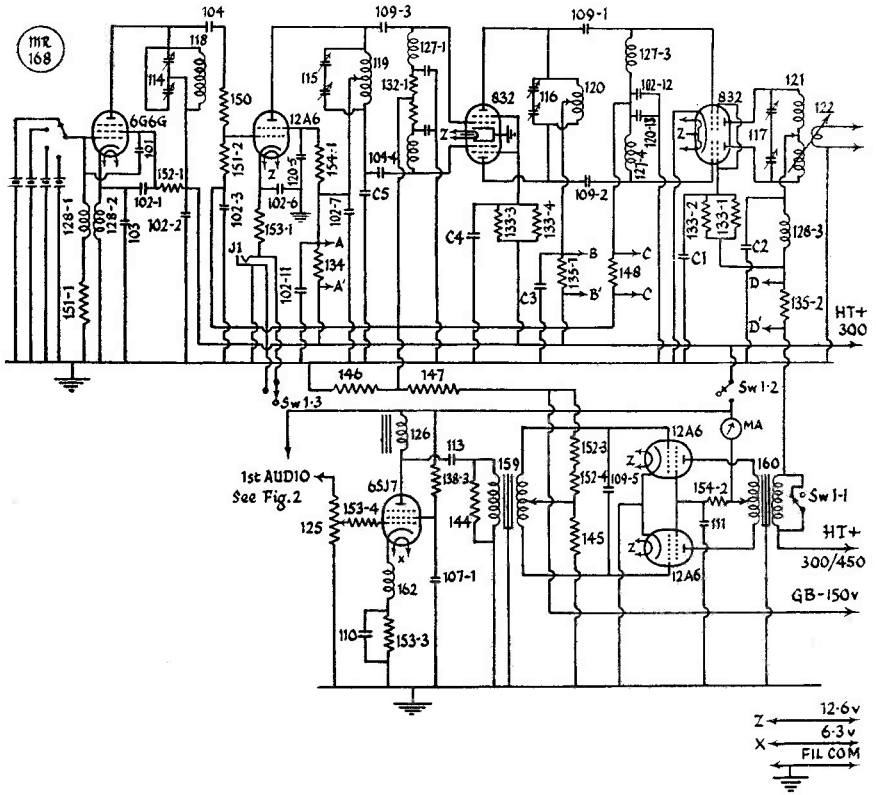


Fig. 1. Circuit complete of the BC-625A, transmitter unit of the SCR-522, with circuit elements numbered in accordance with the original Service annotation, except where stated. All values can be checked by reference to the accompanying table.

Table of Values

Condensers

101	=	10 $\mu\mu$F $\pm$0.5 $\mu\mu$F ceramic
102-1 to 102-15	=	.006 μF 300 v.d.c. mica
103	=	50 $\mu\mu$F $\pm$ 1% 500 v.d.c. silver mica
104	=	100 $\mu\mu$F $\pm$ 5% 500 v.d.c. ceramic
105-1 to 105-3	=	.001 μF 400 v.d.c. mica
107-1	=	.1 μF 400 v.d.c. paper
108-2	=	.001 μF 500 v.d.c. mica
109-1 to 109-5	=	20 $\mu\mu$F $\pm$ 1 μF ceramic
110	=	1.0 μF 100 v.d.c. oil-paper
111	=	0.5 μF 400 v.d.c. oil-paper
113	=	.003 μF 500 v.d.c. mica
114	=	Variable 65.5 $\mu\mu$F
115	=	Variable 27.0 $\mu\mu$F
116	=	Variable 16.5 $\mu\mu$F
117	=	Variable 11.0 $\mu\mu$F

Resistors

125	=	1 Megohm Potentiometer
132-1 and 132-2	=	25,000 ohms, 1 watt
133-1 to 133-4	=	40,000 ohms, 1 watt
134	=	1.53 ohm
135-1 and 135-2	=	0.76 ohm
135-3	=	1 Megohm, 1 watt
140-2 to 140-4	=	50,000 ohms, 1 watt
141-1 to 141-4	=	1 Megohm, $\frac{1}{2}$ watt
142	=	5,000 ohms, 1 watt
143-1 and 143-2	=	82 ohm, 1 watt
144	=	250,000 ohms, $\frac{1}{2}$ watt
145	=	15,000 ohms, 1 watt
146	=	6,000 ohms, 1 watt
147	=	18,000, 1 watt
148	=	75 ohm, 1 watt
150	=	50 ohm, 1 watt
151-1 and 151-2	=	50,000 ohms, 1 watt
152-1 to 152-4	=	50,000 ohms, 1 watt
153-1 to 153-4	=	2,000 ohms, 1 watt
154-1 to 154-3	=	5,000 ohms, 1 watt
158	=	Microphone transformer 45.7 : 1
159	=	Interstage transformer 1 : 2
160	=	Modulation transformer 2 : 1
162	=	Choke 38 turns 28 SWG enamel

Additional Components

C1, C4	=	.006 μF 500v mica
C2	=	.001 μF 1000v mica
C3	=	.001 μF 500v mica (105-4, *see text*)
C5	=	10 $\mu\mu$F ceramic
J1	=	Open circuit jack (key)
J2	=	Closed circuit jack (mic)
Sw1	=	3p. 2w. (Phone/CW)

When the (normally open) relay 131 is energised, the output of the modulators is fed back to the speech amplifier input circuit through resistors 140-2, 140-3, 140-4 and condenser 108-2 to produce an audio tone of approximately 1000 c/s. This is used to modulate the power amplifier under certain circumstances.

In some models there is an extra valve, a 6SS7, which is connected as a diode rectifier and samples the RF output, feeding a DC voltage back to the meter switch to give an arbitrary indication of output.

Modifications

The author wanted a 2-metre transmitter which did not look like surplus equipment externally, and considered that the 522 transmitter was worth dressing up. As a result, a panel was put on the unit, and all controls, except tuning, were brought out to the front.

When these transmitters are purchased, they are usually stripped of a number of the following components:— Meter switch, microphone transformer, modulation transformer, LF choke, both relays, RF chokes 128-1 or 128-3. Most of these can be purchased as required.

The filaments are wired for 12.6 volts. In the set where there is no RF indicator, the 6G6G crystal oscillator is connected in series with the 6SS7 speech amplifier. When there is an RF indicator, it is in series with the crystal oscillator and the 6SS7 speech amplifier has a series resistor in its heater.

There are three possible modifications here. If all the right valves are available, use a 12.6 volt heater supply—two 6.3 volt windings in series. The 6SS7 and 6G6G are likely to be difficult to obtain, in which case a 6V6 can be used in place of the 6G6G (also the 12A6) and the 6SS7 replaced by a 6SJ7; the 832 heaters are connected in parallel, and the whole unit run off a 6.3 volt supply. The third possibility is to do as the author has done—that is, to bring both 6.3 volt and 12.6 volts into the unit. A 6G6G was available, but no 6SS7; so the valves used, 6G6G and 6SJ7, could not be wired in series owing to the different heater current. In addition, an extra stage of audio was required.

In the set there were four crystal positions; it was decided to utilise them, so a 4-way switch was mounted just below the position of the old meter switch and alongside the crystal panel. The old switch and wiring were scrapped. If this switch is not taken out, one of the tuning mechanism rods must be fixed in the "in" position and that crystal position used. If only one is required, it is best to wire up one position only, with the other holders retained as spares.

The meter switch was one of the

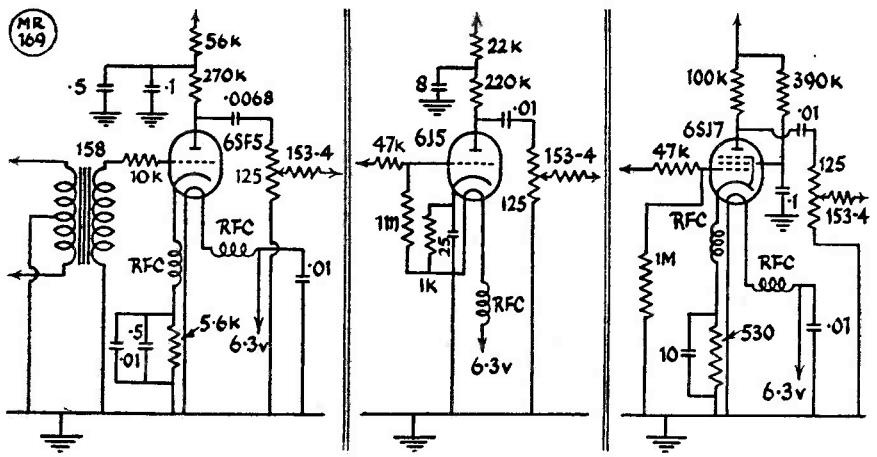


Fig. 2. Three possible methods of wiring in the additional speech amplifier, depending upon what type of microphone and 1st audio stage valve are to be used. In each case, RFC is 20 turns of No. 28 SWG enamelled wire on a 1-watt resistor as former.

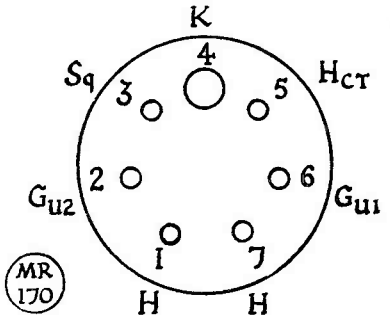


Fig. 3. Base connections of the 832 used in the BC625A.

missing items, so a double-pole five-way switch was put in the top of the speech amplifier section and the cable—which had been cut short—was pulled back through the bulkhead and was then just long enough.

The audio gain control was taken down under the main chassis and brought out to the front panel and all surplus components removed. Otherwise, if a carbon microphone is used, the audio side can be left as it is.

With a crystal microphone, an extra audio stage is necessary, and Fig. 2 shows circuits which may be used, dependent on the output of the microphone. In the author's case, a triode amplifier was found to be sufficient.

The audio choke 126 can be left in or replaced by an anode load resistor. The leads are rather long to the choke.

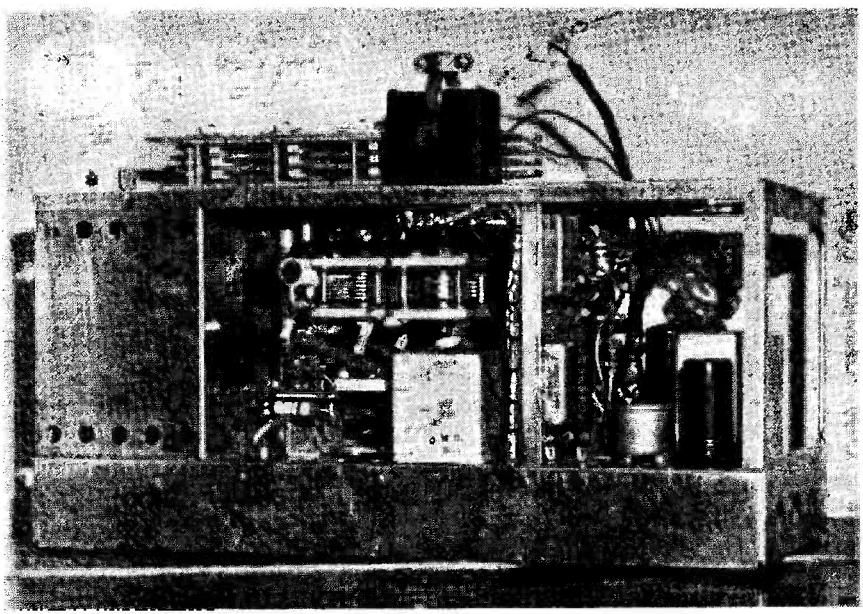
A microphone jack, key jack and Phone/CW switch were added.

Wiring Changes

Remove resistors 140-2, 140-3, 140-4, 141-1, 141-2, 141-3, 141-4 and 142, and condensers 105-3, 108-2, 102-14 and 102-15, together with all associated wiring.

Take the yellow lead (shielded) from the junction of the two 40K resistors 131-1 and 131-2 and connect it to the end of 152-1, to which are attached orange/red and blue leads. This point is the HT + and avoids the screens of the second tripler being supplied by a modulated voltage.

Remove the yellow screened lead



Rear view of the BC-625A, which is the transmitter section of the SCR-522, showing the additional audio stage as suggested by G2AO (*see* Fig. 2).

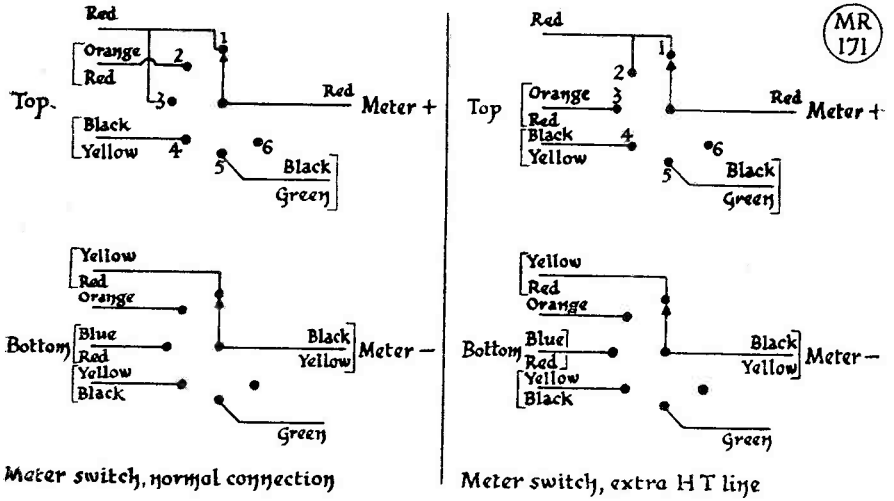


Fig. 4. The switching detail referred to in the text. The colour codings will identify the leads.

running from resistor 140-3 to the anodes of the 12A6 modulators; this takes off the audio feed circuit. If they are in the circuit, remove the relays 161 and 130, together with associated wiring.

To obtain both filament supply voltages, bring in the 6.3 volts to pin 5 of the Jones plug and run it down through the cable form to a tag point under the chassis; from this point a lead is taken to the extra audio stage, the latter *via* pin 6 on the inner 12A6 modulator. Take the brown lead off the 6G6G filament and earth this pin; the other side (brown/white) returns to the above pin 6. (This filament change only occurs in the model without the RF indicator valve).

With the RF indicator model, the following filament wiring changes are recommended if a 12.6 and 6.3 volt supply is used. Remove the brown lead running between pin 2 of the 12A6 and pin 7 of the 6G6G or pin 7 of the 6SS7 RF indicator and connect to the 6.3 volt supply. Remove resistors 143-1 and 143-2 and connect the lead running from pin 7 of the 6SS7 second speech amplifier to the 6.3 volt supply.

If 6.3 volts are used throughout, these details still hold, but all leads should connect through to the original positive filament supply, which is on pin 2 of the Jones plug 123-2; from this point it runs first to the power amplifier socket and then branches out. Now both 832 valves have to be changed over to 6.3 volt heater operation. This is done in both cases by joining pins 1 and 7 together, disconnecting pin 1 from earth, leaving condensers 102-10 and 105-1 earthed and joining pin 5 to earth. Fig. 3 shows 832 socket connections. This covers all possible variations of filament wiring.

Most of the remaining work is the adding of by-pass condensers, which greatly improve the efficiency the unit. These are discussed below.

Power Amplifier

The screen should be by-passed with a .006 μF mica condenser C1, which is soldered directly from pin 3 of the 832 valveholder to earth. The anode is by-passed by C2, a .001 μF 1000v wkg condenser (mica). This condenser is fixed to the top of the amplifier compartment and is wired from the coil side of the RF choke 128-3 to earth.

2nd Tripler

The anode of this stage is by-passed with C3 which is a .001 μF 500v wkg mica; this is also done in the amplifier compartment at the point where the tank circuit anode tap comes through from below chassis. This condenser is present in some models and is numbered 105-4. C4 is the screen by-pass con-

denser for this stage; it is fixed on to the screen resistor group board beside the valveholder; the value is .006 μF 500v wkg mica.

It will be noted that the drive to the second tripler, measured on each grid resistor, is unequal. This was found to be due to the output capacity of the 12A6 first tripler across one half of the tank circuit, so a 10 $\mu\mu$F condenser, C5, was wired between the free end of the tank circuit and ground; this cured the discrepancy in the drive. The output capacity of the 12A6 is 9 $\mu\mu$F, and one or two condensers should be tried to find the optimum value, as wiring variations at this frequency, 48 mc, can have a considerable effect on the circuit capacity.

A key jack is wired into the cathode circuit of the 12A6 tripler. This is also connected to the Phone/CW switch which shorts it in the phone position. In the CW position, the key jack is open, the modulation transformer secondary is shorted, and the HT to the audio section opened.

HT Line Changes

The only change which is considered necessary is that of providing a switch to short the modulation transformer, as mentioned above. The other changes can be adopted if desired.

As an extra hole was available on the panel used, an 0-200 mA meter was put in to measure the current to the two modulators, and wired to measure the anode current only. This means putting in a two-point soldering tag to provide a tie point for separating the anodes from the rest of the circuit and for the meter wires.

The 832 final amplifier can be run at a higher anode voltage than the 300 actually used in the set, with advantage on CW. To do this it is necessary to run a separate lead to the anode of the final amplifier. Even if it is not wanted immediately, it is as well to do this whilst the cable forms are undone. The wiring changes can be traced from the circuit diagram, Fig. 1. Pin 4 on the Jones plug is used for the extra HT line, the lead running from the oscillator coil being removed and replaced on pin 3, the positive 300 volt line. If this HT line is put in, a change is necessary on the meter switch; if the original switch is in, the top wafer contacts 1 and 2 are tied together instead of 1 and 3, while the red lead goes to pin 1 or 2 and the orange/red lead to pin 3.

For the convenience of those BC-625A owners whose meter switch had been taken out, a circuit of both meter switches is shown in Fig. 4, together with the lead identification colours.

A list of components is given using the original numbers; the additional components are given separately.

Amateur Built Broad Band Couplers

DESIGN AND CONSTRUCTION

By **REV. F. NESS, M.A. (G3ESV)**

The convenience of using broad band couplers in low-power transmitter circuits and driver stages is well worth the consideration of those interested in the design of compact equipment, if only for the reason that variable tuning controls can be eliminated. This article gives all the necessary information for the construction of broad band coupler units for use on 3.5, 7 and 14 mc, and explains clearly the method of adjustment and setting up.—Editor.

THE present-day trend in transmitters is definitely away from the big rack-and-panel jobs, with their impressive rows of dials and meters, and towards less elaborate and bulky apparatus. The ideal amateur transmitter is probably the table-top design, with at the most two tuning controls (VFO and final) and a plate current meter. This will enable rapid QSY without the need for re-setting three or four condensers in order to keep the grid-drive constant.

There are two particular ways in which the number of controls on a transmitter may be reduced. One is to follow receiver practice and gang the tuning condensers of the VFO and doubler stages, so that altering the VFO frequency tunes all the other stages (except the final) at the same time. This

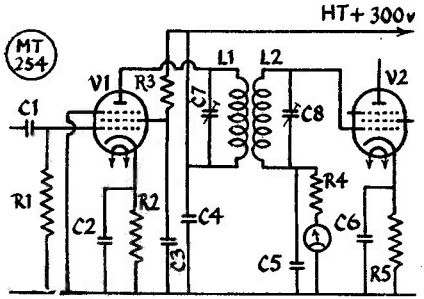


Fig. 1. Test circuit originally used by G3ESV for investigating broad band couplers in low power circuits. L1, L2 are the coupler windings, fixed-tuned by C7, C8 and the optimum degree of coupling between L1, L2 was determined by the reading obtained on the meter in the grid of V2 for a given input at the grid of V1.

method is sound in theory and has been used in the past, but the constructional difficulties are not inconsiderable. To ensure good tracking, coil values are critical, and the mechanical problems connected with ganged tuning condensers put an extra strain on the constructor's ability. On the whole, that method is best left to the experts.

The other approach is to employ circuits which need no tuning at all, once they have been adjusted to the correct frequency range. Here again one is adopting receiver design—for the intermediate frequency transformers of the superhet work in just this way. They are so constructed as to pass a small band of frequencies centred on the intermediate frequency. The difference is that for receiver purposes the IF transformers are designed to be as selective as possible, *i.e.* to pass a narrow band of frequencies only and to reject sharply all frequencies outside that band. For use in the doubler stages of a transmitter, on the other hand, rather broadly tuned circuits are called for, so that an entire amateur band—say from 3.5 to 3.8 mc—is passed with uniform response. It is the purpose of this article to show how such broadly tuned circuits can be designed and adjusted under working conditions.

