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FOR THE RADIO AMATEUR & AMATEUR RADIO

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THE *SHORT WAVE LISTENER* ASSOCIATED WITH THIS MAGAZINE IS SPECIALLY FOR THE RECEIVING ENTHUSIAST

SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR AND AMATEUR RADIO

EDITORIAL

Resolutions

It is customary at this season to scatter a few words of blessing and goodwill—and also to offer some sound advice on the importance of making and keeping a good resolution or two.

So far as Amateur Radio is concerned, this is all quite easy. Here are the resolutions: Take your phone away from the LF end; run the lowest possible input when working locals; check the gear on artificial load and never on open aerial; cultivate the art of snappy operating; learn to avoid blather when working on phone; do not criticise, over the air, other operators' manners or methods; if you promise anyone a card, send it; remember that Amateur Radio is a hobby and that, for intelligent people, life holds many other interests.

All these are obviously good resolutions, worth making and keeping. If they were all kept by everyone on the air today, many of our most urgent problems would solve themselves. But as always amateurs will remain individuals, who pursue a great hobby as the spirit moves them—they are not really much concerned about what others may be doing or thinking. The very fact that there are so many aspects of Amateur Radio is one of the reasons why it always remains so fascinating, even after years of activity and a long experience on the air.

So we would simply say to those who may glance over this page that we wish all our readers, all over the world, the best of luck, happiness and good fortune for the coming year, and the utmost success in whatever direction their amateur activities may lead them in 1951.

AUSTIN FORSYTH, G6FO.

LINEAR TRANSFORMERS FOR AERIAL MATCHING

Influence of the SWR, Checking Feeder Characteristics, and Adjusting Matched Open-Wire Systems

This is essentially a practical article giving a clear picture of the operation and adjustment of open-wire feeder lines, and as such will be extremely helpful to those who would wish to know how to set up such a system correctly. As this involves an understanding of the use of matching sections and the significance of the standing wave ratio in such systems, the author deals very fully with these factors.—Editor.

THE open-wire type of feeder is more widely used in commercial radio practice than any other; it is also deservedly popular amongst amateurs, especially those who are fortunate in having at their disposal sufficient space for the erection of radiating systems designed on well-established principles. The open-wire aerial feeder line has certain clear advantages over other types, *viz*: the initial cost is low, when correctly installed the loss is extremely low, it is easy to check for correct operation, it is unaffected to any great extent by weather conditions, and it is relatively light in weight.

Basic Principles

As is well known, a feeder consisting of a pair of parallel wires may be operated either as a matched transmission line or as a resonant system. In the latter case the transmitter end of the feeder is reactive and the reactance has to be tuned out by some form of aerial coupler at the transmitter. The feeder is, in effect, merely part of the aerial folded in such a way that equal and opposite currents flow in the adjacent wires, which do not therefore contribute to aerial radiation. In the case of a matched line, the transmitter has to load into a pure resistance equal in value to the characteristic, or surge impedance, of the line (usually 500 to 700 ohms). This latter arrangement may simplify the design of the aerial coupling method, and it also has the further advantages that the losses are lower, no high impedance points occur on the line (thus reducing possible causes of TVI and BCI), and there cannot be a high impedance point within the station, which fact removes one of the chief causes of RF feedback in amateur layouts. Furthermore, if a broadband radiator is used, *e.g.*, a folded dipole, a whole amateur band can be covered without the necessity for readjustment of the coupling between transmitter and feeder: in the case of resonant feeders it is often found that aerial coupling arrangements have to be altered considerably when the transmitter frequency is moved from one end of a band to the other. A feeder which is not operating in a matched condition has standing waves along its length, that is to say, maxima and minima of current occur along the whole length at intervals of a quarter wavelength. Incidentally, a point of mimium current (current node) corresponds to one of maximum voltage and *vice versa*. The "goodness" of a matched transmission line is expressed in terms of its "Standing Wave Ratio," *i.e.*, the ratio of maximum to minimum current along its length (or maximum to minimum voltage). A matched feeder naturally has a SWR of 1:1; ratios up to about 3:1 are of little consequence in amateur work, but a ratio of 10:1 is very poor.

Adjustment of a matched line consists merely of connecting it to a resistance equal in value to its characteristic impedance. If the line is to be used to feed an aerial, arrangements must be made so that it is connected in such a way that, at the point of connection, the aerial presents an impedance equal to the characteristic impedance of the feeder. There are many ways of accomplishing this, *e.g.*, by the use of delta match, T-match, Q-bar or Linear Transformer methods. A pair of Q-bars form a quarter-wave linear transformer, but this article deals with the type of linear transformer often referred to as a Matching Stub.

Test Gear

In setting up aerial systems, one or two items of simple test gear are needed. A Standing Wave Indicator is a necessity and a small but sensitive absorption wavemeter, of the type described on page 541 of the October 1950 issue of

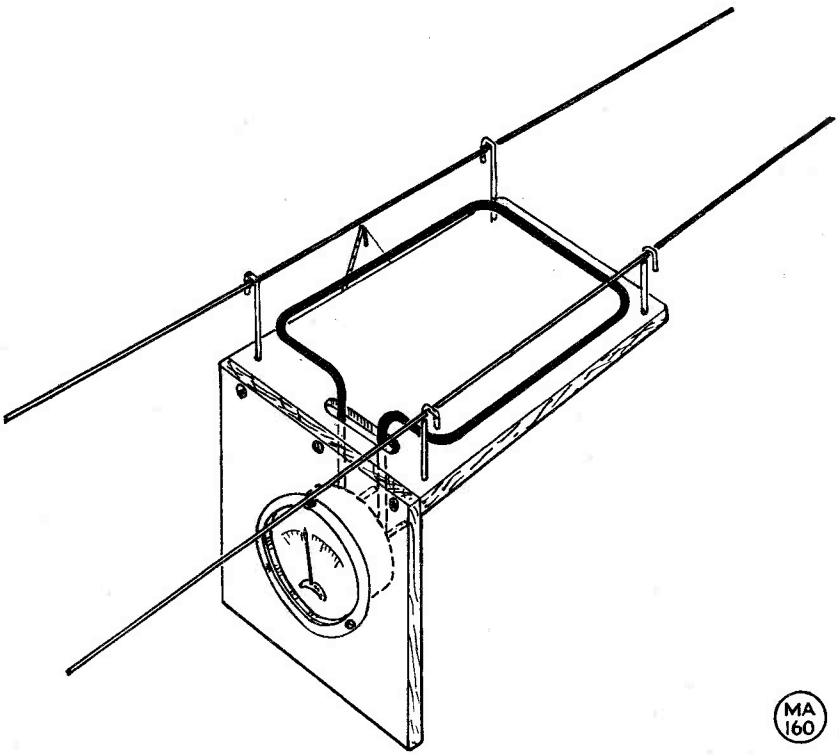


Fig. 1. A simple Standing Wave Indicator consisting of a loop and thermo-milliammeter mounted on a suitable carriage. The operation of this device, and the precautions to be taken in using it, are explained in the text.

Short Wave Magazine, is also useful for giving a final check on feeder balance, presence of harmonics, and so on.

The simple standing wave indicator shown in Fig. 1 consists of a loop of stiff copper wire connected across an 0-250 thermo-milliammeter. The loop and meter should be mounted on a small wooden or bakelite carriage which can be run up and down the feeder. The diagram shows a suggested arrangement; the loop should be as loosely coupled to the feeder as possible consistent with reasonable meter deflection, and should be symmetrically disposed between the feeder wires. The small arrow is mounted on the carriage so that reasonably accurate distance measurements on the feeder can be made, the arrow being taken as a reference point. If a thermo-milliammeter is not available, a 0-1 or 0-5 mA meter may be used in series with a crystal diode. The meter should be shunted by a .001 μF mica condenser and the coupling loop should be quite small and loosely coupled to the feeder, otherwise the meter may be overloaded. If a thermal instrument is used, great care must be exercised in order not to exceed full-scale deflection under any circumstances. These instruments are very delicate and, since they operate on the current value squared, they are easily burnt out.

In using the standing wave indicator, it is merely hooked on the feeder line and run up and down over a distance of about half a wavelength: naturally the power output of the transmitter would have been adjusted to give reasonable meter deflections. The standing wave ratio is simply the maximum reading divided by the minimum reading. If the ratio is high, some difficulty may be encountered in finding the exact position of minimum current; in this case the

approximate position of the minimum should be noted and the indicator then moved to either side of this point until readable deflections are obtained. The actual position of the current minimum is then mid-way between positions of equal current on each side.

Linear Transformer Aerial Matching

The quarter-wave linear matching transformer shown in Fig. 2 offers one most effective method of matching a non-resonant feeder to an aerial: it consists merely of a quarter wavelength of open wire transmission line short-circuited at one end. It has the property of possessing a high impedance at the open end AB and, obviously, a low impedance at the short-circuited end. Between the two the impedance varies from high to low along the length. It may, of course, be considered as a half-wave dipole folded back on itself; thus, the points AB are readily seen to be high voltage, zero current points and SS to be zero voltage, high current points.

Fig. 3A shows the method of matching a non-resonant line to a high impedance aerial system (in this instance two half-waves in phase). In such an instance, the impedance across AB is high, but at SS it is low, and it is possible to select points XY at which the impedance equals that of a non-resonant feeder. Clearly, the resonant frequency of the aerial and linear transformer may be varied by altering the position of the short-circuit SS.

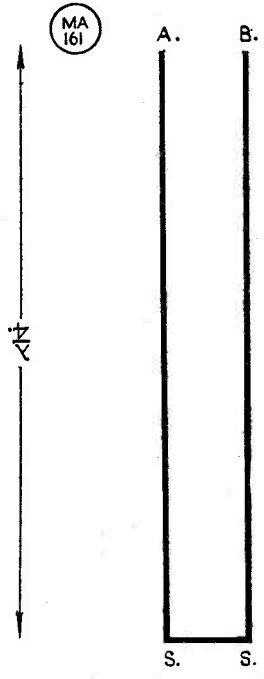


Fig. 2. A quarter-wave linear transformer.
(Sign is inverted)

In the case of Fig. 3B, which shows a similar method of matching a feeder to a half-wave dipole, the points AB are at low impedance, and thus an open quarter-wave matching transformer is used; the points OO are at high impedance, and, as before, the feeder is attached at some intermediate position. The open quarter-wave section has the disadvantage that points OO are at high RF potential and require adequate protection. Further, the system cannot be brought to resonance by sliding a shorting bar up and down; it must be done by adding or subtracting lengths of wire from the free end of OO.

A more convenient method of feeding a dipole at its centre is shown in Fig. 3C. In this case the matching section is extended to a half wavelength; a low impedance position again occurs at SS and a shorting bar may be used for resonance adjustment.

Methods of feeding the simplest types of aerial have been described, but, generalising, it will be appreciated that a short-circuited quarter-wave section can be employed for matching a feeder line to any high impedance aerial and a short-circuited half-wave section may be used in the case of any low impedance aerial. The terms "high impedance" and "low impedance" imply aerials whose impedances at the point of attachment of the feeder and matching systems are respectively greater or less than that of the characteristic impedance of the feeder. In general, centre-fed dipoles, parasitic beams and similar types are low impedance systems; all end-fed aerials, two half-waves in phase and their derivatives, are high impedance systems. Symmetrical aerials, *i.e.*, centre-fed, are very much to be preferred to end-fed systems owing to the difficulty of obtaining feeder current balance with the latter type.

Setting-up Procedure

Having decided to feed the aerial through a non-resonant line and to use a linear matching transformer, the following paragraphs give complete setting-up and matching procedure, stage by stage: [over

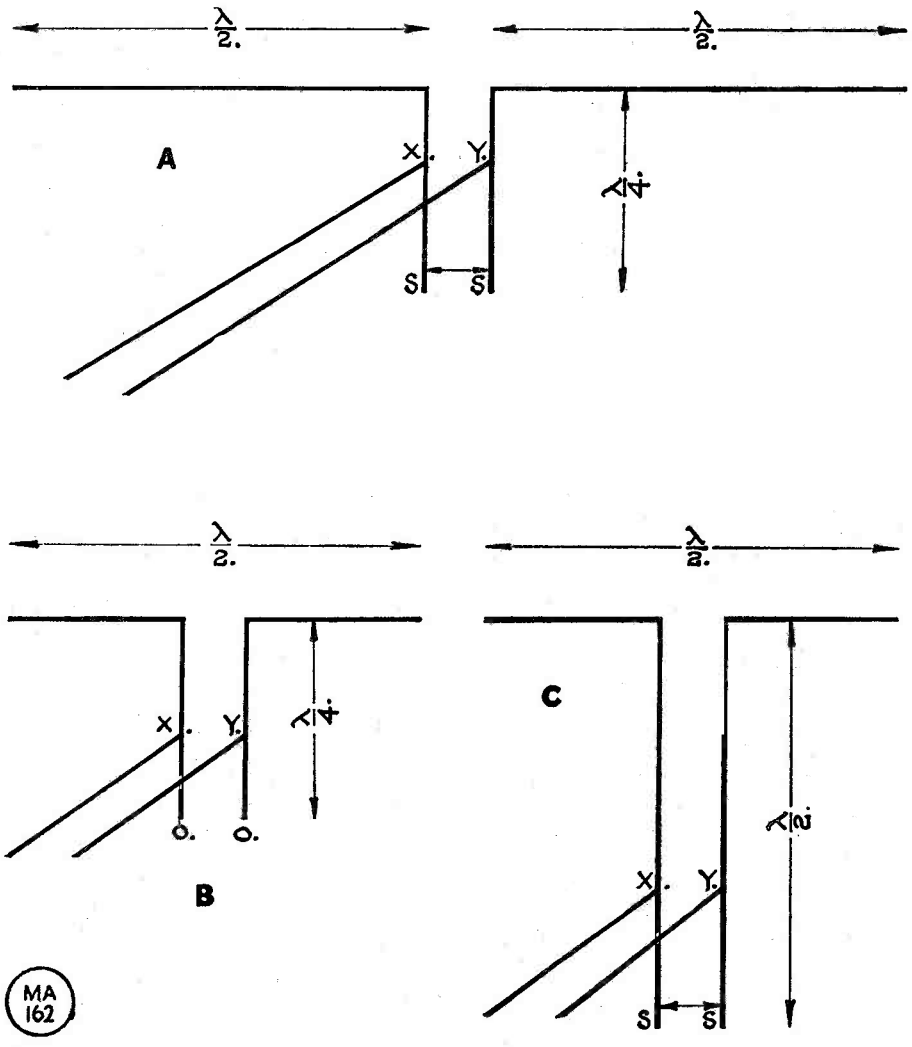


Fig. 3. (A) A short-circuited quarter-wave linear transformer used for matching an open-wire feeder to a high-impedance aerial. (B) An open-circuited quarter-wave transformer used for matching an open-wire feeder into a low-impedance aerial. (C) A short-circuited half-wave transformer for matching an open-wire feeder to a low-impedance aerial.

(1) Cut the aerial to length using the accepted formulæ. Make up the matching section using the same wire gauge and spacing as is intended for the feeder itself and attach the matching section to the aerial. Set the shorting strip a quarter-wave from the point of connection to the aerial if the latter is of high impedance type, or a half-wave distant if the aerial is being fed at a low impedance point. Include an extra 2 or 3 feet of matching section beyond the shorting strip to allow for its adjustment.

[over

(2) Construct the feeder of such length that it will reach to any point on the matching transformer, but do not connect it. Make sure that at least a half-wave run of feeder (anywhere along its length) is accessible for SWR measurements.

(3) Excite the disconnected feeder by the transmitter, thus setting up standing waves and, using the standing wave indicator, explore the feeder for any point of minimum current. Mark its position with a piece of sticky tape.

(4) Move the standing wave indicator slowly towards the aerial end of the feeder and mark the position of the first current maximum. This will be a quarter-wave distant from the point of minimum current. (The minimum and maximum current positions are represented by points L and H respectively in Fig. 4.)

(5) Attach the feeder to the matching section, at the top if the section is a quarter-wave long, half-way along if it is a half-wave long. Explore the feeder near position L for a new current minimum (this may not be so pronounced as previously). If this new point lies between L and the aerial move the shorting strip a little way up the stub; if it is on the transmitter side of L, move the shorting strip down. After moving the shorting strip, search for the current minimum again and repeat the process until the new current minimum coincides exactly with L. This procedure has tuned the radiator and matching section to the frequency of the transmitter, and the only further adjustment of the shorting strip will be that necessitated by any slight detuning effect caused by moving the point of attachment of the feeders described in the next operation.

(6) Compare the currents at L and H by means of the standing wave indicator. Move the position of the feeder taps down a short distance and again compare readings at L and H. Repeat the process until a tapping point is found where the reading at L is identical with that at H.

(7) Final matching is now merely a question of trimming previous adjustments, but first, run the SW indicator along the line and find maximum and minimum readings. The ratio gives the standing wave ratio on the line and will probably not now exceed about 2½:1. To reduce this figure still further, search for a minimum or maximum reading (it does not matter which) near point L; this will be rather broad and not very deep, of course. If it does not coincide with L, move the position of the shorting strip slightly; upwards if the minimum or maximum is between L and the aerial, downwards if between L and the transmitter. Continue until the minimum or maximum does coincide with L.

(8) Again compare currents at L and H and, if they are not equal, adjust the feeder taps slightly. If the current at H is greater than at L, move the taps down; if smaller, move them up until currents at L and H are identical.

In most cases it will now be found that the standing wave ratio is very low—certainly not higher than about 1.5:1—but if for any reason this is not the case, stages 7 and 8 may be repeated as many times as necessary.

Points To Remember

It may not always be very clear beforehand whether a particular type of aerial system has a high or low impedance feed point. A few measurements will readily solve the problem. Construct the feeder and, without connecting it to the aerial, find positions L and H in Fig. 4. Now connect the feeder directly to the aerial without a matching section. Again compare readings at L and H: If the current at H is greater than that at L, the aerial requires a high impedance feed; if the current at L is the greater, a low impedance feed is needed. The appropriate matching transformer may then be constructed. It may happen that currents at L and H are equal when the feeder is directly attached to the aerial. If this is the case, the feeder should be explored for standing waves; if they are present, it is safe to assume that the aerial requires a high impedance feed, but if it so happens that the S.W.R. is already 1:1, obviously no matching transformer is needed at all.

In matching feeder lines to parasitic beam aerials, all adjustments of the element lengths to give the desired beam performance must be done *before* final adjustment of the matching section shorting strip and the position of the feeder taps.

If a feeder system and aerial appear to load the transmitter easily, *i.e.*, very loose-coupling produces high PA current, it must never be assumed that the feeder matching is all in order. It usually means that a high SWR exists on the feeder. Difficult loading, often associated with the necessity for large adjustments of the aerial matching circuits as the

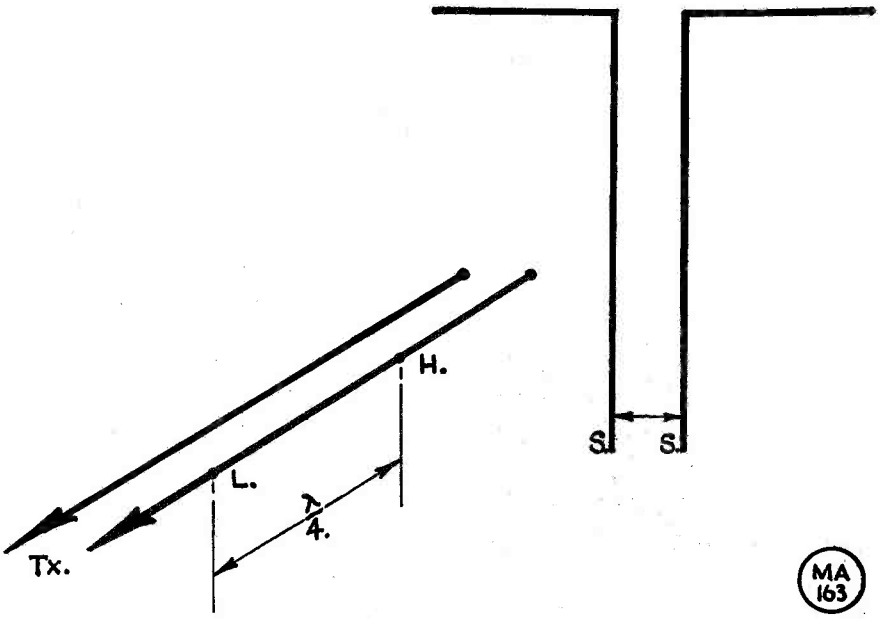


Fig. 4. Determination of maximum and minimum current points on a feeder during the setting up and matching procedure.

transmitter frequency is moved a few kilocycles, also means the presence of high SWR's.

