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BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

- WHYS AND WHEREFORES OF "S" METERS
- A 28 Mc/s. ROTARY BEAM
- HARMONIC SUPPRESSION MONITOR
- V.H.F. RADIOPHONE CAR SERVICE
- THE MERCURY-VAPOUR RECTIFIER
- AFFILIATED SOCIETIES

R.S.G.B. BULLETIN

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CONTENTS for JUNE 1948

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UNIQUE—TECHNIQUE!

THE timely appearance this month of *Valve Technique* and *V.H.F. Technique* provides further evidence of the desire on the part of the Society to provide for its members authentic technical information on specific aspects of Amateur Radio. These two new publications, together with *Micro-wave Technique* are unique, in the sense that never before, to our knowledge, has an attempt been made to treat these specialised subjects so exhaustively, in books written specially for the amateur.

Two years ago, when it was seen that the *Amateur Radio Handbook* had almost had its day (it ran through 14 editions and sold over 200,000 copies in five years), the Technical Committee promised to produce a series of pocket-size booklets covering a wide range of subjects bearing on Amateur Radio. At that time they had little idea of the many difficulties that would have to be faced and overcome before the first booklet could appear. Cheerfully they talked of publishing at least six booklets during 1947 but they could not then foresee that an economic —as well as an actual—blizzard would hit the country in that year of grace. Neither did they fully appreciate the amount of time that would be required to prepare the manuscripts, produce the drawings and check the proofs, to say nothing of the problem of obtaining adequate supplies of paper for the texts and cardboard for the covers. Yet by dint of great perseverance and by the burning of much midnight oil, *Micro-wave Technique* duly appeared on the opening day of the 1947 Amateur Radio Exhibition.

In offering *Valve Technique* and *V.H.F. Technique* to the membership the Council is fully conscious of the great debt which is owed to the co-authors and to all others who have assisted in the production of these books, not forgetting the Society's Printers (*Sir Joseph Causton & Sons, Ltd.*). In particular the co-authors of *V.H.F. Technique* received great assistance from Mr. W. A. Scarr, G2WS and Mr. W. Dolphin, G4DN, as well as from many sections of the Radio Industry.

Micro-wave Technique has already established itself in amateur circles at home and abroad. That the two new books will be equally well received seems certain, if early comments can be taken as a guide.

Home readers will be doing both themselves and the Society a good turn by bringing these publications to the notice of their overseas friends, for by so doing they will be assisting the Export Drive. The more copies we can export, the easier it will be for the Society to obtain further supplies of paper for reprints and new publications.

It seems hardly necessary to draw attention to the high technical standard which has been aimed at by the authors and the Technical Committee alike, yet we should be at fault if we omitted to emphasise this point. The books are fully illustrated and—if we dare to presume—well produced. The freshness of the cover designs will make an instant appeal and the convenient size will no doubt be warmly welcomed.

The task which the Committee have undertaken is still only partially complete, for at least another seven booklets are in production, but we should require the Wisdom of Solomon to predict publication dates. Readers may, however, rest assured that when they *do* appear they will be as authentic and up-to-date as are those which are now asking to be given a place in every ham-shack.

Beware!

A paragraph which appeared recently in the National Press, concerning the disastrous effects which resulted when a surplus ex-Government radar set exploded, throws into bold relief the danger that may arise when inexperienced people handle lethal devices. In the case reported there seems to be little doubt that gross carelessness somewhere along the line was to blame for the accident. As far as we know all war-time I.F.F. and similar secret equipment was fitted with clearly marked detonating devices, which precaution should be sufficient to warn anyone of the lurking danger. To-day, in London and other towns, the second-hand radio shops are loaded up with equipment which we suspect is similar to that which recently exploded. Obviously no reputable dealer would offer such equipment for sale until he had first satisfied himself that the explosive had been removed. Unfortunately, however, the human element comes into play and accidents can and do happen.

To all who purchase ex-Government equipment whatever the type, we say "beware—watch out for hidden dangers."

Holiday Season

June sees the beginning of the annual exodus from smoky cities to wide open spaces and resorts by the sea. Summer is the time for making new contacts and reviving old friendships. The railway clerk who sells you a ticket, the taxi driver who conveys you to your hotel and the hotel proprietor himself may all be hams but unless a chance remark provides the clue a contact will be lost—*unless you wear your badge.*

With the "basic" back and cars once again on the road fresh opportunities arise for displaying the Black Diamond sticker on the windscreen.

How about a brief account for publication of your most interesting personal contact established as the result of displaying your badge? J.C.

THE WHYS AND WHEREFORES OF "S" METERS

By J. N. WALKER, (G5JU)

Theoretical Considerations

TO start with, it is necessary to clear up one or two confusing ideas about signal strength meters. The first concerns the "R" versus "S" controversy and until the RST system of reporting, with "S" representing "signal strength," becomes universal for any type of signal, some confusion is bound to occur. As a step in the right direction, this article will refer to a signal strength meter as an "S" meter.

Without any method of visible indication, an operator is bound to judge the strength of an incoming signal by comparing it, on the one hand, to the weakest signal he can hear and, on the other, to the loudest signal he has ever received. The actual strength will depend on the audio output given by the receiver, and an S9 signal on an 0–V–1 battery receiver will be quite different from an S9 signal on a mains-operated set. Obviously, therefore, judgment by audibility alone cannot be other than rough and unreliable.

At the same time, this method is normal when receiving C.W. since, usually, the A.G.C. (which actuates an "S" meter) will be switched off when the B.F.O. is brought into circuit. An "S" meter *can* be used on C.W. and details are provided later.

Another complication—and a major one—results from the fact that the strength of a telephony signal depends very largely upon the depth of modulation. An "S" meter reads carrier strength and does not take into account modulation, unless the latter is excessive. Two different signals, one modulated 50 per cent. and the other 100 per cent., while perhaps showing identical "S" strengths on the meter, will produce very different amounts of audio power at the receiver output terminals.

Desirability of an "S" Meter

The reader must decide for himself, therefore, whether an "S" meter reading carrier strength only is going to be really useful. It is a fairly simple matter to fit such a meter into circuit for telephony operation, but a much more complicated process when it comes to C.W. operation.

Any given "S" meter reading really indicates that a certain signal intensity, measured in microvolts per metre, is being applied to the aerial terminals of the receiver. The reading will, therefore, depend upon the efficiency of the aerial. This, in turn, involves matching systems, directional properties, variation of polarisation, etc. Alterations to the aerial, or change of location will affect the readings.

It is possible to give other stations accurate *relative* reports on their signals but if a certain signal is received at S6 at one location and S9 at another, using equipment of identical types at both places, it is not to be assumed that the former station equipment is below par.