Checking the Theory

As a preliminary, a test circuit was built on an old chassis, just to find out how these couplers really work (Fig. 1). The valves actually used were a pair of 6AG7's, arranged so that V1 is a straight

Table of Values

Fig. 1. Circuit arranged for testing Broad Band Couplers

C1, C2, C3,
C4, C5, C6, = 0.01 μF moulded mica
C7, C8, = 30+30 $\mu\mu$F rotary disc type twin ceramic trimmers (or similar)

R1 = 50,000 ohms
R2, R5, = 220 ohms
R3, R4, = 22,000 ohms
} All ½ watt

V1, V2, = 6AG7
Meter = 5 mA full scale.
L1, L2 = See coil table.

buffer, with V2 coupled to it by the broad-band coupler under test. An 0-5 mA meter in the grid of V2 provided a ready means of checking the performance of the coupler. The circuit itself is, clearly, identical to the IF stage of a superhet. The actual band-pass couplers can be made out of all sorts of odds and ends once the general principles have been grasped. The one illustrated had a block of polystyrene as a base, on which to mount the twin ceramic trimmers and the coils. These latter were wound on pieces of Denco ribbed coil formers, 1⅛ inches diameter (type No. IF/1000). The lower coil former is cemented to the base with coil dope (the usual solution of polystyrene in benzine) after winding. A strip of stiff paper some 6 inches long is then rolled into a small tube and slipped inside the

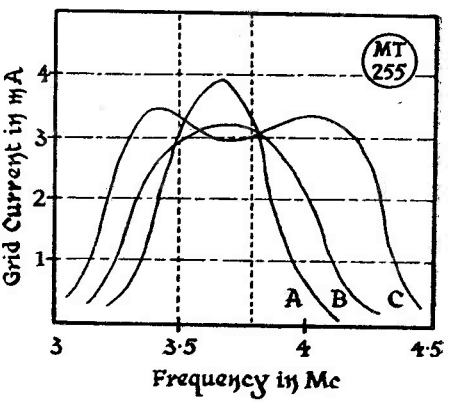
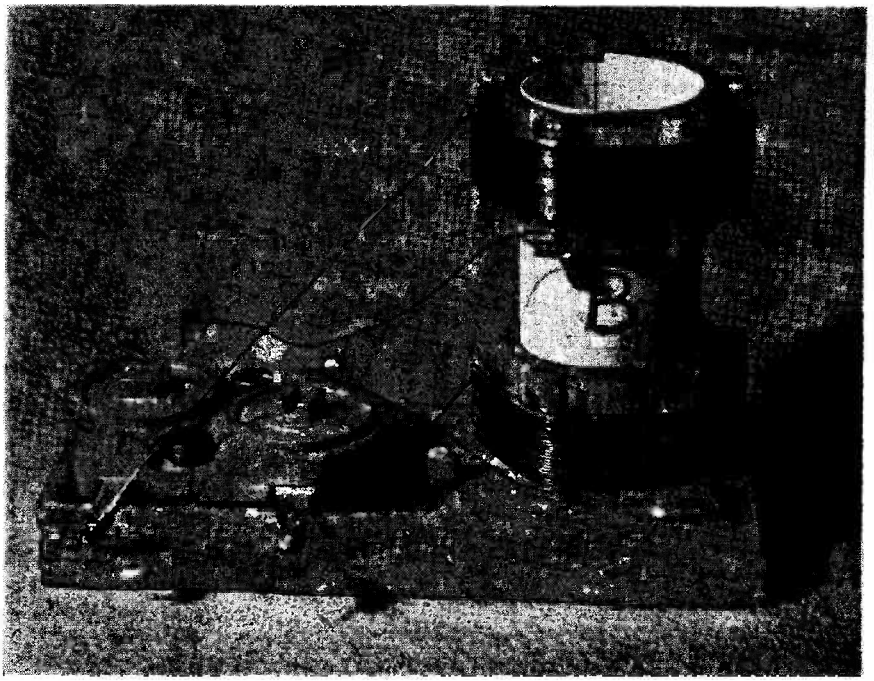


Fig. 2. These curves are of grid current against frequency in terms of band-width and show how changing the degree of coupling between L1, L2 in Fig. 1 affects the response. Taking 3.65 mc as the reference frequency, curve B indicates the correct degree of coupling for level drive conditions over the 80-metre band; in curve A the circuits are under-coupled (too "sharp") and in curve C they are too tightly coupled, giving the double-hump tuning effect.



A coupling unit as described by G3ESV. Compare with the sketch in Fig. 4.

lower former. The upper coil is then wound on to its former, and this makes a nice push fit over the paper tube. All this may sound very complicated, but it is essential that the spacing (and hence the mutual inductance) between the coils, be variable over a fairly wide range—and this is just one way of doing it. Any other form of construction which permits the spacing between the windings to be varied, would be equally satisfactory.

Practical Tests

With the completed 80-metre BPC installed on the test-chassis, the "force output" of 1 volt from a signal generator was applied to V1. The frequency was set to 3.65 mc, this being the mid-band point. The top coil was then pushed up to give maximum spacing—about 1½ inches between coil centres. In this position, the two coils are very loosely coupled and the mutual inductance is at a minimum. The circuits were peaked to resonance by means of the trimmers, both of which tuned very sharply. The signal generator was then swung over the range 3 to 4.5 mc, and a graph was drawn showing grid current to V2 against frequency (Fig. 2A). The result is what one would expect—a sharply peaked response curve, very like that of an IF transformer. The upper coil is now slid down on its former about half-an-inch, and the signal generator is again swung over the same range. This time the curve is flatter, because the grid-current variation over the range is less.

A spacing can be found in which the grid current stays reasonably constant over the full width of the 80-metre band, and falls off at the edges fairly rapidly (Fig. 2B). This is the correct spacing between the coils.

Note that at no time is it necessary to *re-tune* the circuits—the broad-banding is achieved simply by altering the spacing between the two coils. Just for the sake of it, the two coils were moved very close together—almost touching—and the familiar double-humped curve resulted (Fig. 2C). For

TABLE OF CONSTRUCTIONAL DETAILS FOR BROAD-BAND COUPLERS

RANGE A, 3.5 to 3.8 MC
Coils L1, L2, each 45 turns No. 30 SWG enamel close-wound on Denco ribbed polystyrene formers, diameter 1⅛ ins.
C7, C8=30$\mu\mu$F ceramic trimmers, disc type, either twin or two singles.

RANGE B, 7 to 7.5 MC
Coils L1, L2, each 22 turns No. 30 SWG enamel close-wound as above for range A.
C7, C8=as for range A.

RANGE C, 14 to 15 MC
Coils L1, L2, each 9 turns No. 30 SWG enamel, close-wound as above for range A.
C7, C8=as for range A.

our purposes, this setting is no use. because the band-width is too great. and there is a drop in response at the mid-band frequency.

Another Approach

After testing all the coils in this way, a different method of adjustment was tried. Both coils were wound on a single former at the spacing that was found to be optimum, and an attempt was made to secure the desired degree of coupling by tuning the two trimmers, one near the low edge of the band, and the other near the high edge. The attempt was a decided failure, and no amount of playing with the trimmers would give a symmetrical response curve. The reason is this: When closely-coupled circuits are tuned, varying the inductance or the capacity of one circuit causes mistuning of the other; in other words, the adjustments interlock. After struggling for ten minutes or so, the coil former was sawn in two and the coupler rebuilt to the original plan. The coils were peaked to resonance at the mid-band frequency, the coupling was increased, and the whole unit correctly set up in less than 60 seconds.

Application

The actual circuit arrangement used when the 80-metre BPC was put to work in a small rig built for use at the /A location is the same as in Fig. 1. The full line-up of the transmitter is briefly: EF50 Clapp VFO with untuned output, followed by an EF50 doubler with the BPC between it and the 807 final. An 0-5 mA meter was connected in circuit to read the grid current while the coupler was being adjusted. With power supplies switched on (but without plate or screen voltage on the final stage), the usual procedure was followed for peaking the trimmers at the mid-band frequency, and then adjusting the coil-spacing to give the required band-pass characteristic, as described above. Several generous coats of coil dope were then applied to the paper cylinder and the coil forms, to fix everything firmly in position. This makes a remarkably solid and permanent job. Over the range of 3.5 to 3.8 mc, grid current to the 807 averaged 3 mA, with a maximum variation of 0.3 mA. This was considered satisfactory, and the grid current meter has been removed, as it is now superfluous.

An alternative method of connection is shown in Fig 3, where the grid leak and condenser are in series with the grid tank circuit. The grid drive to V2 can be checked by measuring the grid *voltage* with a high-resistance voltmeter connected between grid and chassis, with an RF choke in series with the lead that is connected to the grid. Then, every 22 volts of negative bias indicates one milliamp of grid drive, and so on in proportion. Aim at about 60 to 80 volts of bias, because the grid current will fali a little when the plate and screen voltages are applied and the 807 is loaded up. The overall drive can be increased or reduced by altering the screen voltage on the previous stage. This circuit is handy when the BPC is being used to couple a buffer stage or a VFO to a following doubler stage.

On Other Bands

The 7 mc and 14 mc BPC's have been embodied in the 10-metre rig, which is very similar in other respects to that

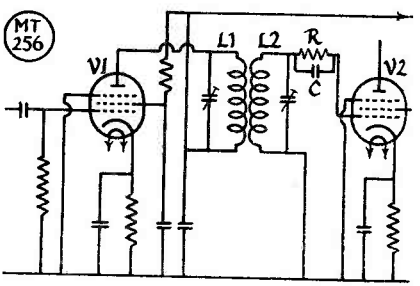


Fig. 3. An alternative circuit to that of Fig. 1, suitable for broad-band couplers used in intermediate stages. R can be 22,000 ohms and C 100 $\mu\mu$F.

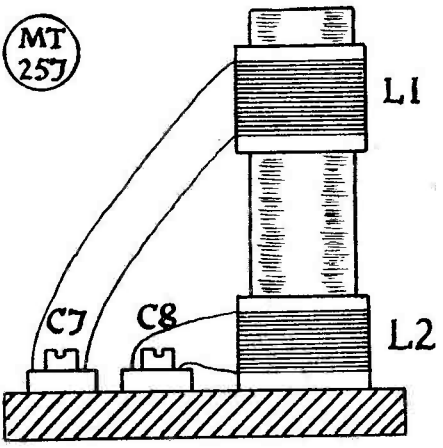


Fig. 4. Mechanical arrangement of the broad-band couplers described by G3ESV in his article. Compare this sketch with the photograph of a completed unit. It should be noted that with this form of construction the power must be kept low, otherwise the circulating current will be high and the units will tend to over-heat.

described by G2IQ in the December 1950 issue of *Short Wave Magazine*. Here again they perform with great efficiency, so much so that it has been necessary to reduce the screen voltages on the intermediate doubler stages to avoid excessive drive. Details of the three BPC's used in these experiments are given in the table. There is a wide range of choice, however, in such details as diameters of coil forms, the use of iron-cored coils, and so on, and the following general suggestions are offered as a guide to those wishing to use up materials to hand:

1. Use a high L/C ratio for best results. With the aid of the GDO (which is really essential for this sort of work) wind a pair of coils which will resonate in the desired band with about 30 $\mu\mu$F maximum. In lower power doubler stages, small trimmers of the type used in receiver coil packs work well.
2. Leave enough slack in the connecting leads to allow a reasonable range of movement in one of the coils—1½ inches will usually suffice.
3. Iron-cored coils can be used very effectively in conjunction with small fixed ceramic or mica condensers of 25 to 30 $\mu\mu$F. Adjust the number of turns on the coils so that they resonate at the desired frequency with the slugs about three-quarters inside the winding. The idea is to have enough inductance variation to compensate for the added capacitance of the associated valves and wiring when the BPC is installed in the transmitter.
4. Don't use too much power in the doubler stages; valves such as the 6V6, 6F6 or even the EF50 give ample output when run with 300 volts on the anodes, to drive any of the modern tetrodes or pentodes.
5. Don't play with the trimmers or slugs when once the coils have been adjusted and cemented into place. It is almost impossible to find the original settings, and the coupler may have to be rebuilt.

There is almost certainly a position in nearly every rig where at least one BPC can be used to replace a conventional tuned circuit, with a saving both in components and in the time spent shifting frequency. They are, of course, the ideal things for multi-band-switched transmitters or exciters, but such applications are beyond the scope of this introductory article.

XTAL XCHANGE

Insertions in this space are free, but can be accepted in respect of *exchanges* of crystals only. Offers should be set out in the form shown below, on a separate slip headed "Xtal Xchange — Free Insertion," and should give details of mounting, whether a calibration certificate is available and the make or type number of the crystal(s); all negotiations should be conducted direct.

G2BGG, Barbon, Aigburth Hall Road, Liverpool, 19.
Has Marconi 3750 kc crystal, ¾-in. mounting. Wants any frequency 3500-3600 kc, same pin spacing.

G3FHZ, 16 King's Road, Sutton Coldfield, Warks.
Has crystals 7473, 7506, 7706, 7716, 8206, 8240 kc ½-in. pin spacing; and 100 kc bar, 8180, 8410, 8910 kc ¾-in. mounting. Wants 1000 kc bar and any frequencies in 3.5 and 7 mc bands.

G3GLS, 37 Gothic Road, Twickenham, Middx.
Has two ex-A.M. crystals 7010 kc, ¾-in. mounting, no certificates. Wants frequencies 1850-1900 kc and 3525-3550 kc.

G3HAZ, 73 Pamela Road, Northfield, Birmingham, 31.
Has RCA Type VC5 100 kc bar, 3 pin mounting, and Standard Radio 1000 kc bar with wire ends. Wants FT243 type crystals between 8000-8035 kc.

"TRANSMISSION FOR BEGINNERS"

This is the title of a useful series of articles which appeared in our *Short Wave Listener & Television Review*. The first three parts were first published in the October-November, December and January issues, of which a few copies are available at 1s. 7d. post free. Order on the Circulation Manager, Short Wave Magazine, Ltd., 53 Victoria Street, London, S.W.1.

The Overtone Crystal Oscillator Against TVI

AVOIDING THE GENERATION OF UNNECESSARY HARMONICS

By **E. J. PEARCEY (G2JU)**

The arguments put forward by our contributor are worthy of the serious attention of all who are suffering from TVI, or are located in areas where TV reception will soon become general. It is not suggested that TVI can be absolutely prevented merely by proper choice of fundamental or multiplier frequencies in HF or VHF transmitters, but by the adoption of the principles stated in this article, a long step can be taken towards its elimination. And it is probable that in the case of 2-metre equipment the cure could be complete if the receiver converter is given the same attention as the transmitter.— Editor.

WITH the spread of television and the accompanying onslaught of TVI, it is imperative that amateur techniques be examined in the light of present-day necessities.

It will no longer suffice to construct a transmitter or receiver using methods which have long been current in amateur circles merely because these methods result in thoroughly workable equipment.

The expansion of the area covered by television brings with it as a primary consideration the need for building amateur equipment in such a way that it will not produce and radiate frequencies which fall in the various television bands.

One way of dealing with the problem is to use techniques hitherto considered perfectly satisfactory from the point of view of the performance of the equipment as such, and then to apply TVI suppression. This is rather like watching someone, within reach, about to fall 50 feet and then, when it has happened, coming along with an offer to mend the broken limbs.

A more satisfactory way of tackling the problem of TVI is to build, if possible, in such a way that the interfering frequencies are not generated in the first place, as this will considerably simplify the elimination of any TVI which might arise subsequently.

From the purely mechanical aspect of design, one method which should no longer be used is open type construction, commonly known as "breadboard" style. The reason for discontinuing this method is the totally inadequate, or complete absence of, any screening for the very high electromagnetic fields produced. In these days it is necessary to build on a metal chassis and completely to enclose the equipment under a metal cover in order to prevent direct interference due to these high field intensities.

On the electrical side, excellent articles have already appeared in print dealing with one or another aspect of TVI. There is, however, a notable dearth of information on the particular section of a transmitter (and also a receiver) which is primarily the cause of all the trouble. The writer refers, of course, to the oscillator, and particularly to "overtone" operation.

It is true that certain items of equipment have been described using this type of oscillator, but sufficient attention has not been drawn to the ease with which it can be made to operate, and also to the simple way in which it avoids TVI.

Overtone Oscillators

It may come as a surprise to many readers that it is not necessary to purchase special "overtone" crystals, and that practically any of the ex-Government surplus crystals which will oscillate in a normal circuit can be made to operate readily in the overtone mode.

There is nothing special or tricky about the circuit and it can be thoroughly recommended as a means of preventing from the very start the production of interfering frequencies. Overtone control has recently been incorporated, with complete success, in the 2-metre transmitter and crystal controlled converter at G2JU (it is just as important to apply it to the receiver).

and a little consideration will show the enormous advantages to be obtained by operating crystal oscillators in the overtone mode instead of by the fundamental frequency method.

Let us assume, for example, a 6050 kc crystal. If this is used in a 2-metre transmitter the crystal would normally operate as a fundamental oscillator and would produce a first frequency of 6050 kc. This frequency would probably then be multiplied by four, either as a tri-tet oscillator or by a separate stage, to give a frequency of 24.2 mc. This might then be multiplied by three to give 72.6 mc, and a further stage multiplying by two would finally reach the wanted frequency of 145.2 mc. Correct design would then call for a power amplifier stage at the final frequency, as it is bad practice to feed an aerial from a multiplier stage because of the magnitude of the harmonics produced in such a stage.

Some Examples

Now it is all very well to rig up stages to multiply by a required figure such as 4, 3 or 2 already mentioned. But because they have been designed as *multipliers* the stages will also automatically multiply the crystal frequency by 2, 3, 4, 5, 6, 7, 8, and so on right through the spectrum. It is true that the unwanted frequencies will be much weaker than the frequency to which the multiplier is tuned, but as we are dealing with hard-driven stages the unwanted frequencies will still be at a useful level and will occur, at a separation of 6050 kc, up to quite high frequencies before they are finally undetectable.

Thus, for example, in a particular transmitter the frequencies produced could be:

f	= 6,050	
x2	12,100	
x3	18,150	
x4	24,200	
x5	30,250	
x6	36,300	
x7	42,350	} London
x8	48,400	} London
x9	54,450	
x10	60,500	Birmingham

The two frequencies marked "London" and the one marked "Birmingham" will be strong enough to cause quite healthy interference on receivers tuned to the appropriate television transmissions.

In the case of London, the response of receivers to the two frequencies indicated is almost at a maximum, and in the case of Birmingham the frequency indicated is in the middle of the pass-band, as the Birmingham transmitter operates on the lower-sideband principle.

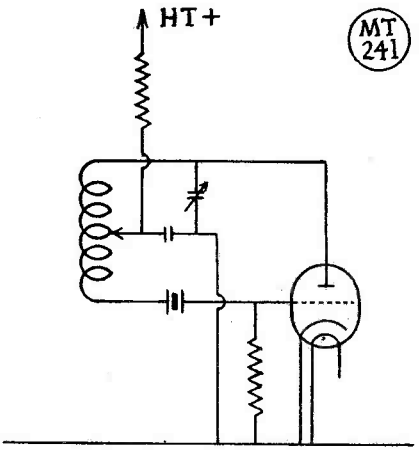


Fig. 1. The overtone CO circuit, due to Squier and first published in our American contemporary "QST."

In fringe areas the problem will be worsened considerably by reason of the fact that the field strength of the wanted television signal is low and consequently much higher gain is used on the receivers, causing them to be much more susceptible to the interfering frequencies.

This latter is the condition at G2JU (on the South Coast of England), and the fundamental frequency crystal oscillators and multipliers in both transmitter and receiver converter produced such bad interference in a television receiver a few yards away as completely to obliterate the picture and substitute in its stead a screen filled with bright light.

Conversion of the oscillators in both transmitter and receiver to the overtone mode of operation has, in the case of the receiver converter, completely removed every trace of interference, and in the case of the transmitter has reduced the interference to a faint pattern on a more pronounced picture. (This pattern will now be eliminated by additional screening and filtering, and be it noted, the television receiver is in the same house with the 2-metre transmitter and receiver, while the field strength from the London television

transmitter is about one-quarter flea-power.)

A little calculation will serve to show the advantages conferred by using the crystal oscillator in the overtone mode.

Assuming the same crystal frequency as before, *i.e.*, 6050 kc, operation at the third overtone will produce a first frequency very close to 18.150 mc, and the frequencies present will now be at a separation of 18.15 mc throughout the spectrum, as follows:

f	= 18.15
x2	36.30
x3	54.45
x4	72.60

and so on

The frequencies of the two television transmitters at present operating in Great Britain are:

London (Alexandra Palace)	Vision 45 mc, (double side-band) Sound 41.5 mc.
Birmingham (Sutton Coldfield)	Vision 61.75 mc. (lower side-band) Sound 58.25 mc.

It will immediately be apparent that the frequencies due to overtone operation of the crystal oscillator will not fall anywhere near those of the London and Birmingham transmitters and, in fact, will be well outside the pass-band of the appropriate receivers.

Higher Frequency Crystals

Let us consider the case where a crystal in the 8 mc range is used in the normal fundamental oscillator. Assuming a crystal of 8000 kc, the following frequencies will be produced:

f	= 8,000
x2	16,000
x3	24,000
x4	32,000
x5	40,000 London
x6	48,000 London
x7	56,000
x8	64,000

and so on.

The frequencies liable to cause serious interference are the 5th and 6th harmonics so far as the London transmitter is concerned, whilst the 7th is very near to the sound channel of the Birmingham TV transmitter.

Overtone operation will result in the following frequencies:

3rd overtone of 8000 kc crystal.

f	= 24,000
x2	48,000
x3	72,000

and so on.

It will be seen that there are now no frequencies anywhere near those of the Birmingham TV Station, but that the 2nd harmonic is dangerous to receivers tuned to London TV.