Parasitic and "W8JK beams" are inherently frequency selective, and it is not possible to achieve very low SWR's on their feeders as the transmitter frequency is moved from one end of a band to the other. The only solution is to make the bandwidth of the radiating elements as great as possible by the use of thick elements, or multi-wire elements, and by tuning up the system at the mid frequency of the band in use.

Finally, it is suggested that aerial work of the type described in this article should be limited to periods when DX signals are absent, and that it should be carried out in a manner which gives other amateurs who may be active on the band the least possible inconvenience.

MORE ABOUT THE RF-25 UNIT

The current (January) issue of *Short Wave Listener & Television Review* carries a useful and interesting practical article on the modification of the RF-25 to work as an RF preamplifier for TV reception; it should thus be very helpful to those who, in fringe areas, need a bit more gain at the front end to produce a really good picture. A few copies of this issue are available at 1s. 7d. post free. Circulation Manager, Short Wave Magazine, Ltd., 53 Victoria Street, London, S.W.1.

HOME SERVICE BROADCAST

Those of our readers who are in the habit of listening to the BBC (Home Service) during the hours before breakfast may be interested to know that Howard Thomas will be "at the Theatre Organ" during the period 0630-0655 on January 12. So if you would like to hear G6QB (for it will be none other than the talented contributor of our "DX Commentary" feature) modulate a few of the BBC's megawatts, then is the time to listen—with the morning cup of tea!

REMOTE CONTROLLED RELAY SYSTEM

Using the OA4-G Glow Discharge Tube

By **R. E. B. HICKMAN**

(R.C.A. Photophone, Ltd.)

A REMOTE control system for a radio receiver or transmitter which eliminates special cables and gives the operator the utmost flexibility in choice of control position can be designed using a cold-cathode, glow-discharge tube of the starter-anode type as the control relay. Such a relay may be operated by RF impulses transmitted over the mains supplying the equipment to be controlled.

A suitable tube is the OA4-G, which consists of a cathode K, a starter-anode P1 and an anode P2, as shown diagrammatically in Fig. 1. One of the major advantages of glow-discharge tubes for relay circuits results from the use of a cold cathode, thus eliminating the filament supply ; hence, the tube consumes no power during stand-by periods.

In normal operation of the OA4-G a relatively small amount of energy initiates a glow - discharge between cathode and starter-anode. This discharge produces free ions which assist in initiating the main discharge between cathode and anode. The anode current which flows during the cathode-anode discharge can be used to actuate a relay or other device connected in the anode circuit. It may be of interest to consider the characteristics of the OA4-G and its operation in a typical carrier-actuated system.

Breakdown Characteristics

Any of six different discharges may occur in a gas-triode, depending upon the circuit arrangements, *i.e.*, the relative potential differences between the electrodes, and upon the tube design characteristics such as the inter-electrode spacing. The closed curve shown in Fig. 2, which describes the voltage conditions necessary for breakdown between any two electrodes in a tube of given geometry, is called the " breakdown characteristic " of the tube.

From Fig 2 it will be noted that when the voltage on the anode is less than approximately 285v. no discharge will be initiated until the starter-anode voltage is approximately 85v. When this value is reached, a discharge occurs between cathode and starter-anode. This condition is shown in section A of the curve.

When the anode voltage is increased to 285v, a breakdown occurs between cathode and anode. The value of anode voltage required for breakdown between cathode and anode is substantially independent of starter-anode voltage in the range approximately 18 volts to 85 volts. This condition is shown by section B of the curve.

In section C a discharge occurs between starter-anode and anode, the starter-anode acting in this case as a cathode. In section D the discharge is between starter-anode and cathode. These are the same electrodes that figure in section A, but in the present case, the starter-anode, being at negative potential with respect to the cathode, functions as the cathode.

Section E and F show the relation between anode voltage and starter-anode voltage which are required to initiate discharges between anode and cathode and between anode and starter-anode respectively.

Characteristics of OA4-G

The OA4-G is designed for operation under the conditions shown in section A of Fig. 2. The tube will of course function in the other regions, but due to its physical characteristics, its operation in these regions is unstable. In normal

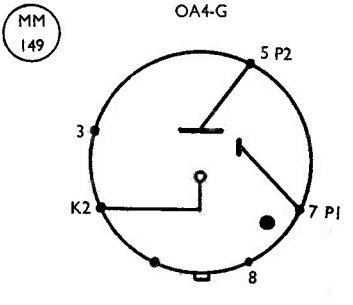


Fig. 1. Base connections of the OA4-G, in the International Octal convention. P1, Starter anode ; P2, Anode ; K2, Cathode.

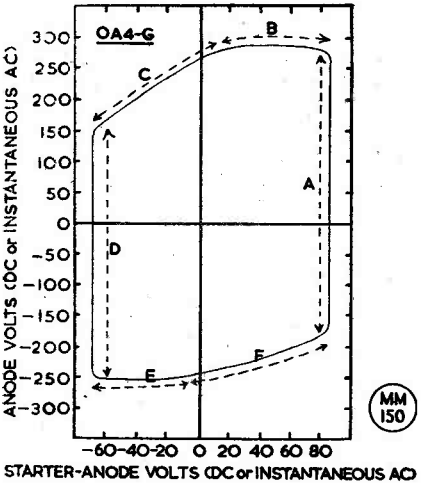


Fig. 2. This curve shows what is known as the "breakdown characteristic." See text for explanation in relation to the OA4-G.

operation, a discharge between cathode and starter-anode assists in initiating the main discharge between cathode and anode. As the starter-anode supply voltage is increased above the value at which the K-P1 discharge occurs the starter-anode current increases in proportion and the starter-anode voltage remains substantially constant at approximately 60 volts. Over the useful operating range of the tube the anode-cathode voltage drop remains very nearly constant at 70 volts. Operation is best confined to a range anode currents from 5 to 25 mA.

OA4-G in a Carrier Actuated System

The circuit of a typical relay system for remote control of a receiver is shown in Fig 3. 115v AC is applied between anode and cathode through the relay S and the RF coil L. A portion of this voltage is also supplied between starter-anode and cathode by means of the potential divider R1, R2. In addition, the supply line also carries an RF voltage generated at the operating position. The resonant frequency of the components L and C is the same as the frequency of the applied RF voltage, so that a high RF voltage is generated across L.

This RF voltage is modulated 100% at the supply frequency. With proper adjustments of the amplitude and frequency of the applied RF voltage a discharge between starter-anode and cathode may be initiated. In practice it is found that the RF signal need not supply all the power required to initiate the discharge. R2 is usually adjusted so that the voltage across it is rather less than the breakdown value. Then, the RF voltage need only be large enough to supply the difference between the breakdown voltage and the applied low frequency voltage. It is recommended that an RF voltage of approximately 55 volts peak across L be provided. With a 50 c.p.s. supply and an RF source at approximately 100 kc it is recommended that the voltage across R2 *plus* the voltage across L should not be less than 110 volts peak.

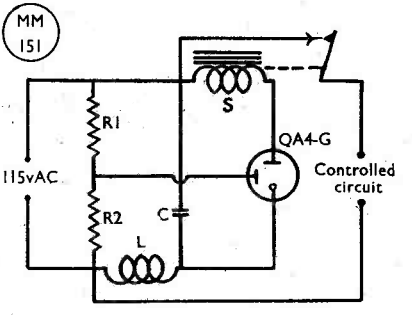


Fig. 3. Practical circuit for a remote control system, using the OA4-G. Values are given in the table.

Table of Values

Fig. 3. Practical Control Circuit.

L, C = High-Q tuned RF circuit
R1 = 15,000 ohms
R2 = 10,000 ohms
S = Relay, contacts as required

STARTING ON TWO METRES

The Economical Approach

By **N. P. SPOONER (G2NS)**

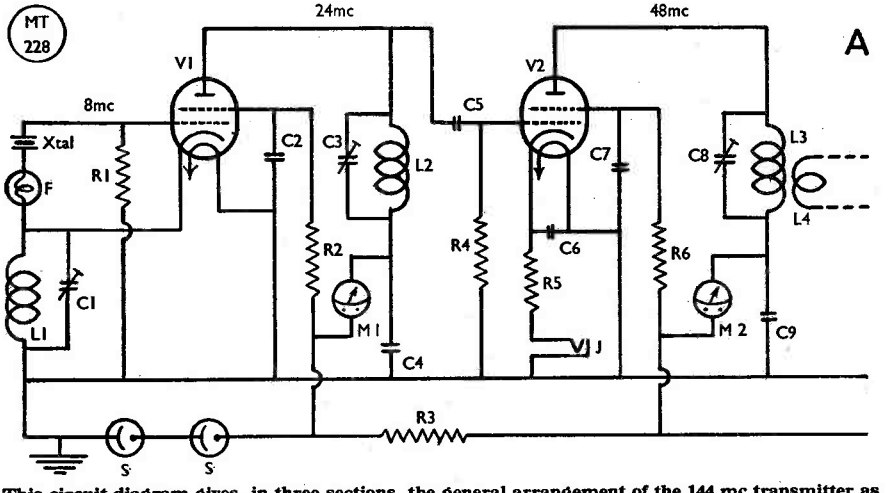
In showing how easy it is to get started on Two with a good transmitter, our contributor is describing his own recent experiences and problems. As a practical man, he puts his finger on the first essential—the necessity for a calibrated absorption wavemeter to find 144 mc and the multiplier frequencies to reach that band. This is not so easy if there is no local activity—but when these frequencies are found, the transmitter side is plain sailing.—Editor.

WHILE a station has at times almost to fight for a hearing on the LF bands, many operators feel that they suddenly become nothing more than a small voice crying in the wilderness when they turn to the VHF's. The apparent lack of activity encountered thereon is said to be the reason for slow recruitment to 144 mc. Though the newcomer joyfully discovers the absence of serious interference he quickly becomes overawed by the uninhabited wideness of the open spaces, by the encroaching scourge of TV that casts a spell of silence over its victims during certain evil hours of the night, and by the preoccupation at other times of intimate circles of rag-chewing friends.

Getting Started

True as these complaints may be, the writer feels, however, that the real deterrents to migration are the prospects of having to acquire a new technique and purchase new gear. Both these snags, as will be shown, may reasonably be overcome—and here it can be strongly recommended in regard to the first that the mass of excellent material appearing in the *Magazine* be carefully studied, while at the same time personal contact is made with the nearest VHF worker. Harmonic-hunting is no joy for a newcomer, and to plunge in without the help and advice of an already active amateur is much the same thing as putting to sea without a compass. The existing LF receiver will identify an 8 mc or other suitable crystal fundamental, and if the tuning-range extends to 32 mc then both 16 and 24 mc will be found with the receiver when needed.

Further to this, some simple wavemeters of the absorption type, consisting



This circuit diagram gives, in three sections, the general arrangement of the 144 mc transmitter as described by G2NS. The article shows that it is both easy and cheap to get a good Tx going on the two-metre band.

(Sections A, B, C, should be read as one diagram).

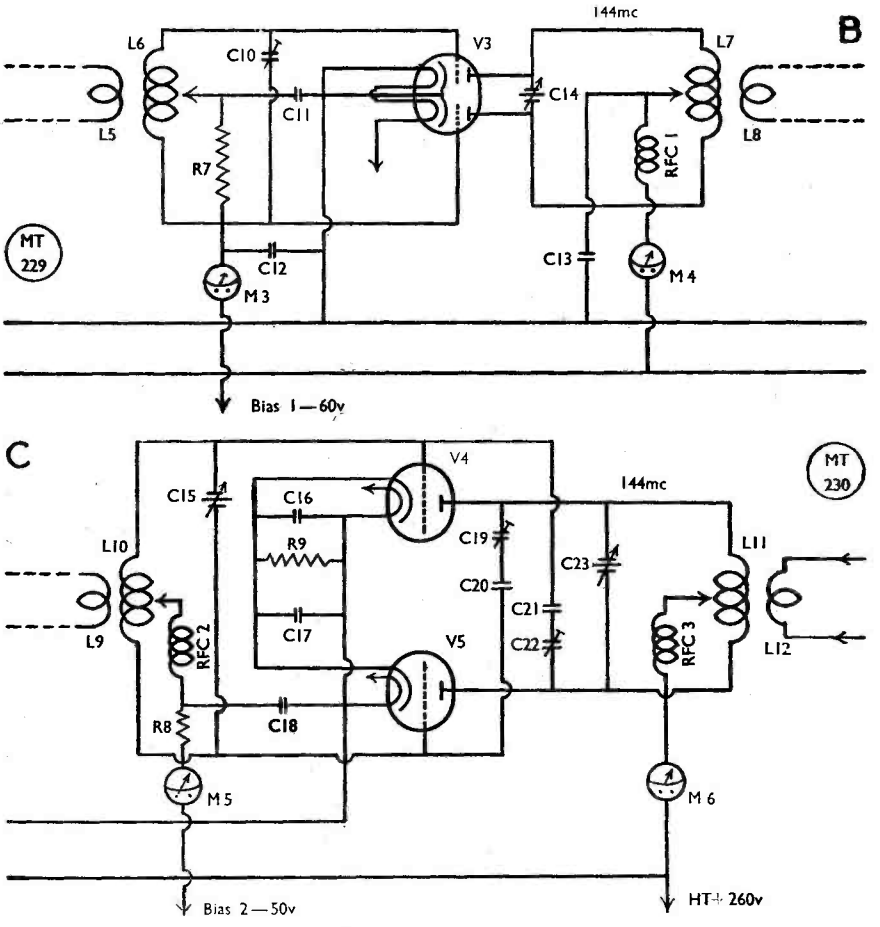


Table of Values

Circuit of the 144 mc Transmitter

C1, C3, C8, C10 = 30 $\mu\mu$F trimmer
C2, C4, C6, C7, C9, C11, C13, C20, C21 = .002 μF
C5 = 100 $\mu\mu$F
C14, C15, C23 = Split stator 25 × 25 $\mu\mu$F
C12, C16, C17, C18 = 500 $\mu\mu$F
C19, C22 = 8 $\mu\mu$F trimmer
R1, R2, R4 = 50,000 ohms, 1 watt
R3 = 1,200 ohms, 3 watts
R5, R9 = 250 ohms, 2 watts
R6 = 27,000 ohms, 1 watt
R7 = 4,500 ohms, 1 watt
R8 = 2,000 ohms, 1 watt
RFC1, 2, 3 = 35 t., 18 SWG, enamelled, close, $\frac{3}{8}$" dia.
X = 8 mc Xtal
M1 to M6 = 0-50 mA or closed cct., jacks.
J = Closed cct., keying jack.
V1, V2 = 6V6
V3 = RK34
V4, V5 = 7193
F = 40 mA Fuse bulb
S,S = S130 Stabilisers (or VR150/30)
L1 = 20t., 22SWG, enamelled, $\frac{1}{4}$" dia. former
L2 = 11t., 14SWG, enamelled, $\frac{1}{4}$" dia. self-supporting
L3 = 6t., 14 SWG, enamelled, $\frac{3}{8}$" dia. self-supporting
L4, 5, 8, 9 = 1 turn link
L6 = 13t., 14 SWG, enamelled, $\frac{3}{8}$" dia. self-supporting
L7, 10, 11 = 2t., 14 SWG, enamelled, $1\frac{1}{4}$" dia. self-supporting
L12 = 1t., loop to aerial co-ax

each of a few turns of wire tuned by a small variable condenser or trimmer, should be taken along to the man-who-knows for his calibration in the region of 48, 72 and 144 mc. Armed then with these guides to one's whereabouts the chance of getting lost between stages is eliminated.

Next for consideration and dispatch comes the "new gear" bogey. Fortunately, in these days of austerity the old truth remains ever fresh that quite 75% of a station's performance depends entirely on the type and efficiency of the aerial. This means that the appearance and nobility of what is actually used to generate the RF is in comparison of little importance.

The Transmitter

Having thus turned our thoughts in the what-have-you direction, another comforting fact is that a couple of 6V6 valves, surely to be found in most junk-boxes, will happily and efficiently transport us in two stages as far as 48 mc. From there can be seen the desired 144 mc horizon only three more hops away. For this driver stage on 144 mc, and to save expense, one might even be lucky enough to find an old pre-war RK34 valve. Lastly, comes the PA, and here the *Magazine* surplus component advertisers help us. A couple of excellent low-power VHF triodes can be had for as little as four shillings, and as we have already from the same source secured a suitable crystal for around eight shillings it becomes increasingly obvious that to start from scratch and build with junk-box and surplus components is going to provide far more instruction and satisfaction than will be obtained from struggling to follow out and modify a rat-nest ex-Service transmitter originally intended for some quite different purpose.

While of course full power can be used, a modest start with ten or fifteen watts input will nevertheless quickly demonstrate the truth that, reckoning five or six dB as being equal to one S-point, the signal put down at the receiving end under normal conditions will be only a couple of S-points weaker than that which should appear when the input is increased to as much as 100 watts.

The construction of the transmitter to the circuit shown needs no detailed description beyond advising the short grid and anode leads obtainable by bunching condensers and coils close up together at their valve bases or caps. With the exception of the CO cathode, all coils are of 14 gauge enamelled wire and self-supporting; the number of turns suggested will vary with individual circuits. By using the calibrated wavemeters the turns should as required be opened or closed, increased or lessened, in order to find the desired harmonic at each stage.

Setting Up

With HT off the PA, neutralising is carried out simply by varying two 8 $\mu\mu$F trimmers equally until no movement of the grid current meter is visible when the tank condenser is tuned slowly through resonance. (If with plate modulation of the PA these trimmers are not heard to flash over then the series fixed .002 μF condensers need not be included!) Any stage may be keyed, but a spacer might be reported if this is done in the 144 mc driver or PA. Should the 48 mc doubler be keyed, as shown, the voltage-dropping resistor and stabilisers in the HT lead to the CO need not be included unless chirp results.

Nothing has been said about the receiving side, but an excellent three-stage converter can be made from an RF26 or 27 unit obtainable for a pound or thirty shillings. Many articles describing their conversion and the construction of suitable receivers have already appeared, as also have details of rotary beams for combined transmitting and receiving.

The present story is of the steps taken by the writer to break into the VHF's and sincere thanks are due to the many active amateurs, too numerous to mention singly, who gave personal and over-the-air help and advice. Although the apprenticeship is still being served at G2NS this article is offered for the encouragement of those who still hesitate to strike out on the VHF bands.

★ ★ ★

"RADIO FOR THE AMATEUR LICENCE"

This is the title of a very good *postal* Course offered by E.M.I. Institutes, Ltd., for those wishing to secure a pass in the Radio Amateurs' Examination. Having been established for some years, the Course has been well tried, and many transmitters now on the air can testify to the assistance it gave them to get through the R.A.E.

CHEAP VFO CONVERSION

Driver for Five Shillings

By **G. PROCTOR (GM8SQ)**

THE writer hastens to say that five shillings represents the cost of a Command transmitter chassis; the valves and a few extra resistors, condensers and so on required were unearthed from his junk box. Most amateurs will have these additional parts on hand, but, in any event, their cost is trifling. This transmitter is supplied with the tuning coils stripped of wire, but is otherwise complete. For the VFO to be described the unit covering 3-4 mc was used.

The original circuit is a Hartley high-output triode oscillator (1629) inductively coupled to two 1625's in parallel, running at about 100 watts. The idea of a single oscillator driving two other valves to 100 watts was viewed with some disfavour, and there was a suspicion that difficulties would be encountered. However, the lay-out presented distinct possibilities as a VFO and various ideas were considered. The final set-up is a Clapp oscillator, using a 6AG7, driving an 807 to a few watts input.