For co-operative tests in radiation problems with another amateur, the "S" meter is obviously of great value. If an incoming signal of steady strength is available, the "S" meter will again assist in proving whether internal adjustments to the receiver or external alterations of any kind are beneficial or otherwise.

Practical Considerations

The meter, that is the moving coil instrument itself, is the major item. It should be as sensitive as possible, since the deflection obtained, whilst also dependent on circuit constants, is directly in proportion to this factor. It is better to have something in hand rather than have to resort to improvisation in order to get adequate readings. Admittedly, with a very sensitive receiver having, say, two R.F. stages, a relatively insensitive meter, with a 5 mA. full-scale deflection, can be made to give good results. Generally, however, the full-scale deflection should not exceed 1 mA., and 500 μA. is a good all-round figure. The movement should be free, well-balanced and adequately damped. A needle pointer is a distinct advantage.

The New "S" Meter introduced by Stratton & Co., Ltd. for use with the S640 Receiver

The potentiometer, necessary for zero adjustment, should be a good quality component. For the higher resistance values, a carbon type of the usual 3 watt rating is adequate. Miniature components are sometimes available, and, if external resistors of correct value are added to absorb some of the wattage they will prove suitable. Adjustment of zero will also then be less critical. Where a low value potentiometer is called for, the wire-wound type becomes essential.

Other than the above, a selection of half-watt composition resistors should be on hand for carrying out experiments with the object of securing maximum linearity and suitable sensitivity.

Valve Sequence and Meter Position

The "S" meter is actuated by a change of potential across two points, this potential causing a current to flow through the meter. The meter itself is usually of very low resistance and, except when absolute maximum sensitivity is required, it is wise to insert a resistance in series with it, in order to restrict the flow of current.

The actual change of potential is invariably derived from the variation in current through a valve consequent upon the application of automatic gain control voltage to its control grid. Any valve included in the A.G.C. chain may, therefore, be used to obtain the indications, but maximum deflection—with minimum disturbance of other design factors—is obtained from the I.F. valve, if there is only one, or from the first I.F. valve, if there are two or more. In some receivers, the A.G.C. potential applied to

the R.F., I.F., and possibly the frequency changer valves is graded, but it will usually be found that the full potential is applied to the grid of the first I.F. valve.

The meter may be inserted in the anode, screen or cathode circuit, but the screen or cathode lend themselves better to the purpose in an existing receiver. The anode arrangement will not be considered as it offers no advantages.

Calibration of an " S " Meter

This article is written for the benefit of the ordinary amateur who requires some definite indication—on which he can rely—of signal strength as received on his own receiver at his own particular location. At the same time, it will be useful knowledge for the user to know how the scale calibration is derived.

To start with, we must have an arbitrary reference level, but any such level must be chosen having regard to the receiver sensitivity. There will be general agreement that a signal that is only just audible (S1) is more or less lost in the inevitable noise and is not intelligible. (Notice that the mix-up between carrier strength and audio output breaks in again but it cannot be avoided). With some receivers, this result will come about with an input of 1 microvolt, with others a considerably greater input may be necessary. It will usually be found that a sensitive " S " meter gives a very small response to whatever input is found necessary to produce a just audible output, provided—and this is important—there is no delay in the A.G.C. action. If there *is* a delay obviously the meter will not commence to function until the signal is sufficiently strong to overcome the delay voltage. This is not material because in practice interest does not arise until a signal becomes intelligible. However, for setting-up purposes, any A.G.C. delay should be temporarily cut out of circuit.

Having established a convenient reference level the next point is to decide the increment of the divisions above S1. Various figures have been used, generally between 4 and 6 decibels per division. By this is meant that if say 2 μV is used as a reference level for S1, the input for S2 will be 6 db. (for illustration purposes) above 2 μV–or 4 μV; S3 will be 6 db. up again, that is, 8 μV. In this example, S9 becomes 572 μV—a figure which will most certainly give a very respectable S9 signal with any good communication receiver! If each step was 3 db., then S9 would be 29 μV. Which illustrates the large difference which can occur in the results.

Most communication receivers will produce a loud signal with an input of 29 μV, although in some cases a pre-selector may be necessary. However, the movement of the " S " meter needle will depend not only on the relative strength of incoming signals but also on the variation in the slope of the valve when A.G.C. voltage is applied. The greater the variation, the greater the meter indications. In actual practice, it is advisable first to adjust the operating conditions of the appropriate valve, so that the A.G.C. characteristic can be varied either way, and then set up the " S " meter on a basis of 3 db. variation in signal strength per division. If the result, on actual audibility tests, tends to give the impression that the meter is reading too low, it is only necessary to increase the sensitivity of the circuit (to changes of A.G.C. voltage) in order to put matters right, and *vice versa*.

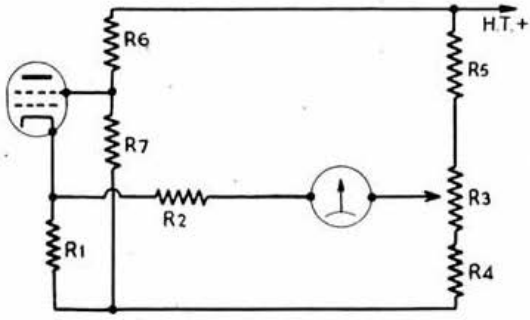


Fig. 1.

Cathode connections of " S " Meter.
R1 Normal Cathode resistance. R4 470 ohms.
R2 200–1000 ohms (see text). R5, 6, 7, 47,000 ohms.
R3 500 or 600 ohms potentiometer.

Practical Circuits

Probably the most generally used circuit is that shown in Fig. 1. One terminal of the meter is connected to the cathode of the valve and the other to a point of equal positive potential, derived from a potentiometer placed across the H.T. line. Under no-signal conditions, no current will flow through the meter but, when A.G.C. voltage is applied to the valve, the current through R1 will be reduced, the cathode will become less positive and current will flow through the meter. If R2 is omitted the current may, with a strong signal, prove excessive, and it is therefore advisable always to include it in the position indicated. If R2 is made variable, it can be used to control the sensitivity of the " S " meter. A maximum value of 1,000 ohms is suggested, with a minimum of 200 ohms. Another reason for including R2 is that, in its absence, the normal cathode resistor R1 will be shunted by R4, the total resistance being less than the proper value. The higher the value of R2, the less will the operating conditions of the valve be disturbed.