From this consideration it would appear that crystals in the 8 mc range are not suitable for trouble-free operation in the London television area, but that crystals in the 6 mc. range can be used in this area *so long as they are operated in the overtone mode.*

Either 6 mc or 8 mc range crystals can be used in the Birmingham television area, *but only in the overtone mode.*

The New Stations

Let us now consider operation in the areas of the other television stations, frequencies of which have been published, but which are not yet in operation.

Holme Moss (Near Manchester)	Vision 51.75 mc. Sound 48.25 mc.
Kirk O'Shotts (Scotland)	Vision 56.75 mc. Sound 53.25 mc.

Fundamental operation of both 6 and 8 mc crystals will produce the following frequencies:

6 mc crystal.		8 mc crystal.	
f	= 6,000	f	= 8,000
x2	12,000	x2	16,000
x3	18,000	x3	24,000
x4	24,000	x4	32,000
x5	30,000	x5	40,000
x6	36,000	x6	48,000 *
x7	42,000	x7	56,000 Ø
x8	48,000 *	x8	64,000
x9	54,000 Ø	and so on.	
x10	60,000		

and so on.

It will be seen that frequencies marked * will interfere in the Holme Moss area, and those marked Ø in the Kirk O'Shotts area.

Third overtone operation will result in the following frequencies:

6 mc crystal.		8 mc crystal.	
f	= 18,000	f	= 24,000
x2	36,000	x2	48,000
x3	54,000	x3	72,000
x4	72,000		

It will be noticed that the 6 mc crystal is clear of interfering frequencies in the Holme Moss area, but that the 8 mc crystal will produce one interfering harmonic (2nd).

In the case of Kirk O'Shotts, the 6 mc crystal in its third overtone mode is unsuitable, as the 3rd harmonic will be in the pass-band of receivers. The 8 mc crystal on 3rd overtone will, however, be entirely satisfactory, as the harmonics produced are well outside the television frequencies involved.

If amateurs concerned were to choose their method of operation on 2 metres (transmitters and receivers) in

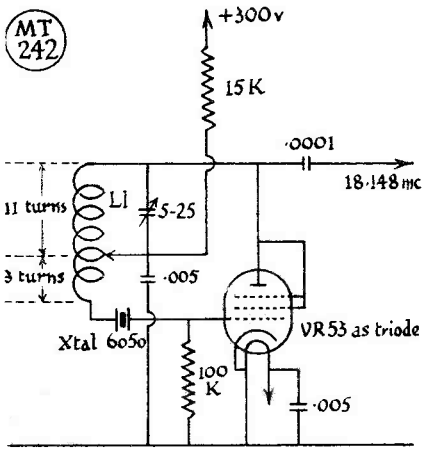


Fig. 2. This is the circuit to use for getting out the 3rd overtone of the crystal, proper choice of which will eliminate the possibility of generating harmonic frequencies falling in the various TV channels, as explained in detail in G2JU's article. Assuming this oscillator is required to drive a 2-metre transmitter, the final frequency could be about 145.18 mc. Coil data: L1, 7/8-in. former, wound with 14 turns of 26 SWG over 3/8-in. and tapped at the 3rd turn.

the light of the foregoing arguments, then 2 metres could be a much more delightful band than it is at present, as many more transmitters could be on the air during television periods without the lurking fear of TVI.

The writer is well aware of the fact that there are other causes of TVI, but the complete elimination of unwanted frequencies *by not producing* them is a first step which could hardly be bettered.

The Overtone Oscillator

This might be called an "assisted oscillator," in that the crystal is encouraged to operate at a multiple of its frequency instead of at its fundamental. The term "overtone" is used instead of "harmonic" because the frequency is not an exact multiple of that of the crystal, whereas harmonics are exact multiples.

The overtone frequency is very slightly lower than the multiple chosen for operation. This, however, is so slight that it can usually be ignored unless band-edge frequencies are chosen. As an example, a 6050 crystal used as a fundamental oscillator and multiplied by 3 in another stage will produce a harmonic frequency of exactly 6050 x 3 = 18,150 kc.

The same crystal operating in a 3rd overtone circuit will produce a first frequency approximately 2 kc lower than 6050 x 3, *i.e.*, 18,148 kc. For 2-metre operation these two cases will result in the following final frequencies:

Fundamental — 6050 x 24 = 145.200 mc
3rd 'Overtone' — 18.148 x 8 = 145.184 mc

In the interests of accuracy, of course, the 3rd overtone frequency must be measured, but the point the writer is endeavouring to stress is that overtone operation produces no violent change in the final frequency, and it does completely remove a whole host of unwanted harmonic frequencies, so is worthy of adoption by all progressive VHF workers.

Stability

If the right values are chosen the stability of an overtone crystal oscillator is equal to that obtained at fundamental operation.

When correct, the circuit should only oscillate at the frequency produced by the crystal, and should show no greater tendency to "pull the frequency" when passing through "tune" than does the fundamental method. Any experiences of unstable operation can usually be traced to incorrect choice of values.

Circuit Details

The circuit used is that due to Squier, and has already been well publicised; it is shown in Fig. 1. It will be noticed that feed-back is provided *via* the crystal, and that the variable condenser is connected across only that part of the coil between the anode and tap (HT positive). It is the position of the tap and the damping across the coil which are instrumental in securing correct operation. If there is too much feed-back or insufficient damping the circuit may tend to oscillate freely at a frequency depending on the setting of the variable condenser.

When correctly adjusted it should be possible to swing the variable condenser gradually from maximum capacity to a position of lower capacity at which the circuit suddenly commences oscillating at the correct overtone of the crystal.

Oscillation may continue *at this same frequency* right down to the zero setting of the condenser. From maximum capacity down to just before the point at which the crystal takes charge there should be no oscillation whatever. Over

the whole oscillating range of the condenser there should be only a microscopic change in frequency. RF output is approximately equivalent to that of a normal crystal oscillator. There should be no tendency to frequency drift; any trouble on this score would indicate that the crystal is being over-run, as it would also be present in a normal crystal circuit under similar over-run conditions, using the same crystal.

Two practical applications of the principle will be given and should serve as a guide to those desiring to convert existing equipment.

The first is the oscillator of a much modified Type 17 Transmitter Unit from the TR.1143 Aircraft VHF Transmitter/Receiver.

The crystal oscillator in the original unit uses a VR53 RF pentode. This has been retained and arranged as a triode. Fig. 2 shows circuit and practical values. All the stages of this transmitter unit have been retained, together with the normal (not particularly high frequency) valves. Thus the overtone oscillator is followed by three doubling stages to reach 145 mc, and these are followed by the push-pull power amplifier. With valves specially designed for VHF it should be possible to discard two stages.

The next example is the converter of the 2-metre receiver. Fig. 3 shows practical details. In this case the converter was specially made for the purpose and the valves are VHF pentodes with B7G bases.

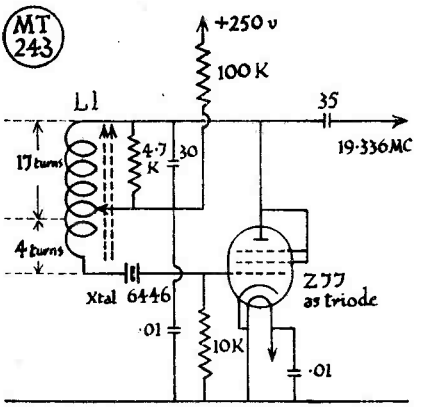


Fig. 3. It is just as necessary to choose the right frequency for the CO stage of the 2-metre converter. With an oscillator frequency of 19.336 mc, multiplied to approximately 116 mc, a tunable IF of 28-30 mc would be produced in the 2-metre receiver. In this case L1 is a 3/8-in. former wound with 21 turns of 26 SWG over ¼-in., tapped at the 4th turn. The coil is fitted with an adjustable dust-iron core.

In both cases the 3rd overtone of the different crystals is used and the oscillators are as easy to adjust and as stable as the normal fundamental type. They have been in use for many months and the crystals are those normally obtained on the surplus market for fundamental operation. The writer has tested many of these crystals and every one has been found to be entirely satisfactory in the 3rd overtone mode of operation.

Crystal Calibrator Unit

FOR ANY COMMUNICATION RECEIVER

By **W. R. JOSS (G2AJ)**

A unit for self-calibration to the high degree of accuracy given by the available standard-frequency transmissions is obviously of great value when incorporated in the station communications receiver. This article describes a small 100 kc crystal oscillator, the mechanical design of which could be modified to fit it into almost any make of receiver.—Editor.

THE desirability of having an accurately calibrated receiver on the amateur bands need not be stressed. It is a requirement which is now recognised by the leading manufacturers both in this country and America, and many of them are fitting built-in 100 kc calibrators to their latest Communication Receivers, the advantages of which are obvious.

The majority of amateurs, like the writer, will probably be in possession of receivers of war-time or pre-war vintage and are therefore lacking this refinement. It is hoped, therefore, that the following notes may be of interest to those who wish to have calibration facilities.

A general view of the 100 kc Calibrator as described.

Requirements

The requirements of a calibrator unit are modest, and can be summarised as follows:—

(a) It must produce good harmonics up to 30 mc, (the upper limit of the average receiver).

(b) The filament consumption of the valve used must be low, so as to prevent overheating of the receiver power transformer.

(c) The HT consumption of the unit must be such that the additional load does not cause variation of the receiver supply, thus tending to "pull" the local oscillator and produce slight changes of frequency when the calibrator is switched on.

(d) As the available space in most communication receivers is somewhat restricted, it is necessary to limit the overall size of the unit; in view of this, the use of a (B7G) valve was considered desirable.

Construction

In the writer's case the unit was designed to fit underneath the chassis of an RCA AR88, but it is so compact that it should be possible to find a corner for it in almost any receiver. The odd pieces which can be seen cut out of the bracket on which it is constructed were necessary in order to avoid certain obstructions peculiar to an '88.

Fig. 1 shows the bracket, which can be folded up out of any odd piece of metal, 18-gauge steel being used in the original design.

Circuit

Several circuits were tried, and eventually the one shown in Fig. 2 was found to be the best suited. It is easy to get going, and will operate with almost any crystal. Further, it is rich in harmonics owing to the large amount of feedback obtained with the two .001 μF condensers and 6 mH choke. This tuned circuit in the screen is important, and the values should be kept approximately to those suggested, as these components should resonate at the crystal frequency. Slight variations can be tolerated, but if the values are widely different from those specified, it is possible that the crystal would oscillate in the wrong mode.

In other words:—

$$\frac{1}{2\pi\sqrt{L\frac{C}{2}}}$$ **should equal 100 kc.**

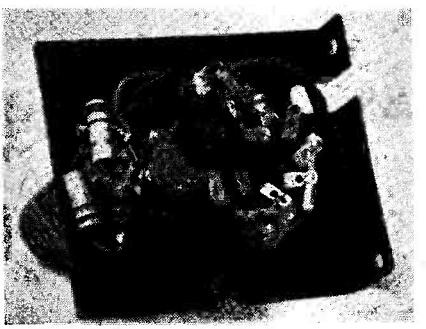
where L = inductance of choke = 6 mH
and C = value of one condenser = .001 μF

If a 1 megacycle crystal is used in place of the 100 kc bar, then the values of condensers should be reduced to 200-300 $\mu\mu$F, and the choke to approximately 1mH. Whilst a one-megacycle crystal has a limited usefulness as a band edge marker on the HF bands, it is of practically no advantage on the 3.5 mc and 1.7 mc bands.

An RF pentode such as an EF91 may be used in place of the EL91, if harmonics are not required as high as 28 mc—if they are, then an EL91 was found to be essential. The advantage of the EF91 is its lower filament consumption, which reduces the drain on the main receiver power supply. An EL91, however, was found to be perfectly satisfactory when used in the AR88.

The condenser C3 provides a zero adjustment on the crystal, and may or may not be required, depending on the crystal used. The writer found that about 2-5 $\mu\mu$F was necessary in order to zero-beat the output with WWV.

In the original design this condenser



An under-chassis view of the Crystal Calibrator, made up to fit into an AR88.

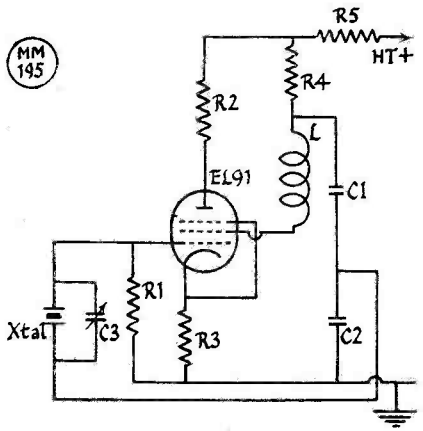


Fig. 1. Sketch of mounting bracket for the Crystal Calibrator, showing important dimensions when fitted to an AR88. With suitable modifications to this mounting, the Calibrator could be fitted to almost any receiver in the communications category.

consisted of a 3-25 $\mu\mu$F variable condenser with four of the vanes removed. It was mounted on the rear of the '88 chassis, so that adjustment was possible with the receiver in the normal operating position.

Power Supply

When the unit was first installed, its HT was derived from the 150v stabilised supply in the AR88. It was found, however, that the extra drain was sufficient to cause a very slight voltage drop each time the unit was switched on, resulting in a slight change of frequency amounting to a few cycles in the local oscillator of the receiver.

This state of affairs was highly undesirable, and steps were taken to prevent it occurring. A series resistance R5 was placed in the HT feed to the unit, and the HT voltage reduced to about 100 volts. Checks were made, and it was found that the harmonics on 28 mc were still satisfactory, whilst the change in local oscillator frequency, although still noticeable, was reduced. Next, the feed point was removed from the 150v supply and attached to the full HT supply of about 260v, while the dropping resistor was increased to maintain the calibrator at about 100v. This provided a further improvement, and only a very minute change of oscillator frequency was detected when the calibrator was put in circuit.

After some further experiments, it was discovered that the volts on the EL91 could be reduced to about 70v, while still producing adequate harmonics up to 30 mc. With a suitable resistance in circuit to produce the 190v drop from the main receiver supply, no change in oscillator frequency was detected. As this was considered satisfactory, the investigation was carried no further. The value for R5 finally used with the AR88 was 68,000 ohms, but would-be constructors are advised to determine this value by experiment, particularly if a different receiver is being used.

Table of Values

Fig. 2. Circuit of the 100 kc Calibrator

Condensers

C1 and C2	—	.001 μF
C3	—	2-5 $\mu\mu$F variable *(see text)*

Resistances

R1	—	560,000 ohms, $\frac{1}{2}$ watt
R2	—	47,000 ohms, $\frac{1}{2}$ watt
R3	—	220 ohms, $\frac{1}{2}$ watt
R4	—	10,000 ohms, $\frac{1}{2}$ watt
R5	—	*See text*

Coil L — 6 millihenry, wound on Alladin dust-iron core $\frac{3}{8}$in. former, position of core not critical.

Valve — Mullard EL91

Crystal — Q.C.C. 100 kc, Type Q5

Calibration Checking and Adjustment

After completion, the unit should be installed in the receiver, the filaments connected to the heater supply, the HT feed to R5 connected *via* a toggle switch located on the receiver panel, and the

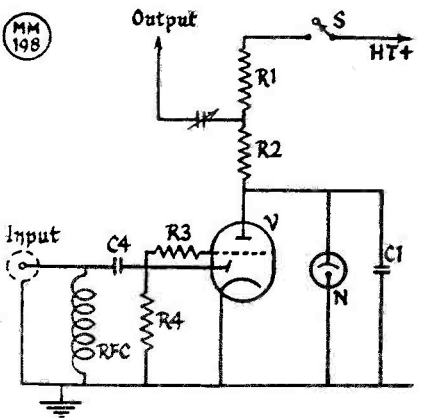


Fig. 2. Circuit of the 100 kc Crystal Calibrator as described in the article. It will give check points up to the 28 mc band and, if incorporated in the station receiver and zero'd on WWV or the BBC's 200 kc transmission, will enable a high order of calibration accuracy to be achieved on all bands.

value of R5 adjusted as described. A check should now be made to ensure that the crystal will zero on 100 kc by means of the condenser C3, after which the receiver may be mounted in the normal operating position, and one of the known frequency standard signals tuned in. The writer used WWV on 15 megacycles, but any other WWV transmissions will suffice, or the BBC Light Programme transmission on 200 kc, which is maintained to a high degree of accuracy. The receiver should be tuned zero beat with the standard signal, the calibrator switched on, and condenser C3 adjusted until the crystal is zero beat with the incoming transmission. This having been done, the calibrator is ready for service, and can be switched on whenever a frequency check is required.

Decibel Dementia

GETTING DOWN TO THE FACTS

By **B. WARDMAN (G5GQ)**

The dB, already degraded to "dog biscuit" in amateur parlance, is again attacked as a meaningless term if used by itself to report signal strength against no agreed reference level. Our contributor argues that what matters at the receiver is audio output compared with local noise, irrespective of actual strength. In amateur working, the use of the S-meter, in fact, remains that of giving comparative reports only.—Editor.

WHAT would be your reaction if some amateur described his transmitter as "taking 200 milliamps more than somewhat" or "peaking 2kV higher than individual reference level"? At the very least there would be shakings of heads, and muttered regrets that such a nice fellow was getting a bit weak in the head. But there is an element of fact in each of these statements, for both 200 milliamps and 2kV are recognisable terms.

Yet are these more nonsensical than the jargon heard on the air, "Your signals are S9 plus 47dB," etc.? Does it roll off the tongue nicely, does it sound impressive and technical, does it please its recipient?—because I, for one, just haven't the faintest idea what it means.

Reference to text books tells us that the decibel is the common logarithm of the *ratio* of two powers. Turn to the tables and we find than this "S9 plus 47dB" means:

The power of your signals is 50,120 times stronger than S9
or
The voltage of your signals is 223.9 times greater than S9.

Nice, isn't it? Upon receiving such a report we should immediately reduce our input so that our signal is only strong enough to maintain reliable communication—that is an (international) regulation embodied in our licences. Let's be content with an S9 signal; that means, according to our friend, that we can afford to drop 47dB. In plain English, it means that we should be able to reduce our input to one fifty-thousandth, from 150 watts to 0.03 watts, and our signal would still be S9! Try it and see.

Let's get away from this mumbo-jumbo and consider the more practical aspects. Most of us are interested in Amateur Radio as a hobby, not as a theoretical exercise. Our aim is to communicate with other amateurs, and that's a vastly different thing from driving some meaningless meter round the scale on the other fellow's receiver. When we visit our friends we speak loudly enough to be heard clearly; we do not shout at the top of our voices.

What is Wanted

So, first to the receiving end. The chap there wants a well audible and readable signal. As far as he is concerned, the only criterion is what his ears appreciate, not what some meter fancies; in other words, all he is really concerned about is the effective output of his headphones or loudspeaker. What may be an effective signal one moment may be completely ineffective a minute later if it is completely obliterated by another signal. Any suggestion that "a signal would be S9 but for QRM" is just self-deception; it's about as fatuous as the man who returned from the public meeting and told his friends that it was a magnificent election address, but no one had heard a word because some pneumatic picks were at work on the walls. There are no ifs-and-buts about hearing; either one hears or one doesn't, and that applies equally to the man at the receiver or to the audience at the public meeting. [*over*

The receiver input required to give an effective output must vary from location to location, and from time to time. Conditions are different for the receiver which has a good aerial and the receiver that has a poor one, for the location that has no background noise and the location surrounded by diathermy plant, lifts, electric shavers, and so on. Yet the need remains the same—a certain effective signal in the headphones. But the fetish of the S + dB has to be followed, and the unfortunate operator in a poor or a noisy location screws up the adjustment of the wretched thing to what he thinks it should read "if only he had a decent aerial and no noise." Often the lowest reading on it under this condition is S7. The only possible use for the thing is to give signal strength as *compared* with other stations, but generally it is useless for giving any realistic report on direct signal strength.

Transmitting Conditions

Now to the transmitting end, and the effect of power input on the signal received. The human ear can just comfortably detect a two-to-one change in volume. So the present S code is based on appreciable differences in volume as noticed by the ear, the actual figure being a four-to-one change in audio volume for each S point. Therefore, to increase a signal from S5 to S6, or from S8 to S9, means increasing its volume by four times in each case. (This is pure theory, based on the assumption that a perfect signal is received and that the ear compares instantaneously the two volume levels.) But if the ear were given first an S5 signal, then after a minute's pause an S6, and after another interval an S7, it is extremely doubtful whether it would classify them accurately; it can *compare* but it *cannot* measure.

Theoretically, therefore, increasing the input to the transmitter fourfold should push up one's signal by one S-point at the other end. On a test, when the operator at the other end listens first to one input, and then to four times the input, he would most probably report an S-point difference, other things equal.

The Power Factor

Practically, is it worth increasing power? Sooner or later in his career every amateur asks that question. If increasing power from 30 to 120 watts only increases signals by one S-point, is it worth the expense? The answer is "Yes, and No," but it is a clear answer. Here are the facts.

Many years ago the writer was the fortunate possessor of high-power facilities specially granted by the GPO. Knowing this, many local amateurs asked for information on relative powers. At that time G5GQ was engaged mainly on daily tests with W6 and W7 on 14 mc, and, apart from fixed schedules, many friends out there were asked to give a call and report each morning they heard G5GQ calling CQ (or "Test," as it was in those days). By shorting out a resistance in the primary of the main HT transformer, anode volts to the final could be raised from 1,000 v. to 2,500 v. instantaneously, representing a power increase of about 6, which should mean just over the "S" point. Half-minute calls, whether "Test" or "CQ." were standardised.