The new circuit below shows that the Clapp oscillator is conventional, but instead of the more usual capacity coupling to the buffer stage, it was thought worth while to try the effect of retaining the inductive coupling, which is inside the oscillator coil. This saved some cutting up of the original wiring and proved to be very satisfactory. The rest of the circuit is straightforward.

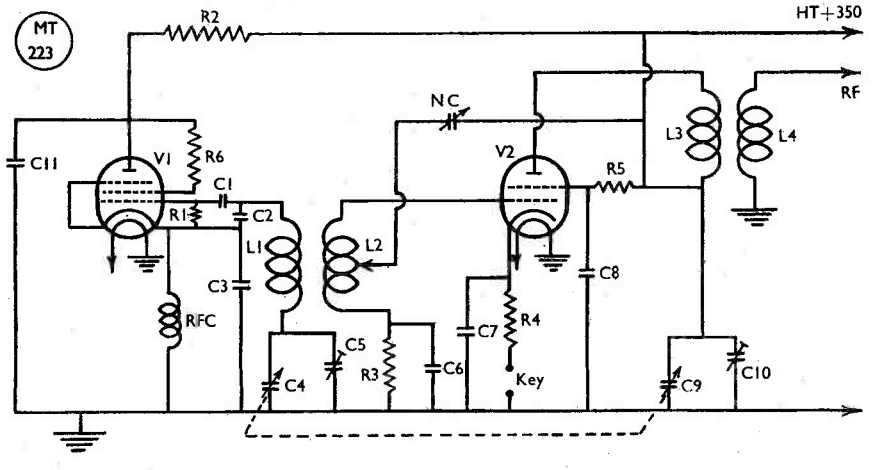
Constructional Details

The first step is to remove the aerial and oscillator relays and their associated wiring. The coil formers should be unscrewed and the wiring points carefully unsoldered. No difficulty should be experienced in replacing the coils, except at the bottom of the buffer stage coil, where the bakelite wheel is close to the former. Wind on the turns on the top part of the coil, then calculate roughly the amount of wire required for the bottom half. Snip

Table of Values

The Oscillator-Buffer Driver Unit

C1	=	.01 μF
C2, C3	=	.001 μF
C7	=	.01μF
C4, C5, C6, C8, C9, C10, C11	=	Tuning and bypass condensers as already fitted in unit
R1	=	47,000 ohms
R2	=	5,000 ohms
R3	=	15,000 (*part of unit*)
R4	=	500 ohms, 6 watt
R5	=	10,000 ohms
L1	=	28 turns, 20 SWG
L2, L4	=	Already wired
L3	=	26 turns, 20 SWG
V1	=	6AG7
V2	=	807



Circuit of the Oscillator-Buffer conversion described in the accompanying article.

off this length from the reel of wire and carefully thread each turn through between the wheel and the former, keeping the turns tight as they are put on. The aerial inductance can be ignored or removed and the aerial terminal replaced by a coaxial socket. The end of the coupling coil (L_4) is wired to this socket.

The heaters of the 1629 and 1625's are wired for a 24-volt supply, and these must be rearranged to suit the new valves. The oscillator heater is connected through a coupling coil on the oscillator inductance, and this is removed. In order to make room for wiring up the oscillator stage, the oscillator condenser (C_4) can be loosened from the chassis, lifted out and bent over at the end of the driving cable. Otherwise the space is rather cramped for manipulating a soldering iron. The 1625 sockets are 7-pin, but careful filing of the appropriate holes will enable an 807 to be inserted. A slight alteration to the screen and anode connections is necessary to suit the 807. The screen dropping resistor is wired across the valve holder and the screen voltage supply to the rear plug is removed.

Keying is obtained by fitting a telephone type jack in the bottom left-hand side of the front panel (there is a convenient blank space). The writer at present keys the buffer cathode, but other methods can be adopted.

The power supply socket at the rear was removed by slitting the side halfway round with a knife and applying "brute force" with the fingers. An octal socket replaced it and an octal valve base supplied the plug. No milliameter was provided, although it could be conveniently mounted on the top half of the panel, if desired. In the VFO as constructed, the meter is jacked into the cathode circuit of the buffer valve in place of the key when current readings are taken.

Operation

To line up the circuit, the dial is set at 3.5 mc and the oscillator preset condenser (C_5) revolved until the signal zero-beats at 3.5 mc on a frequency meter or crystal multi-vibrator. The buffer valve is then plugged in and C_{10} adjusted, with a milliameter in circuit and a flash lamp bulb across the output. It is probable that the calibration on the dial will not line up with the new circuit, but some juggling with the size of the oscillator coil should rectify this, which failing, the old frequencies can be blacked out and new readings marked on the dial. Any small variation in the setting can be readjusted by the small trimmer on top of C_5.

In the model converted, stability was very good, and loading of the buffer stage had little effect on the frequency of the oscillator. In this respect, it compared favourably with another VFO having an extra untuned buffer stage. The whole outfit has a neat and "professional" appearance, especially if one is fortunate enough to get a unit with a black crackle finish.

Since completing the conversion, it has been used for a few nights as a QRP transmitter on 3.5 mc and reports have been consistently T9.

PAPER STRINGENCY

Many of our readers will be aware that paper is now among the primary commodities which are getting scarcer and increasingly expensive. In common with other publishers, we can only supply the *Magazine* to order, so as to conserve paper stocks. This means that though newsagents can always obtain *Short Wave Magazine* to order, we cannot let them have copies for chance sales. Readers are therefore particularly asked to assist us by placing firm orders —either direct with us or through their newsagents—also informing us if they have any difficulty in obtaining a regular copy locally. The immediate solution to that difficulty is, of course, a direct subscription.

XTAL XCHANGE

Below are the offerings for this month; all negotiations should be conducted direct. If you want a notice in this space, set it out in the form show here, on a separate slip headed "Xtal Xchange—Free Insertion."

G3FZS, 26 Redhill Drive, Fishponds, Bristol.
Has Bliley 3570 kc crystal, 3/4-in. mounting, no certificate. Wants 100, 500 or 1000 kc bar.

G3GMY, 68 The Drive, Barnet, Herts.
Has Type FT-243 crystals 8075 and 8100 kc, no certificates. Wants frequencies between 8038 and 8047 kc.

G3HRH, 80 Longcroft Lane, Welwyn Garden City, Herts.
Has 3615 kc crystal, 3/4-in. pin spacing. Wants any frequency 3525-3560 kc, same mounting.

PRACTICAL ROTARY DIPOLE FOR TEN

By **W. E. GREEN (G3BTC)**

THE ideal of most amateurs is to erect an aerial which is as high, mechanically strong and as light as it is possible to achieve. The following explanation of a 10-metre rotating dipole erected at the writer's QTH covers these desirables and gives rotation as well. The existing pole is 40 ft. high, and it was required to erect and revolve a 10-metre dipole without lowering the pole, or being involved in mechanical difficulties.

The sketches with these notes are self-explanatory. Two telescopic dural tubes were mounted on insulators screwed on to a piece of oak 4 ft. x 2 in. x 1⅛ in. A ¾-in. hole was drilled through the centre of the oak batten and a piece of ¾-in. electrical conduit, about 4 ft. long, threaded for 2 in. at one end was pushed through the hole in the oak and locknuts applied (Fig. 1). Two pieces of wood were cut, 5 in. x 3 in. x 1½ in. and a ¾-in. clearance hole drilled through the 3-in. width section. Two clips were attached to each block, made of mild steel, approximately 6 in. x ½ in. x ⅛ in. (Fig. 2). These blocks were screwed to two pieces of wood 3 ft. x 1⅛ in. x ½ in. (Fig. 3) and two screw-hooks attached.

The dipole, complete with the 4-ft. tube attached, was then dropped through the upper piece of wood and then through the lower piece, a length of 1-in. dia. tube 6 in. long being placed over the ¾-in. tube to act as a spacer. The coax. cable was then passed through the tube and attached to the aerial, the rope taken to the top screw-hook and the whole lot hoisted up the pole. The two pieces of mild steel act as a guide and go round each side of the pole; they must therefore be bent so as to clear the pole by about ⅛ in. The free end of the rope should be attached to the lower screw eye and can be used as a steadying line while raising the dipole. (It is assumed that the pulley on the pole will be within 6 in. of the top, otherwise a longer spacing tube will be required.)

To rotate the dipole, cords are attached to each end of the dipole support and simply pulled to move the aerial as required. If necessary, the ¾ in. tube could be lengthened and operated from the bottom of the pole, but the original idea was to make something light and easy to handle; it is clear that, by clipping in extensions to each half of the dipole, a 20-metre aerial can be constructed and raised in the same way.

The complete job should look something like Fig. 4. It is the writer's experience that even having a rotating dipole certainly pays dividends when trying to raise distant stations.

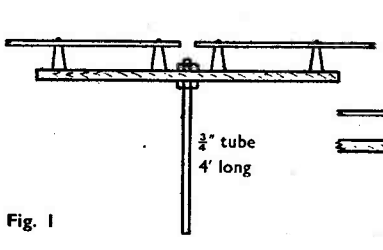


Fig. 1

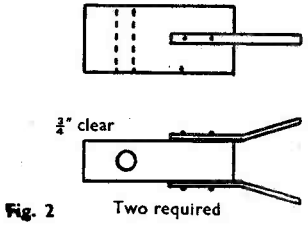


Fig. 2 Two required

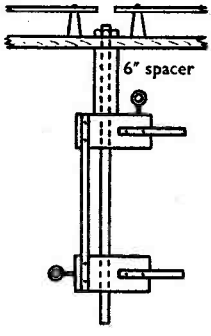


Fig. 3

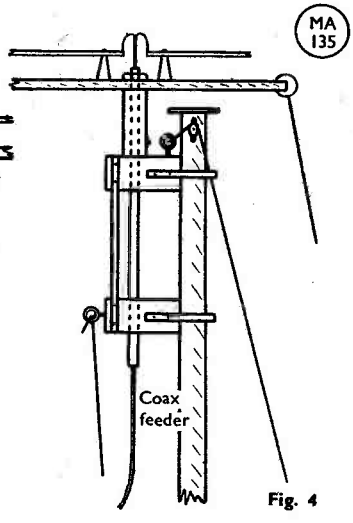
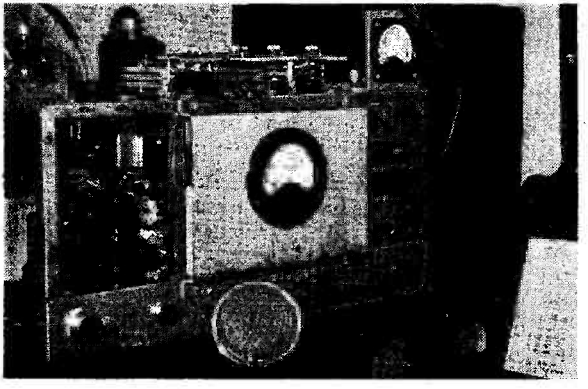


Fig. 4



DX COMMENTARY

CALLS HEARD, WORKED & QSL'd

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

JUST for once we propose to take time off from the reporting of individual DX feats, and to consider the broader aspects of the whole subject. These thoughts are occasioned by the fact that this is January, 1951—and that most of the pre-war amateurs regained their licences in January, 1946. We therefore have five years of Amateur Radio (post-war variety) to look back upon.

What kind of years have they been? There are, as always, several points of view. From that of the keen DX-chasing type — the Pot-Hunter, the Country-Counter, the Record-Smasher— those five years have been more eventful than any five-year stretch before the war. The first three of them, at least, saw an extremely good period of DX conditions, and these, allied with our better receivers, better transmitters, better aerial systems and (above all) the general use of 150 watts, brought a new meaning to the expression DX.

It may seem strange, but it is perfectly true, that many of the Old Timers now wiping up the DX with 150 watts seldom or ever used more than 10 watts before the war; and the great majority of them certainly never used more than 50.

This increase in the power of the G stations, together with the other technical improvements, has altered the standards of DX work completely. The alteration may be measured, roughly, by the fact that the working of 100 countries in the pre-war years was a feat just about equivalent to the scoring of, say, 180 or 190 since the war. In the 1930's the mere thought that anyone would ever reach a score of 200 would have appeared completely ridiculous and impossible. For the DX man, then, the first five years of the Post-War era have been pretty eventful.

Rising Population

What of the type—much more frequently met with—who takes his hobby in a leisurely way, doesn't enter for contests, and wouldn't dream of waiting half-an-hour in a queue for a new country? Because (let's face it) he is much more representative of Amateur Radio than the really rabid 'chaser. He builds nice gear, taking a long time over it; tests it out with care, generally with locals; puts out a nice-quality signal, sends slowly but meticulously; and when a nice piece of DX happens to come his way, he is as pleased as a dog with two tails. You all know him!

In our opinion, *he* hasn't fared quite so well. The bands are crowded, now, at all times of the day and night. He doesn't claim to be a red-hot operator,

and if the QRM is too bad he will pack up and either read a book or start building something else. So his hours on the air have been somewhat curtailed. Furthermore, he doesn't approve of the way everyone *hustles* him these days; in the middle of a nice leisurely QSO with someone or other, a completely different station appears on the frequency and starts calling him (much too fast!) and it all seems pointless. The fact that the said station wants to tell him he is on top of FB8ZZ (or someone) doesn't mean a thing—he was there first and it isn't his fault if some DX station pops up on his frequency.

Experiences like this have shaken a lot of the pre-war amateurs into believing that what was once a leisurely hobby has turned into a perpetual rough-and-tumble with no peace for anyone—and maybe there is something to be said for that view.

On the LF bands, of course, the change has been tremendous. Such people as our gentle friend could formerly work on 1.7 mc with a particular crony of theirs in the next town and rarely hear another station; *now* they have a job to pick out the one they want from the crowd on the frequency.

Bad Temper and Bad Manners

The worst change of all, in our opinion, has been the decline in the general level of "behaviour"—a term which embraces operating manners, both on Phone and CW, together with "what one says and what one does" in all circumstances.

As in every walk of life, it is the worst that attracts most attention. Thus the types that we have already dubbed "Spivs" seem to be far more numerous than they really are, and many completely innocent operators who unwittingly sit on a frequency or cause QRM in any way are classed with the few bad-mannered oafs whose technique is confined to the "Gercher—get out of *my* way!" manner.

So, to the Old Timers, the bands now seem to be packed with an impatent, thrusting crowd of quite a different type from the pre-war amateurs. And to what purpose? Chiefly, we regret to say, bent on the amassing of new countries—a pursuit which we are frequently accused of fostering more than most others!

Well, it has already been argued that we must have some sort of competitive urge for the good health of the technical side of radio. Likewise, the keenness of the continual stream of newcomers is not satisfied by just sitting back and working whoever happens to fall most easily within range. [over

At the FOC Dinner on Saturday, November 25. Left to right: G6QB (of "DX Commentary"); G5PS (Joint Honorary Secretary, FOC); G6FO (Editor, *Short Wave Magazine*) and G2NM (President, First Class Operators' Club).

So we must have this continual competition—but *must* it always be of the cut-throat variety? Are the days of friendly rivalry over? If you don't pick up that VK9 or ZS7 this week, won't he still be there next week? Just ponder on these questions and decide how much your DX achievements mean to you—and how much they *ought* to mean to you, regarded in a level-headed way.

FOUR BAND DX

FINAL 1950 LISTING

Station	Total Score	3.5 mc	7 mc	14 mc	28 mc	Countries
W2QHH	454	76	74	200	104	201
G6QB	442	41	81	187	133	210
G3ATU	408	27	87	194	100	202
G2AJ	378	24	66	179	106	196
G2VD	362	29	68	164	101	171
G2WW	349	21	53	170	105	181
G5FA	330	24	97	137	72	150
G2AVP	297	28	73	164	32	171
G3FNJ	290	24	53	120	93	150
G6BB	277	32	70	121	54	136
G8PW	253	20	60	115	58	129
G8IP	249	15	49	115	70	133
G2BJY	249	4	25	115	105	150
G3FGT	239	33	42	110	54	129
ZB1AR	233	31	45	113	44	120
G8VG	226	27	61	112	26	128
G2YS	214	24	33	117	40	130
G3ABG	212	22	62	121	7	127
G6QX	208	19	35	108	46	123
G2FYT	197	5	35	126	31	133
G3FXB	191	21	48	91	31	102
G2VJ	173	4	13	100	56	116
G6TC	173	11	45	99	18	107
GM3EST	170	20	24	124	2	126
G2HKU	168	1	42	111	14	120
G6AT	160	21	46	92	1	97
G2DHV	147	12	20	92	13	97
GM2DBX	145	5	23	62	55	92

Why These Countries?

And here is another big change in Amateur Radio since the early days. DX used to be measured in distance. When Goyder of G2SZ made the first British contact with New Zealand, that was the DX to end all DX. It might have been more difficult, from an operating point of view, for him to have worked Monaco, or Liechenstein, or to have extracted a QSL from Luxembourg —but the supreme technical achievement was that of getting signals to New Zealand.

Well, nowadays we can all do it. G5QA, of Exeter, has done it nearly every day for nearly ten years! So, to find something more difficult to do, we have adopted the (rather ridiculous) standard of Country Prefixes as a yardstick. And now the difficulty of the DX depends no longer on distance or, in fact, on any technical aspect at all, but purely on whether we can push sufficiently hard through the crowd to make the lone operator in Monaco, or Andorra, or Marion Island, listen to our call and come back with "Ur 569 will QSL 73 bcnu" before disappearing again for ever (as far as we are concerned).

It's a pity . . . but there it is. There will always be those to whom the number of countries worked means more than everything else that Amateur Radio has to offer. We can t do much about it, either. But we can just remind everyone that there *are* many other things to do; you can use the bands for making friends, instead of enemies. And that, in itself, is not a bad thing to do.

If you believe in New Year Resolutions, and all that, now is the time to do yourself a bit of good. Make a resolution that you are going to get more enjoyment out of Amateur Radio during 1951, simply by trying things that you have not tried before. Work on other bands; use phone instead of CW, or *vice versa*; stop ignoring that European who comes back to all your CQ's and find out what sort of a fellow he is. Try telling a W or a VE that there's no hurry, instead of saying "Won't hold you now." And when you hear a pile-up for a new one, just for once *don't* join it but look round the band for some of the other nice types who feel the same way! You'll be surprised.

As for ourselves—we're going to make a set of Bad Resolutions so as to feel

frightfully virtuous when we don't keep them. And so to our mail . . . .

News From Overseas

Eric Trebilcock, that OT among Australian SWL's sends some very interesting items. First, the current VK1 list, in full, shows that VK1HV, 1PG and 1YG are on Heard Island, while VK1JW, 1RB and 1YM are on Macquarie Island. There are no others. FB8ZZ, Eric says, is still active, and he is, and always was, on Amsterdam Island. Two new ones are on from Canton Island, in the British Phoenix Group—VR1E and VR1F, both on 14 mc.

VP1NW (Belize) writes to say that he runs 25 watts to a "lump of wire," all day and any day on 14 mc. He wants to work stations in the Dover or Folkestone area.

ST2KC (Port Sudan) hopes to be active by January 1 on 14, 21 and 28 mc, running about 100 watts. He has DC mains which are "500 nominal," meaning anything between 350 and 600.

VQ6BFC (Hargeisa, British Somaliland), to whom reference has been made in the last two issues, now writes with his own story. It is, of course, Bill Wheeler, of G3BFC and MT2BFC, and he is officially licensed. Far from "paying a fleeting visit," as we suggested, he says he will be on the air for at least a year. VQ6BFC will be on 14, 7 and 3.5 mc; every night from 1900 onwards he will be somewhere near 14200 kc or slightly lower. All that he had worked at the time of writing was "several VK'S and our old friend, Ken Ellis."

ZD2AJ is a new station in Lagos; the operator is ex-VQ4AJ and G3GAJ. He will be on 7, 14 and 28 mc, starting up on 14 mc CW and Phone.