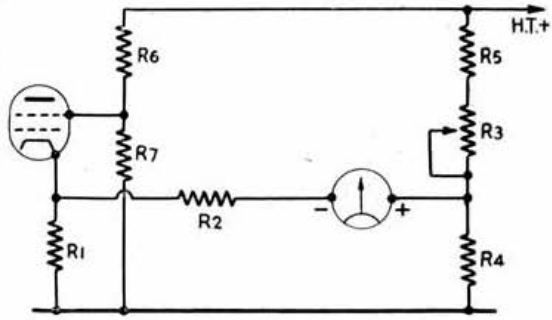


Fig. 2.

Cathode connections of " S " meter but using high resistance potentiometer. Values as for Fig. 1 except R3 (50,000 ohms).

R6 will usually form part of the normal circuit, but not always R7. With R6 only, the screen potential is permitted to slide—the length of the grid base being thereby increased. Under these conditions, stronger signals can be handled with less likelihood of distortion but the change of current through the valve is retarded and the " S " meter indications will be more gradual. The grid base of the valve is shortened, if the screen is operated at more or less a fixed potential, by adding R7. Adjustment of the relative values of R6 and R7—commence by making them equal—will provide a means of varying the " S " meter reading for any given strength of signal. It should be remembered, however, that the shorter the grid base of the valve, the less its capability of handling strong signals without distortion.

The current through R1 may be anything up to 10 mA., and in an average case, the voltage at the cathode between 1·5 and 3 volts. The current

through the potential divider (R3, R4 and R5) will be small and the value of R4 should, therefore, be two or three times that of R1. R3 may be 500 or 600 ohms and should be of the wire-wound type.

If, on initial test, balance cannot be achieved, either R4 or R5 must be changed. If the needle swings hard over to the right (beyond full scale deflection) R4 is too large or R5 too small, and *vice versa*. R2 will have little effect on the point of balance, unless R4 be made much too small.

If a low resistance potentiometer is not available, the circuit can be changed to that of Fig. 2. Exactly the same considerations apply but balance is now obtained by varying the current flowing through the resistance network. R3 becomes a 50,000 ohms potentiometer and more care will be required initially in choosing the value of R4.

The Screen Circuit

The cathode connection suffers from lack of linearity, the scale being unduly cramped at the lower "S" readings, giving open readings between S6 and S8 and then tending to close up again. A circuit which gives better linearity is that shown in Fig. 3. Here the meter is connected from the screen to a point of equal potential, again obtained from a resistance network across the H.T. line.

The meter indication is derived from the variation of screen potential with the application of A.G.C. voltage and the sliding screen circuit is an essential feature. If the sensitivity is too great, a resistance can be placed in series with the meter, as shown at R2 in Fig. 3. The value will vary according to the full scale meter deflection.

With the majority of variable *mu* valves—such as the EF39, KTW61, and 6K7—R5 and R6 may be 100,000 ohms, R4 47,000 ohms and R3—the balance adjuster—50,000 ohms. R4 should be increased if the needle persists in holding over to the right (full scale deflection).

C.W. Indications

When the B.F.O. is switched on, a voltage near the intermediate frequency will be applied to the A.G.C. diode and the resulting A.G.C. voltage will be applied to the earlier valves and the sensitivity considerably reduced. For this reason, it is usual to switch the A.G.C. system out of circuit when receiving C.W.

If the circuit is arranged to prevent A.G.C. voltage developing, *except* from the actual signal, then the A.G.C. system can be permitted to continue to function for the reception of C.W. as well as telephony, with some advantage during periods when fading is prevalent. "S" meter readings can also be taken under key-down conditions.

Fig. 4 shows a suitable arrangement. It consists of a buffer I.F. amplifier, fed from the output of the first I.F. valve through a small condenser. The second valve is a diode delivering the usual negative voltage for A.G.C. control. V1 may be any ordinary variable *mu* pentode and V2 a diode valve or a germanium crystal rectifier.

The I.F. transformer should possess equivalent characteristics to those used in the receiver. In some cases, it will be possible to fit the additional parts on to the receiver chassis—in others, a small separate unit can be constructed, taking its power supplies (which are quite small) from the receiver. In order to prevent interaction all leads should be kept short and as much screening employed as possible. Suitable values for the components are indicated in Fig. 4 although variations may be necessary in particular cases. It will, of course, be necessary to disconnect the existing A.G.C. system and retune the I.F. transformers to resonance. The "S" meter will occupy its normal position in the cathode or screen of the first I.F. valve.

The time constant of the A.G.C. system should be long, so that the applied voltage holds more or less constant during key-up intervals. Otherwise the background noise will rise and fall in a somewhat disconcerting fashion.

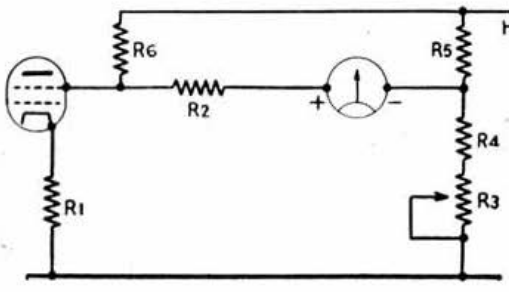


Fig. 3.

Screen connections, giving better linearity.

R1 Normal cathode resistance.
R2 10,000–50,000 ohms.
R3 50,000 ohms potentiometer.
R4 47,000 ohms.
R5 100,000 ohms.

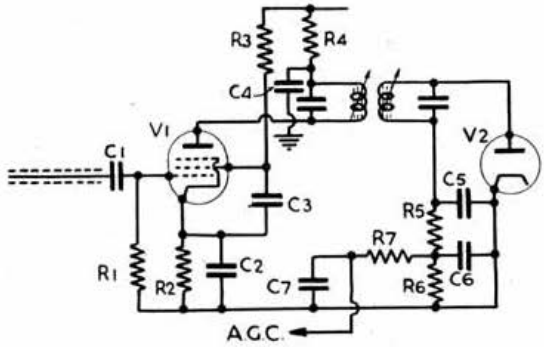


Fig. 4.

Suggested circuit for using an "S" meter during C.W. reception

R1, R6, R7	1 megohm.	C1	10 pF.
R2	300 ohms.	C2, C3, C4	·01 μF.
R3, R5	47,000 ohms.	C5, C6	100 pF.
R4	470 ohms.	C7	1 μF.

Zero Adjustment

Provided the associated resistors have been properly chosen, setting up the meter is a simple matter. The aerial terminals should be shorted out, R.F. gain set at maximum with the A.G.C. in operation and B.F.O. switched off. The meter needle should then be brought to coincide with zero, by adjustment of R3, after which the aerial is again connected up.

When "man-made" static or other noise is brought in by the aerial, the meter will probably show a reading, if the input voltage is sufficient to overcome any A.G.C. delay voltage which may be present. There are then two alternatives—first to allow an incoming signal to override the noise and give a true "S" reading—or, second, back-off the meter further and give, what is in effect, a report of signal strength over and above the prevailing external noise level. It is unwise to adopt the latter method, since the noise will vary from time to time and on different bands, whilst the meter calibrations also will not then be accurate.