Results

During the whole of these tests, over 90% of the low power calls were unproductive. Practically 100% of the high-power calls were successful. Time after time a W6's CQ was answered on low power—but he could not be raised. It was not a question of him working another station but of coming on again with another CQ. Immediately the high-power switch was flipped on and he was called, he would come back immediately, giving S8 or so. Upon reducing power, he would still report a good signal at S7. The S7 signal did not poke out of the general background as strongly as did the S8 signal by *comparison;* once communication was established, the low power was just as satisfactory. It it part psychological and part physical, and these human factors are the ones that modify theory into practice.

The answer, therefore, to the question "Is it worthwhile increasing power from 30 to 150 watts?" is this: If you are mainly engaged upon working other stations by arrangement or on schedule, *i.e.* stations who are looking out for (and who know where to find) your signal, then QRO is not worth while.

If, on the other hand, mainly you call CQ or chase DX stations, *i.e.* your signals are not being looked for, then the increase in power may just give you that extra boost that will raise you above the common throng and attract attention.

Which, when you come to think of it, explains why some of these rare DX stations appear to achieve miracles on comparatively low power.

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

QUITE an amusing month all round, thanks to solar activity and the effects thereof. On the whole, the VHF boys have had the best of it, but for a "bad" month in a "bad" year the DX has been quite astonishing. Totals continue to mount apace, and the Marathon enthusiasts show little sign of slowing down.

One very surprising feature of the month has been the number of ten-metre openings—even including some to the USA and Canada. And yet, coupled with this, real DX has been worked on eighty metres. The four-band man has very little excuse for grumbling, even in these days.

Nothing really exciting in the way of new countries has shown up, but some of that Pacific DX has suddenly broken through on mornings that one would otherwise have described as dead. ZM6AK, ZK1BC, KM6AV and some VR2's have all been there on CW, and ZM6AA, ZK2AA and VR5's have been on phone. Only those keeping a pretty regular watch have been lucky enough to strike the right mornings for them.

DX on Twenty

As usual, the 14 mc band has borne the brunt of the attack, and so we will deal with it first of all. G5FA (London, N.11) collected EA9AP, TA3AB and MP4BAF for new ones this year, with VQ4's, VS6, HZ and SU as make-weights. He tells us that LZ1KSR is genuine, and he now has a card from him.

G3FXB (Hove) raised his score with CP5EK, CR4AH, F8EX/AR, HC1JW, KG6AAE, XE1DA and other good ones. He had never before heard an XE on CW, and this one came back to a CQ at 0230 one morning; next CQ brought back YS1O. 'FXB tells us that a QSL from LU2FN shows his power as 2 kW, which probably explains the

Calls Heard, Worked & QSL'd

strength of a good many South American signals. Nice ones that got away were FN8AD, FB8ZZ, FY7YB and UH8KAA.

That consistent gen-merchant G3ATU (Roker) still romps away at the head of the Marathon table, aided by such DX as YS1O, 9S4AZ, FP8BX, CP5EK, VP5BL, FN8AD and 3A2AF, the latter being Bill Orr (W6SAI). He will have had a week in London before this appears, and we naturally hope to meet him personally. (Incidentally, there is a buzz that PX-land will be receiving his attentions before he returns). AC3SQ was heard and called, but wiped out by QRM.

G3ABG (Cannock) added VP3YG and 9S4AX. The latter, by the way, is quite an old-timer who used to be EZ4SAX long before the war. G3BDQ (St. Leonards) stuck to Twenty and put his score up by ten. Late night work brought in CP5EK, HC1JW, HP1BR and VP3TF; evenings fetched CR4AH, CR5AC and UH8KAA. Other good stuff included JA's, TI, VP8, VP4, VP5 and some of the more usual DX.

The list from G3COI (Wolverhampton) includes KV4AA, SU's, VP6AL, VU2NB, VQ4HJP and YV5EH, but 'COI laments the relative shortage of W's, as he is still plugging away towards WAS. He has nothing but praise for Sutton Coldfield, as its high field-strength allows him to work during TV hours!

Gloom in the Queue

G3GUM (Formby) sat in the ZK1BC queue for two hours and then had to go to work. He asks how it is that all the regular DX-hounds seem to know

just which morning and what time to assemble for such a piece of DX. (We were one of the lucky ones, by pure chance, but we did notice that all the top-scorers seemed to be on parade at 0740 that morning!) 'GUM remarks on occasional outbursts of DX of this kind, when the general level is so poor. On another morning he knocked off Utah, Nevada and Arizona in about ten minutes. Other good ones were VP4's. TI2PZ, PJ5CW, KZ5DC, YS1O. CE3AE and VS6BZ.

G6TC (Wolverhampton) collected five KH6's plus VQ4, VS2, UN1, VK7 and plenty more. But he says it makes his mouth water just to look at his own log for two years ago. GM3EST (Motherwell) and several others comment on the queer conditions that brought in G's from all parts of the country at S9 plus on one or two occasions. We think we are right in saying that this was not the usual sporadic-E propagation, because notes remained T9 instead of changing to the customary T6.

G2HKU (Sheerness) worked CO6NF, VP6SD, VQ3, ZE and the like. He also heard XE1AC (many times at 0600), FM7WF, ZK2AB and other attractive specimens. 'HKU asks us to open a real blitz on all the commercials on the band who send CQ or V's for hours on end. FZR6, mentioned last month as owning parasitics all round the band, is at least outside it; all these Russians are, of course, right in it. The only way to make them move is to issue a few 10 kW licences to amateurs, but the cure would probably be worse than the disease in the long run.

To G6QX (Hornchurch) we are grateful for a new term which shall receive regular use—"drivel-dribbling." We all know what it means, and it's one of the reasons why so many of us stick almost entirely to the key these days. 'QX worked YV5EH, FY7YB, TI2PZ, VP6SD, HC1KD and 1JW, VP9DDD, VO6VB and YV5BX—he must have an aerial designed for Central America. He, too, comments on commercials, parasitics, caterpillars and so forth, and says it all shows up the weakness of our status. (Not necessarily, when you reflect on the source of most of them).

G5BZ (Croydon) pulled in ZK1BC, TI2AB, VP6SD, JA8OT, HP2RO, YS1O, HC1JW and FP8BX, plus HK4FV on phone. He also mentions the queer 9B3AA sample, who, the buzz has it, is in Bulgaria. G5JU (Birmingham) increased his score with VQ3, OA, KH6, FQ8, JA, ZD2 and "some rare Europeans."

G3BID (London, N.W.3) put up a two-element rotary and collected KG6, TA, HI, OA, TF, CP, YN, YS and JA—all on phone. He thinks band conditions quite good and enjoyed the burst resulting from the new aerial.

Several new ones for GM2DBX—all on phone—included OY, VP1, HH, KL7, VP6, VQ3, 9S4 and TI.

That seems to sum up the 14 mc news, which, you will agree, doesn't read too badly. Which way are we going now—for better or worse? We ought to know by September.

Ten-Metre Openings

Of course, we realise that Ten is nearly always open for a certain amount of phone DX, but when the CW end also comes to life, that's quite an event (and don't ask us why!). Towards the end of May this sort of thing started happening, and those who had maintained their Ten-metre PA's were rewarded. G5FA collected OE1FF and OK3SP on short-skip; G3ABG worked CR4AH, EK1AO, FF8JC, MI3AB, VQ4HJP, 4X4BX and 9S4AX.

G6QX managed some short-skippers, including FA8RJ. G5BZ did likewise, but roped in CE3AG as well. G5JU came off even better with CR4, CR6 and FQ8. G6QB (Bexhill) added several Europeans to the score and, in the DX line, worked CE4AD, FY7YC, LU5DZ, VQ4RF and CR7IV.

Early in June there was a further opening, and in mid-June there was a day when the U.S. phone band sounded as it used to in 1946! There were not many W's down at the CW end, but a number of interesting DX pieces, nevertheless. It pays to keep an eye on this band at all times.

Clots' Corner

Quite a few recruits to our disreputable company this month. G3GUM nominates "ZK2AB," calling CQ late at night, not answering anyone, and finally calling "CQ No Europa." Yes, that one will take some beating. G6QX proposes for membership the one that called "CQ de VK3AR" at 1000, coming in at S9 with the DX mostly S3 and the band obviously wide open for Europe.

GM3EST would like to include all those know-alls who tell him how to work DX by staying up until 0400, when they have barely reached the 50 mark themselves. He keeps respectable

hours and has a matter of 142 to show for it.

We should like to single out for special mention *all* the clots who suddenly open up on our frequency (and always while the DX station is sending) with the usual "char chip char chip, char char chip char." Either they don't listen first or, having listened, can't hear anything. Whichever it is, the answer still works out at "clot"—especially with those chirpy notes.

Forty and Eighty

Even on phone you can still boost your score on the 7 mc band. At least, GM2DBX can, to the extent of 13 countries in the month, including EK, ZB1, IS, CN, OH, SP and ZB2. G8IP (Hampton) added EK and MD5; G3FXB says there's nothing more exciting than MD2DW and a few W's. Besides, as he says, with Twenty open half the night, why get things the hard way? And even G5FA admits that the real DX on 7 mc is drying up, although there is some there if one stays up until the small hours. But two interesting ones that he did winkle out were F9JD/FC and SM7VV/S, who was on

"AND THE HANDEL HERE IS BACH"

a ship 650 miles West of Scotland.

Devotees of Eighty seem to be fewer still, and the palm goes to G3FXB, who worked VQ4CM up there at 2020 GMT. You will remember that VQ4CM is G2AVP? Well, Van's 14 mc QSL gave the news that he was going to sling 264-ft. between a couple of 80-ft. sticks and try his luck on Eighty. So 'FXB fixed a sked for his 66-footer, and was delighted to make it.

'FXB also tells us that G2DPY (Shoreham) has worked VE1, several W districts, VQ4, PY and a doubtful ZL on the band with 6 watts to a 6L6 CO!

G3ABG has an extremely legitimate grouse about the way eighty-metre phone operators, in particular, seem to imagine that they can stake out a frequency for themselves. 'ABG found a clear spot and was amazed to hear someone come up with pointed remarks to the effect that " . . . If you can hear me though the station expending his good RF on *my* frequency." This decided him that there was no future in joining the knitting-circle, so he returned to one of the other bands.

FOUR BAND MARATHON

(STARTING JANUARY 1, 1951)

Station	Total Points	3.5 mc	7 mc	14 mc	28 mc	Countries
G3ATU	237	21	80	133	3	138
G6QB	222	18	55	119	30	133
G5BZ	206	21	44	129	12	134
G5JU	201	25	51	94	31	108
G3FXB	188	16	65	106	1	122
G5FA	182	15	68	92	7	105
G6QX	180	32	58	80	10	97
G3ABG	166	21	64	60	21	91
G2AJ	152	18	41	75	18	95
GM2DBX	130	1	30	57	42	82
G8IP	125	12	50	55	8	80
G2BW	119	14	30	69	6	80
G6TC	116	13	34	56	13	67
W2WC	110	22	32	49	7	59
G8KU	101	13	26	59	3	73
G3COI	88	19	18	49	2	57
G3EDA	79	12	32	34	1	51
G6AT	60	9	33	16	2	38
G3IAR	18	4	10	3	1	18

(Note that new entries to this table must not include QSO's dating back more than two months from the time of entry. Regular reporters should send in their score month by month—three months' failure to do so will be taken to indicate loss of interest and the score will be deleted).

A Spiv is Born . . .

G3GUM has some trenchant comments to make about this awful business of signing off with VA and not meaning a word of it. He heard a ZB1 saying it to an EK1; the latter came back with QRU, BCNU, VA, at which 'GUM called him. He was therefore surprised to hear the EK sending the one word, " Spiv," with the ZB1 saying some more good-byes in the background. After this the EK calls G3GUM, says " No QSL for you " and goes back to the ZB1 to say " I bet that made him sore—another for the black-list." This sort of thing is hardly worth comment. But 'GUM, as a tail-piece, asks: " What would have been the reaction if it had been, say, an FG7 calling him?"

Other pet aversions up North are the types who " fiddle with carriers just for the fun of watching meter needles " and, of course, those who just blatantly call a nice piece of DX all through a contact. Yes, Twenty certainly needs cleaning up. See if we can't do something ourselves by concentrating on one bad fault each month. Thought for this month—Are *you* a door-knob polisher, or do you really mean good-bye when you send your VA? Remember, it should only be sent *once* by each station during any QSO. If you intend to come back to the other man again after his fond farewells, then send " K " the first time and keep the VA until you really mean it.

From the Overseas Mail

G3AET (Falmouth) has been asked by VQ5CB to state that the only genuine stations in Uganda are VQ5AU, 5CB, 5CK, 5DES and 5WCP, the last two now being QRT. Others are pirates and not even in the Territory. A note direct from VQ5CB confirms this.

EK1CW tells us definitely that when licences are allotted in Tangier the prefix will be CN2. The EK's, of

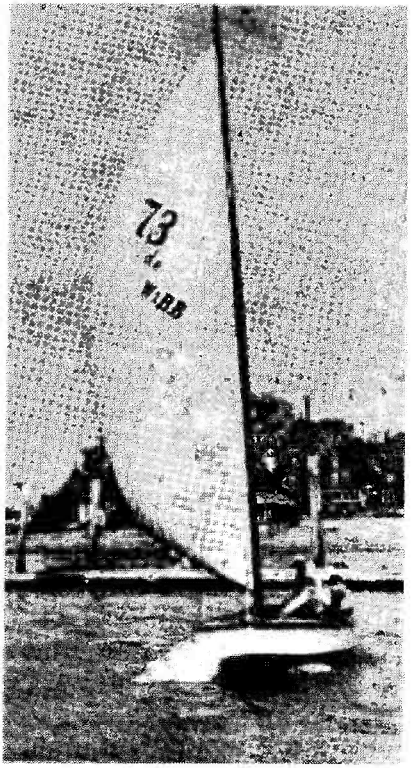
course, are not licensed ; they just issue their own call-signs and go ahead. CN2AA is already on the 14 mc band, but he has a commercial licence and a commercial rig. There are some sixteen EK's on the air, and their QSL Bureau address is French P.O. Box 150, although those who work for RCA can be reached *via* British P.O. Box 57. EK1CW is ex-G2CIW.

4X4CJ (Tel-Aviv) writes to comment on the recent "Ethics" article (March, *Short Wave Magazine*). In particular, he says that he does not agree with the ethics, on the air, of one of the DX operators whose views were quoted therein. Reasons—calling a directional CQ and then coming back to someone else, although 4X4CJ was in the favoured direction. Furthermore, failure to QSL in spite of the despatching of four cards from the other end. After standing-by two hours for a contact, this does seem a little hard.

ZS2AT (East London) asks us to explain the mentality of the type that calls CQ DX at about 35 w.p.m. Does he really want a reply from a real DX station (where he may be only 229) or is he plying the bug for the joy of monitoring his own transmission? If the latter, he could do it without switching on the PA. Apart from the weak-signal possibility, ZS2AT points out that not *every* DX amateur is capable of copying at 35 w.p.m.

'AT wonders whether anyone has heard or worked XU6F? He says QSL to an address in Hong Kong, which sounds a bit queer. Also, whether there are any active stations in Delaware, which state is holding up ZS2AT's WAS. Apparently the KL7's are starting to arrive in South Africa again ; 'AT enquired after the whereabouts of a few, and learned that KL7GG is now in Egypt. Finally, a card to FI8GD was returned from REF with the note that the FI8's are not licensed. Some of them may really be there, but FI8GD seems to be a sour one.

KZ5PC and his XYL, KZ5AC, are regular followers of this piece, having been given a subscription in return for some hospitality to a G operator "passing through." (This is worthy of mention here because many of our travellers would doubtless be able to reward little acts of kindness in a similar way, and they often wonder how to).



In case anyone should imagine that W1BB, Winthrop, Mass. spends all his time on 1.7 mc, here he is out for a sail in the centre-board. Note the signal on the mainsail—as Stewart himself remarks, "It only shows the lengths to which some hams will go!"

KZ5AC is the first YL or XYL ever to receive a KZ5 licence, and has been on the air for two years. 'PC asks us to remind the gang of the Certificate available to anyone who has worked 25 KZ5's, together with "stickers" for 50 and 100. QSL's are not required—just a letter giving the usual details from the log. KZ5PC/5AC work all bands, CW and Phone, with 150 watts to beams ; a mobile is also in action, and they look forward to the first mobile QSO with England.

Miscellany

Readers are requested not to shy at the rather peculiar call-sign GW3WIF. If this is heard between July 4 and 18 it will be perfectly legitimate, being the call allotted to the station at the Welsh

Industries Fair, Cardiff. The amateur station will be operated from the Fair during the period stated, and will be controlled by GW3BZH and GW5FN; special QSL cards will commemorate contacts, and tape recording equipment will be available for use and for demonstration.

We are asked by G8SG to state that the Field Day portable GM5BA/P operated from Lamberton Moor on June 2 and 3. This was in the county of Berwickshire; so if any people who worked the portable station want that county, they should ask either GM5BA or G8SG for a QSL.

We frequently receive letters from transmitters who don't normally spend their time chasing DX, but make an excursion on to the DX bands just once in a while. It seems that an increasing number of them are being frightened off again by (*a*) Poor conditions, (*b*) Bad behaviour and (c) QRM. It is therefore refreshing to hear from G6LB (Chelmsford) in a different vein. 'LB deserted the Top Band and returned to the DX bands after four years' absence; he says "After the winter's fun-and-games on 1.7, working DX leaves me with an odd 'couldn't-care-less' feeling — it's much too easy."

G6LB, by the way, was pleased to get a Top-Band QSL from OH2PK, who reports his signals for a morning in January on which 'LB heard no DX whatever.

The other point of view comes from G3DXI (Welwyn). *He* was contemplating the building of a small phone rig for "a certain DX band," so he decided to have a look at his crystal frequency in that band. (This at 1610 hrs.) At 1611, from the speaker came a voice saying "Yes, this modulator is working FB now, and I can modulate to 150 per cent. if necessary." At 1612, G3DXI was calling CQ on the Top Band again. (Don't get discouraged, 'DXI—150 per cent. is jolly decent for the DX bands! We thought you needed 400 per cent. to be seen in the best European circles.)

G3FXB, G3BDQ and a few others take a rather sour view of the fact that they can't get cards through to these (may we call them?) political pirates like the "Z" series from Chile and Argentina. 'FXB says "CE7ZQ is just another ham to me, and the fact that he is on an undeveloped piece of British Antarctic territory is no concern of mine." On the other hand, some of the more rabid DX-baiters can't be bothered to work them anyway, because they know they don't count as new countries.

G3FXB also brings up the subject of WAZ, which, of course, will be just about impossible from now onwards, with the faithful AC4's no longer able to be on the air. So far as we know, there is no amateur transmission from any part of China now. Maybe a revision of the Zones is called for, although that would doubtless enrage those who spent years trying to get Zone 23.

HI6EC told G3ATU that he and HI8WF were the only stations in the Dominican Republic. They are both virtually 100 per cent. phone men, which seems a pity.

Another Contest

The DARC intends to organise, this August, an "Inter-European Contest of Good Will," somewhat on the lines of the ARRL Sweepstakes, and we were promised that the rules would be re-

ZONES WORKED LISTING

POST WAR

Station	Z	C
Phone and CW		
G6ZO	WAZ	232
G6RH	WAZ	224
G6QB	WAZ	218
G3ATU	WAZ	207
G5YV	WAZ	205
G3DO	WAZ	200
G2FSR	WAZ	196
G4CP	WAZ	195
G8IG	WAZ	188
G2VD	WAZ	171
G3BI	WAZ	162
G3TK	WAZ	157
G3AAM	WAZ	154
G2IO	WAZ	152
G3YF	WAZ	152
G8IP	WAZ	144
G3AZ	WAZ	133
G5BJ	WAZ	126
G5VU	WAZ	124
G2AJ	40	201
G2WW	40	183
G3FNJ	40	150
G6BB	40	136
G3BNE	40	134
G5MR	40	130
G3BDQ	39	165
G5FA	39	160
G8KU	39	158
G2BJY	38	160
G3COJ	38	157
GM3EST	38	142

Station	Z	C
cont'd.		
G2FYT	37	137
G3ABG	37	136
G6QX	37	136
G3FXB	36	137
G3GUM	36	134
G2YS	36	130
G3CIZ	36	127
G2HKU	35	122
G6TC	35	112
G2DHV	35	106
G3FGT	34	129
GM3CVZ	34	107
G3HDA	34	103
G6AT	34	100
G2BBI	30	101
Phone only		
G2AJ	38	161
G3DO	37	160
G6WX	37	135
G8QX	36	139
G3COJ	36	134
G2WW	36	134
G2VJ	34	122
GM2DBX	33	103
G2BBI	30	98

ceived by us in time for quoting in our July issue. Up to the last moment they have not arrived, so it looks as though you will have to wait until August.

We also hope to be able to state firm dates for next year's Top-Band Trans-Atlantics. At the moment we are discussing matters with W1BB on the other side, and it has been agreed that the series of week-ends should begin earlier and finish earlier, using only the well-proven time-limits of 0500-0800. It seems, therefore, that the first week-end might well be before Christmas and the last at the end of February. There's plenty of time, fortunately, but we want even more co-operation this year, as we have every hope that conditions will be as good as they were for the last series. Several new countries are expected to be taking part.