VP7NM (Nassau) sends a new list of Bahamas stations; they are now VP7NG, 7NH, 7NJ, 7NL, 7NM, 7NN, 7NQ, 7NR and 7NU. VP7NM, who is QSL Manager, particularly wants to contact a GD; surely there's a GD who wants a VP7?

In a last-minute contact with HZ1KE on 7 mc, we gathered that he has been doing pretty well on 14 mc phone. Here's his list: VR1F, VR2BT, VP8AO, VK1HV, VK1PG, PK5AA, KS4AI, ZD1PW, ZD2LO, ZD6JL, ZK1AB, ZK2AA and ZS7E . . . "among others." And Ken mentioned a seven-way phone contact in which the seven were himself, KH6OR, KH6BA, VQ4RF, ZL2GX, ZK2AA and VR1F, with KJ6AL standing by.

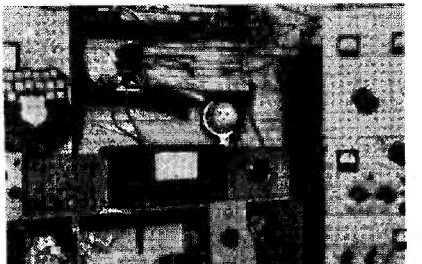
HZ1KE has a ground-plane for 7 mc and was roaring in at S8/9 when we worked him. He has worked W6DFY, PK4DA and UAØKQB on the band.

ZD4AB tells us of an unusual portable expedition: ZD4AD/P is bound for England, *via* the Sahara, in a Jeep! He works phone on 14300 kc after 1730 each day. Probably some of the 'chasers will have found and worked him by now.

And MT2E writes to say that he is now QRT from Tripoli, with all QSO's acknowledged by card *via* the various bureaux. He hopes to be on again shortly as VS9E from Aden, and also mentions that anyone working "MD2WY" was in contact with an unregistered station for whom any cards sent have been destroyed.

From Ismailia, GM3ECI writes that the as yet unlicensed MD5 boys are rarin' to go, and would make it a hive of activity if only they could get on the air; as it is, all they can do is to read about DX, listen to it—and hope! Bad luck.

OZ2NU (Aalborg) sends a most amusing letter headed "Play with Russian QSL's" and encloses *five* Russian SWL reports, all on the same transmission (which he didn't make) and all with different "pretty pictures." They are all signed by the same person. He tried to contact Box 88 and to tell them that such reports were of no value and not required in future, but still they come. We suggested to OZ2NU—and now pass it on for what it's worth—that all such cards should be stamped "Reception Verified" or "Reception Not Verified" and shot back to Box 88. After all, if the chap the other end wants a verification, he gets it that way! If a few hundred G's would do



This is a view of the station of ZL1HM, Papatoetoe, New Zealand, who is active on the DX bands.

At the Amateur Radio Exhibition on the opening day, November 22. Left to right: J. C. Clarricoats, G6CL (Editor, *RSGB Bulletin*); Austin Forsyth, G6FO (Editor, *Short Wave Magazine* and *Short Wave Listener & Television Review*); W. A. Scarr, G2WS (President, Radio Society of Great Britain); P. H. Falkner (Advertisement Manager, Short Wave Magazine, Ltd.); and, near right, Hugh S. Pocock (Managing Editor, *Wireless World* and *The Wireless Engineer*).

this, it might make a difference, or something.

Anyone who worked ZE3SY during three days in September made a contact that will not be repeated. We have received one of their special souvenir QSL's showing that the station was operated from the Royal Show at Salisbury and the call specially allotted for the occasion. There were eleven different operators (all licensed ZE's) and the 100-watt rig was loaned by ZE2KZ. All contacts will be QSL'd—a total of roughly 130. This information by courtesy of ZE3JO.

The Four Band Table

As we said last month, this is the last Four Band DX table in its present form—for the nonce. During 1951 we want to run this table as a 1951 Marathon, starting right away. So when you write in this month (deadline is the 15th) send your Four-Band scores so that we can at least get the table started. For goodness sake, don't hold back just because of low scores; we are making this clear start simply because we want to see some new calls coming to the top. Everybody starts equal at midnight on December 31 with a score of four noughts!

Please remember one thing in this connection: you must keep your score up-to-date month by month. You can't just leave it blank for six months and then suddenly weigh in with a load of accumulated DX. All claims must refer to contacts not more than *two* months in arrears.

It is nice to see the present table winding up with a QRP W station at the head. Though W2QHH (Hamilton, N.Y.) uses only 35 watts to a 135-ft. end-fed aerial, he competes nicely with the kilowatt boys. But Howy says he feels an intruder at the head of that column, and only sent the figures in to show it could be done. (Maybe he'll be in for that 1951 Marathon, though).

DX of the Month

December seemed pretty grim to us on all bands, although at the middle of the month the 14 mc band livened up a lot during the afternoons. Once or twice the W6's and 7's were banging

through between 1500 and 1600 in quite the old 1947 style.

ZS2MI (Marion Island) has showed up again and is rather difficult to work because of somewhat pecular tactics. Look for him anywhere between 14000 and 14100, T6-7, with a "commercial fist." HS1VR is another good one that everyone else seems to be calling. VS6's have been heard working him on 14100 at about 0900. VT1DF in Kuwait is also a nice 14 mc scoop.

G3COJ (Hull) is just due for his call-up, but had a final fling on 14 mc and collected FQ8AE and ZD6EF (CW) and EA9AI and VT1DF (Phone). He reminds us that a good indicator for Pacific DX is WWVH (Hawaii) on 15 mc—sometimes audible for two hours at a time. On 7 mc 'COJ worked CE3AG, KZ5ES, KP4KD and some VK's and ZL's. A VK gave him R5, S6 on 7 mc phone, but he couldn't make it a two-way. Other stations heard were FM7WF (2330), W1FAX/KW6 (0815) and LZ1KSR.

G5VT (Bishops Stortford) and others tell us that ZS7C is now active on 28 mc phone. ZS7C passes along the news that ZS7D is now licensed, but will probably be on CW only for a year.

G3BXO (Leeds) is pre-war VU2FX, and sends along some interesting documents to prove that he did work Afghanistan (YA5) before the war. Our "flat refusal to believe that anyone had worked YA" was only meant to apply to this *Post-War* era, but it's nice to find that there was a genuine contact once upon a time.

G8IP (Hampton) has got back to the DX bands at last and celebrated by working VK1YG and FF8JC for new ones. The VK was raised at 1625 GMT on a CQ call (14030). 28 mc has needed some digging, but resulted in QSO's with CN, VQ2, HZ, TA, ZE, ZS, MI3 and the like. On 7 mc 'IP had a fine QSO with ZD4AB, 579 both ways and no QRM, but, in general, he thought the band was terrible.

G3BNE (London, N.W.3) has found 14 mc pretty poor, but with 30 watts of supermodulated phone he has worked quite a bit of DX, including 3A2AB, EA6AR and IS1AEX for new ones. He says the outstanding phone stations are XZ2SY, VQ4RF and PK4DA, all of whom appear about 1600 GMT.

G2AVP (Thaxted) is another 7 mc devotee and has worked VQ4, VP6; VK 2, 3 and 5; PY 1, 2, 3, 4 and 7; ZS 2 and 6; and ZB2. Among those that got away were a CR6, a KR6 and a KW6.

GM8SV (Aberdeenshire) reports for the first time, and comments on G6AB's claim of the first G/UR contact; we hoped we had made it clear that this referred to the Top Band. 'SV lives on the end of a grid line and his volts fluctuate between 152 and 350! He has lost several rectifiers, condensers and a complete power pack, and now sits with a large AC voltmeter right in front of him all the time. He comments on the frequent "echo" effect on 14 mc signals —both phone and CW; we have had several days of that, but it is probably even more prevalent up there in GM. 'SV has been off the air during eight months' illness, but hopes to report regularly in future. We hope so, too.

GM3EST (Motherwell) has now applied for DXCC and has been working new ones apace—such as KG4AD, VQ8CB, FQ8AE and LZ1JW. He has found conditions terrible, 14 mc being dead from 1600 onwards. That seems to be a penalty of living in the Land

ZONES WORKED LISTING

POST WAR

Station	Z	C	Station	Z	C
Phone and CW			**Phone and CW**		
G6ZO	WAZ	227	GM3EST	38	126
G6RH	WAZ	224			
G6QB	WAZ	210	G3ABG	37	127
G3ATU	WAZ	202	ZB1AR	37	120
G2FSR	WAZ	196	G2GM	37	110
G4CP	WAZ	195			
G3DO	WAZ	191	G2FYT	36	133
G8IG	WAZ	181	G2YS	36	130
G5YV	WAZ	172			
G2VD	WAZ	171	G6QX	35	122
G3BI	WAZ	162	G2HKU	35	120
G3TK	WAZ	157	G6TC	35	107
G3AAM	WAZ	154			
G2IO	WAZ	152	G3FGT	34	129
G3YF	WAZ	152	GM3CVZ	34	105
G3AZ	WAZ	133	G6AT	34	97
G8IP	WAZ	133	G2DHV	34	97
G5BJ	WAZ	126			
G5VU	WAZ	124	G3GUM	33	82
G2AJ	40	196	G2BBI	30	100
G2WW	40	181			
G3FNJ	40	150	**Phone only**		
G6BB	40	136			
G3BNE	40	132	G2AJ	38	157
G5MR	40	125			
			G3DO	37	154
G3DCU	39	159	G6WX	37	128
GM3CSM	39	158			
G5FA	39	150	G8QX	36	139
G8VB	39	149	G3COJ	36	134
G3CVG	39	145	G2WW	36	121
G3BDQ	39	140			
			G2VJ	34	116
G3COJ	38	157			
G2BJY	38	150	GM2DBX	31	92
G3AIM	38	130			
G8PW	38	129	G2BBI	30	97

of the Midnight Sun—but it might also have its compensations?

G3HDA (Kidderminster) is a newcomer but a very keen and experienced SWL. To demonstrate the value of this, he has worked, in a week or two, such DX as VK1YG, CR4AD, FF8AC, EQ3FM, VS6, AP, HZ, KP4, YI, YV and so on—all with 18 watts. With conditions as they are, it seems pretty good to work 58 countries in 24 Zones during one's first ten days on the air!

G3ALE/A (lately back in Wales as GW3ALE) tells us that he will probably be heard in the future from VU, AP, VS7 or EP. He should, by now, be in Calcutta, but expects to do some travelling around, returning home in about 1953!

GM2DBX (Methilhill) breaks into both DX tables with a Phone-Only score. He works mostly on Ten, in spite of conditions; since September he has had QSO'S with CR7, ZS7, VS9, ZC4, YV, XE, CO, CX, FF8, KV4, ZD4 and ZS.

G3FXB (Hove) is now running 120 watts on 14 mc, and finds a marked difference between this and his old 25-watter. VE's, W's, VK's, ZL's all fall into the bag now, as well as CE5AW and KP4KD. PX1BU was worked; does anyone know of this one? Safe to assume that *all* PX's are phoney!

GW3ASW (Aberdare) moved from his old QTH last September to a spot where he hopes to open up a really good station. Unfortunately, sudden illness and a bereavement in October has completely upset all his plans. (He asks G2ANT, address unknown, to note).

DX QTH's

ST2KC	M. D. Kendall - Carpenter, c/o Eastern Telegraph Co. Ltd., Box 99, Port Sudan.
VK1HV	H. Vause, 50 Mitchell Street, North Ward, Townsville, Queensland.
VK1PG	J. H. Gore, 12 Pearl Street, Newtown, N.S.W.
VK1YG	L. McGorrigle, Princes Highway, Engodine, N.S.W.
VK1JW	J. L. Ward, 42 Electra Street, Williamstown, Vic.
VK1RB	T. R. Boyd, 6 Portland Street, Seacliff, S.A.
VK1YM	D. S. Cohen, 35 Devoy Street, Ashgrove, Queensland.
VP1NW	L/Cpl N. Wakefield, Royal Signals Det., Airport Camp, Belize, British Honduras.
VQ6BFC	W. H. C. Wheeler, Airport Manager, Hargeisa Civil Airport, Somaliland Protectorate.
ZD2AJ	H. C. A. Burt, Box 136, Lagos, Nigeria.

Now, however, he does expect to get going, 800 ft. a.s.l. and "aerial troubles negligible." He hopes to be on Top Band with a broadside to the States.

G2AJ (Biggin Hill) caught us just too late for last month with a report of nice DX worked in the various November contests. On 7 mc he raised FM8AD, VP5BF, ZD4AB, VP8AI, EK1AO and VK3AZW (at 1520 GMT). On 28 mc CW during the *CQ* Contest he worked EA8BE, VQ9AA, TI2BR, VP4TG, OA4BR, KS4, KZ5 and all that. New ones on 14 mc phone were VP2DC, 3A2AB, ZS7C and PJ5FN; on 14 mc CW, VP8AJ and CR5AC. One other point of interest is that 'AJ worked HZ1KE on all four bands within twelve hours.

Top Band Topics

'First and foremost—don't forget the Top Band Transatlantic Tests. To refresh your memories, the main dates are

January 14 and 28; February 11 and 25; March 11.

Full details on p.679 of the December issue, and even fuller details on the Log Sheets now available from the office. To get these, please send a large S.A.E. to the Circulation Manager, *Short Wave Magazine*, 53 Victoria Street, London, S.W.1, with a card marked "Top Band Test Logs," and they will be forwarded. So get weaving, but for goodness' sake *don't* transmit in the American band (1800-1825 kc) and *don't* call CQ when you ought to be listening.

G2HKU (Sheerness) says he has finally got out of England and has worked OK1AJB, OK1VW, DL2CH and DL2QM—all with his 4 watts to half of a 7 mc dipole.

G2NJ (Peterborough) received OK1AJB working DL2QM at 1538 GMT, and also tells us that UA3IS and UA4FC were heard on the band by G3KP. Further, G3GGN and GD3UB have heard the W's already, the former having logged W4CZW on phone!

G2YY (Berwick-on-Tweed) reports that UA3KLA, UA3IS and UA4FC have all been active round about 1820 kc at 1800 GMT or thereabouts.

For further Top-Band news, read the report of the Fifth MCC elsewhere in this issue. You may be surprised at some of the achievements mentioned therein.

So that's all for the present—our

parting salute to 1950. May 1951 be no worse as a DX year—we can hardly expect it to be any better, unless the sunspot cycle has become more than usually asymmetrical this time!

Two final reminders: Get cracking in the Top Band Tests, and work enough countries on the other four bands to send in an early entry for the Four Band Marathon. Deadline for the next issue is **first post January 15.** Address it all to "DX Commentary," *Short Wave Magazine,* 53 Victoria Street, London, S.W.1. For overseas readers, the next deadline will be **February 12;** home readers had better note that too, because it is immediately after publication of the February issue. Until January 15—73, BCNU and Good Hunting.

USING THE TYPE 1 VISUAL INDICATOR

Some Practical Applications

By **R. W. ROGERS (G6YR)**

The uses to which the instrument discussed in this article can be put are not very obvious at first glance. But as the Type 1 Visual Indicator consists actually of a pair of sensitive, high-grade 0-50 microamp movements, it is well worth considering the suggestions put forward by our contributor.—Editor.

AN instrument which has received little or no mention in technical journals, and may be unfamiliar to many, is the Visual Indicator Type 1. It is available on the surplus market at a price of a few shillings only, from at least one regular advertiser in the pages of *Short Wave Magazine.*

Fundamentally, the instrument comprises two very sensitive moving coil *microammeters* in a single 3½-in. diameter case. The pointer needles are so positioned that they cross one another and, with equal deflections of both needles, the cross-over occurs somewhere over a vertical line marked on the dial, as shown in Fig. 1(A). This indicator was originally designed for use with the R1155 for D/F purposes, but, with slight modifications, it lends itself admirable to many amateur applications, among which may be mentioned:

(a) In push-pull anode or grid circuits, to read simultaneously the separate currents or voltages in both halves of the circuit and at a glance show whether the stage is correctly balanced (or for any other application where currents are to be balanced).

(b) To read both plate and grid currents in a transmitter stage, or both plate and screen currents in pentodes and tetrodes.

(c) As a very sensitive field-strength meter indicator in conjunction with a crystal diode and tuned circuit. By using one section to indicate RF pick-up and the other to measure the audio component of the signal, modulation percentages can be read off directly.

(d) As a basis for a multi-range test-meter, using one section for voltage ranges and the other for current, enabling both to be used simultaneously in a circuit.

(e) Many other circuits requiring a *sensitive* indicator, such as a grid-dip oscillator, S-meter and in similar instruments.

The Movement

The two moving-coil assemblies are exceptionally well made and have a resistance of approximately 900 ohms each. Their basic sensitivity varies somewhat, but lies in the range 30 to 60 μA for maximum deflection. As supplied, the movements are invariably shunted to pass 120 μA at full-scale deflection, irrespective of their basic sensitivities. In this connection, it might be mentioned that there seem to be at least two different versions on the market (by different manufacturers), and, although the dials are the same, the internal construction is quite different. The more sensitive type can be identified by a deeper case, 2¾-in., as compared with the 2-in. depth of the other.

[over

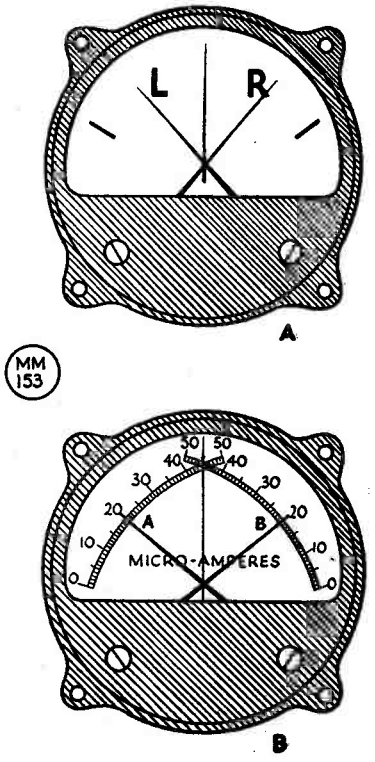


Fig. 1. (A) Appearance of an unmodified Visual Indicator, Type 1. (B) A specimen instrument as modified and calibrated by G6YR, for 50 μA maximum reading on both scales. When both needles are equally deflected, as when reading balanced currents, the cross-over always occurs over the centre line of the dial. The significance of this is explained in the accompanying article.

Modifications

For merely indicating balanced currents in two circuits, the indicator can be used exactly as it is, suitably shunted where necessary, but to make the most of the possibilities of the instrument, the dial will require calibrating.

To obtain access to the interior, a metal cover must first be removed and this, being usually a tight fit, may require judicious levering off with screwdrivers. The bakelite cover may then be taken off.

It will be seen that the zero marks are set rather high up the dial, giving a maximum deflection through only 45°, but this can be increased to about 65° without in any way affecting the sensitivity, but setting back the zero. In order to keep the scale as linear as possible, both the normal zero adjuster and a similar preset adjuster at the other end of the moving coil should be gradually moved by equal amounts in the same direction until the needle takes up the required zero position. In this way the original tension on the two hair-springs will be maintained; these hair-springs are wound in opposite directions, as viewed from the front. By treating both movements in this way, the available scale length can be increased up to about 2¼-in., which is practically equal to that of the conventional 3¼-in. diameter meter.

Calibration

The actual calibration naturally will depend on the purpose for which the meter is to be used. Where advantage is to be taken of the maximum sensitivity of the movements, the shunts should be removed and the meters calibrated in terms of their actual sensitivity in micro-amperes. But if they are to be used in balanced circuits, probably the wisest course is to leave the movements shunted as they are and then both scales are certain to be equal. The shunts are wound on small bobbins, of which there are four. Two are the actual parallel shunts, the others being series resistors, which should not be touched.

The original dial is finished matt black and the calibration may be inked on with white photographic ink or a paper scale can be glued on and marked in black Indian ink.