Other Points

The manual R.F. gain control in the majority of communications type receivers varies the bias applied to the first I.F. valve (and also other valves).

Continued on page 241

A 28 Mc/s. ROTARY BEAM

By R. W. H. BLOXAM (GM6LS)*

The completed 28 Mc/s. rotary beam with its owner.

A NUMBER of factors governed the design of the tower and beam to be described. A general review of the published information was made with the object of incorporating the latest ideas in so far as they were applicable.

With a QTH 5 miles outside Edinburgh—famous as the " Windy City "—and 600 feet up on a hillside, gales are something to reckon with. For this reason alone strength was one of the major factors to be considered.

After due consideration it was decided that three elements would provide all the gain desired, the increase obtainable from a second director not being worth the weather hazard, nor the added difficulties attendant upon its adjustment.

A triple dipole radiator was chosen, since it offered the advantage of " broad-band " tuning with minimum structural complications and windage. Equally important was the fact that, when used in a 3-element close-spaced beam, this type of radiator can be made to present a centre impedance approximating 50 ohms, thus enabling direct centre feeding to be employed, and dispensing with quarter-wave stubs or T-matching.

*15 *Corstorphine Hill Road, Edinburgh* 12, *Scotland.*

Polystyrene 52 ohm coaxial cable provides an efficient, untuned, low impedance, weatherproof feeder, which is easy to bring into the shack and simple to couple to a transmitter by means of a link. The feeder can if necessary be any length up to about 100 ft. Further it does not need to be strained into place or kept away from other objects to avoid losses.

Theory of Multiple Dipoles

For those who are unfamiliar with the principle it may be stated that a multiple dipole comprises two or more dipoles connected in parallel at their ends. One of the dipoles is split at the centre, at which point current is fed in the usual manner. (Fig. 1).

When such a radiator is employed in the familiar 3-element close-spaced array, having two parasitically excited elements, the centre impedance of the multiple dipole is increased by the square of the

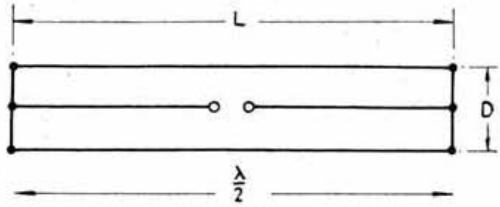


Fig. 1.
Multiple dipole consisting of 3 dipoles joined in parallel, with one split in the centre for the feed-line.

number of dipoles paralleled. Thus 3 dipoles will raise the impedance 9 times, if their diameters are equal.

By using wires to form the outer pair of dipoles this factor is reduced from 9 to approximately 5, and since the centre impedance of a normal (single dipole) close-spaced array is of the order of 8 to 10 ohms the triple dipole raises this to a figure between 40 and 50 ohms if wires are used for the " outers."

G. N. Carmichael (W4GCA/9) in an excellent article in " QST " (June, 1947), suggests that the " broad-band " propensities of the multiple dipole are dependent upon the amount by which the impedance (or radiation resistance) is raised—in other words, by the number of dipoles paralled, being greater for a greater number of elements. (See also article in R.S.G.B. BULLETIN, October, 1947.—ED.).

Experience with the triple dipole in use at GM6LS shows that the tuning is reasonably broad between 28 and 29 Mc/s., as evidenced by the fact that only slight changes of the variable link coupling to the P.A. are necessary for constant " draw " within this range.

Radiator

The length L in feet is given by : $\frac{468}{f(Mc/s.)}$.

Carmichael suggests reducing L by twice the distance D, but experience has shown this to be too short for the triple dipole. The length given by the above formula seems to be about right without deducting D.

It seems probable that the radiator length can be adjusted by the method described below for the other elements, but this has not yet been tried.

Parasitic Elements

The reflector length in feet is given by : $\frac{492}{f(Mc/s.)}$

and the director length by : $\frac{450}{f(Mc/s.)}$.

The exact lengths will also depend upon the spacing of the parasitic elements from the radiator, but will be close to the formulæ figure for normal close-spaced arrays.

Tuning of the parasitic elements with the multiple dipole would seem to be less critical than when using a normal 3-element beam.

The usual length-adjusting arrangement—employing some form of telescoping end-sections—is not viewed with favour. The resistance of the elements must be kept very low, and such joints are not conducive to this condition besides being generally inaccessible.

It seems a far better proposition to split the elements at the centre and to alter the electrical length by the insertion of linking pieces. If the elements are cut about 3in. short of the calculated length (measured from tip to tip) a suitable range of adjustment is secured.

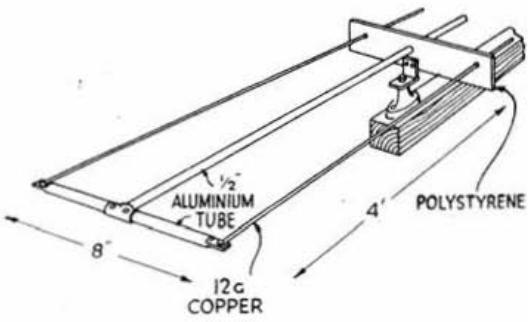


Fig. 2a.

Element construction showing method adopted by the author to obtain rigid support of the three dipoles.

Element Spacing

Spacing the reflector 0·2 wavelength from the radiator seems to provide maximum forward gain. However, as this necessitates rather long booms a spacing of 0·17 wavelength was adopted as a compromise. A "middle" frequency of 28·4 Mc/s. was chosen.

The spacing is calculated from the formulæ:

$$\lambda = \frac{300}{f\ (Mc/s.)} = \frac{300}{28{\cdot}4} = 10{\cdot}55 \text{ metres.}$$

Then, λ (in feet) = 10·55 × 3·28 = 33·6 feet. and 33·6 × 0·17 = 5·9 feet or 5 ft. 11 in. approx.

The director spacing adopted was 0·1 wavelength, which gives a distance of 3ft. 4in. in front of the radiator.

Element Construction

Aluminium tube ½ in. dia. 20 S.W.G. was employed for all elements except the two "outers" of the triple dipole. These were made with 12 S.W.G. copper wire.

The end pieces of the radiator are made with 9in. lengths of the aluminium tube, flattened in the centre and at both ends. Two 4 B.A. screws and washers secure these end pieces to the flattened ends of the centre element and single screws fix the ends of the copper wires.

The wires are spaced 4in. on each side of the tube, in the horizontal plane.