Can You Beat It?

The month's tall story concerns an aerial system that brings in QSL cards. GM3EST had worked VP6CDI a long time ago, but had never received a card and had given up hope. So he decided to put up a new W8JK beam which would do things for him in the West Indies. Up it went, and just before the feeders were connected the postman arrived with a card from VP6CDI.

We could do with something of that sort, but it would have to be rotary *and* power-driven: our missing cards are rather widely distributed, all the way round from LX to KM6!

The month's Peculiar Pirate is reported by G3FBZ (Wolverhampton). This bird used a G2 call-sign and said the QTH was Dublin. He gave his name, details of rig, and waited a minute or so because his power-pack was going up in smoke, and finally turned it over without any further call-signs, not having given 'FBZ a report. A somewhat erratic QSO went on like this, with the "G2" repeating all words twice, in spite of a 589 report. You need to see the QSO down on paper to savour the full flavour!

Just at the last moment we hear the welcome news that the ZL's are now licensed for eighty-metre phone, and also that they will be licensed for the Top Band next winter. We are not quite clear on whether they *already* have the band, but they will by the winter. This should make the Top Band DX Tests even more interesting, and we are wondering whether we can still call them Trans-Atlantic or whether that is becoming a little too parochial?

When G2BCX of South Woodford, London, goes /P on Ten, this is the outfit. It is completely self-contained and input is about ½-watt. Ranges up to a mile or so have been possible with the 1/8th wave vertical rod.

Last month's brief reference to DAC on 1885 kc has brought forth a surprising number of remarks of all kinds. It seems that most people using this part of the Top Band have been "QRT'd" by the said station.

G4FZ (Orpington), G3CEU (Baldock) and GW8WJ (Prestatyn) all point out that DAC is a German coastal station on the Elbe with the same status as GNF, GNI and the others, and therefore has a perfect right to clear his frequency. Agreed—but what seems strange to us is that he should experience any interference that really matters from 10-watt stations in the U.K., when he is presumably working to ships with greater power and at shorter range.

The real danger, as pointed out by GW8WJ, is that there seem to be many phone amateurs operating who literally *cannot read Code.* They are obviously asking for trouble, as they will realise if they read their licences. A request

for a QRT (from a Government station or otherwise) is almost sure to be on CW, not phone.

Remember, all Top-Band users, that it is a shared band, and that ship-shore traffic is likely to be far more important than some of the natter going on on the same frequencies. So be prepared for a request to QSY.

Next month's deadline is even earlier than this one was; **July 11, first post,** is definitely the limit for all your offerings. Please note this and be sure to get in on time. For the following issue *August* 15 will be the deadline. Address your DX news, scores and everything to "DX Commentary," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. Meanwhile, best of luck on the bands. 73 and BCNU.

Safety and Protection

THE SWITCHING OF POWER CIRCUITS

Part I

By **B. W. F. MAINPRISE, B.Sc.(Eng.), A.M.I.E.E. (G5MP)**

In the interests first of personal safety, and secondly the protection of valuable equipment, no precaution should be disregarded. It is easy to build up a station by connecting gear in piecemeal, but at all times the circuits should be so arranged that the equipment is safe to handle.—Editor.

WHEN giving instruction to radio operators or engineering students, the author has always considered that the subject of safety should be introduced at an early stage, as much in the interests of the men as of the equipment they are to handle. To point the moral, two analogies spring to mind.

First, consider a chemist's shop. It is stocked with numerous compounds, many of which will certainly burn or kill if used carelessly or ignorantly. But, used with due care and precaution, these same compounds can be of the greatest benefit, and such is the skill with which they are dispensed that accidents are rare in the extreme. The same holds good with electricity. Badly insulated or carelessly handled, it will instantly burn or kill. Used with due precaution and knowledge, it is of the greatest service to mankind.

Next, consider road safety. Before stepping off the pavement, it is recognized good practice to pause and look in both directions to ensure that the road is clear. This is a simple precaution and normally we carry it out instinctively. If on some occasion we momentarily forget to do so, we usually feel we have just incurred a slight yet rather foolish risk. In the same way, before starting to work on radio equipment it should be a matter of habit instinctively to pause and check that both ends of the circuit have been disconnected. If on occasion we neglect this instinctive pause, then we should feel we have just incurred a needless risk. Electric shock is a greater hazard in our private stations than in other electrical surroundings. For instance, a machine room or switchboard is designed with a view to unaltered service over a number of years, apart from routine maintenance of contact surfaces and other items involving corrosion or wear. It is seldom, however, that we design a receiver or transmitter for unaltered service over long periods; valve types and even much of the circuit may be changed after comparatively short intervals, depending on fancy, fashion or finance. Again, coils may be changed several times in a session. In fact, it is probably true that the private operator comes into contact with behind-panel or sub-chassis wiring very much more frequently than many a commercial or power station engineer.

A brief review of the chief sources of danger may therefore be opportune, together with suggestions on good practice, but it must be clearly stressed that these suggestions apply solely to the exceptional conditions existing in Amateur Radio stations and must in no way be taken as applicable in all instances to commercial installations.

Connection to Supply

A common error is to assume that floor switches in domestic wiring (the trade description is switch-plugs, a term without much justification), are of the

double-pole type. This is rarely the case, so that even with the switch in the OFF position the equipment is still in connection with one pole of the supply. These switches should be in the "live" lead, thereby leaving the equipment connected to the neutral lead, which is normally within a few volts of earth potential, depending on the balance of the street load. If, through chafing of insulation or other defect, the neutral lead comes in contact with an earthed chassis, the fault current may be quite heavy and even sufficient to result in risk of fire in the absence of the operator. More serious, and by no means rare, is the case where the single-pole switch has been incorrectly placed in the neutral lead, so that with the switch OFF the equipment is still in contact with the "live" pole of the supply, and provides a serious hazard for the unsuspecting owner.

Nor are defective switches uncommon, and it must be remembered that domestic toggle switches permit no visual check that the contacts have actually opened unless the covers are removed. For instance, in the writer's own home installation, where the wiring has been installed by the local supply authority and by a local contractor, it was reported at the end of the war (when the windows were being re-glazed and the rooms dried out after flying-bomb and French coastal artillery explosions) that the floor-switches in two of the rooms were running very hot, though of 15-ampere rating. Investigation showed that the heat had been sufficient to char and break the insulating strips operating the contacts, so that the switches did not operate when turned to OFF. Apparently, the resistance through corrosion at the contacts during the windowless period had been so high that intense local heating had resulted when the switches were in the ON position, though externally no fault would have been suspected.

For this reason, the writer prefers connection of equipment to the mains to be made as follows:

The rising cable at skirting-board level passes through two fuse-boxes, one in each lead, and thence to a double-pole switch. (Fuses in neutral leads are often looked on with disfavour, as should equipment be shut down through blowing of the neutral fuse, a person may think the supply has been switched off and start work on it, whereas it is still connected to the live lead. But as earth faults may be met with in private stations, the writer prefers a fuse in this lead, if possible of rather heavier rating than that in the other lead).

From this double pole switch, the cable proceeds to a mounting block carrying several 5-ampere sockets, into which are plugged just those leads feeding equipment actually in use. These sockets are deliberately placed in view of the operator instead of under the operating desk. Before servicing any piece of equipment its plug is pulled out, so rendering its disconnection from the mains both physical and visual. Also, any equipment not in use, *e.g.* VHF units when operation is on lower frequencies, always have their plugs taken out. A different type of lead or heavy flex is used for each unit: thus, cab-tyre cable for the 150-watt RF stage; round braided flex for the exciter; American-type oval flex for the receiver; and so on. This reduces the risk of pulling out the wrong plug before working on a chassis.

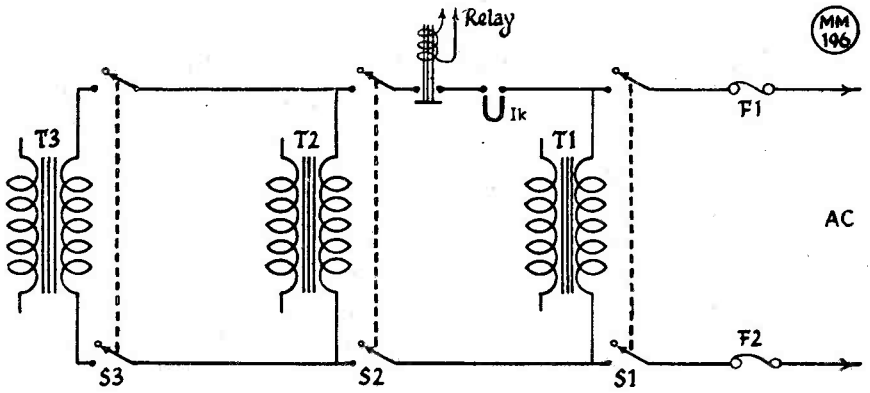
Panel Switches and Fuses

Following up a lead from the socket on the skirting board, entry to the chassis should be through an insulating bush or rubber grommet. On no account must the chassis hole be a tight fit, for a grommet or the metal edge may cut through the rubber. The cable should be anchored by a clip to take any pull, and then terminate at a double-pole fuse-holder. For a receiver, 1-ampere rating is ample; for a transmitter, a rather heavier rating of fuse may be necessary, but the value should always be kept as low as possible.

From the other side of the panel fuse-holders, connection will be made to the panel switches. These should always be of the double-pole type, so that when in the OFF position, the primary of each transformer fed from them will be completely disconnected from the supply.

In the average case there will probably be three transformers, namely, the filament transformer giving 6.3 or 10 volts, an exciter HT transformer giving some 400 volts on either side of the secondary centre-tap, and the output stage transformer, giving some 1200 volts. Each should have its controlling double-pole switch, *and on no account may these switches be wired in parallel.*

Fig. 1 shows a normal arrangement. With S1 open, all transformers are disconnected from the supply. With S1



A simple switch-for-safety wiring diagram for the power supply units. Each transformer—filament, exciter HT and PA HT—is controlled through DPDT switches S1, S2 and S3, which can only be made in that order. Additional safety is ensured by the mechanical interlock Ik, while the relay can be wired for remote switching of the HT supplies from the operating position.

and S2 closed, the exciter HT transformer is energized, and with S3 closed the final stage receives its plate voltage. During normal operation, S2 stops or starts the transmitter, and for convenience a relay can be used, with its low voltage coil operated from the receiving position. Note the position of the relay. On no account may it be in parallel with S2, for should it accidentally close through vibration or other cause while the operator was working on the transmitter with S2 open, the risk would be serious.

It is desirable to have panel indicator lamps across each primary, showing through a coloured glass dome on the panel. When selecting holders for the indicators, the writer advises the open type. The glow of the lamp behind the panel then acts as a warning should one approach the rear of a chassis. Neon lamps are safer than those of the filament type, as there is no filament to burn out. Where the latter type are used, they should have a rating well above the voltage at which they are fed.

Fuses on DC Side

The panel fuses already mentioned will protect the installation against short-circuits between turns of a transformer, or from a turn to core or chassis, or a short-circuit on filament wiring. None of these faults are very common in comparison with those met with on the plate voltage wiring. Therefore a fuse must be arranged to protect the transformer and also the rectifier emission should any of the following faults develop:—

(a) Failure of a smoothing condenser or by-pass condenser,
(b) Failure of insulation where leads cross or pass through a chassis hole,
(c) Flash-over of a tank circuit,
(d) Plain overload through absence of bias, or tank circuits being off resonance.

In the writer's experience, protection against these faults is provided very efficiently and very simply by an ordinary flash-lamp bulb, placed in the lead from the transformer centre-tap to chassis. This type of fuse has the advantage that as it carries the charging current of the reservoir condenser (where condenser input to the smoothing section is employed), it will light up when the anode current drawn is about 80 or 100 mA. If its brilliance under normal working conditions be noted, any change in this light will draw attention to a fault or maladjustment far more rapidly than an abnormal milliammeter reading. Therefore, it is good practice to mount this bulb on top of the transformer it protects, or in some convenient position where it can be seen from a wide angle and can easily be replaced when necessary. If large capacity electrolytic condensers are used, especially in the reservoir position, the initial charging current may be heavy enough to blow the fuse, but in transmitter applications paper condensers provide quite sufficient capacity and more reliable life.

A simple bulb of this type, or two in parallel where currents are fairly heavy, proves entirely satisfactory on voltages up to 500. For voltages up to 1500, the writer still uses them, but two in series, to give a greater gap against arc-ing and less stress on the base insulation, backed by a tubular fuse of rather greater rating. It is surprising how satisfactorily they operate and how seldom the tubular fuse has to act.

This form of protection is used throughout the writer's station, in equipment ranging from the domestic battery portable receiver to the 150-watt final stage, and during the past 20 years not a single rectifier or choke has been damaged by overload. In contrast, there are many domestic receivers where bills from £3 to £5 have been incurred through filter condenser breakdown, some of the cases almost resulting in fire.

High Voltage Power Supplies

For safety reasons a high voltage power supply should give both visual and audible reminders that it is switched on. The use of a panel indicator lamp wired across the transformer primary has already been described. Further visual indication is supplied *gratis* by the ionization glow of mercury vapour rectifiers such as the 866, and it is convenient to cut a rectangular hole in the panel, protected by a wire mesh, so that the bluish glow is visible from the operating position.

The audible reminder is easily provided by slight lamination hum. Most moderate-sized transformers already produce this, but where a silent model is found, the quiet hum may be obtained by easing off a clamping bolt. Care must be taken that the vibration is not transmitted either to the valve electrodes or to the main tuned circuit of a VFO stage. In some cases it may be desirable to mount the transformer on rubber grommets, at the same time checking that the core is not left without a connection to chassis. These points will rather depend on the layout at individual stations.

The next precaution is to ensure that the filter condensers discharge rapidly when the unit is switched off. The capacities should be kept as low as possible without impairing a T9 note, and, provided the exciter unit is carefully designed to give a real DC note, the total capacity is the power supply feeding the output stage may not need to be greater than some 3 μF. In fact, regulation rather than smoothing may prove the determining factor.

However, even 3 μF can give a nasty shock several minutes after the high voltage has been switched off unless a deliberate leakage path is provided for the charge. Accordingly, a permanently connected bleeder resistance is *essential*. In this application it is not altogether wise to rely on a wire-wound component, however generous the rating, owing to the danger of an open circuit developing through electro-chemical action between the fine wire and a clamping band, or through mechanical movement when heating and cooling. It it much safer to use carbon-type resistors of 5-watt rating having a value of some 100,000 ohms each. The potential across carbon resistors should not exceed 500 volts, and it is therefore necessary to use three or four such resistors across the average 1250-volt supply, since the no-load potential will rise to nearly 1800 volts. To keep down this pressure rise, it is normal to fit a bleeder resistance to draw some 25 mA of current. Here a wire-wound type is quite in order, but it may still be preferable to spread the potential drop across more than one resistor, though not as essential as with carbon types.

It is wise to use insulating caps on the rectifiers and to cover the terminals of the filter condensers and chokes with a strip of paxolin as a safeguard against accidental contact. As a further precaution, an interlock should be fitted so that access to components at high voltage is barred under operating conditions. A satisfactory but simple interlock will be described in Part II of this article.

(To be continued.)

CARDS IN THE BOX

Following are operators for whom we are holding cards in our QSL Bureau. As we are without a postal address for delivery of the cards, a large S.A.E. with name and call-sign should be forwarded to BCM/QSL, London, W.C.1. If publication of the call-sign/address is desired in "New QTH's" and subsequently in the *Radio Amateur Call Book*, this should be mentioned at the same time.

G2FNQ, 3BIK, 3BWZ, 3DMZ, 3ESU, 3FNF, 3FYR, 3FYU, 3GLW, 3GNO, 3GVI, 3GZO, 3HEY, 3HFS, 3HLG, 3HVK, 6JF, 6KG, GI3HHJ, GW3HMA.

Random Jottings

By **THE OLD-TIMER**

(These notes, which will appear from time to time, are exactly what the title implies—odd thoughts scribbled in the margin of the log or on the back of a QSL card while the writer is busy in the shack or on the air.)

IT struck me the other day that a good many signals gaining a "Readability 5" report are not really R5 at all. This is confirmed by the number of requests for repeats that one hears. On CW someone comes back with a "579" report and then fails to get your name; on Phone one is told "R5, S9 plus," and then, next time, one hears that QRM was pretty terrible and a whole chunk was missed. We know that QRM varies from one minute to the next, but I still think we should be more sparing with "R5" and use "R4" a little more often. Note for the CW man: If you want to see whether you really *are* putting in a good signal, send your name only once, and fairly fast at that. If the other fellows gets it pat, you are entitled to that slight glow of satisfaction.

RELAY KEYING

I have heard people say they were not equipped for break-in work because they didn't like the idea of having to operate change-over relays from the key. One chap pointed out that once you put a relay across the key-contacts, you had to use another one for the actual keying, since the contacts were never really open-circuit any more. This isn't correct; continue to use direct keying, and put the coil of your aerial change-over relay (or receiver muting relay, or whatever it is) in the HT feed to a buffer, or an FD, or one of the valves whose anode circuit is cut off when the key is open. I do agree that relay keying is a snare and a delusion unless the relay available is at least as snappy as the bug-key itself.

THOSE WATERY SIGNALS

Why do the CW men generally get a special thrill from one of those hollow, watery signals coming back to a CQ? It may not even be real DX, but it always has a flesh-creeping quality. Is it an instinct dating back to the old days, when the West Coast of USA and Canada represented just about the ultimate in DX work? KL7's, KH6's, many Pacific stations and the Arctic boys all have it; but so do the OQ5's on many occasions. I have noticed this repeatedly—why should *they* behave as if they were coming over the North Pole?

NEW-FANGLED MODULATION SYSTEMS

Being rather a cynical Old Timer, I am inclined to judge a system of modulation by (*a*) The quality of the speech, and (*b*) The amount of spread. I find that most manifestations of the various modern systems fall down badly on both counts. Even an SSB transmission is occasionally guilty of causing more spread than a conventionally-modulated carrier. (Yes, I know this is the fault of the operator and that the system isn't properly lined up . . . my point is that if these systems are more difficult to tame than the older systems, then they ought to be tested more thoroughly before being put on the air.)

LONG-WIRE AERIALS

One frequently hears a long-wire exponent being chided for being so old-fashioned, and asked why he doesn't build a beam. Don't these beam experts (or even folded-dipole users) realise that a long-wire, apart from its advantages in the preferred directions, is the only multi-band system worth having? A Zepp of 136 ft. is good for four bands and will also work quite well on the Top Band with the dummy feeder left out; a Zepp of 270 ft. (for the lucky ones with plenty of space) is a perfect five-band aerial. And if it points the right way, the results it gives on 28 mc are not to be sneezed at, either! Surely the rotary beam is the aerial for the man who hasn't the space for a long wire? Or have we missed something?

VHF BANDS

By **E. J. WILLIAMS, B.Sc. (G2XC)**

Great June Opening—

New VHF Records Made—

Seven European Countries Worked—

The Story in Full Detail

LAST month this column opened with a reference to some signs of an awakening of 2-metre conditions. It need hardly be said that by June 1 there was no doubt whatever about the awakening. Before recounting the stories told in the letters which have reached us here is a brief resumé of the high-spots of a wonderful fortnight in early June.

June 1, G3WW works OZ2FR for the first G/OZ, and G5YV works SM7BE for the first G/SM and new European record of 602 miles; June 3, ON4BZ works OZ2FR for first ON/OZ; June 4, very widespread opening between G and Continent, G2XC working DL3MH at 486 miles; June 8, GM3BDA works G3BLP and G2AJ, the latter at 355 miles being new inter-G record; June 10, EI2W and G3EHY make first EI/G telephony contact; June 12, EI2W and GM3BDA make first EI/GM; June 13, EI2W and GI3GQB make first EI/GI.

G3WW (Wimblington, Cambs.) came on the band soon after 2130 on June 1, and, *off the back of his beam,* heard OZ2FR calling "CQ G." Although at first somewhat suspicious of the authenticity of the OZ, G3WW replied and made contact at 2145, and, with the beam directed at OZ, signals were S9 plus. Later, at 0001, G3WW worked OZ1WP, who was using NFM, and at 0036 OZ6PX. For the benefit of those who are interested in calculating distances, OZ2FR is in Baekke, which is 55° 34'N and 9° 9'E, while OZ6PX is in Kolding, 55° 30'N, 9° 30'E.

OZ2FR had called "CQ G" as a result of hearing G6LI (Grimsby), who was actually raised immediately after the G3WW QSO. A contact then followed between G6LI and OZ6PX and, as a result of "information received," G6LI decided to call "CQ SM." G5YV (Leeds), hearing these calls, decided to look for SM himself, and in the course of this search just caught an S7 signal signing over. All that G5YV got was "BE 2 AR K." Having read his *Short Wave Magazine,* G5YV immediately associated the "BE" with SM7BE and gave him a call, just in case. And back came SM7BE with a RST 589 for G5YV! A subsequent card from SM7BE tells that he had been hearing G6LI for a solid two hours before this contact was made. So even although he did not make the first contacts, G6LI has the distinction of being the first G heard on two metres in both OZ and SM. SM7BE is in Lund (55° 42'N, 13° 12'E) and, as mentioned above, the G5YV/SM7BE contact over approximately 600 miles is believed to be the European record. G6CW also heard the signals from SM7BE and worked OZ2FR and OZ1WP.