To set about calibrating the two movements, the zero marks having been fixed, the first thing is to settle the position for full-scale reading. The most sensitive and accurate meter available should be used as a standard and run in series with the two meter movements, a battery and a variable resistance. Assuming, for instance, that the most sensitive meter is 0-500 μA and it is found that the movements give a suitable maximum of 50 μA, the current passing should be set as accurately as possible on the 50 μA mark of the 500 μA meter, and the points can then be marked on the scale of the indicator, under the two needle tips. It is very helpful to use a magnifying glass in order to set the 50 μA mark accurately, and also the meter glass should be gently tapped to ensure that the needle

is not sticking slightly. It will be appreciated that final accuracy will depend on the care with which these full-scale deflection points are fixed.

Once the full-scale and zero points have been established, a different technique is advisable for completing the rest of the calibration—unless the reader is fortunate enough to have been using a 0-50 micro-ammeter as the standard. To mark in all the sub-divisions, each movement should be separately shunted by a variable resistor so that it passes exactly the same current as the standard meter at maximum deflection, — 500 μA in our case. The various sub-divisions should then be carefully marked in by adjusting the current to read each division in turn on the standard. Perhaps it is worth mentioning that it is important to shield all draughts from the meter whilst calibrating, or very erratic results are to be expected.

Fig. 1(B) shows a completed meter calibrated in this way by the writer, giving a full-scale deflection of 50 μA on both scales.

Further Notes On Application

When the meter is to be used to indicate balance in push-pull circuits, suitable points of connection in the circuit must be selected. Fig. 2 shows how grid, cathode, screen or anode currents may be read in a push-pull amplifier, and if suitable shunts are connected permanently in each lead (according to the normal current passed) one indicator may be readily switched to check the balance on each pair of electrodes. A big advantage of the instrument is that when balanced currents are passing the needles always cross each other exactly over the centre line, irrespective of the magnitude of the currents, so that it is not necessary to read off the individual currents to see that they agree numerically. This is particularly advantageous when used in a Class-B audio stage where the actual current is constantly fluctuating. The needle cross-over moves straight up and down the centre line if the valves are balanced in every way. Some valves may pass the same standing current, but vary considerably when driven, and this will show up on the indicator.

When used in a Class-B audio stage, the indicator may conveniently be inserted in the cathode circuits. With directly heated valves, separate filament windings must be provided. Audio voltages rather than current flowing may be

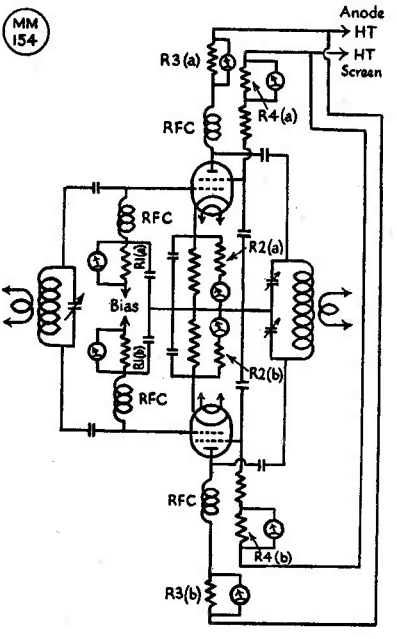


Fig. 2. Connecting the (modified) Type 1 Visual Indicator into a push-pull RF circuit to check the balance of grid, cathode, screen or anode currents. R1, R3, R4, are low resistance shunts to give suitable deflections. Balance can also be checked by measuring voltage drop across the cathode resistors, using R2 as high value series resistors.

checked by connecting one movement across each half of the modulation transformer through small metal rectifiers, or crystal diodes and high series resistors. In this way, balanced input and output voltages can be checked. Naturally, in applications like this, the series rectifiers and resistors should themselves be checked for balance before putting into commission. This is easily done by checking a test voltage on both movements, which should read alike.

Modulation Percentage Indicator

A modulation percentage indicator can be combined with a field strength meter by arranging to measure the audio component of the received signal. A suitable circuit is shown in Fig. 3. The movement used to measure the audio should be unshunted, both from the point of view of maximum sensitivity and also because the movements are very well damped and any low resistance

shunt makes the needle rather sluggish. Of course, as a programme meter or average level indicator, this is ideal, but generally the amateur is more interested in keeping an eye on the higher peaks of speech.

The RF movement should be shunted so that with a reading of, say, 80% full scale, 100% modulation registers nearly full scale on the audio meter. The percentage modulation will have to be calibrated with the aid of an oscilloscope or by some other means. The use of separate movements to indicate carrier level and depth of modulation is found, in practice, to be much more convenient than the more usual switching of one meter to either circuit, as a constant check can be made on the carrier level which ensures that the modulation scale is reading correctly.

Multi Range Instrument

When the instrument is to be used as the foundation for a multi-range test-meter, it is suggested that voltages be on one movement and current ranges on the other. It is possible to obtain a voltmeter of up to 20,000 ohms per volt if one is lucky in one's choice of indicator, but in any case, 10,000 ohms per volt or better should always be obtainable. If resistance ranges are added, it will be possible to measure up to ten or twenty times the value of resistance attained with the conventional 0-1 mA meter, under the same conditions.

For those with a really delicate touch, it is possible to obtain a real razor-edge pointer by giving a 90° twist to the needle, along its length. This is not recommended unless the reader is prepared to exercise plenty of patience, but it does give a very suitable needle where several concentric scales are to be used, and estimation to a fifth part of a division, on a 50-division scale, can easily be made — probably greater accuracy than the movement itself justifies.

Table of Values

Fig. 3. Circuit of the Modulation Level indicator.

C1 = 25 $\mu\mu$F
C2, C4 = .001 μF
C3 = 2 μF
R1 = 1,000 ohms
R2 = 2,000 ohms
R3 = 1,000 ohms variable
X1, X2 = Crystal Diodes

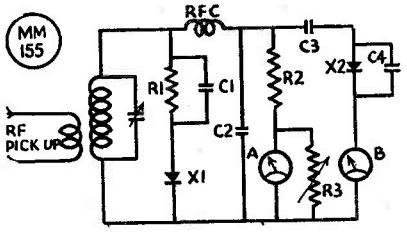


Fig. 3. Circuit of a suitable modulation indicator, using the modified Type 1 instrument. R3 should by adjusted so that with a 100% modulated test signal reading full scale on movement B, the deflection on A is some arbitrary figure near full scale; the R3 adjustment is then locked, and thereafter modulation depth is correctly indicated on scale B when scale A is set to the "standard deflection" by varying RF pickup; this can by done by adjusting physically the degree of stray coupling between the indicating device and the aerial tuning unit.

Conclusion

There are many other uses for which the instrument is eminently suitable, where a sensitive micro-ammeter is required, such as for a harmonic checker for TVI; for measuring the oscillator injection on frequency changers; for S-meters, where two separate meters can be provided, if desired—one to cover the ten-metre band or where the main receiver is used with a converter and the gain differs from that on the lower frequency bands; or as a grid current meter in a grid dip oscillator; and so on.

The moving-coils and needles are very light and the damping is very high, so a useful tip—when it is necessary to shunt a movement to read much higher current and it is desirable to prevent the meter from becoming very slow in following variations—is to place a resistor of a few thousand ohms in series with the moving coil and then shunt the whole.

It is hoped that the foregoing notes will prove useful to those not already familiar with the Visual Indicator, or who have not fully appreciated its potentialities, especially as it is available at a price lower than that charged for most single meters of the conventional type, of much poorer sensitivity.

VALVE REPLACEMENT GUIDE

Of particular interest to dealers is the new Mullard Valve Replacement Guide, now available from wholesalers at 2s. 6d. This edition of the Guide covers all receivers manufactured between the years 1933 and 1949 inclusive, and gives full replacement data.

VHF BANDS

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

Two-Metre Contest Results—

G5BY Leads Again—

Score Tables in Detail—

Survey of Equipment Used

FOR the second time in three years G5BY (Bolt Tail) has achieved first place in the annual *Short Wave Magazine* Two-Metre Contest, and again his lead is so great that the main competition has been to see who would occupy second place. In 1948, three out of the first four placings were filled by the Devonshire stations; in 1949, the first three were all from the South London area. But this year, with Devon, Surrey and Leicester stations occupying the leading positions, no one area can claim to have been specially favoured by either conditions or scoring. This is, in fact, the sort of result we like to see, and although there were criticisms of the method of scoring it is felt that the Contest result has fully justified the existing system.

Several competitors, particularly from the North, suggested that the Contest should have been for DX contacts only. So, in order to show the effect of such a restriction, two other Tables of Results have been compiled: One with points for contacts under 50 miles deleted; and the other with everything under 100 miles omitted. To your conductor, the chief effect of this seems to be to place G5BY still further in the lead! Other competitors suggested that one or other of the zones was at a serious disadvantage—so a fourth Table has been produced to show the winners and placings inside each zone.

To all who have reached high positions in any of these tables *Short Wave Magazine* offers congratulations, which will be echoed by all who follow this piece. And to those who failed to reach the top, often because of insurmountable local difficulties, our sincere sympathies and our thanks for having put in an entry. In 1948, there were 28 entries; in 1949, 58 came in; and this year, no less than 72 British operators sent in Contest scores. Additionally, in 1949 there were 10 European entrants, while the 1950 Contest has produced 18, together with a large number of "check logs."

So in terms of support given and results achieved, the 1950 *Magazine* Contest has been by far the most important and interesting yet held in Europe—and for that we have to thank everyone who came on the air during the Contest period.

The Winners

G5BY, using 145 watts to a push-pull VT62 stage for transmitter, and two converters, worked G3APY and G8UZ (both around the 230-mile mark) for his best DX. No less than 24 contacts were over distances in excess of the 150 miles. Amongst the "super-DX" which was heard but not worked were G2OI, G2XV, G3DAH, G3WW and G4MW. Had the repeated calls which G5BY made to these stations produced contacts his score would have been at least 150 points greater than it was! The converters were first, the usual 6J6 plus two 954 RF stages, 954 mixer and 955 oscillator which G5BY has had in use for some time, and secondly, a new all-6J6 circuit with only 20 volts on the oscillator.

G3BLP (Selsdon) was in 3rd place last year, and many, especially the Midland competitors, thought he would be first this time. The London area stations are at a disadvantage when it comes to the number of DX contacts which can be made, but G3BLP did much to overcome this by working the enormous total of 108 stations in all. Of these only five were in the over-150 mile category. His transmitter used 100 watts to push-pull 826 in the final. A crystal-controlled

THE SHORT WAVE MAGAZINE
TWO-METRE CONTEST
NOVEMBER 11-12, 1950

(See page 560 October issue for Rules)

Position	Call	Location	Points	Input (Watts)	Aerial System
1	**G5BY**	Bolt Tail, Devon	409	145	4/4/4/4
2	**G3BLP**	Selsdon, Surrey	306	100	Various
3	**G3ENS**	Loughborough, Leics.	281	75	5 Yagi
4	**G6NB**	Aylesbury, Bucks	266	150	16 Stack
5	**G3APY**	Kirkby, Notts.	234	50	5 Yagi
6	**G3ABH**	Sandbanks, Dorset	223	95	5 Yagi
7	**G3ABA**	Coventry, Warw.	218	140	16 Stack
8	**G2XC**	Portsmouth, Hants.	216	25	4/4
9	**G2CPL**	Lowestoft, Suffolk	213	20	4 Yagi
10	**G2AJ**	Biggin Hill, Kent	212	75	16 Stack
11	**G5RP**	Abingdon, Berks.	209	100	5/5
12	**G4CI**	Worcester Park, Surrey	202	140	4/4
13	**G3WW**	March, Cambs.	190	110	5/5
14	**G5WP**	Woking, Surrey	184	60	16 Stack
15	**G2XV**	Cambridge	182		3/3/3
16	**G3DAH**	Herne Bay, Kent	173	60	4 Yagi
17	**G5MA**	Ashtead, Surrey	171	90	4/4
18	**G8IL**	Salisbury, Wilts.	168	90	4/4
19	**G4HT**	Ealing, Middlesex	167	100	Various
20	**G3VM**	Norwich, Norfolk	164	18	4/4
21	**G3BOB**	Bromley, Kent	161	20	12 Stack
22	**G2AIQ**	Histon, Cambs.	155	18	
23	**G6CW**	Nottingham	144	18	4 Yagi
24	**G2MV**	Kenley, Surrey	143	25	Bi-Square
25	**G2ANT**	Godalming, Surrey	141		
26	**G5DS**	Surbiton, Surrey	139	20	12 Stack
27	**G2OI**	Eccles, Lancs.	138	50	5 Yagi
27	**G3CGQ**	Luton, Beds.	138	40	4 Yagi
29	**G3BA**	Daventry, Warw.	128		3/3
30	**G3FXG**	Clapham, London	127	25	4 Yagi
31	**G3FAN**	Ryde, I.o.W., Hants.	120	15	4 Yagi
32	**G6LI**	Grimsby, Lincs.	114	150	4 Stack
33	**G5NF**	Farnham, Surrey	112		
34	**G2UJ**	Tunbridge Wells, Kent	110	65	6 Stack
35	**G3GSE**	Kingsbury, Middlesex	102		
36	**G3FD**	Southgate, Herts.	100	45	4/4

converter with a 6AK5/EC91 cascode RF stage, 6AK5 mixer and 6J6 oscillator-multiplier took care of the receiving side. Three aerials were available, two 8-element stacks and a 4-element Yagi, all at 35 feet.

G3ENS (Loughborough) jumps from 23rd place last year to third this time—a most meritorious performance. Amongst his achievements was a contact with G3BW in Whitehaven, and a large proportion of his points were for over-100 mile work; he worked 58 stations in all. The transmitter ran an 829B PA, while the receiver had a CV139 RF stage, CV1136 mixer and 6C4 oscillator; his 5-element Yagi was up at 72 feet above ground. G3ENS heard a large number of stations which he could not raise in spite of repeated calls.

The Zone C winner, G2OI (Eccles), was unable to be active on the Saturday afternoon and worked only 30 stations. Undoubtedly he and all others in the Northern counties were at a disadvantage in this Contest, with conditions as they were. His best contacts were three over-150 mile QSO's, all made within half-an-hour of each other on the Saturday evening. His transmitter consisted of an SCR522 to drive an 829, while the receiver used CV53, EF91 and 6AK5 RF stages, with EAC91 osc-mixer into a 28 mc IF. His most consistent station

TWO-METRE CONTEST (*contd.*)

Position	Call	Location	Points	Input (Watts)	Aerial System
37	**G2NH**	New Malden, Surrey	93	60	4/4
38	**G3GBO**	Denham, Bucks.	91		4/4
38	**G5PY**	Clapham Park, London ...	91	70	4 Yagi
40	**G3GDR**	Watford, Herts.	89	10	4 Yagi
41	**G6CB**	Wimbledon, Surrey	88	50	3/3/3
42	**G2WS**	Shortlands, Kent	83	50	3/3
43	**G5UM**	Knebworth, Herts.	76	16	3 Yagi
43	**G8IP**	Hampton, Middlesex	76	16	4/4
45	**G8UZ**	Sutton, Notts.	75	30	5 Yagi
46	**G2AHP**	Perivale, Middlesex	70		12 Stack
47	**G5HN**	Reading, Berks.	62		
48	**G6PR**	Slough, Bucks.	62	16	2/2
49	**G2DTO**	Tooting, London	61		
50	**G3BHS**	Eastleigh, Hants.	58	28	4 Yagi
51	**G5JU**	Birmingham, Warw.	57	50	4 Indoor
52	**G5LQ**	Chiswick, Middlesex	56		
53	**G2DLJ/A**	Derby	54	12	16 Stack
53	**G3SM**	North Harrow, Middlesex ...	54	16	3/3
55	**G3CGE**	Southampton, Hants	48	20	3 Yagi
56	**G3BUN**	Hornsey, Middlesex	47	18	4 Yagi
57	**G3CAZ**	Gillingham, Kent	46	24	Various
58	**G2FNW**	Melton Mowbray, Leics. ...	42		
59	**G2XS**	Mansfield, Notts.	39	40	6 Stack
60	**G3BOC**	Heswall, Cheshire	35	15	3 Yagi
61	**G8GL**	Northallerton, Yorks.	33	12	4 Yagi
62	**G2DCI**	Speke, Lancs.	28	20	6 Indoor
63	**G3EMJ**	Derby	22	18	3 Yagi
64	**G8LN**	London, S.E.18	20	12	Dipole
65	**G6SC**	Ewell, Surrey	19	22	4 Yagi
66	**G4LX**	Newcastle, Northumberland ...	14		12 Stack
67	**G8LY**	Lee-on-Solent, Hants. ...	11	18	4 Yagi
68	**G3GRA**	Barnet, Herts.	10	14	Dipole
68	**G6TS**	Bournemouth, Hants. ...	10	13	Rotary D.
70	**G6PJ**	Sheffield, Yorks.	9	18	5 Yagi
71	**G3YH**	Bristol, Glos.	6	25	6
72	**G6TG**	Scarborough, Yorks.	4	15	4/4/4

Note: Figures in the "Aerial System" column give number of elements, *e.g.* 3/3 denotes 3-over-3.

was G3ENS—and G3ENS says much the same about G2OI in the reverse direction.

G6NB (Aylesbury) made the highest score in Zone G. Unfortunately, he missed the first few hours, but in spite of that worked 95 stations. His transmitter runs push-pull HK54's and the 16-element beam is 40 feet high. A CC converter has 6J6 RF and mixer stages. Runner-up in this Zone was G2CPL (Lowestoft) who made his score from 34 contacts, of which one with G8IL (Salisbury) at 182 miles was the best; his 832 PA running at low power was helped by a beam 60 feet high. The converter had two RF stages, the first with a 6J6 and the second pp EF91's. In spite of his position on the coast G2CPL heard no Continental stations.

G3ABH (Poole), who has given many of us the county of Dorset, just beat G2XC to it for Zone H winner. (By the way, if it happens that you do not like to see G2XC's call in the table, just draw a line through it and raise everyone else with a smaller score up one place!) G3ABH worked 51 stations, with G3APY as his best. The receiver had two 6AJ5 RF stages, a 6J6 mixer and crystal oscillator, and the transmitter ran 95 watts whenever the mains voltage permitted.

European winner was PAØWI (Schagen), who from his location in

North Holland worked several Belgian stations as well as a dozen or so in the Netherlands. He heard no signals from G or DL, and so once again conditions spoilt the chances for some interesting Continental working. Transmitter at PAØWI ran an 832 in the PA with only 15 watts, while the converter is a 6J6 type based on the *Short Wave Magazine* design.

Other Competitors

About two-thirds of the entries show that converters with 6J6 RF stages were in use. The 6AK5, however, is still the favourite at many stations, including several in the first dozen places in the table. RF26 and RF27 units, modified in various ways, were also not uncommon, while G5MA used three 954 RF stages, and several other competitors had modified ZB2 units. On the transmitter side, 832's and 829's figured prominently as PA valves. G3ABA and G3WW were different with a pair of 24G's, G2WS an 815, G4CI a pair of 8012's, G3GRA pp DET20, G3GDR an RK34, G5JU a QQVO6/40, G5UM a TT15 and G3BUN a pair of 7193's. With a few exceptions, therefore, two-metre equipment appears to have reached a reasonably consistent design standard throughout the country. Whether or not this is a good thing is, of course, debatable.

The aerial systems in use at all stations are indicated in the Table of Results. They appear to consist of three main types—simple Yagis, stacked Yagis and stacked colinear arrays. All three types are represented in the first three positions. Readers will no doubt draw their own conclusions regarding the merits of each.

Conditions

There is little doubt that conditions were superior to those existing last year, but in spite of that no contacts were made between this country and the Continent. Considering the scale of activity, especially in the Netherlands, this was both surprising and disappointing. GDX was reasonably good throughout Saturday afternoon and evening, but deteriorated very noticeably on the Sunday. This coincided with a marked change for the worse in the weather.