Each half of all the elements is supported by two insulators. The triple dipole requires a special support to take the weight of all the conductors. This comprises four pieces of $\frac{3}{16}$in. polystyrene 9in. × 2in. drilled to take the tube and the two wires. One of these pieces is attached to each insulator by means of a small brass bracket bent from $\frac{3}{4}$in. strip. (Fig. 2a).

The mechanical strength of the arrangement was tested before construction, and it was ascertained that an overhang, unsupported, of 4ft. was satisfactory. This overhang was adopted for all the elements, the timber supports being cut to length accordingly, the reflector, of course, being longest.

The centre gap between all the tubes was made ½in. giving a centre-to-centre distance of 1 $\frac{3}{16}$in. between the holes in the flattened ends, to which the strapping pieces are attached on the director and reflector, and the co-axial cable to the radiator.

Straps of varying length can thus be inserted to alter the electrical length of the parasitic elements. These should be made from aluminium strip. It is undesirable to join dissimilar metals, but this cannot be avoided in the radiator, unless aluminium wire can be obtained for the outer dipoles.

Apparently the impedance is not greatly affected by the size of the conductors, provided the spacing is large compared to their diameter. The open ends of the director and reflector tubes were plugged with wood, to prevent water entering, and to stop them whistling in high winds.

Rotating Head and Frame

The element supports are 1½in. square section timber, bolted to the two booms, the latter being 2½in. × 1½in. section and 10ft. long. The booms are 18in. apart inside. These have two wooden spacers screwed between them, each approximately 18in. from the centre.

The booms are carried on two pieces of 1in. angle iron 2ft. 6in. long, and are secured by ⅜in. brass bolts and wing nuts through the sides, and close to the ends of the angle. Thus, by removing two of the bolts, and slackening the other two, the whole array can be tilted down the tower, enabling either parasitic element to be adjusted.

The rotating head was constructed from a 6in. dia. ballrace. This article, intended to be a thrust-race for a 2,000 h.p. speedboat engine, was found in a Scottish scrapyard! Unlike the usual plain race, it has convenient lugs cast on it, to which the angles were bolted by welded-on straps. The head was secured to a timber frame of 2in. + 2in. hardwood which bolts in turn to the top of the tower.

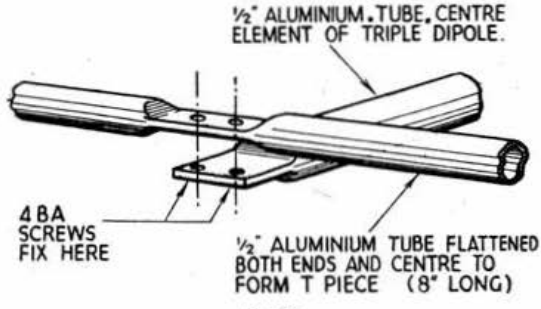


Fig. 2b.

Shows an enlarged view of the method used for fixing the T piece at each end

Turning Gear

Two lengths of 1in. dia. electrical conduit tube, screwed 1¼in. both ends, were joined with "flanges." These flanges are described as "dome covers" by electricians. Screwed in the barrel portion, they have holes ready drilled in the flange. These were screwed on to the pipe and locknuts fitted. To prevent the possibility of them unscrewing, holes were drilled through the barrel portion and $\frac{3}{16}$in. taper pins driven right through. However, conduit is rather thin, and tends to whip a little in high winds, so it is suggested that steam or gas pipe would be better. Two guides are fitted on bars across the tower, and these are simply 1in. cast conduit saddles. Conduit fittings have the "ready-made" advantage.

An 18in. dia. disc with a 2in. deep ring round the edge, was made by a tinsmith. The ring was accurately divided with a protractor, at 10 degree intervals and stencilled in white figures on black.

The disc is clamped by locknuts, so that the azimuth of the beam can be set in relation to a pointer. At GM6LS this direction-indicator is in full view from the shack.

Turning is effected at present by an old car steering wheel and worm-drive, obtained as scrap for 5/–. Undoubtedly, control from the shack is advantageous, and will be added.

Direction indicator and drive mechanism of the beam.

Tower Construction

For low-angle radiation, the aerial should be an odd number of half-waves high. Space limitations and the question of strength ruled out a structure 50ft. high, and since timbers 20ft. long were obtainable, this height was adopted. The fact that it is slightly more than one half wave is not of much consequence since the effective electrical earth level rarely coincides with the ground level anyway.

The tower was designed to be self-supporting, and no chances were taken with the foundations. Each leg is supported on a concrete block 2ft. × 2ft. × 2ft. 6in. deep. Holes for these were cut in the clay soil. The holes taper out a little at the bottom, and old pipes were driven into the corners to give "spread" and grip the concrete.

The fixings set in the concrete are 14in. lengths of 2in. × ¾in. mild steel bar, bent at right angles 3in. from the bottom end, and "ragged" along their edges. These fixings project 4in. above the concrete, and have ¾in. clearing holes for the fixing bolts. These were set in the concrete two at a time, whilst bolted to a wood bar having holes exactly 4ft. centres. Careful levelling and cross measurement when the other pair are set, attached to the same bar, results in a dead square, level base.

Each leg is 20ft. long and 3in. × 2in. section pine. Fishplates 16in. long and 3in. wide × ⅜in. thick were cut and drilled by a blacksmith. These clamp the lower end of each leg on both sides, and are secured by ½in. bolts. The ends project 3½in. beyond the timber, and are drilled ¾in. clearing for the fixing bolt to pass through. A number of 2in. square flat packing-pieces were made, and these fit over the fixing bolts between the fixings and the inside of the fishplates, so that when the bolt is tightened an absolutely solid grip, over a good area, results. This is very important.

All the cross-bracings and the steps are 2in. × 1½in. section, and where they cross the 2in. dimension of the uprights they are recessed ½in. All the joints are bolted with ⅜in. coach bolts and 2in. dia. washers, to prevent pulling into the wood.

The wood bar employed to set the fixings in the concrete should be used to hold the lower ends of the uprights whilst making the sides, thus ensuring that they fit the base exactly.

Two lengths of angle iron are visible at the base. These were fitted to take the strain of levering up the tower, and were left on as they add to the strength.

An eyebolt, set close to the wall of the house, facilitated erection with a borrowed block and tackle, and a round-up of a few local amateurs. The operation, in service parlance, was "a piece of cake," and it is thought now that it could be done quite easily without the tackle, especially if there is space for a good rope haul.

A local short-wave enthusiast who is also a joiner rendered invaluable assistance and advice in the construction.

Operation

The beam worked first "go," in fact the only alteration made has been to lengthen the link on the reflector by 2in.

Coupling the beam to the receiver proved the operation as soon as the band opened up. American signals received on the front at S8/9 were barely readable off the back—only the strongest getting through.