G3HAZ (Birmingham), only able to use CW, found it necessary to wait until everybody else had finished on phone and then, when only he and the DX were left, proceeded to work 500 miles with comparative ease. OZ2FR, who was first heard at 2200 on June 1, was finally worked, after many calls, at 0150 on June 2, when he was still S8. OZ6PX was raised at 0104, while OZ1WP could not be read due to his NBFM. These are excellent distances, being of the same order as the previous European record (G2BMZ/DL4XS).

It is known that the OZ stations were heard in the London area, and, rumour has it, worked from south-east England, but this opening on June 1-2 appeared chiefly to benefit the Midlands. The Danish signals continued to be heard well for the following few evenings, and

ON4BZ (Brussels), who had heard SM7BE on June 1, made the first ON/OZ contact when he worked OZ2FR on June 3. Signals were S7 both ways. F8NW was heard calling OZ2FR the same evening, so it is probable that the first F/OZ has also been achieved. Between June 1 and 4, OZ2FR worked 24 G, 20 PA and 4 ON stations! G signals were best with him on June 1 and 2, PA on June 3, and ON on June 4. On June 2 and 3, DL6FX and DL6SW (Hamburg) heard and called many G's, including G2HCG, G2UQ, G3BA and G5YV, but found the G's went back to PA's every time.

Most widespread opening occurred on June 4, when almost the whole country seemed to be alight, southern England included, although the south-west did not obtain the full benefit. This is well illustrated by the fact that signals which were S9 plus with your conductor in Portsmouth were only S6-7 in Salisbury and Dorchester and inaudible in Devon. G3EHY, G5BY, G5UF and G8IL all comment to the same effect, but it was interesting to hear GW3EJM, off the back of the beam at G2XC, calling ON4 stations, in vain, and saying they were S9 plus with him. Perhaps it was this ending of the "duct" somewhere over Hampshire which gave G2XC the chance to make what appears to have been the longest contact of the evening. DL3MH (Celle, 40 Km N.E. of Hanover) was an S7 phone signal in Portsmouth and seems to have been missed by most G's. (We hardly like to suggest that his frequency of 145.62 mc had anything to do with it!). He worked G3BK, and half-worked G6LI in addition to G2XC. Amongst others heard by DL3MH and called in vain were G2FTS (S8), G2AHP and G3BLP. Star performer of the evening was probably ON4BZ, who raised no less than 56 G's in this one session. GW5MQ (Rhosesmer) worked right across England to contact one Dutch and three Belgian stations. G3HAZ and many others worked DL1LH (Wuppertal). So far, Wuppertal has not been pin-pointed, so it has been impossible to calculate the distances involved. Many other excellent contacts were made—far too many, in fact, to be recorded here in detail.

After June 4 the band seemed quiet, but this was only a relative quietness, for had the terrific opening of June 4 not been vouchsafed us, it is probably correct to say that the period June 5 to 15 would have been generally classed as good. It included contacts with F and ON, numerous firsts with GC, QSO's between southern G and GM, and EI contacts across the Irish Sea. On June 7, G3BW (Whitehaven) worked a long string of southern G's. On June 8, at 2254, GM3BDA (Airdrie) heard G2AJ (Biggin Hill) at RST 579. Contact was made with G3BLP shortly afterwards, and then with G2AJ. The distance is 355 miles, and hence is a new inter-G record. (This GDX record is, of course, now becoming of interest only to southern G and GM). Signals from G2AJ were audible for some time after the QSO was finished, and G3BLP was still coming through to GM3BDA at midnight. A G6 was heard calling "CQ GM" on about 144.9 mc. Only other G stations heard by GM3BDA were G3BW and G3EHY.

On June 10, EI2W and G3EHY made the first two-metre telephony contact between G and EI over a distance of about 200 miles. More QSO's followed between EI2W and G8SB, G2OI and G3FMI. On June 11, while all London was calling GC2CNC, G2XC worked F8JR and ON4BZ, but conditions were not as good as on June 4. June 12 saw GM3BDA arriving home late, so late in fact that he was sure that any DX there might have been would have gone to bed. However, with the idea of passing on news about the DX stations he had been hearing and working, he turned his beam on Glasgow and called "CQ Local." Over in Dublin, EI2W was about to write off the evening as poor, having been listening and calling since 2115 with no success whatever, when at 2320 he heard "CQ Local." (What would you do, chum? Yes, just what EI2W did!) As a result, the first

TWO-METRE PROGRESS

BRITISH RECORDS

Sept. 1, 1948	G2BMZ-G6LK	140 miles
Sept. 5, 1948	G2AJ-G5MQ	164 miles
Sept. 14, 1948	G5BY-G5MQ	220 miles
Sept. 14, 1948	G3APY-G5BY	227 miles
Sept. 17, 1948	G5BY-G6OS	287 miles
Nov. 12, 1948	G5BY-PAØZQ	380 miles
Jan. 1, 1949	G2BMZ-PAØEO	384 miles
May 13, 1950	GW2ADZ-PAØHA	417 miles
June 28, 1950	G5BY-DL3FM	470 miles
Sept. 13, 1950	G2BMZ-DL4XS/3KE	520 miles
June 1, 1951	G5YV-SM7BE	602 miles

Note: The G5YV/SM7BE contact is also believed to be the European Record on Two Metres. The Inter-G Record is held by G2AJ/GM3BDA at 355 miles.

EI/GM was made. The first EI/GI followed on June 13, when contact was made with GI3GQB (Ballywalter).

Comment

One factor which made the June 4 opening much more pleasant than it might otherwise have been was that, in spite of the enormous activity on the band, there have been no reports of real trouble from QRM. Now there most certainly would have been had VFO technique been in use. With almost every signal up to 300 miles at S9, it would have been chaos if everybody had been able to slide about at will. Several correspondents have mentioned that the DX stations did not appear to tune around their frequency, and as a result they are considering shifting to what they consider to be a more advantageous position in the band. May we urge all concerned to resist the temptation to do this? It can only result in everyone either being on 144.0 mc or piled up on top of the DX station, and neither of those situations will be to the benefit of *anyone*. With the present distribution of operating frequencies, a certain measure of luck is involved, but to the several who wrote saying that the DX stations did not look above 145 mc, we can only say that G2XC worked throughout on 145.3 mc and found no difficulty whatever. At the same time, we would draw the attention of our many Continental VHF readers to the fact that G stations are working in reasonable numbers up to at least 145.6 mc. G stations would also do well to note that there are Continental stations at the HF end of the band. Here are some frequencies which may be of interest. They have been supplied by DL2DV and DL3MH:

DL3JI	**144.14 mc**	**DL3BW**	**145.26 mc**
DL2MW	**VFO (144.1 or 144.6)**	**DL1CK**	**145.35 mc**
SM7BE	**144.72 mc**	**DL2DV**	**145.4 mc**
OZ2FR	**145.05 mc**	**DL3MH**	**145.62 mc**
DL6SW	**145.27 mc**	**DL6FX**	**145.9 mc**

Propagation Note

The recent good conditions on two metres apparently coincided with some short-skip on ten metres, and, as a result, there are those who seem to have imagined that there is some connection between the two—and, in fact, more than one VHF operator has been heard forecasting good two-metre DX as a result of hearing short-skip signals on ten metres. Now, nobody can say that there is nothing yet to be learned about VHF propagation, but it is generally recognised that short-skip signals on ten metres (as on the old five-metre band) are due to *sporadic-E* ionisation. This occurs at about 80 miles or so above the earth's surface and reflects signals of frequencies considerably above those normally returned by the ionosphere. As frequencies are increased, however, the ability to reflect becomes less, and the skip therefore lengthens and above 100 mc reflections are extremely rare and, in any case, would be over the maximum distances, *i.e.* about 1200 miles. The signals would also be very erratic and therefore subject to extreme fading. Such propagation is obviously not the answer to the recent two-metre records. These have been due to tropospheric phenomena, and results tie up nicely with the known weather conditions.

Signals travelling at very small angles above the horizontal only need a little bending to return them to earth, and such bending is possible in the first few thousand feet of the earth's *atmosphere*

SOME TWO-METRE FIRSTS

G/DL	**G3DIV/A-DL4XS/3KE**	**June 5, 1950**
G/EI	**G8SB-EI8G**	**April 23, 1951**
G/F	**G6DH-F8OL**	**Nov. 10, 1948**
G/GC	**G8IL-GC2CNC**	**May 24, 1951**
G/GM	**G3BW-GM3OL**	**Feb. 13, 1949**
G/GW	**G5MQ-GW5UO**	**Oct. 22, 1948**
G/ON	**G6DH-ON4FG**	**Sept. 25, 1948**
G/OZ	**G3WW-OZ2FR**	**June 1, 1951**
G/PA	**G6DH-PAØPN**	**Sept. 14, 1948**
G/SM	**G5YV-SM7BE**	**June 1, 1951**
GI/EI	**GI3GQB-EI2W**	**June 13, 1951**
GI/GM	**GI2FHN-GM3OL**	**July 1, 1949**
GI/GW	**GI2FHN-GW3ELM**	**July 8, 1949**
GM/EI	**GM3BDA-EI2W**	**June 12, 1951**
GW/EI	**GW2ADZ-EI8G**	**April 19, 1951**
DL/OZ	**DL6SW-OZ2FR**	**Mar. 4, 1951**
DL/SM	**DL2DV-SM7BE**	**Mar. 10, 1951**
ON/OZ	**ON4BZ-OZ2FR**	**June 3, 1951**

TWO-METRE DX MARATHON

Station	Miles
G5YV (SM7BE)	**602**
G2BMZ (DL4XS)	**520**
G3HAZ (OZ6PX)	**519**
G3DIV/A (OZ2FR)	**501**
G2XC (DL3MH)	**486**
G5BY (DL3FM)	**470**
G6CW (OZ2FR)	**452**
G3WW (OZ6PX)	**432**
G6LI (OZ6PX)	**428**
G3BK (DL3MH)	**411**

Minimum distance for this table is 400 miles. Claimants must submit NGR or Lat. and Long. for both ends of contact.

if the correct temperature and humidity gradients exist. These are the product of the complicated systems of depressions, anticyclone, troughs and ridges of pressure which make up our weather. The chance of the correct conditions existing are greatest during periods of high pressure, but they can occur at other times. In the extreme case, a duct is formed, and in this the VHF waves are trapped and guided round the earth's curvature. It was such an occurrence which almost certainly caused the wonderful two-metre conditions during early June.

It will be realised from the foregoing remarks that there can be no connection between short-skip on Ten and DX on Two such as we have recently experienced.

TWO-METRE ACTIVITY REPORT

G2AJ, Biggin Hill, Kent.

WORKED: DL1LH, F8AA, 8KF, G2CPL, 2CPT, 2DLJ/A, 2FNW, 2FO, 2IQ, 2OI, 3APY, 3AUS, 3DUP, 3BA, 3BK, 3BW, 3EHY, 3ENS/P, 3FIH, 3GUD, 3VM, 5JU/P, 5RW, 5SK, 5UD, 5YV, 6CI, 6CW, 6LI, 6XY, 6YU, 8GL, 8IL, 8KC, 8SB, GC2CNC, GM3BDA, GW2ADZ, ON4BZ, 4HN, 4IW, PAØAD, ØCAM, ØFB, ØFC, ØFP, ØLDG, ØOP, ØRK. (*All over* 100 *miles*).

G6CB, Wimbledon, Surrey. 144.88 mc.

WORKED: F8LQ, 8GH, 8NW, G2AVR, 2FNQ, 2FNW, 2HCG, 2OI, 2UQ, 2XC, 3ANB, 3BA, 3BEX, 3BNC, 3CCP, 3DUP, 3EHY, 3FAN, 3FQS, 3FUL, 3HCU, 4SA, 5BY, 5UD, 5YV, 6CI, 6GR, 6JP, 6KB, 8AX, ON4BZ, 4XB.

HEARD: DL1LH, F8AA, 9DI, G2CPL, 2KI, 2RI, 2XS, 2XV, 3CJY, 3EHB, 3ENS/P, 5BM, 5RW, 6LI, 8SY, GW3EJM, ON4AP, 4HN.

G3BEX, Southwick, Sussex.

WORKED: F8GH, 8NW, 9DI, 9MX, 9RL, G2AJ, 2AVR, 2BMZ, 2DGB, 2DSW, 2DVD, 2FTS, 2JU, 2MV, 2NH, 2XC, 3AUS, 3AVF, 3BNC, 3CGQ, 3DEP, 3BLP, 3FAN, 3FEX, 3FZL, 3GSK/A, 3HCU, 5DS, 5MA/P, 5RO, 5TP, 5UF, 6CB, 8IL, GC2CNC, GW3EJM, ON4AP.

HEARD: F8AA, 8KF, G2FKZ, 2HCG, 2MC, 3GHI, 3FD, 3GOP, 4HT, 6AG, 6NB, 6XM, ON4BZ. (*May* 1 *to June* 12).

G2HDZ, Pinner, Middlesex.

WORKED: DL1LH, G2AHP, 2AJ, 2AOK/A, 2DPD, 2DTO, 2FTS, 2FVD, 2HCG, 2IQ, 2NH, 2XC, 3AVO/A, 3EHY, 3FAN, 3GBO, 3GGJ, 3GHI, 3MI, 3ZI, 4MR, 4SA, 5BC, 5DS, 6GR, 6LX, 6NB, 8OU, 8SY, GW3EJM, ON4BZ, 4UV, 4XB.

HEARD: F8AA, 9AE, G2AVQ, 2FNW, 2UQ, 3ABA, 3BA, 3CZY, 3DIV/A, 3EHB, 3FQS, 3GAO, 5UD, 6LI, 6XY, 8AX, 8SB, ON4AP, 4HC, 4HN, 4IF, OZ2FR, PAØFC, ØFP. (*May* 1 *to June* 7).

G2XC, Portsmouth, Hants. NGR 41/760069.

WORKED: DL3MH, F8AA, 8GH, 8JR, 8NW, 9RL, G2CPL, 2IQ, 2WJ, 2XV, 3ABA, 3BA, 3BW, 3GAO, 3HAZ, 5SK, 6CW, 8SB, 8SY, GC2CNC, ON4AP, 4BZ, 4HC, 4HN, 4IW.

HEARD: DL1LH, F3LQ, 8KF, 9DI, PAØBAL, ØEO, ØFC, ØFP. (*May* 18 *to June* 12, *DX calls only*).

GW5MQ, Rhosesmor, Flint. NGR 33/209695.

WORKED: G2BUJ, 2FQP, 3BKS, 3DA, 3GMX, 3HII, 3VX, 4MW, ON4AP, 4BZ, 4HC, PAØFP. (*May* 9 *to June* 10).

G3BW, Whitehaven, Cumberland.

WORKED: G2AJ, 2NH, 2OI, 2XC, 3BA, 3BLP, 3CGQ, 3EHY, 4MW, 5DS, 5JU, 5MA, 5RW, 6LC, 6VX, 6XM, 8AX, 8OU, 8SB, GM2DRD, 3BDA, 3FOW, 3EGW, 3OL, 5VG.

HEARD: G2FTS, 2HGR, 2IQ, 2MA, 2UQ, 6LI, 6LL, 6NB. (*May* 11 *to June* 11).

G3VM, Norwich, Norfolk. NGR 63/182101.

WORKED: G2AJ, 2CPL, 2DLJ/A, 2FTS, 2FQP, 2NH, 2WJ, 2XC, 2XV, 2YU, 3BK, 3BLP, 3CFK, 3CGQ, 3CUA, 3DUP, 3ENS/P, 3FIJ, 3GX, 3WW, 4KD, 4PV, 5DF, 5DS, 5RP, 6LI, 6LX, 6WU, 8AX, OZ6PX, PAØOE, ØOP, ØPR, ØUP.

HEARD: G2FKZ, 2XS, 3AEP, 3ANB, 3BA, 3BEX, 3DIV/A, 3EHY, 3FXG, 3FZL, 4HT, 4MW, 5MA, 5MA/P, 5UM, 6NB, 6UJ, 8SY, OZ2FR.

G3EYV, S.W. London. NGR 51/301751.

WORKED: G2AHP, 2AJ, 2DTO, 2FKZ, 2FVD, 2HDY, 2NH, 2XC, 2XV, 3BLP, 3CGQ, 3FD, 3FQS, 3FYU, 3FZL, 3GBO, 3HCU, 3SM, 4DC, 4MR, 5DF, 5LQ, 5MA/P, 5PY, 5UM, 6CB, 6GR, 6NB, 6NF, 6QN, 6UH, 8HY.

HEARD: G2IQ, 3ABA, 3BA, 3BNC, 3CCP, 3DIV/A, 3DVD, 3ENI, 3HSC, GW2ADZ, 3EJM, ON4BZ, 4HC, 4IF, PAØFC. (*May* 14 *to June* 11).

G5LI, Hampstead, London.

WORKED: F3LQ, 8AA, 8KF, 8NW, 9DI, G2ATZ, 2HCG, 3AUS, 3BA, 3FIH, 3GOP, 4SA, GC2CNC, ON4BZ.

HEARD: G2DLJ/A, 3AHX, 3HAZ, 4RK, 6CI, 6YU, 8DM/A, ON4AP, 4HC, 4HN, 4UV, PAØFB.

G3HCU, Chiddingfold, Surrey.

WORKED: G2AHP, 2AJ, 2ATZ, 2DTO, 2DVD, 2FNQ, 2FKZ, 2FTS, 2HDJ, 2KI, 2NH, 2XC, 2XV, 3AHX, 3ANB, 3AVO/A, 3BA, 3BEX, 3BHS, 3BLP, 3ECA, 3EYV, 3FAN, 3FD, 3FEX, 3FZL, 3GBO, 3GDR, 3GOP, 3GX, 3HCK, 3HSC, 4MR, 5DF, 5DS, 5LI, 5LQ, 5MA, 5TP, 5UD, 5UF, 6CB, 6LR, 6NB, 6QN, 6UH 6XM, 8AX, 8IL, 8KZ, 8LG, 8OS, 8OU.

GC2CNC, Jersey, Channel Islands.

WORKED: G2DSW, 2NH, 2XC, 3BEX, 3BHS, 3BLP, 3BNC, 3FAN, 3GOP, 5BY, 5LI, 6LK, 6NB, 6XM, 8IL.

HEARD: G3CFR, 3GRA, 8LY. (*May* 24 *to June* 10).

GW3ENY, Llandudno, Caerns.

WORKED: G2CYN, 2OI, 3DA, 8SB.

HEARD: G3AGS, 3BW, 5KX, GW2FVZ, 5MQ. (*May* 11 *to June* 11).

GW3ENY/P, Great Orme, Caerns.

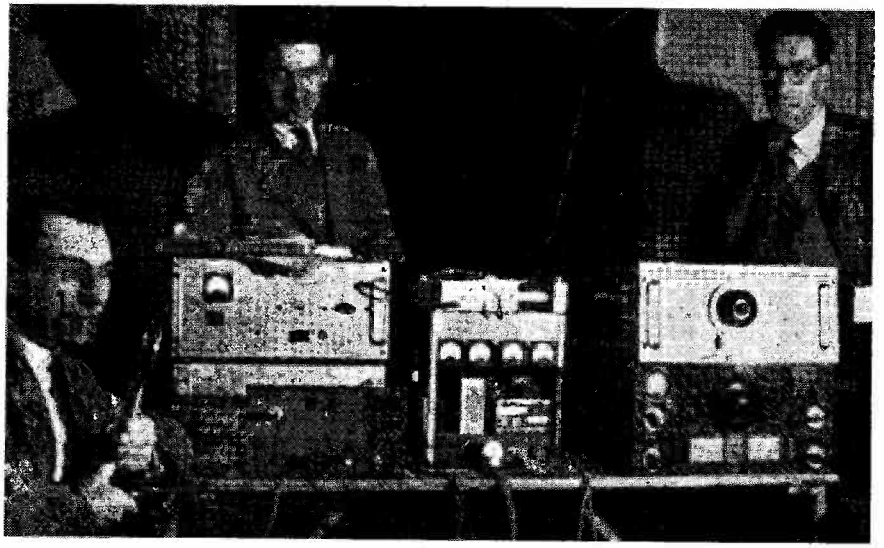
WORKED: EI8G, G3ATZ, 3DA, GW5MQ.

HEARD: EI2W, G2OI. (*June* 11).

G3AVO/A, Watlington, Oxon.

WORKED: G2AHP, 2HDZ, 2IQ, 3BA, 3BNC, 3CCP, 3EHB, 3ENS/P, 3FAN, 3GHI, 4MR, 4SA, 5DF, 5DS, 5MA/P, 5RP, 5TP, 6KB, 6XM, 6XY, 8OU, GW3EJM.

HEARD: G2AJ, 2AK, 2AOK/A, 2BUJ, 2DVD, 2FNQ, 2FNW, 2FTS, 2OI, 2RI, 2UJ, 2XC, 3BLP, 3DJX, 3DUP, 3EHY, 3FFX, 3FQS, 3FZL, 3GHS, 3GBO, 3HAZ, 4HT, 5MA, 5UM, 5YV, 6CB, 6LX, 6VX, 6YU, GW2ADZ, ON4BZ.



A 70 cm set-up at G3ASR on April 18 last, when a Seventycem demonstration was given to the Edgware Club "for one night only." G2DD is on the microphone and the 70 cm transmitter is in the centre of the array of gear.