General Comments

General operating technique appeared, to your conductor, to be quite good, and the more frequent use of QLH and QHL signals by many operators was noticeable. These signals result in a great saving of time and QRM and their use at all times is commended. On the debit side must be mentioned the unnecessarily long calls made by some stations, both when calling CQ and other stations. It may seem hardly credible but G2XC was actually called for *six minutes* by one competitor! Several operators also indulged in long CQ calls after completing each contact, apparently failing to realise others were already waiting to call them

TWO-METRE CONTEST

EUROPEAN COMPETITORS

Position	Call	Location	Points	Input	Aerial Elements
1	PAØWI	Schagen	61	15	4
2	PAØFB	Hague	50	25	4
3	PAØFC	Maasluis	40	35	5/5
4	PAØNO	Maasluis	37	15	4
5	PAØPN	Middelburg	36	50	4/4
6	ON4HN	Antwerp	33	75	6
7	PAØTG	Rotterdam	32	27	5
8	PAØNL	Amsterdam	26	15	3/3/3
8	PAØPAX	Hilvershum	26		3
8	PAØTF	Breda	26	20	
11	PAØLU	Voorburg	20		
12	PAØLDG	Rotterdam	15		4
12	PAØOD	Rotterdam	15	15	3
14	PAØRK	Scheveningen	13		5
15	PAØBAL	Rotterdam	12	20	4
16	PAØJOB	Rotterdam	9	8	4
17	DL3FM	Mulheim/Ruhr	8	130	4
18	PAØIH	Gouda	1	10	4

and a *short* QRZ? or CQ was all that was necessary.

A number of competitors have asked that the next Contest be CW only. Although regretting the inability of many 'phone stations to work (or, in some cases, it would seem, read) CW, it is felt that one of the great objectives of this annual Contest is to get as many stations as possible on the band at the same time and that as many as possible of VHF operators should be able to join in the fun. There have also been a number of requests for another Contest in the spring or early summer, and while no decision has yet been made on this, it may be possible to organise such an event and at the same time use it to try out some of the ideas put forward by competitors in the 1950 Contest.

Almost all who entered commented on how much the Contest was enjoyed, and your conductor is indeed grateful for all the kind things said about the organisation for the event. To satisfy everyone completely is, as most competitors realise, virtually an impossibility. One operator's suggestions are cancelled out by the next man's, and often to change the rules to meet criticism from one quarter would only call down a shower of abuse from another direction! All the impressions, suggestions and criticisms which came in with the logs were read with much interest—and will be read again before next year's Contest is staged. But no promise can be given of any violent change, for the reasons already stated.

Our thanks are also due to all those who sent in check logs. They were of great value in working out the results, and it is hoped that next year some of these check entries will come in as full Contest entries. Some at least merited honourable placing in the Tables.

TWO-METRE CONTEST

SCORES AFTER ELIMINATING LOCAL CONTACTS

Pos.	Call.	Pts.	Pos.	Call.	Pts.
1	G5BY	403	34	G3CGQ, G5PY	49
2	G3ENS	248	36	G8IP	46
3	G3BLP	215	37	G5JU	44
4	G2CPL, G3APY	209	38	G2DLJ/A, G3FD	40
6	G3ABH	205	40	G2NH, G3CAZ	38
7	G3ABA	188	42	G3BHS	37
8	G2XC	178	43	G2WS	35
9	G3WW	167	44	G3CGE	33
10	G3DAH	160	45	G8GL	29
11	G3VM	158	46	G5NF	28
12	G6NB	154	47	G3GSE	23
13	G2XV	153	48	G3GDR	22
14	G2AJ	147	49	G6CB	20
15	G4CI, G8IL	146	50	G3GBO	19
17	G5RP	145	51	G2XS	18
18	G6CW	130	52	G5LQ	16
19	G2AIQ	127	53	G5UM	14
20	G2OI	118	54	G2FNW, G3BOC	12
21	G6LI	110	56	G5HN	9
22	G5MA	105	57	G2DCI, G4LX	8
23	G5WP	104	59	G2AHP, G2DTO, G3BUN, G3EMJ	6
24	G3FAN, G4HT	94	63	G3YH	5
26	G3BOB	93	64	G6PR, G6TG	3
27	G3BA	73			
28	G5DS	71			
29	G2MV	67			
30	G8UZ	61			
31	G2ANT	57			
32	G2UJ	56			
33	G3FXG	53			

Note: For this Table only contacts over distances in excess of 50 miles have been counted.

More Comments

A few more extracts from the "impressions" accompanying the logs are appended as food for thought, and to show the good humour and sporting spirit displayed by competitors generally.

"Dare one ask for a QRP 2-metre contest? 5 watts or one watt and under. Yes, I think it could be done and DX worked. (G8LN) . . . . "Brickbats to the Electricity Board for complete power failure on three occasions on Sunday." (G3VM) . . . . "During the Contest that part of the band which should be used by the South Western, Welsh and Irish stations was completely unused as far as I was concerned." (G3WW) . . . . "These Contests stimulate one's interest in the bands and I think cause one to strive for still better results." (G3CGQ) , , , , "The short times I was able to devote to the Contest coincided with the periods of lowest activity." (G3EMJ) . . . . "I enjoy hearing stuff even if I cannot work it." (G3EYV) , , , , "One fault to find—stations who call CQ in one direction on CW and then QSO the loudest station calling them on phone in a different direction." (G8LY) . . . . "A very good show, with excellent operating by all." (G2MV) . . . . "No matter what I did to attract their attention G3DAH, G3WW,

G2XV and G4MW continued to work semi-locals." (G5BY) . . . . "Best DX heard was G5BY. The signals were RST569 for quite long periods." (G3DAH).

And there we must leave the 1950 Two-Metre Contest. If your conductor has appeared to be somewhat inactive on VHF for the past few weeks his excuse must be the Tables which appear herewith. Thank you all for your support.

Other News

An interesting letter from DL4XS arrived just too late for last month's issue. He includes a list of G's worked in chronological order, and as it will undoubtedly interest many here it is :

June 9: G3DIV/A.
June 11: G3DIV/A.
August 20: G3DIV/A.
September 12: G3DIV/A, G2XC, G3BHS, G4AU, G6WU, G3EBW, G4MW.
September 13: G3EBW, G2AVR, G2BMZ, G6LK, G3GDR, G5WP, G3BNC, G4MW, G6XM, G3AEX, G6AG, G2XC, G6WU, G2CPL, G8SY, G8VR.
October: G3DEP, G3DIV/A, G5RO.

TWO-METRE CONTEST

OVER-100-MILE SCORES

1	G5BY	384		G2UJ	
2	G3ENS	188	32	G3FXG	28
3	G2CPL	176		G4HT	
4	G3APY	155		G2MV	
5	G3VM	136	35	G5PY	24
6	G3BLP	132		G8GL	
7	G2AJ	112	38	G3CGE	20
8	G2OI	92		G2WS	
9	G4CI	88	39	G3BHS	16
	G8IL			G3CAZ	
11	G2XC	80		G5JU	
	G6CW		43	G2NH	12
13	G3ABH	76		G3BOC	
14	G3DAH	72		DL3FM	
15	G3ABA	68		G2DCI	
16	G5MA	64		G3BA	
17	G5WP	60		G3CGQ	
	G6LI			G3FD	
19	G6NB	52		G3GDR	
20	G2AIQ	48	45	G3GSE	8
21	G8UZ	47		G4LX	
22	G3BOB	44		G5NF	
23	G5RP	40		G6CB	
24	G2ANT	36		ON4HN	
	G5DS			PAØFB	
26	G2DLJ/A	32		PAØNO	
	G2XV				
	G3FAN				
	G3WW				
	G8IP				
	PAØWI				

In all DL4XS has worked 6 countries, 21 G's in 9 counties, 14 PA's, 9 ON's, 4 HB's and 4 F's, as well as 52 DL's. This splendid record includes 30 contacts at over 350 miles. He comments that according to the local weather man "it has been a poor year." DL4XS has now moved to Rhein/Main near Frankfurt and is active from there on both Two and Seventycems. He hopes to work some of us via Aurora this winter and suggests that whenever there are signs of Aurora effects watch be kept for him. On 70 cm he has a pair of 8025's on 433.3 mc and for receiver there is an APR-4 working into a Super-Pro. Other DL4 stations are also just about ready. DL nationals are not at present allowed to operate on 420 mc.

G8LN (South-East London) says he is still at a loss to understand why 144 mc is deserted most evenings in South London, whereas 1.7 mc is cluttered up to breaking point with local phone chats. However, he experienced some good conditions during the recent foggy spells. G8IP (Hampton) wonders if some of those who complain about lack of activity ever do *anything* except Amateur Radio ; his rebuilding is still not finished, mainly due to lack of available time. A disappointing evening was November 26 when G3BHE and G4NB were good signals at G8IP but could not be raised. G3YH (Bristol) also notes November 26 as a good date ; he has been trying out a 6-element broadside stack with encouraging results, but it has been temporarily put out of action by a gale.

G3DVQ (Purley) made his first 2-metre contact on September 21, and is using a modified R1132A until a G2IQ converter is finished ; the aerial is a 2-over-2 in the roof-space and his frequency 145.08 mc. G2JU (Wittering) has been temporarily inactive, but is now back again on Saturdays. G3HBW (Wembley) has been on Two since November 28 with about 5 to 10 watts to a pair of 6C4 valves, and on 70 cm since December 1 with 3 watts to a 6J6 tripler ; a few locals have been worked on Two and G2DD and G8SM on the higher frequency band. G6PG (Dartford) reports working G2FKZ and G3FZL/A on 420 mc ; his frequency is 435.3 mc and he is on it nightly at 2100 and onwards.

G3ELT (Salford) tells us there is some increase of activity on the VHF bands in the Lancashire area, although conditions are far from good ; his beam is now 26 feet higher up, but so far this has shown little improvement over

NATIONAL GRID REFERENCES

As Given By Competitors

G2AHP	51/169830	G3EYV	51/3075
G2AJ	51/417594	G3FAN	40/591924
G2ANT	41/960427	G3FD	51/286948
G2CPL	62/536910	G3GDR	52/0902
G2DCI	33/431832	G3SM	51/577072
G2MV	51/325582	G3VM	63/182101
G2NH	51/2069	G4CI	51/220651
G2OI	33/993753	G5BY	20/688388
G2UJ	51/577399	G5DS	51/185665
G2XC	41/670069	G5PY	51/2973
G2XV	52/473568	G6LI	52/9396
G3ABA	42/353822	G6NB	41/7915
G3BLP	51/34936269	G8IL	41/129307
G3BOC	33/279816	G8IP	51/136698
G3CAZ	51/785687	G8LY	41/566006
G3ENS	43/53351525		

previous results. Tests on 70 cm with G2OI still continue; signals can pass over the path between them (a few miles) without the feeders being connected to the 832 treblers.

G3DVQ, G3GSE and G6PJ are welcomed as new members to the Five-band Club.

Complaints regarding failure of well-known stations to QSL frequently appear in this column—and it now appears that due to a cardinal error in the "Cards In and Out" book some stations may not have received their QSL from G2XC! If this is so, your conductor bows his head in shame and will be pleased to put the matter right immediately on request.

In Conclusion

Publication of the Contest Results has meant dropping the usual tables from these columns this month, but they will be back again next time. And comment on a number of report letters received just as this was going down is also being held over for the next issue. Due to the Christmas rush this offering of "VHF Bands" has had to go to press earlier than usual and it is probable that more of the mail has not reached us in time. To any who have written and not received mention here as a result of this, we offer apologies. The latest date for next month's mail **is January 16** and the address E. J. Williams, G2XC, *Short Wave Magazine*, 53 Victoria Street, London, S.W.1. With you again on February 9.

TWO-METRE CONTEST

RESULTS BY ZONES

Zone C

1	G2OI	138
2	G8GL	33
3	G2DCI	28
4	G4LX	14
5	G6PJ	9
6	G6TG	4

Zone E

1	G3ENS	281
2	G3APY	234
3	G3ABA	218
4	G6CW	144
5	G3BA	128
6	G6LI	114
7	G8UZ	75
8	G5JU	57
9	G2DLJ/A	54
10	G2FNW	42
11	G2XS	39
12	G3BOC	35
13	G3EMJ	22

Zone G

1	G6NB	266
2	G2CPL	213
3	G3WW	190
4	G2XV	182
5	G3VM	164
6	G2AIQ	155
7	G3CGQ	138
8	G3FD	100
9	G3GBO	91
10	G3GDR	89
11	G5UM	76
12	G6PR	62
13	G3GRA	10

Zone H

1	G3ABH	223
2	G2XC	216
3	G5RP	209
4	G8IL	168
5	G3FAN	120
6	G5HN	62
7	G3BHS	58
8	G3CGE	48
9	G8LY	11
10	G6TS	10
11	G3YH	6

Zone I

1	G5BY	409

Zone J

1	G3BLP	306
2	G2AJ	212
3	G4CI	202
4	G5WP	184
5	G3DAH	173
6	G5MA	171
7	G4HT	167
8	G3BOB	161
9	G2MV	143
10	G2ANT	141
11	G5DS	139
12	G3FXG	127
13	G5NF	112
14	G2UJ	110
15	G3GSE	102
16	G2NH	93
17	G5PY	91
18	G6CB	88
19	G2WS	83
20	G8IP	76
21	G2AHP	70
22	G2DTO	61
23	G5LQ	56
24	G3SM	54
25	G3BUN	47
26	G3CAZ	46
27	G8LN	20
28	G6SC	19

TO OVERSEAS READERS

With the steadily increasing circulation of *Short Wave Magazine* in distant parts, we would particularly invite more activity reports (for "DX Commentary") and general news items from our DX readers. Good clear photographs of Amateur Radio interest are always wanted, and those used are paid for at generous rates.

MODIFIED RF MONITOR

Ideas for the Absorption Wavemeter

By **A. M. H. FERGUS (G2ZC)**

SEVERAL articles have appeared on the construction of a Monitor/Field Strength meter, all of which conform to a basic design, so no new originality is claimed in this brief comment on the same subject.

Many months ago the writer constructed a combination instrument incorporating an absorption meter with the monitor/field strength type, with some slight modifications.

Referring to the article by GM6LS in the December, 1948, issue of the *Short Wave Magazine*, the following modifications are suggested, indicated by the heavy lines in the accompany diagram. Comparison may be made between the original circuit and the one published here.

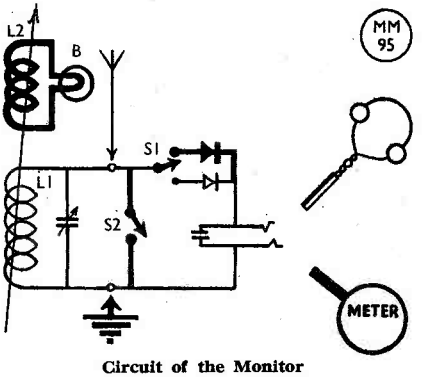
To start with, when using the instrument as an absorption meter proper, portability and size are important features, so the writer's instrument is built into a metal cabinet measuring 4¼ in. high, 3⅜ in. broad and 2¼ in. deep. This prohibited the microammeter being permanently mounted, which is actually no disadvantage, as if it be inserted *via* a standard phone plug it can be introduced at will, or withdrawn to protect the sensitive meter when absorption tests are being undertaken.

Referring to the diagram, the phone jack therefore serves the dual purpose of bringing in either the headphones or the microammeter, and, when an absorption check is being done, neither are in circuit.

Germanium and selenium crystals appeared to be slightly different in sensitivity, so one of each was provided; either can be brought in by means of the SPDT toggle switch S1.

When operating as an absorption wave-meter, it is imperative that the crystals should be protected, so the switch S2 was incorporated, which shorts them out of circuit when such readings are being taken—or for the reason given in GM6LS's article, where he advocates detuning.

The modification to the coils lies in the mounting of L1 and L2, using four-pin formers. L1 is soldered to the grid/plate pins, and L2 to the filament pins. L2 is connected to the usual "peanut" bulb, and loose coupled to L1. Experiment will decide as to the number of turns required and the position of the coupling (influenced somewhat by the power used), but there is nothing critical about this, as the untuned coil L2 mere "picks up" from the tuned coil L1, and gives a much sharper resonance setting. About five turns is a safe number to suggest for the first trial.



Circuit of the Monitor

Stand-by BC Rx !

The last modification is the mounting of an earth terminal. When the unit is connected between a good aerial and earth (with, of course, a coil of suitable size) in comes the B.B.C.!! That idea may cause derision, but in these days of "shedding the load" all-mains stations still need a means of obtaining time signals and the news. So the idea is not so foolish as it may at first sight appear. Most of us have forgotten, and many have never known, the quality of broadcast signals as received on the simple crystal set against a dead silent background. Yet here we have just that "something for nothing," which is preferable to a dead silent station when the power it out!

IMPORTANCE OF THE AERIAL

At the National Radio Exhibition, the GPO had an interesting exhibit designed to illustrate the importance of providing a good aerial. Its inspiration was the fact that last year the Engineering Department dealt with 94,272 complaints of TV/BC interference. Of these, no less than 15,000 were explainable by the fact that poor aerials were being used with the receivers affected.

The other man's station G2BJY

GEOFF JOHNSON of G2BJY (22 Lynton Avenue, Hateley Heath, West Bromwich, Staffs.) has been a very successful DX operator for some time now, even though, as he puts it, "the input is only 25 watts." Nor does he make any apologies for what he calls the "bare-bones appearance of the rig" which is designed for accessibility and quick band changing.

The station was first licensed AA in 1937, full radiating facilities being granted in March, 1946. Activity is on all bands, the preference being for 28 mc phone and 14 mc CW, with a maximum input of 25 watts—except for the Top Band, where a QRP one-watt rig is used with an O-V-1 receiver. The main transmitter on the HF bands runs 807-6L6-6L6-6L6-807 PA, the exciter unit giving output on 3.5, 7, 14 or 28 mc as required. For speech working, a pair of KT66's plate-screen modulate the 807 PA.

The receiver is entirely home-constructed and is under almost continuous modification; it is an 8-valve job with an EF50 RF amplifier. Auxiliary gear includes a BC-221, an oscilloscope, a signal generator, and a field strength meter-phone monitor.

Aerials are a three-element close spaced beam for Ten, a full-wave wire for Twenty and a 7 mc dipole. The station record includes the DXCC certificate, with two more States required for WAS and two zones for WAZ. Of the 138 countries worked, 114 had been confirmed as at the end of August, 1950. Altogether, an interesting station and good record, saying much for the less elaborate approach to amateur DX working.

NEW QTH's

All addresses appearing under this heading are inserted only at the direct request of the holder of the callsign, and appearance in "New QTH's" ensures publication in the quarterly issue of the *Radio Amateur Call Book* in preparation. We do *not*, as is apparently often thought, confine this feature to direct subscribers—*any* reader who cares to send us the necessary details is assured of entry in his turn. But it is advisable to inform us promptly.

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.

EI5B R. J. Toby (*G2CDN, ex-SU1CX-ZC1AR/ZC6*), Fintargh, Knapton Road, Dun Laoghaire, Co. Dublin, Eire.

G2APN R. A. Perryman (*ex-ZC6RP/VS1DK*), Hillside, Whitehill, Bordon, Hants. (*Tel.: Bordon* 213).

G2FGQ G. Jenkinson, 86 East Ella Drive, Hull, Yorkshire.

G2FWJ F. Simmons, 28 Melton Gardens, Romford, Essex.

GM3COB J. Paterson, 37 Burnhead Street, Greenock, Renfrewshire.

G3CQH C. W. Fleming, Brockhampton Court, Brockhampton, Andoversford, Glos.

G3FBR J. F. Lewis, 42 Garthorne Road, Forest Hill, London, S.E.23.

G3FZF South West Essex Radio Society, 367 Rush Green Road, Romford, Essex.

GM3GCH A. Johnston, 16 Whinhill Terrace, Banff, Banffshire.

G3GCO S. A. Bowen, 43 Turreff Avenue, Donnington, Nr. Wellington, Salop.

G3GHM P. Maxwell, 93 Bowerdean Road, High Wycombe, Bucks.

G3GOV W. W. Smith, 62 Cobbett Road, Honicknowle, Plymouth, Devon.

G3GSB W. J. Galloway, 5 Regency Road, Malvern Link, Worcs.