Field strength measurements taken at a range of about 250 yards indicated a very high back-to-front ratio, in fact it could not be properly determined, as the signal disappeared completely off the back when using phones, whilst the meter (0–200μA) was not sensitive enough to give a minimum reading. The front reading was 50μA on these tests, and a good signal in the phones.

It would seem that the ratio on a DX signal is not as high as local tests indicate, but in practice this is not entirely a disadvantage. If, for instance, one is beaming East, it is useful to know whether the band is open in the opposite direction without having to turn the beam.

Tests with the transmitter on and a neon attached to a stick long enough to reach the ends of the elements were interesting. The neon glows normally along the radiator, brightest at the ends. On the reflector there is precisely nothing. Cancellation of the received and reflected waves accounts for this, and it is therefore an indication of correct operation. The director is "hotter" than the radiator, which is also as it should be.

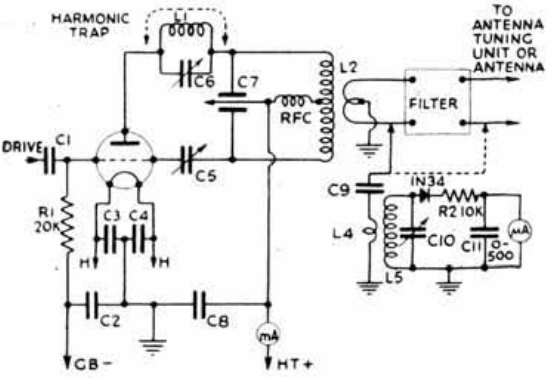
To check experiences the writer would be interested to hear from any other reader who has used this form of radiator.

FOR TRANSATLANTIC PHONE CONTACTS USE FREQUENCIES BETWEEN 14,300 AND 14,400 KC/S

A SIMPLE HARMONIC SUPPRESSION MONITOR

By LOUIS VARNEY, A.M.I.E.E., (G5RV)

IN the course of extended T.V.I. tests at G5RV it became apparent that some simple, yet accurate, form of harmonic indicator was essential in order to ensure that harmonic trap circuits and feeder filters were functioning correctly. In an earlier article* it was stated that an S27 receiver was used as a means of measuring the harmonic output from a 14 Mc/s. transmitter while adjusting the harmonic rejector circuits in the transmitter. It was realised at the time, however, that many amateurs would not possess such a receiver and would, no doubt, have to build a suitable V.H.F. converter unit to place ahead of their normal communication receiver for such tests. A simple and reliable harmonic indicator has now been designed and tested successfully and the information concerning this device which follows is passed on for the benefit of all who may require to deal with cases of T.V.I.



A Simple Harmonic Suppression Monitor.

C1	50 pF.	C11	·001 μF.
C2, 3, 4	Tubular paper. ·01μF	L1	12 turns 18 S.W.G. bare copper wire ¼ inch I.D. spacing ⅛ inch.
C5	Neutralising.	L2	Normal tank coil.
C6	3–20 pF midget air-trimmer double-spaced.	L3	Link coil.
C7	50–50 pF transmitting variable.	L4	One turn link adjustable.
C8	·001 μF H.V. mica.	L5	4 turns 14 S.W.G. enamelled copper 1½ inch I.D. ⅛ inch spacing.
C9	2–5 pF.	R1	20,000 ohms 10 watt.
C10	7–100 pF midget air-trimmer.	R2	10,000 ohms ½ watt.

Description

Since long-term tests at G5RV have established the necessity for readjusting anode trap circuits to maintain harmonic suppression, when changing frequency from one end of the 14 Mc/s. band to the other, a direct reading harmonic indicator has been built into the transmitter thereby enabling readjustment of the harmonic trap to be effected quickly and accurately.

The indicator consists, essentially, of a sensitive absorption wavemeter tunable over the Television sound and vision channels (41 to 47 Mc/s.) using a 1N34 crystal valve and a 0–1 mA. or preferably a 0–500 μA. D.C. meter. The circuit diagram is shown together with component values.

(*) Curing Amateur Interference to Television—*R.S.G.B. Bulletin*, March, 1948.

Operation

The method of using the device is as follows. The transmitter is first tuned-up in the normal manner with the PA. anode harmonic trap circuit (or circuits if push-pull is used), short-circuited temporarily by a short lead fitted with crocodile clips. The harmonic indicator is then coupled to one side of the feeder line (or output link coil) through a capacity of about 2 to 5 pF as shown in the diagram. The indicator is then tuned to resonance with the P.A. harmonic which falls in the T.V. band. This will produce maximum deflection on the meter. The coupling to the indicator should now be adjusted so as to produce full-scale deflection of the meter under this reference condition. The harmonic trap shorting-link is now removed and the trap circuit condenser adjusted to produce minimum deflection of the indicator meter. This should be zero on a 0–1 mA. meter when the PA. is running at 150 watts on 14 Mc/s. This done, it is only necessary to retune the indicator first to produce a maximum deflection—after changing transmitter frequency—and then retune the trap circuit to regain minimum deflection.

The indicator is very loosely coupled to the feeder and produces negligible loading or unbalance. It may thus be left in circuit, when it will function as a permanent monitor of the transmitter harmonic output.

Should a feeder harmonic filter be used in addition to the anode trap circuit, its efficacy may be judged by shorting-out the trap circuit and observing the indicator deflection before the filter (*i.e.* full scale) and then clipping the indicator coupling condenser on to the feeder immediately after the filter and reading the indication thus produced. If necessary, the filter elements may be adjusted by this method for maximum rejection in the T.V. band.

A further benefit which accrues from using the harmonic indicator is that it does not require the service of an assistant as does the receiver checking method, since it is unlikely that the check receiver could be used successfully in the same room as the transmitter.

If the law of the crystal valve-micro-ammeter combination be known, or calibrated, the device may be used to measure the actual attenuation in decibels produced by the harmonic trap or filter. In this case, it is assumed that the filter would be inserted in a reasonably well terminated feeder so that the input and output impedances of the filter may be considered to be equal.

In the case of a low power transmitter it may be necessary to connect the harmonic monitor link coil across the feeder through a small capacity in each leg —say 5 to 20μF—in order to obtain sufficient deflection of the 0–1 milliammeter.

It is suggested that the harmonic trap circuit condenser spindle be extended *via* an insulated coupling and brought out as a front-of-panel control for maximum convienience.

NETHERLANDS V.H.F. RADIOPHONE CAR SERVICE

By T. O. CADELL, (PAθTOM)*

THE writer was privileged last month to participate in a series of tests with some new V.H.F. radiophone car equipment of a type which is shortly to be introduced commercially in the chief cities of the Netherlands.