Around the Stations

EI2W (Dublin), who has been making VHF history in Eire, has a 4-element beam with folded dipole feed. The transmitter line-up is EL91-N77-N77-832-829B. Although EI2W does not say so himself, it is gathered from others that he is using VFO, or at least, is not CC. The receiver uses two RF stages, the first a 6AK5, and then a 6J6. The mixer is 6AK5 and oscillator 6C4. Incidentally, he remarks that he knows he is called by many stations, but they often make the mistake of continually repeating "EI2W" and not giving their *own* call until they have faded out!

GM3BDA (Airdrie) sends us the following GM frequencies:—

GM3BDA 144.46 mc	**GM3NG 144.2 mc**
GM3EGW 144.25 mc	**GM5VG 144.18 mc**
GM3ENJ 144.18 mc	**GM6ZV 144.2 mc**
GM3FOW 144.2 mc	

All of these have been active recently, and he suggests the best time to look for GM's is 2200 to 2300. The GM beams, he says, seldom aim in any direction other than South! GM3DIQ (Saltcoats), in spite of a schedule with G3BLP, did not manage to get through to G during the opening on June 8. Both GM3DIQ and GM3DDE are putting up new aerial arrays, being composite systems for 2 metres and 70 centimetres.

GW3ENY (Llandudo) has been active every night from May 11 to June 11 and had a total of 7 contacts. However, he is operating /P on Monday evenings from 2100 to 2300 from the top of the Great Orme, and from there has worked EI8G.

Northern England

G3BW (Whitehaven) had the misfortune to lose his beam in a gale on May 27, and so missed the great June 1 to 4 session. By June 6 he was back on the band and once more putting a good signal into southern G. He considers contacts with G2XC and GM2DRD (Angus) the highlights of the month for him. (He also asks, "Where is G5BY?"). G2FO, G2FTS, G3WW, G6LI, all heard, are desired for new counties. G3BW, who is on 144.25 mc, has a nightly schedule with G3BA at 1900. He would be glad to see any of the VHF "boys" who visit the Lake District this summer.

G6LI (Grimsby), who was well in on the great DX openings, considers a duct began by opening from the East Coast to Sweden and this slowly travelled

TWO METRES
ALL-TIME COUNTIES WORKED LIST
Starting Figure, 14
From Fixed QTH only

Worked	Station
49	G2OI (232)
48	G3BLP (430)
46	G2AJ (375), G3EHY (250)
44	G5WP
43	G3COJ (123), G6NB
42	G2NH (341), G3ABA (193), G5MA
40	G3CGQ, G8SB
39	G2IQ, G3BA, G3WW, G4HT (344), G6XM (208)
38	G2XC (325), G3APY, G5BM, G5BY
36	G3CXD
35	G6LK
34	G2CPL (288), G3VM (170), G4AU, G4DC, G5JU
33	G2FNW, G2XS (147), G5DS (230)
32	G3BK, G3BW, G6CW, G8IL, G8IP G8WV
31	G2CIW (231), G5RP
30	G3BOB, G4CI, G5NF (201), G6YU, G8SM
28	G2DLJ/A, G5YV (132)
27	G3AKU, G3DAH, G6CB (224), G6UH, G8QY
26	G3BHS, G3FAN, G4NB, GW5MQ, G5SK
25	G3GSE, G5UM (163)
24	G2AIQ, G3FXG, G4SA, G5LI (210), G6CI, G8KL
23	G2NM, G4RO, G5PY
22	G3GBO (189), G4RK, GM3BDA
21	G2HDZ, G3FD, G3FMF, G4MR (114)
20	G2ANT, G3AEP, G3EYV (142), G8KZ
19	G3BNC
18	G2AHP (188), G3HCU, GM3OL
17	G3HBW, G5MR, G6XY
16	G2AOL, G5LQ
15	G2DVD, G2AVR, G3AVO/A

NOTE: Figures in brackets after call are number of different stations worked. Starting Figure, 100.

South. He is now looking for Norway and Switzerland! G5YV (Leeds) has worked 132 stations and 6 countries during his first six weeks on the band, as well as being the holder of the European DX record.

The East

G3VM (Norwich) worked OZ6PX, while others were queueing for OZ2FR. He disagrees, or rather does not understand, G3GBO'S remarks regarding CW contests. He considers phone is not the best way to work DX, and points out that phone takes up too much room in a congested band (G3BW says much the same). Regarding G3AKU's remarks asking for less CQ'ing, G3VM suggests that it is no use just listening during *normal* conditions, as everyone else is doing that! G3WW (Wimblington) had a number of troubles during late May. The feeder came off the 5-over-5, the 6J6 RF stage died in the receiver, several valves in the IF strip did likewise, and five by-pass condensers in the BC348 succumbed. In addition to his DX achievements already mentioned, he heard and called DL3MH on June 4. G3WW now wants F, GW, GI, EI, SM, Glamorgan, Northumberland, Cumberland and Cornwall. So perhaps some of you will oblige? G3CUA (Luton) is back once again from VK and is active on Two; he has an 832 with 20 watts and a 3-element beam. G3CGQ (Luton) heard G5YV calling SM and LA; he is still using 25 watts to an 832 with a bi-directional 8-element stack, and also a 4-element Yagi. Both aerial arrangements have their advantages, he says.

The Midlands

G5JU (Birmingham) has worked G3BW for a new county. He hopes conditions favour him on July 8, when he will be portable in Carmarthenshire. G3HAZ (Birmingham) apologises for being on 144.735 mc, but says it is the result of a little amateur crystal grinding. In an attempt to take just a *little* bit more off the quartz, he jumped it into the next zone! G3HAZ now has 4-over-4 Yagis and eventually hopes for 6-over-6-over-6.

G2HOP (Wothorpe) worked OZ2FR at 2200 on June 1, and again at 0730 June 2. Signals at the latter time were S9 plus both ways. G6YU (Coventry) had his first experience of a two-metre Continental opening; he was able to work PAØEO, a personal friend. G6CW (Nottingham) was called many

Another VHF Dinner photograph (London, April 14). Left to right: G3FSD, G4CG, G3EYV, G2DTO, G6CB, G6QN—all members of the South London VHF Group.

times by a station to his north-east on June 1, but was unable to get the call. Amongst the letters heard were O, H, L, A and the figure 2; at least two *very* nice DX calls could be made out of this! On one or two occasions G6CW has heard London stations working G3BW when the latter was very weak in the Midlands. G6CW is using 24 watts to SCR-522 and a 4-element Yagi at 33 feet.

South-West

G8ML (Cheltenham) is also running an SCR-522 on phone and CW, and has a 6-element wide-spaced Yagi 50 feet high; he is badly screened by the Cotswolds. G3FKO (Bath) is in a second-floor flat of a 4-storey house, so aerials are a problem. GW3EJM has been worked with 6 watts input. G8DX (Bath) is also becoming interested, but again is in a bad location, there being a 300-foot cliff overhanging his house. G3FIH (Radstock) continues active, as also does G5QA (Exeter). G3EHY (Banwell), who, together with all the other Somerset stations, was accidentally omitted from last month's Activity List (*earth on our head again*!) was somewhat disheartened at being outside the area which enjoyed the Continental DX. However, as some compensation, phone contacts with EI2W and G3BW were made. He reports that EI2W calls CQ nightly at 2200, 2215, 2225, 2300 and 2330 BST. G5BY only heard two ON's and one PA during the June 4 opening and was obviously right outside the area of the opening.

South-East

G3HCU (Chiddingfold) has changed frequency to 144.803 with 145.377 mc as alternative in order to avoid other local stations; his 5-element Yagi has been raised to 55 feet. G3BLP (Selsdon) asks if GC2CNC counts as another county. The answer is Yes! G2NH (New Malden) worked 15 counties in his first 15 contacts in the recent contest. G5MA (Ashtead) hopes to be /P in Brecknockshire on July 8. G6CB (Wimbledon) was there for the European opening. G3ENI (Kew Gardens) has completed a new converter using neutralised triode connected 6AM6, GG 6J6, and 6J6 mixer and oscillator. Controlled carrier constant modulation is in use and reports on this would be appreciated.

G8LN (Plumstead) heard the DX, but his 7 watts did not raise it. He has been hearing G8AX well, and now contemplates an increase in power. G3EYV (S.W. London) has heard Continentals, but, having to be up early in the morning, could not stay on to work them; he now has 100 QSL's for two metres. G3FD (Southgate) having raised his aerial to 45 feet, can now hear more than he can work; he hopes to be /P at Dunstable on July 8. G2AJ (Biggin Hill) was there to work the DX on June 4, and raised a total of 15 stations in DL, F, ON and PA; he has 12 half-waves in phase stacked in pairs 60 feet up.

G2AHP (Perivale) asks for a "Countries Worked" table. (We will

list anyone with 8 or more worked!) G2HDZ (Pinner) was disappointed but not surprised at the lack of entries from high-power stations in our April Contest. He has worked several new counties and countries. G4MR (Slough) missed the good spell and is now on 144.684 mc. G4SA (Steventon) heard OZ and SM as well as the nearer Europeans. He called several but had no luck. G3AVO/A (Watlington) has the Chilterns rising 400 feet above him a mile away, but finds they do not make much difference; he has worked south-coast stations. G5LI (Hampstead) has completed a G2IQ converter, and feels it has been worth the effort. The beam has also been tuned up and the driven element is now delta-matched. This is found to be much easier to adjust than a folded dipole system.

Channel Islands

GC2CNC (Jersey) is at the south-eastern tip of the island; his best DX, when he wrote, was G6NB, but it is believed he worked G3BA later. He asks to be placed in Zone H and not I, where we put him last month. It is intended to operate on 145.44 mc shortly, and GC3FSN will be on 145.26 mc; both of them will be glad to meet any VHF lads who visit GC on holiday. '2CNC asks for his thanks to be conveyed to all for their patience with him, and he would appreciate any suggestions for curing 10 mc break-through on the IF.

Continental

ON4BZ asks to be excused for the brevity of his contacts on June 4, but there were so many G's after him that speed was necessary to enable him to work as many as possible. DL3MH (Celle) remarks that there is plenty of DL activity every night from 2030 to 2200 GMT. DL2DV (Fassberg) missed the great opening, being away during that week, but has now worked 17 stabilised transmitters. He tells us that OZ2FR worked 27 G's as well as numerous PA and ON stations. '2DV has noticed that good conditions for N-S working coincide with the trailing edge of a high.

During the period June 1-5, OZ2FR reports working the following G's: G2ATK, G2FNW, G2HCG, G2HOP, G2UQ, G2XV, G3AKU, G3BA, G3CJY, G3DIV, G3DMU, G3DUP, G3FFC, G3HAZ, G3WW, G4MW, G5UD, G5YV, G6CW, G6LI, G6XY, G8QK and G8SY. OZ2FR beams S/W every evening from 2100 to 2130 BST; he sends us an interesting map which shows that OZ1WP is on Zealand, which is north-west of Copenhagen; this means that many of the stations listed in the new "Two-Metre DX Marathon Table" (*see* below) which was prepared before OZ2FR's letter was received, have actually worked longer distances than those with which they have been credited; and, similarly, his list of G's worked indicates others who should be in this Table.

SM7BE also writes of his experiences and remarks that he works OZ2FR almost daily at 2100 BST; on June 1-2, G6LI was heard and called before G5YV was received. The SM7BE transmitter runs an 829B PA, and the

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1950
Starting Figure, 14

Worked	Station
40	G3CGQ
39	G3BA, G3EHY
36	G3WW, G5MA
35	G2AJ
33	G3ABA, G4HT, G5DS
32	G2XC
31	G2FNW, G2OI
30	G6CW, G6YU
29	G8IL
28	G2DLJ/A, G2NH, G5YV
27	G3VM
26	G2CPL, GW5MQ
25	G3AKU, G3GSE, G5UM, G6CB
24	G3BW, G4SA
23	G2XS, G3FAN, G8IP
21	G2HDZ, G3BOB, G3COJ, G3FD
20	G3GBO, G4MR
18	G2CIW, G3EYV, G3HCU, G5PY
17	G2AHP, G2ANT, G3HBW, G6XY
15	G2DVD, G3AVO/A

Note: This table will run for one year to August 31, 1951

Rx is two 6J7 GG stages into 6AK5 mixer, with 6J6 oscillator, with an HQ120X as main receiver and a 5-over-5 aerial. He sends greetings to all VHF G's, and we are sure readers will wish us to congratulate him on his fine QSO with G5YV.

DL4XS says that he missed the good openings reported above because of power pack trouble on Radio Hill. However, he is back again with a 450-watt PA and has *removed the modulator* so as to be able to concentrate on CW-only DX, and avoid being tempted into phone chats with locals; they have perhaps not realised that to operate from Radio Hill means for him a round trip of some 64 miles, so that VHF operating time at DL4XS is understandably valuable!

Seventycems

G5BY (Bolt Tail) has a new 30-element beam up for 70 cm. It consists of six 5-element Yagis; local measurements show it to be vastly superior to the previous 24 phased dipoles and reflectors. On June 6 G5BY worked G3CGE (119 miles) for a very fine two-way phone contact. G3CGE was S8 on the new beam, and also S8 on two metres. G5BY has been carrying out some 430 mc tests with G3BEX (Southwick), but so far without success.

G3DA (Liverpool) has a receiver consisting of 446B RF stage, ASB8 mixer cavity, crystal diode and crystal-controlled oscillator; the head-IF amplifier is a 6AG5. His transmitter uses an 832A, and best DX worked is G2JT (35 miles), while G2OI, G3ELT and GW5MQ have also been contacted. G3DA would like more Seventycem activity and asks for schedules to the east and towards Oswestry. A number of aerials have been compared, and so far a Yagi is preferred. A receiver for 23 cm is now under way.

G3EHY has been heard once again by G2DD, and now has a 32-element beam in operation. GW5MQ (Mold) is hearing G3VX (Preston) well.

In a long letter, received just as we closed this for press, DL4XS raises a number of interesting points in connection with Seventycem equipment and operation—his main argument being that conditions should now be coming right for real DX on 70 cm; he gives his fixed frequency as 434.700 mc and his receiver tuning range as 434-436 mc; he asks that, if possible, G's call him within this range, and he would also be very glad to have the fixed 70-cm frequencies of individual G stations. What it amounts to is that Joe means business on Seventycems, and will be on Radio Hill looking for us on 434-436 mc whenever conditions seem like being right.

Sayings of the Month

"Have not had time yet to get the latest gen on Two on 80!" (G3VM) . . . "As only EI8G is regularly active, you can imagine the hours spent hollering into thin air over two years on an empty band" (EI2W) . . . "Another thrill was to have two big fish, G2AJ and G3BLP, on the hook at the same time" (G3BW) . . . "I shall always be indebted to G8IL, whose true spirit of comradeship is a pleasure to meet" (GC2CNC) . . . "It is a horrid thought that probably the next real European opening that covers us all is 12 months away" (G3CGQ) . . . "The colossal signals that were sailing overhead here on phone during the peak periods of the scramble were simply amazing" (G3HAZ) . . . "I did hear GD3UB mention on 20 metres that he is quite willing to have a bash on Two, as he has 3 transmitters, but no receiver" (BSWL-4051) . . . "I shall be ever grateful to those people sending in a score lower than my own in the *Magazine* contest" (G3EYV) . . . "There seems two trends on Two—strict DX hunting when DX is about, and, when the band is dead, long local QSO's which are mainly natter" (G8LN) . . . "How on earth everyone found out the band was open I just do not know" (G6CB) . . . "Why waste a whole page on 2-metre calls worked and heard?" (G5BY) . . . "QRZ? means 'Who is calling me?' and should only be used when a station has been heard calling you, but whose call-sign you have failed to copy" (G2QY) . . . "Here we think *Short Wave Magazine* is best" (ON4BZ).

With a long story this month and heavy pressure on our space, it has not been possible to show the usual Activity by Zones and Counties Table—but it will reappear next time. And, again, we have to thank numerous correspondents for useful, interesting Calls Heard lists, not all of which could be included in the Activity Report.

As a matter of general interest, a table headed Two-Metre Progress has been prepared, which speaks for itself, and we also propose a new ladder, to be called Two-Metre DX Marathon;

the necessary calculations to start this off have been done on the latest available information, and this Table appears herewith. It also explains itself, and we hope those who qualify will let us have their claims. Collectively, our various Tables now comprise a record of VHF activity and achievement in the statistical sense, for which purpose alone they are of the greatest value, apart from the fact that they also keep everyone informed as to how things are going.

In Conclusion

The Dutch VHF Contest is scheduled for September 22-23 and 29-30. As mentioned here in June, it was thought to organise a contest in collaboration; but their rules make this PA Contest open to all in Europe, so details will be given next month, for which issue latest date for all reports is **July 11** and the address E. J. Williams, G2XC, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. We meet again on August 3, so till then 73.

G1BF Here

ALL GOOD STUFF

Met old pal MO1FFI knocking 'em back in local other evening, and he said You worked XQ6BF/PM yet? Knowing this one of *my* exotic calls, immediately said Yes he gave me RST589xx no trouble at all QTH here Greek island. MO1FFI bit nonplussed said Funny when I heard him he was S99 about T3 sounded like European pirate on Ten short-skip. This gave me idea—will work some Ten in future and give boys bit of DX thrill using XQ6BF/PM (this will of course be me G1BF).

Arising my comments last month am now involved furious correspondence with editor *Communistratzblah* on politico-legal aspects my bash-bash 813 patents. In Zone 16 G1BF now rated enemy of people and tool of monopolist —editor *Communistratzblah* says that in Zone 16 unbelieving deviationist anti-proletarian obstructionists like G1BF with reactionary neo-fascist tendencies to express own opinion always either shot or posted Zone 23 to work out salvation. Correspondence still proceeding.

Am now working on new patent (Box 88 pse note) to drive Rx tuning, VFO-Exciter and auto callsign sender on same shaft. PA so heavily loaded already that output retuning not necessary when changing frequency. Tests with new gear very satisfactory so far and FB reports from Zone 16 — "Ur ur RST599x 599x 599 RST599x FB FB dr dr OM OM pse pse QSL QSL dr dr OB OB via via Box Box 88 88 hr hr sure sure QSLL QSLL tnx tnx dud-dud-dud-dah-de-dah" is only sample reports received when signing PQ1ZZ, AKS6LE/A and SS5HS.

More useful advice next month so dud-dud-dud-dah-de-dah.

(The man is quite mad and ought to be shot.—Editor).

"OTHER MAN'S STATION"

Readers are again reminded that we are always interested to see descriptions "in own words" for this popular feature, but it is essential to send in a good sharp photograph (print or negative) with the story. Payment is made for all such material used.

MAP FOR DX

Our *DX Zone Map* is still the only thing of its kind available to the DX enthusiast, giving full details of the Zone System as well as being a great circle map of the world, in five colours, for wall mounting. The *DX Zone Map*, at 6s. post free, has been a steady seller for several years, and will be found displayed at many amateur stations. It comes to you carefully packed in a cardboard "postal tube," and can be obtained on order to The Circulation Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

BOOKS FOR REFERENCE

The last few copies of our *DX Operating Manual* (2s. 8d. post free) and *Principles of Short Wave Reception* (1s. 8d. post free) are now being cleared and will be found to be of particular interest to the beginner. Their titles indicate scope and coverage, and they are invaluable for general reference purposes. Order of The Circulation Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HERE & THERE

Reminder — New QTH

Will correspondents kindly note that our address is now **55 Victoria Street**, London, S.W.1 (ABBey 2384), to which all mail should be directed, including correspondence for the regular news-feature articles. The *Magazine* departments are: Editorial, Advertising, Circulation, DX Commentary, VHF Bands, QTH Section and Club Secretary. All general correspondence outside these departments should be marked for the attention of the Editor, and the address of our QSL Bureau is BCM/QSL, London, W.C.1. And it is *not* true that we also have trap-doors labelled "Moans & Groans" and "L.T.B.W."

New Call Books

Our last issue carried on p.227 detailed information regarding the new publication arrangements for the *Radio Amateur Call Book*; it is now available in three separate versions: Complete, as at present published, at 20s. post free; Foreign Section only (all-world but less the W listings) at 8s. 6d. post free; and the *G Call Book*, containing only the U.K. lists, at 4s. 6d. post free.

To make sure of appearance in all three versions of the world-wide *Radio Amateur Call Book*, new G call-sign/addresses and changes of address should be sent in promptly to QTH Dept., *Short Wave Magazine*, since we are sole U.K. forwarding agents for the G Section.

Radio Control of Models

This is becoming a new field of activity for numbers of radio amateurs, and there are now several club organisations which combine the twin interests of model engineering and the radio control of models. This is as it should be, since few model engineers are really *au fait* with what can be done on the radio side, and likewise most radio amateurs are without experience of the engineering aspects of modelling. Bands have been specially allotted for low-power radio control channels, and some interesting circuits have been devised. Our well-known contemporary, *The Model Engineer*, will be staging—at the New Royal Horticultural Hall, Westminster, during the period August 22-September 1—an Exhibition, of which the chief feature will be radio-controlled model aircraft, ships and tanks.