GI3GSB/A W. J. Galloway, Donacloney, Lurgan, Co. Armagh, Ulster, N. Ireland.

G3GTB T. W. Barrs, 71 Cedars Avenue, Coventry, Warks.

G3GTY R. Heron, London Central Y.M.C.A., Great Russell Street, London, W.C.1.

G3GVX R. W. Martin, 14 Havelock Street, Islington, London, N.1.

G3GWW J. E. Holt, Ardwyn, London Road, Charlton Kings, Cheltenham, Glos.

G3GXB E. Greenwood, Brierley Road, Shafton, Nr. Barnsley, Yorkshire.

G3GXS H. Ness, Greengarth Hall, Holmrook, Cumberland.

G3GYH E. R. Boothroyd, 55 Bank End Lane, Almondbury, Huddersfield.

G3GYK J. Lee, Prinus, Pine Glen Avenue, Ferndown, Wimborne, Dorset.

G3GZB S. N. Radcliffe, B.A., c/o South West Essex Radio Society, 367 Rush Green Road, Romford, Essex.

G3GZM L. Dyke, 5 College Terrace, Berrington Road, Tenbury Wells, Worcs.

G3HAD Kenilworth Radio and Television Society, c/o 30 School Lane, Kenilworth, Warks.

G3HAG R. P. Hughes, 6 Sergrim Road, Roby, Liverpool, Lancs.

G3HBE M. A. Brett, 57 Woodlands Road, Birmingham, 11.

G3HBK R. Barry, 10 Barlee Crescent, Cowley, Uxbridge, Middlesex.

GI3HBT T. Hall, Glenburn, Doagh, Co. Antrim.

G3HCC G. E. Veasey, 6 Elmcroft Terrace, Colham Green Road, Hillingdon, Middlesex.

G3HCF T. Shackleton, 46 High Green Road, Altofts, Normanton, Yorkshire.

GI3HCI W. Campbell, 85 Castlereagh Street, Belfast. (*Te.: Belfast* 57655).

G3HCK T. Foord, The Beeches, London Road, Hurst Green, Sussex.

G3HCM D. Dumbleton, 321 Tile Hill Lane, Coventry, Warks.

G3HCM/A 14463321 L/Cpl. Dumbleton D., c/o Garats Hey Radio Club, 10 W/T Sqdn., Royal Signals, Garats Hey Camp, Loughborough, Leics.

G3HCN W. G. Clapp, 35 St. Luke's Crescent, Totterdown, Bristol.

G3HCO G. A. Errock, 28 Burns Street, Mansfield, Notts.

G3HDD Sgt. Seeney, No. 3 Trg. Bn. (TELS), Baillard Camp, Aborfield, Reading, Berks.

G3IDT D. I. Thompson, Strathmore, A.2 Baghill Lane, Pontefract, Yorkshire. (*Tel.: Pontefract* 545).

G5UJ S. G. Wood, 80 East Bawtry Road, Rotherham, Yorkshire.

G6VG T. L. Peterson, 3 Belle Vue Crescent, Tyne Dock, South Shields, Co. Durham.

CHANGE OF ADDRESS

EI3R T. A. Hurley, Collins Barracks, Cork, Eire.

G2HX L. O. Rogers, 50 Hillview Drive, Hucclecote, Gloucester.

G2JI G. M. Keyworth, Golden Ball Hotel, Worksop, Notts.

G3AAE J. D. Kay, Gothic House, Hadley Common, Barnet, Herts.

G3BAA A. H. S. Bridgman, B.Sc., Highbury, Oakfield Road, Brettel Lane, Stourbridge, Worcs.

G3BDR H. E. Hulbert, 7 Fir Tree Grove, Moortown, Leeds, Yorkshire.

G3BKG Flt. Lt. K. C. B. Field (*ex-GI3BKG*), R.A.F. Station, Ringstead, nr. Dorchester, Dorset.

G3BRK I.E.M.E. Technical Society, Ministry of Supply, Aquila, Golf Road, Bickley, Kent.

GW3BUX M. Faraday, (*ex-G3BUX*), R.A.F., Llandaff, Cowbridge Road, Ely, Cardiff.

G3CBU P. J. Sterry, 1 Lower Park Road, Belvedere, Kent.

G3CII R. Haigh, Green Farm Cottage, Clifton, Brighouse, Yorkshire.

G3CRK A. W. Watkins, 116 East Street, Prittlewell, Essex.

G3CRY P. J. McConnachie, 22 Woolmers Mead, Pleshey, nr. Chelmsford, Essex.

G3DBF F. Knowles, 98 Laurel Avenue, Forest Town, Mansfield, Notts.

G3DCJ J. E. Wootton, Atlantic Breezes, Sennen, Lands End, Penzance, Cornwall.

G3EIO K. J. Marley, Barnjet Priory, West Barming, nr. Maidstone, Kent.

G3EJR J. B. Armstrong, Greengarth Hall, Holmrook, Cumberland.

GM3EOS A. H. Greasley, East Mill House, Brechin, Angus.

G3ESO A. D. Underwood, B.E.M., Winton, Earls Road, Amesbury, Wilts.

G3FCH Miss Jean Knowles, 98 Laurel Avenue, Forest Town, Mansfield, Notts.

G3FPD R. Surman, Lyncote, Coltsfoot Drive, Burpham, Guildford, Surrey.

G3GGJ A. H. G. Waton, 122 Huntingdon Road, Cambridge.

G3SY C. Dawson, 5 Monkhouse Road, Salterbeck, Workington, Cumberland

G4NS J. Hudson, 16 Monkhouse Road, Salterbeck, Workington, Cumberland

G4OU F. G. Maynard, 31 Fleet Avenue, Sheerness, Kent.

G5WQ J. R. Witty, 112 Marple Road, Stockport, Cheshire.

G6XY R. H. Webb, 233 Warwick Road, Kenilworth, Warks.

CORRECTION

EI6X B. Fogerty, c/o Cliff Power Station, Cloghore, Ballyshannon, Co. Donegal, Eire.

G3FNN J. Shields, Haverings, London Road, Billericay, Essex.

Here and There

Festival of Britain

It is probably not yet generally known that there is to be a mobile version of the Festival of Britain Exhibition next year. In a great baggage train of more than 100 lorries, about 5,000 exhibits will be transported in turn to Manchester (May 4-26), Leeds (June 23-July 14), Birmingham (August 4-25) and Nottingham (September 15 to October 6). Divided into several sections, the Hobbies Division of the Exhibition is to cover Amateur Radio. At each location where the station is to be in operation, a local amateur will be nominated in charge, with the transmitting licence made out in his name. The GPO will issue a special callsign for use during the period of the Exhibition, and a suitable QSL card is also being designed for the Exhibition station. We shall be keeping readers fully informed on all details as the project gets under way and takes its final shape. Regular activity reports, covering operating experiences at each location, will also appear.

To Whom It May Concern

With reference to the nomination papers circulated to the membership in connection with the recent RSGB Council election, we desire to make it clear that Basil Wardman, G5GQ, ceased to be associated with Short Wave Magazine, Ltd., in March, 1938, and since then has not been connected with the *Magazine* in any way whatever. At that date, thirteen years ago, *Short Wave Magazine* came under the present Editorial direction, which has remained unbroken ever since.

Radio Amateurs' Examination—1950

The results of the Examination held in May, 1950, show that a total of 833 candidates sat (898 in 1949), of whom 660 were passed (630 in 1949). The pass rate has therefore improved to 79% compared with 71% passed in 1949. The Radio Amateurs' Examination is held under the *aegis* of the City and Guilds of London Institute, for the benefit of prospective amateurs who do not possess the necessary exempting qualifications. The questions set for the 1950 R.A.E., together with extracts from the Examiner's Report, appear in full in the current (January) issue of our *Short Wave Listener & Television Review*.

Disturbing News

Further to the note in this space in our last issue, it is now reported that Robert W. Ford, AC4RF, is facing a charge, by the Chinese Communists who captured him at Chamdo on October 10, of having "poisoned a high Lhama priest." In the *Straits Times* of December 5, it is also said that the Chinese are accusing AC4RF of being a "British secret agent." There is still no news of AC4YN, who is thought to be in Lhasa. For the moment, the Kremlin has stopped the Chinese advance towards the ancient capital of harmless and unarmed Tibet.

Contest Complications

The recent Top Band Club Contest (MCC), organised by *Short Wave Magazine* and now in its fifth year, is reported elsewhere in this issue. There has been a certain amount of misunderstanding (and protest) by reason of the fact that there was some slight clashing with other contests on the same band. The trouble is, of course, that with so many contests of various kinds on different bands (as there are now) it is almost impossible to avoid over-lapping. The contest season is October-November and January-April, because May to September are holiday months, and December brings preoccupations of its own. Furthermore, so far as we are concerned, contests are always arranged for dates which will enable us to report the results in the next-issue-but-one after the event; so, having regard to the periods available, a glance at the calendar will show that there are, in fact, only a few week-ends during the accepted periods when this condition is satisfied. Hence, it is inevitable that dates clash with other events organised on the same principles. In point of fact, this clashing is hardly ever at all serious and does not in any way affect the level of activity.

THE FIFTH MCC

THE MAGAZINE TOP-BAND CLUB CONTEST

NOVEMBER 11-19, 1950

THE hat-trick goes to Rhigos, GW3FFE! For the third year in succession this Club has finished well ahead of the nearest challenger. Many of us prophesied that this would be the result, and, sure enough, it is. This Fifth MCC has had more support than any of the previous events, and we finally received entries and logs from 36 Clubs, as compared with 25 last year.

Here, in the traditional position of honour, are the first three—all of them the same as last year:

1st: Rhigos & District Radio Club, GW3FFE (15,917)

2nd: Neath, Port Talbot & District Radio Society, GW3EOP (12,580)

3rd: Coventry Amateur Radio Society, G3FAB (11,250)

Congratulations to these three on maintaining their leading positions. All matters of scoring, location, and so on can be neglected when reviewing the fact that they *did* make the largest number of contacts and the highest scores.

In fourth place are our old friends of Grafton, G3AFT, who, had it not been for the activities of numerous "phonies," would have ranked second by virtue of their claimed score. But more of that anon.

General Activity

This contest was undoubtedly the busiest of the series. More countries were on the air, as shown by the top multipliers of 11, as compared with 8 last year. Unfortunately, a lot of peculiar people thought it clever to put even *more* on the air. This caused the judges a lot of trouble, but they feel that their final decision on the question of "phonies" is the fair one.

After due deliberation, this is the ruling with regard to the doubtful stations worked by various Clubs:

UA3AKB: This station was not genuine; up to the present, the only three-letter call-signs used in Russia are the Club calls, which *begin* with K. Had this phoney called himself UA3KAB the judges might have been taken in. One Club, in fact, claimed to have worked UA3KAB, but as it was within minutes of the times at which the others worked UA3AKB, this would appear to have been wishful thinking.

F8OD: Struck off because French stations are not licensed on the Top Band. True, he may have been a *French* pirate, but might just as well have been anywhere else.

I1ATS: This station was worked by a few Clubs and heard by quite a number of them. Those in the North were getting him at RST 589 with no fading, and, on one occasion, his back wave with the key up was audible! He gave his QTH as Milano, which doesn't check with the *Call Book*, and he used a few Italian phrases including several words that were spelt incorrectly. So the judges had to strike him off too.

There was also a certain amount of doubt about HA5BK/1, but, after due reflection, it has been decided that he might well be genuine and we allowed him to count. Various OK stations also cropped up, but one Club, at least, lost a possible multiplier here by working OK1AJB and logging him (in fact, working him) as "OK1AJ." Others lost the four points for the same reason, but only one lost a multiplier.

This left eleven countries as "possible": G, GC, GD, GI, GM, GW, DL, EI, HA, OK and OZ. The latter was represented by the old reliable, OZ1W, but only two Clubs managed to work him, and he was only on the air for a short time. Contacts with GD and EI were numerous, thanks to the stout efforts of GD3UB and EI9J.

Reduction of Scores

Practically all Clubs claimed a larger score than they have finally been credited with. In most cases the reduction was due to a number of six-point claims for stations that were *not* Clubs. But Grafton were particularly unfor-

TABLE I

POSITIONS AND SCORING

	CLUB	CALL-SIGN	POINTS	MULTI-PLIER	TOTAL
1.	Rhigos	**GW3FFE**	1447	11	15,917
2.	Neath and Port Talbot	**GW3EOP**	1258	10	12,580
3.	Coventry	**G3FAB**	1125	10	11,250
4.	Grafton	**G3AFT**	842	11	9,262
5.	Gravesend	**G3GRS/A**	875	9	7,875
6.	Chester	**G2YS**	829	9	7,461
7.	Edinburgh	**GM3HAM/P**	825	8	6,600
8.	Harrow	**G3EFX/P**	672	9	6,048
9.	Medway	**G2FJA**	650	9	5,850
10.	Edgware	**G3ASR**	727	8	5,816
11.	Slough	**G3BTP**	624	9	5,616
12.	West Cornwall (Penzance)	**G3DIY**	507	9	5,463
13.	Surrey (Croydon)	**G8TB**	600	9	5,400
14.	Wirral	**G2AMV**	594	9	5,346
15.	West Middlesex	**G3EDH/A**	516	10	5,160
16.	Baldock	**G3AXP/P**	461	10	4,610
17.	Salisbury	**G3FKF**	506	9	4,554
18.	QAU (Jersey)	**GC2FMV**	632	7	4,424
19.	Scarborough	**G4BP**	480	9	4,320
20.	Torbay	**G3GDW**	435	9	3,915
21.	West Kent	**G3FCQ**	474	8	3,792
22.	Warrington	**G3CKR/A**	433	8	3,464
23.	West Cornwall (Falmouth)	**G2AYQ**	377	9	3,393
24.	Rotherham	**G6ZA**	396	8	3,168
25.	Birmingham	**G2BON**	427	7	2,989
26.	Tyneside	**G2BOI**	371	8	2,968
27.	Southend	**G3AXN**	494	6	2,964
28.	Sheffield	**G8JP**	367	8	2,936
29.	Plumstead & Woolwich	**G3EIW**	351	8	2,808
30.	Wanstead	**G3BRX**	352	7	2,464
31.	Nottingham	**G3EKW**	393	6	2,358
32.	Clifton	**G3GHN**	385	6	2,319
33.	Lincoln	**G4BU**	251	8	2,008
34.	Grimsby	**G3CNX**	297	5	1,485
35.	Sutton and Cheam	**G3GFA**	259	5	1,295
36.	Derby	**G3ERD**	201	4	804

tunate in having worked all three of the stations that have been disallowed: UA3AKB, F8OD and I1ATS. Their claimed multiplier was therefore 14. This business of "phonies" has quite decided the judges in their view that future contests should not include contacts with foreign countries.

The business of claiming six points for stations that might have been Clubs, but weren't, was really a sorry affair. We are fully aware that no up-to-date list was published; we have made it clear, in previous years, that this cannot be done on account of last-minute entries and, in some cases, changes of callsign.

The fact is that if all Clubs would do as they are asked and send in entry details by the given date, we could publish a more reliable acceptance list.

But this contest was never meant to be a hit-and-run affair, and surely it was up to the contestants to *find out* whether the station they worked was another Club or not. (The judges rather regret that they did not institute a rule by which points could be deducted from the score for mistaken claims). Some of the Clubs had extraordinarily optimistic scores in this respect, but it is noteworthy that others did not over-claim a single point. There is a moral in this, somewhere. We have, in any case, definitely decided that in the next MCC the exchange of QTH's will have to include the name of the Club, not merely the location. Many Clubs also lost points for incorrect logging of callsigns and QTH's, and for making more than one contact with the same station.

Criticisms of Rules

A number of well-thought-out criticisms were offered in the covering letters. Highest on the list was this business of stations calling "MCC", although not participating. That has already been dealt with above, and is obviously a matter over which no one will ever have any control.

Next, many Clubs consider that the multiplier system was unfair, placing undue emphasis on the number of countries worked. We are inclined to agree.

Again, almost everyone (including the winning GW stations) considers that the "loading" worked heavily in favour of the GW's, but no one denies that they deserved to win if only on the strength of the large number of contacts they succeeded in making. The "loading" was intended to make scoring fairer for GM, GI and GC, but it certainly made things rather too easy for GW.

Individual comments: Grafton and several others would like to see private single-operator stations excluded in future. Plumstead thought nine days too long. Edinburgh rightly said that the GM stations were handicapped by geography. Slough suggested that, in future, contacts within four miles or less should not be allowed; this would prevent all the local Club members giving points to their own station but no others!

Lincoln would like to see a limit on the length of aerials. Neath and Port Talbot suggests that all Clubs ought to use the callsign allotted to them and should not be allowed to use members' stations.

Gravesend sent in an interesting analysis of past Top Band contests to prove that a shorter operating period favours the "wily" operator, and were in favour of abolishing the multiplier in favour of a system giving, say, six points for the first contact in each prefix area, five for the second, and so on, until all contacts only counted one.

Many other Clubs made comments on the lines of one or other of the above.

General Criticism

It was surprising to find several Clubs complaining that MCC "overlapped" the RSGB Top Band Contest. Considering that the overlap lasted for only two hours (2100-2300 on the last Saturday) out of 30 hours allowed, we cannot take this seriously. No Club *need* have been on the air during those two hours; as it was, they all came on and scored many extra points as a result thereof! In any case, for reasons explained elsewhere (*see* "Here and There," this issue) the calendar of contests has become so crowded that it is no longer possible to avoid a clash with somebody somewhere.

Most people thought the operating standard was high and conditions very good, but a few Clubs criticised certain black sheep who worked a DX station and then stayed on the frequency—certainly not the nicest thing to do.

The QAU Club, Jersey, point out that every single contact, for them, was over a hundred miles. Falmouth heard a "UB5." Southend say that the DX stations were coming in, but for long periods their own signals seemed to go no further than the kitchen sink! Coventry heard UA3AKB, LA7KA, AC4RF and VE6DAFT, as well as sundry W's . . . They remark that GC and GD were much easier this year. Birmingham had doubts about the HA5. Wirral heard an OE1, and ON3FT being called.

Derby's low score must be excused by the fact that their transmitter was operating from the Club room for the first time, and could only be on the air during school hours, which cut their time drastically. They were operating in a sub-basement 20 ft. down, with a vertical aerial.

Finally, it is pleasing to read Rotherham's remark that *all* their equipment was home-made, including the electric clocks used for logging purposes.

TABLE II

SHOWING PREFIXES WORKED BY ENTRANTS

Club Station		G	GC	GM	GW	DL	EI	GD	GI	OK	HA	OZ
GW3FFE	(11)	×	×	×	×	×	×	×	×	×	×	×
G3AFT	(11)	×	×	×	×	×	×	×	×	×	×	×
GW3EOP	(10)	×	×	×	×	×	×	×	×	×	×	
G3EDH/A	(10)	×	×	×	×	×	×	×	×	×	×	
G3FAB	(10)	×	×	×	×	×	×	×	×	×	×	
G3AXP/P	(10)	×	×	×	×	×	×	×	×	×	×	
G3EFX/P	(9)	×	×	×	×	×	×	×	×	×		
G2AMV	(9)	×	×	×	×	×	×	×	×	×		
G3DIY	(9)	×	×	×	×	×	×	×	×	×		
G2YS	(9)	×	×	×	×	×	×	×	×	×		
G3FKF	(9)	×	×	×	×	×	×	×	×	×		
G4BP	(9)	×	×	×	×	×	×	×	×	×		
G3GDW	(9)	×	×	×	×	×	×	×	×	×		
G3GRS/A	(9)	×	×	×	×	×	×	×	×	×		
G2AYQ	(9)	×	×	×	×	×	×	×	×	×		
G8TB	(9)	×	×	×	×	×	×	×	×	×		
G3BTP	(9)	×	×	×	×	×	×	×	×	×		
G2FJA	(9)	×	×	×	×	×	×	×	×		×	
GM3HAM/P	(8)	×	×	×	×	×	×	×	×			
G3EIW	(8)	×	×	×	×	×	×	×	×			
G8JP	(8)	×	×	×	×	×	×	×	×			
G3ASR	(8)	×	×	×	×	×	×	×	×			
G3CKR/A	(8)	×	×	×	×	×	×	×	×			
G4BU	(8)	×	×	×	×	×	×	×	×			
G3FCQ	(8)	×	×	×	×	×	×	×		×		
G6ZA	(8)	×	×	×	×	×	×	×		×		
G2BOI	(8)	×	×	×	×	×	×		×	×		
G3BRX	(7)	×	×	×	×	×	×	×				
G2BON	(7)	×	×	×	×	×	×	×				
GC2FMV	(7)	×	×	×	×	×	×		×			
G3GHN	(6)	×	×	×	×	×			×			
G3AXN	(6)	×	×	×	×	×		×				
G3EKW	(6)	×	×	×	×	×	×					
G3CNX	(5)	×	×	×	×	×						
G3GFA	(5)	×	×	×	×			×				
G3ERD	(4)	×	×	×	×							

Judges' Summing-Up

There is no doubt that most of the criticisms made this year are both sound and sensible. The points loading is now considered unfair, and the multiplier constitutes an invitation to the would-be "phoney" to enjoy himself. But all Clubs seem to have found "MCC" a bracing affair again, and most of them promise to be on the mark for the next. Some remark that it is good experience for the younger members, many of whom learn the importance of log-keeping and tight organisation for the first time. Some of them, too, become interested in CW as a result of the contest.