Signals are transmitted from the car on a frequency of approximately 73 Mc/s. and are picked up at a local control station from whence they are passed over the telephone network to the called subscriber. The range of the equipment is sufficient to provide first class service when a car is within a radius of 10 miles from the control station.

The control station used for the tests was located on the ground floor of a three storey building in the centre of The Hague, where access could be obtained to the telephone system. The control station equipment consists of two transmitters and two receivers, which may be relay-operated to allow two mobile units to speak to one another.

Car Equipment

The transmitter uses a crystal controlled Armstrong-type of frequency modulated circuit which delivers 50 watts to the aerial. The valve line-up is as follows: 7F7 Crystal Oscillator and Phase Modulator, 7W7 Frequency Quadrupler, 7C5 1st Doubler, 7C5 2nd Doubler, 7C5 3rd Doubler, 815 Power Amplifier.

The receiver is a 15 valve crystal controlled double super-het using the following valve line-up: 7W7 RF Amplifier, 7W7 1st Converter, 7W7 2nd Converter, 7W7 Crystal Oscillator Multiplier, 7C7 Oscillator Amplifier, 7W7 IF Amplifier, 7S7 3rd Converter, 7C7 1st Limiter, 7W7 2nd Limiter, 7A6 Discriminator, 7A5 Squelch Rectifier, 7F7 1st A.F. Amplifier and Squelch, 7C5 AF Amplifier, 7A4 Relay Amplifier. The frequency range is from 70 to 100 Mc/s.

The transmitter, receiver and power supply are housed in the boot of the car and a half-wave end-fed aerial is mounted on the roof. All controls are located on the dash-board.

The equipment is powered from the 6 volts car battery and when in operation the load is about 30 amps. In the stand-by position the load falls to about 10 amps. The makers recommend that the equipment should not be operated for long periods unless the car engine is running.

Practical Tests

During the recent tests numerous calls were made to local telephone subscribers but, as far as the writer was concerned, the high-light came when a call was put through to Mr. Clarricoats at R.S.G.B. Headquarters in London. At that time the car was cruising along the sea-front at Scheveningen, some 3000 yards from the control station with high ground and tall buildings in between. "Clarry's" voice came over at full loud speaker strength and every word of his conversation was followed with ease. No fading or interference from other vehicles was noticed although it is known that certain types of car are liable to cause trouble in this respect.

The tests provided the writer with his first experience of F.M. and he was particularly impressed by the excellent speech quality.

* *British Embassy, The Hague.*

The V.H.F. equipment fits easily into the boot of a car.

Thanks are recorded to Mr. G. Emmerik, Head of the Netherlands T & T Monitoring station, and to his assistant, Mr. H. Logtens who made it possible for the writer to participate in the tests. During the telephone conversation with Headquarters Mr. Clarricoats sent greetings on behalf of Mr. Lewer and himself to Mr. Emmerik and reminded him that they had met in Atlantic City during the Radio Conference, when Mr. Emmerik was a member of the Netherlands Delegation.

THE WHYS AND WHEREFORES OF "S" METERS—

Continued from page 236

Backing-off this control will, therefore, upset the balance of the meter circuit and the needle will come back against the left-hand stop. No harm will accrue if the value of R2 in Fig. 1 and R4 in Fig. 2 is high enough to prevent the meter passing a current sufficiently large to damage the moving coil winding. If any doubt exists, it is desirable to fit a switch so that the meter can be cut out of circuit when receiving C.W. This switch can often form part of the potentiometer used for controlling R.F. gain, as is the practice in many commercial receivers. It should also be remembered that the meter itself is a delicate instrument. The movement will be highly damped and the needle will move much less if a piece of wire is arranged to short circuit the terminals whenever the meter is transported. This hint is a useful one to apply to any moving coil meter, when sent by post.

Silent Key

We regret to record the passing of Mr. S. Chester, BRS12574, of Leeds. Mr. Chester was held in high esteem by the members of the Leeds and District Amateur Radio Society, of which Society he was a past Chairman and Secretary.

THE MERCURY-VAPOUR RECTIFIER

ITS OPERATION AND CHARACTERISTICS

By K. E. V. WILLIS, A.R.C.S., B.Sc. (G8VR)*

MOST amateurs will be aware of the advantages of the mercury-vapour rectifier over the ordinary vacuum type in circuits of power supply units from which a high current is required. Very few, however, realise why the introduction of a trace of vapour into the envelope should completely alter the characteristics of the valve. At the outset it may be stated that the conductivity of the vapour inside the envelope plays no direct part in reducing the resistance of the valve, for if this were the case the valve would conduct equally well on both half-cycles of the applied alternating voltage, and no rectifier action would result.

Half Wave Rectifiers

Let us consider what happens in the case of a normal vacuum-type rectifier of the half-wave variety. This is simply a diode valve with a filament, heated either directly or indirectly, and a metal anode. When the filament is heated, it liberates electrons, tiny particles of negative electricity, which, by virtue of their charge, are attracted towards any object carrying an opposite or positive charge. Consequently when the anode is made positive, electrons move towards it and some of them actually collide with it to be absorbed into the structure of the anode. The movement of this negative stream into the anode constitutes a current, and more important, it is a one-way current for it will flow only when the anode is positively charged, *i.e.* of opposite sign to the charge on the electron. If, as is usually the case, the filament is specially treated to give a high " yield " of electrons, a sizeable current results when the anode is maintained at a positive potential of something between 100 and 1000 volts, according to the design of the rectifier.

Space-Charge

It must not be supposed that every electron which is liberated from the cathode reaches the anode. Very few manage to do so, due mainly to the " space-charge " effect. This is brought about by a cloud of electrons remaining for a time in the vicinity of the cathode before commencing their journey to the anode. The effect is to tend to restrain further electrons from leaving the cathode, for the negatively charged electron is faced by an adjacent negatively-charged " space " due to the electron cloud. It is obvious that if the electron " yield " is reduced, then the current will be less. This actually happens in the case of the vacuum-rectifier, the effect being to produce in it a high ohmic resistance due mainly to this space-charge. This could be overcome to some extent by increasing the applied voltage to " pull " the electrons into the anode more quickly, or better by utilising a material for the cathode which has a higher yield of electrons. Nevertheless, the voltage drop across the rectifier is appreciable if high currents are being drawn from the supply, often being as high as 100-200 volts.

Mercury-Vapour Rectifiers

The mercury-vapour rectifier was designed to overcome this effect so that high currents (up to 5 amps in large installations) might be drawn from the supply without losing volts through the resistance of the valve. There are a number of suitable vapours which can be used for this purpose, but mercury is the most common and it is usual to speak of a " mercury-vapour rectifier " even if the envelope contains mixtures of other vapours.