Radio Research Station, Slough

Once again, D.S.I.R publishes an informative and interesting report covering activities at Slough during 1949. The Director of Radio Research is Dr. R. L. Smith-Rose, D.Sc., Ph.D., M.I.E.E., F.I.R.E., and one of the studies dealt with in detail in his Report is that of Radio Wave Propagation; this is fully discussed under the headings (among many others) of ground wave range, tropospheric propagation, the characteristics of the ionosphere, and the correlation of solar noise with ionospheric conditions. The price of *Radio Research 1949* is but 1s. 9d., of the Stationery Office or through any bookseller.

Useful Catalogue

The new component parts and equipment catalogue issued by M. Watts & Co., 8 Baker Street, Weybridge, Surrey, will be found well worth having; it is fully detailed, and available on request.

An Interesting Converter

The current (July) issue of our *Short Wave Listener & Television Review* carries a detailed descriptive article on the construction of a high-gain fix-tuned VHF converter for the reception of the BBC's 93.8 mc AM transmission from Wrotham, Kent. Apart from the experimental interest of the transmission in terms of the ranges that might be obtainable—the station is well situated and high powered—and its possible entertainment value (normal BBC programmes are radiated), at that frequency the transmission is particularly useful as a check signal on VHF conditions.

GB3FB at Leeds

The F. of B. Land Travel Exhibition opened at Leeds on June 23, with G6KU and his crew in charge of GB3FB in the Amateur Radio booth. The exhibition remains there until July 14, and no doubt many readers in the district will take the opportunity of visiting the station.

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.

G2FHT H. R. Clough, 244 Ashton Road, Oldham, Lancs.

G3CFV F. T. Gay, 2 Larkhill Avenue, Yeovil, Somerset.

G3FEG C. A. Young, B.Sc., 32 Crown Lea Avenue, Malvern, Worcs.

G3FWB P. L. Hunt, 39 Antrobus Road, Handsworth, Birmingham 21.

G3FYN The Guilford Secondary Girls' School Amateur Radio Club, The Guilford School, Nottingham.

GM3GQG D. R. M. Cowan, 140 Cambridge Street, Glasgow, C.3.

G3HDS R. N. Lawson, 25 Birds Hill, Letchworth, Herts.

GM3HFU A. I. Morrison, 134 Duff Street, Macduff, Banffshire.

GM3HHL H. Cowie, 24 Garden Street, Macduff, Banffshire.

G3HIS G. Berrisford, 4 The Flats, Wyaston Road, Ashbourne, Derbyshire.

G3HJL F. R. Bailey, 41 Drayton Road, Boreham Wood, Herts.

G3HJQ J. W. Stainsby, Perrstain, Fairmoor, Morpeth, Northumberland. (*Tel.: Morpeth* 303).

G3HJT V. Totten, 77 Horsham Avenue, Kinson, Bournemouth, Hants.

GM3HJV D. C. McInnes, 3a Airport, Wick, Caithness.

G3HJY R. A. Houtby, 37 Clifton Avenue, Peterborough, Northants.

G3HJZ S. G. Dade, St. Loyes College, Exeter, Devon. (*Tel.: Exeter* 55428).

G3HKB K. E. Norris, 6 Lyoth Villas, Lindfield, Sussex.

G3HKC G. Nicholson, 91 Court Lane, Erdington, Birmingham 23.

G3HKF G. R. Singleton, 8 Pendle View, Grindleton, nr. Clitheroe, Lancs.

G3HKH M. J. F. Harrison, 66 Grant Road, Battersea, London, S.W.11.

G3HKK G. H. Rathbone, (*ex- MD7GR*), 124a Bridge Street, Peterborough, Northants.

G3HKL P. G. Taylor, 22 Eton Road, Harlington, Hayes, Middlesex.

G3HKM D. S. Wigglesworth, The Gables, Mt. Pleasant, Cambridge.

G3HKO D. A. Wood, 5 Spencer Avenue, Coventry, Warks.

G3HKP Rev. T. G. R. Hughes, The Vicarage, Seaview Avenue, West Mersea, Colchester, Essex. (*Tel.: West Mersea* 303).

G3HKQ V. Westmoreland, 29 School Road, Langold, Worksop, Notts.

G3HKV E. H. Page, 35 Victoria Grove, Bridport, Dorset.

G3HKX D. W. Wooderson, 39 Woolwich Road, Bexleyheath, Kent.

GM3HLA C. Hawthorne, 47 Clouston Street, Glasgow N.W.

G3HLB J. Horton, 61 Westfield Crescent, Thurnscoe, nr. Rotherham, Yorkshire.

G3HLF P. F. Jobson, 13 Brandon Street, Gravesend, Kent.

G3HLI S. R. Bradford, 18 Newey Road, Wyken, Coventry.

G3HLP G. A. Brown, 110 Tarvin Road, Chester, Cheshire.

G3HLR A. D. Dickins, 37 King Edward Street, Scunthorpe, Lincs. (*Tel.: Scunthorpe* 4217).

G3HLX G. H. Matthews, 30 Ringstead Road, Catford, London S.E.6.

G3HLZ E. G. Gwilliam, 95 Mill Lane, Chadwell Heath, Essex. (*Tel.: Seven Kings* 8846).

G3HMC L. H. Waine, 27 Summerleaze Park, Yeovil, Somerset.

G3HMF G. Kenyon, 41 Rushford Street, Longsight, Manchester 12. (*Tel.: Rusholme* 2469).

G3HMH J. Shilling, c/o 9 Melbury Road, Bilborough Estate, Nottingham.

GM3HMU W. L. McIntyre, 5 Bayswell Park, Dunbar, East Lothian.

G3HRO C. J. Salvage, 2 Cedar Road, Bromley, Kent.

G3HRT R. G. L. Tillett, Yew Tree Cottage, Horning, Norwich, Norfolk. (*Tel.: Horning* 240).

G3HIA S. Johnson, The Green, Westerham, Kent.

CHANGE OF ADDRESS

EI5B R. J. Toby, 67 Ranelagh, Dublin, Eire.

G2BPW I. W. K. Smith, 43 Whitethorn Avenue, Coulsdon, Surrey.

G2CFC R. G. Frisby, 25 Knighton Rise, Leicester. (*Tel.: Leicester* 76512).

G2CUR Capt. V. H. Thomas, 3 West Avenue, Wigston, Leicester.

G3ABG/A C. J. Morris, Walsall Road County Boys' School, Wallhouse Street, Cannock, Staffs.

GD3AGC W. A. Curphey, 54 New Housing Estate, Ballasalla, Isle-of-Man.

G3AQB W. Stephenson, Post Office, Belford, Northumberland. (*Tel.: Belford* 1).

G3BED A. E. W. Bennion, 18a Station Road, West Drayton, Middlesex.

G3CHE L. H. Brown, (*ex-GM3CHE*), 134 Fleminghouse Lane, Waterloo, Huddersfield, Yorkshire.

G3DEB T. A. Bennett, 6 Holmdene Avenue, North Harrow, Middlesex.

GM3DOD A. M. Murray, 6 Vernon Terrace, Greenock.

G3DZT J. H. Beamand, 101 Valley Lane, Wissage, Lichfield, Staffs.

GM3EAK R. Macfarlane, B.E.M., Millbank, Victoria Street, Forfar, Angus.

G3EGF T. Kellett, 145 Salters Road, Gosforth, Newcastle-on-Tyne 3.

G3EJR J. B. Armstrong, 40 The Oval, Mirehouse, Whitehaven, Cumberland.

G3FAR R. A. Reynolds, 2 Louise Drive, Fenton, Stoke-on-Trent, Staffs.

GD3FOC L. A. Higgins, Harwal, Victoria Road, Castletown, Isle-of-Man. (*Tel.: Castletown* 2212).

GD3FXN A. D. Radcliffe, 12 Westminster Drive, Douglas, Isle-of-Man.

G3JG D. R. Spearing, 23 Meadow Road, Claygate, Surrey.

G5BT/A C. W. Crook, 12 Manorfield Close, Capenhurst, nr. Chester.

G5IG C. H. Babbs, Bull House, Linton, Cambs.

G5WB C. A. Webb, Thatch End, Staple, Canterbury.

G5WW P. M. Carment, Assoc.Brit.I.R.E., Nethercote, Totteridge Lane, High Wycombe, Bucks.

G6DW D. H. Johnson, Beechcroft, Hollybank Road, West Byfleet, Surrey. (*Tel.: Byfleet* 2936).

G8KW R. G. Shears, 80 Ashmore Grove, Welling, Kent.

G8UG J. K. Coomber, M.P.S., 23 Bramcote Avenue, Mitcham, Surrey.

The Month with the Clubs

FROM REPORTS RECEIVED

This month, owing to the unusually early deadline and the rival attractions of open-air events, we find only 21 Clubs reporting. All of them appear to be busy with both indoor and outdoor events during the summer, and we have no doubt that the rest also continue to flourish.

We wish to acknowledge receipt of the following interesting Club Circulars: *CQCF* (Cardiff), *Brighton Link, Midland News Letter, Wirral Newsletter.*

Please note that next month's deadline is even earlier —first post on **July 11**. For the following month it will be *August* 15. We shall still be glad to see photographs of all kinds, dealing with meetings, field days and other Club events. They need not be large, as long as they are sharp.

And in the next issue we shall be announcing dates and other preliminary details for the Sixth M.C.C., the annual *Short Wave Magazine* Club Transmitting Contest on the Top Band.

The address for all material for this section is: "Club Secretary," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1.

And now for this month's reports . . . .

Medway Amateur Receiving & Transmitting Society.—On July 15 this society holds its Festival Hamfest; last year's gathering was attended by some 200 people. and even more are expected this time. It begins at 3 p.m. at the Co-operative Hall, Luton Road, Chatham, and admission is free. And someone will leave the richer by an ET4336 Transmitter! Ordinary meetings are on Mondays at 8 p.m. On July 9th and 23rd they will be at 17 Five Bells Lane, Rochester, and on the 16th and 30th at the Co-operative Hall, Chatham.

North Kent Radio Society.—Main interest last month centred round the Bexleyheath Hobbies Exhibition, at which the Club Tx, G3ENT/A, was in operation. The week finished with nearly 30 amateurs round the stand, and an unofficial Hamfest resulted!

Stourbridge & District Amateur Radio Society.—The society entered two stations for Field Day on June 2nd and 3rd, and on June 5th members enjoyed a C.O.I. Film on The Cathode Ray Tube. Meetings continue to be well attended and enthusiasm is increasing.

Waterloo Radio Society (Manchester.)—This newly-formed Club meets on Tuesdays at 7 p.m., and it is hoped to promote a lively interest in all aspects of radio. Morse classes have begun, a Club library is organised, and a member has lent a BC348, which will be in action as soon as possible. The programme includes lectures and constructional work, for which facilities are provided. New members will be welcomed—see panel for QTH of Secretary.

Watford & District Radio & Television Society.—At the next meeting, on July 17, G2HAR will talk on Radio Fundamentals. Recent meetings have included a Junk Sale, a talk on Test Gear by G6GR, and a Film Show.

Reading Radio Society.—At a recent meeting there was a recorded lecture (by G3BML) on Tape Recording. Demonstrations included bird songs, dance music and amateur QSO's. On June 30 a Top-Band D-F Contest was held, and on July 28 the subject will be Radio Control of Models. On the second Saturday in the month instructional meetings are held.

Kingston & District Amateur Radio Society.—Members had an enjoyable open-air week-end for Field Day, and on June 6 a Junk Sale was held and proved very popular. Future events include talks on Communications Receivers, Hi-Fi Reproduction and a demonstration of long-playing records. Morse classes are also held regularly, and the club hopes to run its own station in the near future. Meetings are held on alternate Wednesdays at 5 Penrhyn Road, Kingston, and visitors are welcome.

Gillingham Telecommunications Society.—A recent lecture by G2FAQ covered the Electronic Interval Timer, and forthcoming talks will be on The F-M Oscilloscope, Home Production of QSL Cards, Superhet Aligning and Oscilloscope Construction. Meetings are on alternate Tuesdays, 7.30 p.m. at the Medway Technical College, Gardiner Street, Gillingham, and new members will always be welcome. During the period mid-July to mid-September the meetings will be held elsewhere—details from the Hon. Sec.

Bedfast Club.—This Club's latest venture is the provision of technical reading matter for keen radio enthusiasts who are in hospital or permanently bedridden. A library scheme has therefore been started, and any readers who have magazines or text-books which they no longer require are cordially invited to send them along to the Club Secretary—see panel for his address.

Rotherham & District Radio Club.—Weekly meetings continue at the HQ—Cutlers Arms, Westgate, Rotherham. In July there will be a lecture by the AVO Sales Engineer, and a D-F Contest is also being organised for the summer. Recent talks have covered Clamp Tube Operation, and "HRO *v.* S.640." A local net operates on 3600 kc each Sunday morning. Note new Hon. Sec's. QTH, in panel.

Derby & District Amateur Radio Society.—This club is still very active, but attributes a slight decline in membership to the establishment of the TV station at Sutton Coldfield! On July 18 Mr. C. M. Swift will give a talk and demonstration on Modification of ex-WD Surplus, with an accent on two-metre operation. After the talk it is hoped to make a few 2-metre contacts with some of the locals. During the summer the meetings will be held at Room No. 4, 119 Green Lane, Derby.

Brighton & District Radio Club.—A comprehensive summer programme is under way, and the weekly talks and demonstrations will continue until August. During

that month the Club Nights will be informal, in order to welcome any enthusiasts visiting the town. July programme: July 10, Audio Transformer Design; July 17, Hunts Capacitors; July 24, Junk Sale; July 31, Tape Recording, by G5ZQ.

Southport Radio Society.—This club is still flourishing, in spite of the recent absence of notes. Meetings are now held on alternate Mondays at the YMCA, Eastbank Street, Southport, July dates being the 16th and 30th. New members will be heartily welcomed at any meeting.

Manchester & District Radio Society.—At the June meeting G2ALN talked on matching problems with beam arrays; the event for July is a talk by G6OM on VHF Communications, and on August 13 there will be a general ragchew. The Club meets on the first Monday of the month, at the Manchester College of Technology. New members should contact the Asst. Sec., G3FNT, who will make them welcome and introduce them all round.

Dartmouth & District Amateur Radio Society.—Steady progress is being made, and regular meetings continue throughout the summer. Recent meetings have heard talks by G2DPP on Detectors and on Operating Procedure. A Receiving Contest has been arranged, and it is hoped to organise a contest for portable equipment in the near future. New members and visitors will be welcomed at all meetings.

Clifton Amateur Radio Society.—Recent meetings featured a Junk Sale, a ragchew, and a lecture-demonstration on Test Meters for the Home Constructor. A book club, started by G3FNX, is running successfully, and for a small fee members can borrow current radio journals. Meetings are held every Friday, 7.30 p.m. at 225 New Cross Road, London, S.E.14.

At the Thanet Amateur Radio Society Annual Dinner, licensed members present were: Back row, left to right, G3FVV, G3FBL, G2DCG, G3BKT, G3CED; seated front, left to right, G3DNR, G3AXK, G5OX.

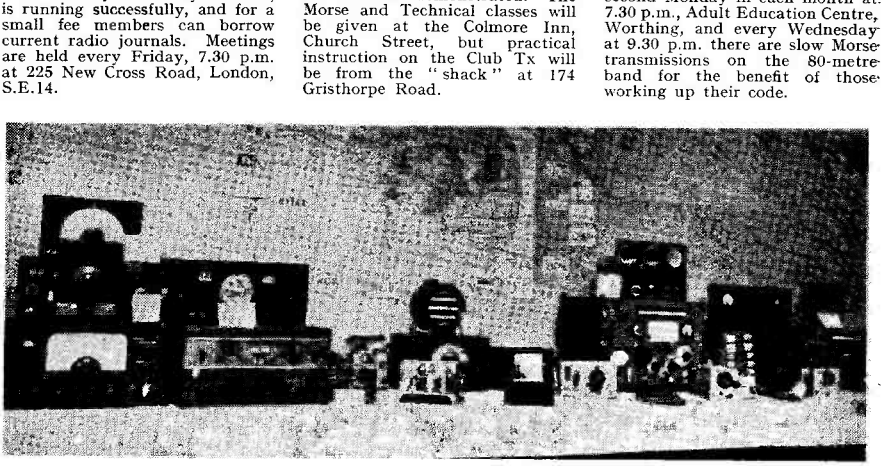
Surrey Radio Contact Club (Croydon).—At the next meeting, on July 10, Mr. W. W. Gunning of the GPO will talk on The Licence and the Log-Book. This important talk should interest those who hold licences and those who hope to obtain them in the near future. Local readers who are not club members will be welcomed on this occasion, but a card to the Hon. Sec. would be appreciated. The venue is The Blacksmith's Arms, 1 South End, Croydon.

Birmingham & District Short Wave Society.—At the July meeting G2BFT is to give a talk and demonstration on Tape and Wire Recorders, and for this event an invitation is extended to members of all other Midland Clubs. There will be a further talk on the Amateur-Band Superhet in August, and the completed set will be demonstrated. The Morse and Technical classes will be given at the Colmore Inn, Church Street, but practical instruction on the Club Tx will be from the "shack" at 174 Gristhorpe Road.

Gravesend Amateur Radio Society.—At a recent meeting G3DCV, a new member, gave a talk in the popular "My Station" series. A ballot has resulted in the retention of weekly meetings throughout the year, and the future programme includes a talk by G3EJK on Panoramic Adaptors. A coach trip has also been arranged for the end of the summer. New members will always be welcome at 30 Darnley Road, Gravesend, 7.30 on Wednesday evenings.

Cray Valley Radio Transmitting Club.—Meetings are held on the fourth Tuesday of each month, at the Station Hotel, Sidcup, Kent. See panel for Secretary's QTH.

Worthing & District Amateur Radio Club.—They meet on the second Monday in each month at 7.30 p.m., Adult Education Centre, Worthing, and every Wednesday at 9.30 p.m. there are slow Morse transmissions on the 80-metre band for the benefit of those working up their code.



When the City of Belfast Y.M.C.A. Amateur Radio Society laid on a stand at an Exhibition locally, these were the receivers they had on view.

Photograph taken at a recent meeting of the Chester and District Amateur Radio Society—standing, left to right, G3ATZ, G3FNV and W. G. Lloyd (Hon. Sec.); seated, l. to r., R. L. Ludlum (an SWL from the States), G3EXT, and G2YS, Chester's chairman.

NAMES AND ADDRESSES OF SECRETARIES REPORTING IN THIS ISSUE:

BIRMINGHAM: W. V. Shepard, 174 Gristhorpe Road, Selly Oak, Birmingham 29.
BRIGHTON: R. T. Parsons, 14 Carlyle Avenue, Birghton 7.
CLIFTON: W. A. Martin, G3FVG, 21 Brixton Hill, London, S.W.2.
CRAY VALLEY: A. Swindon, 135 Station Road, Sidcup, Kent.
DARTMOUTH: A. A. Williams, 51 South Ford Road, Dartmouth, S. Devon.
DERBY: E. Shimmin, Leafmoor Mount, Derby Lane, Derby.
GILLINGHAM: C. E. Pellatt G2FAQ, 101 Boundary Road, Chatham.
GRAVESEND: R. Appleton, 23 Laurel Avenue, Gravesend.
KINGSTON: R. Babbs, G3GVU, 28 Grove Lane, Kingston, Surrey.
MANCHESTER: H. Marshall, G4ND, 14 Greenway Close, Sale.
MEDWAY: C. R. Hawkins, 9 Sanctuary Road, Gillingham, Kent.
NORTH KENT: L. E. J. Clinch, 8 Windsor Road, Bexleyheath.
READING: L. Hensford, G2BHS, 30 Boston Avenue, Reading.
ROTHERHAM: B. Taylor, 3 North View, Swallownest, Sheffield.
SOUTHPORT: F. H. P. Cawson, G2ART, 113 Waterloo Road, Southport.
STOURBRIDGE: W. A. Higgins, G8GF, 28 Kingsley Road, Kingswinford, Brierley Hill, Staffs.
SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
WATERLOO (MANCHESTER): J. C. Henderson, 47 Maple Street, Cheetham, Manchester 8.
WATFORD: R. W. Bailey, G2QB, 32 Cassiobury Drive, Watford.
W.F.S.R.A. (Bedfast Club): J. Woodward, G3GYR, 6 Council Houses, Rode Heath, Stoke-on-Trent.
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£8 Eddystone 358 power pack, all coils. £5/10/0 SCR-522 all valves and xtal. £1 RF27 Unit. Write or call. G3CZY.

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URGENTLY required. Output transformer Type Z.A.3153 for set R.107. Post paid. J. H. Fish, 9 Cliffs End Road, Longwood, Huddersfield.

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HRO with or without coils and power pack, or other good receiver wanted. Will call first week August. State condition, price. Box No. 941.

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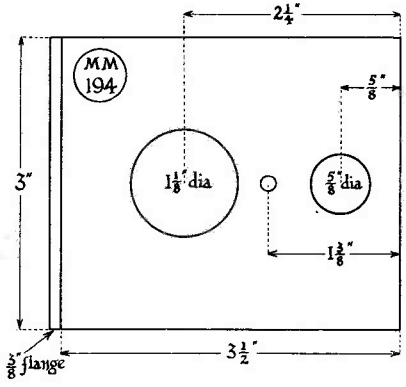
Correction

To face page 284



For Fig. 1 on page 284, see MM194 above.

For Fig. 2 on page 284, see MM195.

MM198, over caption Fig. 2, on page 284 does not apply to this article.