The present line of thought is that future contests in the series should be confined to Club stations operated by the members from the Club room; and possibly that only contacts with other such Club stations should count. In this case, the interest would be sustained by allowing one such contact every day instead of only once during the whole period. But these decisions are for the future, and we have no doubt that "MCC" can be made to keep its essential character, with some of the present unsatisfactory features removed.

In conclusion, we offer our congratulations to the winners; our thanks to all participants for their enthusiasm and their painstaking comments after the event; and to the many transmitters and listeners who went to the trouble of send in Check Logs, again thanks. Here's to the Next!

Date for next "Month with the Clubs" Report:

January 15.

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WE will buy: 250 TH Tubes (new) also AR.88D Receivers, and any surplus Commercial Radio parts and equipment. Box No. 861.

QSL CARDS AND LOG BOOKS. APPROVED G.P.O. SAMPLES FREE. ATKINSON BROS., PRINTERS, ELLAND, YORKS.

LANCASHIRE CONSTABULARY. SALE OF SURPLUS RADIO EQUIPMENT. The following radio equipment will be available for inspection at the County Police Office, Northumberland Road, Old Trafford, Manchester 16, from Monday, 22nd January, 1951 to Friday, 26th January, 1951, inclusive, between 9 a.m. and 5 p.m. 146 "National" Type 1-10 superregenerative Receivers. 82 Ferranti 12 volt Vibrator Power Packs for "National" Type 1-10 Receivers. 28 Masteradio 12 volt Vibrator Power Packs for "National" Type 1-10 receivers. 34 VHF telephony mobile Transmitters type S.440, by Stratton & Co. 12 VHF telephony mobile Transmitters type S.440C, by Stratton & Co. 16 VHF telephony mobile Transmitters by Stratton & Co. 6 VHF telephony mobile Transmitters. The equipment is for sale **IN BULK** and no guarantee attaches to the equipment which is bought as seen and inspected. All offers for the above equipment, in sealed envelopes endorsed "Quotation for Radio Equipment" must be delivered to me not later than the 5th February, 1951. R. Adcock, Clerk of the Standing Joint Committee. County Offices, Preston.

MAGNETIC Tape Recorder Construction. Electrical and Mechanical Theory, full constructioanl data and dimensioned sketches for building a Recorder needing one motor only. 21 f/cap pages, 11 sketches, 7/6, post free. GM6LS, 15 Corstorphine Hill Road, Edinburgh.

110v. Double ended Fan motor in metal case 1/25 H.P., 17/6 plus 2/6 carr. 110v. Mains Trans. 0-2KV. 20ma output. Potted type, 20/- plus 1/9 carr. 110v. Mains Trans. 450-0-450v. 200ma 5v. 3A. 6v. 3A Twice, Potted Type, 20/- plus 1/6 P.P. 110v. HV. insulated Heater Trans. 6.3v. 2 amps, 8/6 plus 1/6 P.P. Well assorted packets of 2BA, 4BA and 6BA nuts and screws, etc., 2/6. The Amateur Radio Service, Moorside Mills, Lomax Street, Bury, Lancs. (*Phone Bury* 1778).

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Box numbers 1/6 extra.

1 mc calibration crystal by R.C.A., 12/6. 465 kc resonator, 5/-. SX28, Offers? Wanted B2 or cabinet transmitter. Offers to Box No. 871.

FOR Sale. HRO Senior, with power pack and all coils amateur bands, xtal phasing, and S-Meter, perfect, £30 or offer? For Sale. Hallicrafter S27, £25 or offer? Box No. 873.

R.208 excellent condition, 10-60 mc, extra IF stage, speaker, spare valves; 134 countries, 37 Zones, £12. Norden (BRS14237), 9 Leeside Crescent, Golders Green, N.W.11. (*SPE* 5186).

SMALL ADVERTISEMENTS

READERS'—*continued*

EXCHANGE : R107 (S-meter), FB condition. Also Type 38 Mk II transreceiver, with throat mike and aerial, RF24 unit, both new. Will exchange for BC348, 200/250v AC input ; S640 ; or what offers ? Equipment, not cash. BSWL 3834, 154 Mill Hill, Deal, Kent.

WANTED, May 1948 *Short Wave Magazine*, I.E.E. Radar Convention *Journals* Vol. 93, Nos. 2, 5, 6, 7 for binding, Panoramic adaptor 465 kc. Knight, Caxton House, High Street, Hoddesdon.

NEW Marconi marine keys, type 365A, with spares, 30/- R.C.A. AR88 cabinet speakers, new, 50/-. TZ40's, 25/-. Eddystone 640, unsoiled, £20. G3FXF, 11 Cecil Street, Huddersfield.

WANTED, Instruction Book and crystal for Frequency Meter type LM13. Sell two G.R. (U.S.A.) brand new variacs. Brand new type TG-10-F Keyer. Offers ? G3DAM, Offenham Road, Evesham.

HRO complete, 6 coils (4 Bandspread), power pack, speaker, 150 watt Tx complete in steel cabinet, separate self-contained VFO/CO, all in excellent condition, £50 or near offer. Box No. 858.

B2 outfit required complete, must be in good condition. Write immediately : G3EDE, 39 Wimborne Drive, Eastcote, Pinner, Middlesex.

1134 AF amplifier with valves, 4/-, 1/6 post. 807, 5/-. 6J5, 2/3. S.A.E. for list. G3FXB, 26 Landseer Road, Hove 4, Sussex.

FOR Sale. B2 Tx/Rx, complete all spares. Excellent condition. Also Zeiss-Ikon camera. Exchange for No. 19 set or good receiver. G2DFH, Pendennis, St. Erth, Cornwall.

GOING VHF : All present equipment for sale at low prices. Eddystone 750 receiver, latest model, brand new condition. BC221 Freq-Meter, with stabilised power pack. 150-watt rack transmitter, also large quantity of radio gear. G3SN, 7 Sidwell Terrace, Exeter.

WANTED : HRO coils, HRO power pack. Power pack for B2 Tx. No. 12 set Tx. Ingram, 47 Putney Hill, S.W.15.

PAIR Belling "Eliminoise" transformers with 33ft. Belling downlead, £2. G3EJL type 70 centimetre converter, new 6J6, EF91, VR150, Muirhead dial, matched xtal, £2. Sams (USA) *Post War Communications Receiver Manual* (new) 12/6. Box 859.

AR88 in first-class condition wanted by amateur. Collection arranged. Details and lowest price to Box. 848.

SALE new boxed valves. 4-RCA 813, £1/10/0 each. 6-TZ40, £1 each. 12 866A, 10/- each. 8 Eimac 35T, £1/5/0 each. Case for BC221, £2/10/0. Collins T.C.S. Tx Rx and tuning unit, as new, £11. RCA77E good condition, £25. You collect. 123 Hamil Road, Burslem, Stoke-on-Trent.

R.C.A. Transformer 400-350-0-340-400 at 200 mA, 6.3v. at 6 amps, 5v. at 3 amps. Chassis, 10 Hy choke, condensers, fuseholders, switch, £2/15/0. 35 Milton Street, Patricroft, Manchester.

WANTED CV90, klystrons suitable hamband conversion, waveguide sections, crystal diodes, other micro-wave gear. Wills, Moor View, Wrefords Lane, Exeter.

S.640 and speaker, £16. BC342, 230v AC, £12. Both perfect. 28 Sycamore Grove, *Malden* 0859, New Malden, Surrey.

SMALL ADVERTISEMENTS
READERS'—*continued*

(V55R) and (BC348-L) Rx for sale. Both excellent condition. £15 each. Internal P/P, also loud speakers. Box No. 860.

MARCONI B36 (less valves) new, £7/10/0 plus carriage. Set and odd ranges Eddystone 358X coils. Offers: 200 Queens Road, Keighley.

COMPLETE Station—AR88D almost new, with crackle speaker, set spare valves. 80 watt Tx, 813 final, mercury relays, spare valves. VFO with P/P, crystal and carbon mikes. Wavemeter. 3-element rotary beam. Sundries £90. Consider 16mm talkie and/or Home recorder. Box No. 863.

HALLICRAFTERS S27 (modified 28-150 mc); Panadaptor, spare 3BPI; P58 Rx 280-680 mc GGRF; SCR522 Tx modified, metered, rack mounted 144 mc; another 460 mc. Marconi Sig Gen 140-300 mc. Lot £70 or offers separately. S.A.E. details. G8NF, Dartmouth Street, Slaithwaite, Huddersfield.

WANTED. Complete 90 mc AM receiver, with push-pull 6J6 convertor, 2 IF's, infinite impedance detector and own AC power pack. Box No. 862.

HALLICRAFTERS SX24, crystal, S-meter, ANL 550kc-43 mc, £20. Burgess, 8 Bradford Drive, Ewell, Surrey. (*Ewell* 2611).

BC221 calibrated, mint condition, in copper lined case, handbook, £7/10/0. FB R1155A, internal P/P, £7/10/0. BC455, with 24v 1A. fil trans., £2/5/0. Bug key, £1/0/0. New Sixtus exposure meter, £3. Tx valves, new 811, 10/-; PT15 10/-; 7158 10/-. £20 the lot, or swop for Eddystone 640. G3FKH, 42 Cressing Road, Witham, Essex.

FOR sale. 150 watt Phone/CW Tx, perfect condition, complete on rack panel, 3 power packs, 3 stage exciter, pair 35Ts in final, full power mod plus pre-amp. Offers. Butcher, 4 Bruce Castle Road, Tottenham, N.17.

25 watt Dx-Band Tx and power supply, 832 PA, fully metered. 3-valve clapp VFO, 6AG7 output 3.5/7 mc. 1-V-2 battery Rx with eliminator and accumulators. The above are as new. Constructed of highest quality components. Commercial appearance. Photos available. Also hotted-up BC348. 6 ACT RF, S-meter, 230v AC, £19. 1155 with external power pack, good condition, £10. G3FPQ, Hilland, Headley, Bordon, Hants. (*Headley Down* 2254).

EDDYSTONE S640 matched speaker and phones, £20. 1355, modified sound, 50/-. Vision 50/- (Sutton). Q5'er, with AC p/p, 70/-. Bench AC motor, £1. 6 volt vibrator pack with new spare valve, 25/-. Carriage paid. Box No. 865.

FOR Sale. Bendix TA12D, 4, VFO, bands 1-7 mc, parallel 807 final. Modulator, power pack, R1155. All in rack, £30. No reasonable offer refused. Box No. 864.

FOR Sale. R.107 receiver, new, perfect condition, £9/15/0. Buyer collects evenings. Dwyer, G3FMR, 6 Royal Avenue, London, S.W.3.

SELLING up. Denco DCR.19, £39/10/0. Mains Power Unit Type 3, £2/5/0. RF26 unused, 25/-. RF27, 21/-. M.C.R.I. complete, £5. Wavemeter W.1191, £3/10/0. All fine condition. Fox, 25 Brook Street, Thurmaston, Leicester.

150-watt rack-mounting CW transmitter, with 1500 volt power pack, £25 or sell separately (£12/10/0 each unit). Also S27 receiver (27-143 mc) revalved and realigned, £25. Owner going abroad. Box 870.

SMALL ADVERTISEMENTS
READERS'—*continued*

144 mc Eddystone convertor, £3/10/0. Denco CT6 coil pack, £3/0/0. Variable IF cans, 10/-. 500-0-500 etc., £1/10/0. R208, £8/0/0. 1155A, needs attention, £2/10/0. Power pack output 1155A, £1/10/0. 38 Tx/Rx, £1/10/0. 144 mc aerial G.S.V., £3/0/0. 100 valves: PX25, CV66, etc. Or near offers or exchange. Carriage extra. Box No. 869.

WANTED: Hallicrafters SX24, good condition. Sale: QCC xtal 1843 kc, 12/6. RK20, 6/-. RL16, 2/6. 9 Hill Crescent, Bexley, Kent.

SELLING up, everything going. HRO Mx 5 coils, S-meter, crystal, National AC P/P, manual, good condition, £25. BC221, stabilised P/P, good condition, £15. Transmitter 25u 80, 40, 20 F/CW, VFO, aerial coupler, in four-tier rack, £15. Partly built 28 mc transmitter, 150w., all new components, gift at £12/10/0. Hundreds of spares, components. The whole £70 or separately as above. Manchester area. Box 868.

HAM going VHF has following surplus. Two 35TG, Three-HK54, Five-866, Five-813. The lot £10 or offers? 1224A Rx converted AC, with P/P, £5/10/0. Box 867.

G3DGH going abroad — Selling complete station. Tx-p/p 807's, 130w, 80-40-20-10, preceded multi-band exciter 7C5's and 807—Separate VFO 6SK7-6AG7 with NBFM-modulator 807's Class-B, compression—Rack built, standard panels, all packs and mike. Scope monitor built in. Separate 160-metre rig, 10w and mod, p/p, etc., VFO. Rx HRO Senior Bandspread, 7 coils 0.18mc-30mc continuous, NL, Speaker and power pack—Bug and straight keys. 2-metre Tx 832 PA and modulator, 2 xtals, seen working by appointment. Offers around £100. *Short Wave Magazine*, April, 1946 to date. Offers? Spares, including 2 complete TR1196's and crates, 150 valves incl. 813, TZ40, etc., hundreds components—must clear. D. G. Hardcastle, G3DGH, 3 Shrubbery St., Kidderminster.

FOR Sale. Complete issues of *Short Wave Magazine*, March 1946 to November 1950. Clean condition. What offers? Also quantity of Radio parts. S.A.E. for list. Asquith, 67 Morley Street, Sheffield 6.

COMPLETE BII Transmitter-Receiver, power supply, two crystals. Used condition but perfect operation, £11. Box No. 866.

PRIZEWINNING 2-metre station — Concentric line superhet receiver, crystal controlled exciter, 832 PA—beautifully made on 8in. dural with 19in. panels, complete with generators and cables for CW portable use. This outfit won RSGB field day 1949—£40. Will preferably sell complete with separate 50-cycle power supplies, 832 modulator, crystal mike, McKelroy de luxe bug, 3-element dural beam, twin feeder, etc., at £60. AR77E, offers over £25—4 KVA variac, VHF receiving and transmitting valves—hundreds other items. Please send stamped envelope for full details. E. J. Greenwood G4OS, 78 Hough Green, Chester.

EDDYSTONE S640, in very good condition, £18. G3DPJ, 28 Delamere Crescent, Croydon.

BC625 new, unused, complete valves, etc. Offers? Wanted: Comm. Rx covering 10 metres, condition unimportant. G3HEC, 270 Spotland Road, Rochdale.

813 R.C.A., G.E.C. 17/6. 811, 10/-. 6BA6 6/6. 6AG5, 6V6, 6F6, 6C4, 5/-. All new, guaranteed. Box No. 872.

DONT MISS THESE BARGAINS

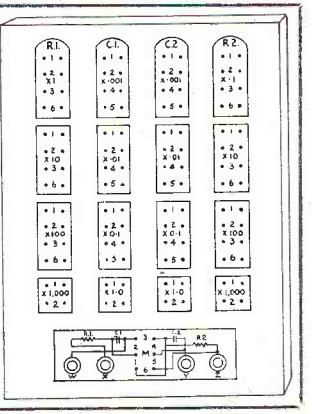
P.M. SPEAKERS

All speakers are by very famous makers such as Rola, Celestion, Goodmans, etc.

Size.	With Trans.	Less Trans.
2½in.	—	10 6
3½in.	—	10 6
5in.	12 3	10 6
6½in.	12 6	10 6
8in.	13 6	11 6
10in.	18 6	16 6
12in.	—	39 6

FOR YOUR LABORATORY

You many times have felt the need of a device which would enable you to put resistance or capacity or a combination of these two quickly into a circuit. We have a small quantity of resistances and capacity boxes which, by the simple manipulation of plugs, will enable you to do this. With these boxes you can put in 1 ohm, 2 ohms, 3 ohms, 4 ohms, and so on, in steps of 1 ohm, right up to 6,000 ohms. In a similar way capacity can be put into circuit by small amounts, thus making it simple for you to find optimum working conditions. These boxes made for Government Laboratories, are available while they last at **19/6** each, plus 1/6 post and packing. Don't delay—order by return.



THIS MONTH'S SNIP

TIMED SWITCH MECHANISM. This comprises a beautifully made 8-day jewelled miniature clock or watch movement, which operates two 2 amp contact switches. These switches also are quite suitable for mains use. There are two calibrated dials, one contact adjusts in ¼-hour intervals up to 6 hours, the other one in 1-hour intervals up to 36 hours. The whole is really precision made to stringent M.O.S. specification. The size of the complete mechanism is 3ins. long × 2½ins. across, or if you wish, the miniature clock movement can be removed completely and this then measures only 1⅝ins. × 5ins. The price of the complete timed switch is **27/6**.

These are brand new still in the manufacturer's original sealed boxes.

VOLUME CONTROLS

All have full-length spindle and are complete with fixing nuts. We stock full range of values between 2,000 ohms and 2 megohms, prices are less switch, **2/6** each ; single-pole switch **3/9** each.

ELECTROLYTIC CONDENSERS

4 mfd. 450 v.	1 6
8 mfd. 150 v.	1 3
8 mfd. 350 v.	1 6
8 mfd. 450 v.	1 11
8 mfd. 500 v.	2 6
16 mfd. 350 v.	1 11
16 mfd. 450 v.	2 8
16 mfd. 500 v.	3 6
32 mfd. 350 v.	2 8
32 mfd. 450 v.	3 6
10 mfd. 25 v.	10
25 mfd. 25 v.	1 0
50 mfd. 12 v.	10
8 mfd. × 8 mfd. at 450 v.	3 4
8 mfd. × 16 mfd. at 350 v.	2 6
8 mfd. × 16 mfd. at 450 v.	3 6
16 mfd. × 16 mfd. at 350 v.	3 0
16 mfd. × 16 mfd. at 450 v.	3 9
25 mfd. × 25 mfd. at 200 v.	3 11
16 mfd. × 8 mfd. at 350 v.	2 6
16 mfd. × 8 mfd. at 500 v.	4 6

LIQUIDATOR'S STOCK

Polished walnut radio cabinet size 20 × 12 × 7½in. complete with L., M. and S. dial, size 7 × 6½in. and backplate with magic eye cutout, also with drilled chassis and hardboard back. You will find it quite a simple matter to complete this into a very handsome receiver of the £15 class. Limited quantity, price 32/6, plus 2/6 carriage for the 5 items.

Orders under £2 add 1/6, under £1 add 1/-. Postable items can be sent C.O.D. additional charge approx. 1/-. Good stock of all items at time of going to press. List **6d.**

ELECTRONIC PRECISION EQUIPMENT

3 Electron House, Windmill Hill, Ruislip Manor, Middlesex. Tel : Ruislip 5780

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