A slight digression into some elementary atomic theory will be necessary to understand the action of this type of valve. Atoms of all substances are composed of a complex nucleus around which a number of electrons (proportional to the atomic weight) orbit in definite paths roughly elliptical in form. The nucleus has a positive charge which is exactly balanced by the total negative charge of the electrons, so that the atom as a whole is electrically neutral. Thus, if even one electron can be removed from an atom, the balance is upset and the result is an atom of charge $+e$ and an electron of charge $-e$. The atom is then said to be *ionised*, or to be a *positive ion*. If we remove two electrons, then the atom becomes doubly ionised and has charge $+2e$. Similarly, if an electron is added, we have a *negative ion* of charge $-e$.

The usual way in which electrons are removed is by bombarding the atom with fast moving particles such as electrons, which knock out other electrons from the neutral atom to produce a positive ion. In the mercury-vapour rectifier the atoms to be bombarded are the mercury vapour atoms, and the electron " gun " which is to be the bombarding source is the combination of the filament yielding electrons and the anode which attracts them at high speed towards itself. Since the mercury vapour is present in the envelope, many of the atoms come under the bombardment of the electrons as they move swiftly towards the anode, and they lose electrons becoming positive ions. This is accompanied by a change of physical characteristics of the atom, and light is emitted producing the well-known blue colouration of the mercury-vapour rectifier. Note that when no current is passing, no ions are being formed and there is little or no colouration within the envelope. The positive mercury ions have totally different characteristics from the electrons, being very slow-moving due to their greater mass, and carrying a positive, instead of a negative charge. By virtue of this latter property, they are attracted, not to the anode, but to the cathode, toward which they drift very slowly. To reach the cathode, however, they must drift through the space-charge electrons, and in doing so they neutralise them by each ion collecting an electron to form a neutral atom. This very effectively eliminates the space-charge which was responsible for the high voltage drop across the vacuum rectifier. It is a very fortunate property of this type of valve that once ionisation has commenced, the voltage drop across the valve remains at a constant value (about 10 volts), this being the *ionisation potential* of the vapour.

The way in which the vapour is introduced into the envelope is to have present a few drops of metallic mercury inside the valve itself. Consequently it is very important to warm up the valve by lighting the filament for a minute or two before applying the high voltage. In this way, any mercury (a high conductor of electricity) which has collected on the electrode assembly of the valve, is vaporised off before it can short circuit the supply.

* *Pine Lodge, Westergate Road, Upper Abbey Wood, London, S.E.2.*

The Station Behind the Call

G5PR*

View of the Operating Room at G5PR.

ONE of the problems confronting many amateurs to-day is the design of equipment suitable for installation in a room not devoted exclusively to radio. The layout at G5PR of Horam, East Sussex, provides an interesting example of how experimental work may be carried out in the lounge without unduly affecting the other members of the household. The transmitter is enclosed in a tall cupboard consisting of a wooden framework covered with "Sundeala" composition board. Mounted on castors, the entire equipment can be wheeled into the centre of the room during spring cleaning operations. A lock on the door of this home-built cupboard keeps the transmitter safe from the prying fingers of the junior op. When the door is open—as in the illustration—all five layers of the equipment are readily available.

Unit Constructed Transmitter

The bottom shelf contains two power packs giving voltages of 350 and 500 for H.T and 4, 6·3, 7·5 and 12·6 for L.T. Permanent wires run up the sides of the cupboard from the power packs; H.T. on one side and L.T on the other. These are connected on each shelf, to baseboard-mounting four-pin valve holders. New apparatus when built is provided with leads terminated in four-pin valve-bases so that it can be easily plugged-in where required. Above the power units is a 30 watt modulator (using EL37 valves in push-pull) together with its associated 400 volts power supply.

The remaining three shelves contain the transmitter proper. Four 6L6 frequency doublers on the third shelf are link-coupled to a 1625 power amplifier mounted directly above and operating on either 7, 14 or 28 Mc/s. Also on the fourth shelf is the grid bias power pack delivering up to 150 volts.

On the top shelf is the 1·7 and 3·5 Mc/s. transmitter. This consists of a 59 buffer stage, an RK25 used as a final on 1·7 Mc/s. and as a doubler on 3·5 Mc/s., and a T20 power amplifier for 3·5 Mc/s.

The Operating Desk

The transmitter is controlled by a Franklin V.F.O, located on the right-hand side of the operating desk and complete with built-in 100 and 1,000 kc/s. crystal oscillators for frequency checking. Immediately beneath this unit are the Morse keys and a switch for telephony change over.

The nine-valve home-built superhet shown in the centre of the desk consists of an EF50 R.F, amplifier; a 6L7 mixer with separate oscillator; two 6K7 I.F, stages with crystal filter; a 6H6 second detector, A.V.C, and noise limiter; a 6J7 B.F.O.; 6C5 audio; and 6V6 output. The frequency range of 1·5–30 Mc/s. is covered by a four position bandswitch. A further EF50 preselector may be brought into use on 28 Mc/s.

The space to the left of the receiver is reserved for odd constructional tasks. In the drawers of the desk are kept tools, spare components and valves, QSL cards, and the hundred and one small items so necessary for the smooth running of a modern amateur station.

Aerial System

Three aerials are at present in use: (i) a 132′ end-on long wire; (ii) a 33′ VS1AA Windom; and (iii) a 66′ VS1AA Windom. The two Windoms run north and south and are strung in line. On 14 Mc/s., both these aerials are connected simultaneously to the same point on the plate tank coil and this arrangement has proved to give low-angle radiation in all directions. Probably neither aerial is working as a true balanced Windom but reports from all parts of the world leave little to be desired considering that the input to the final stage never exceeds 50 watts.

* G. C. Proctor, Sunny Ridge, Horam, E. Sussex.

Amateur Radio in Greece

By HARRY BARNETT (SV1WE)

HAVING just returned to England after spending four years in Greece readers may be interested in a brief description of amateur radio conditions in that delightful but unfortunate country. In the first place, it should be stated that Amateur Radio has at no time been sanctioned by law although, before the war, the Director of Posts and Telegraphs did grant one or two amateur licences. These were however withdrawn in September, 1939, and, as a state of war virtually exists in Greece to-day, they have never been re-issued.

Restrictions Galore

During 1947, a house-to-house search was instituted and all transmitting equipment confiscated, as well as much other gear which was alleged to be suitable for transmitting purposes. Even an S28 receiver was a transmitter, so said the authorities, because it embodied a switch marked "Send—Receive"! It will thus be seen that the amateurs of Greece have had, and are still having a very lean time. Some of them, however, still indulge in listening, so that once the restrictions are lifted, there will be, at least, 15 stations on the air. Even listening is restricted because permits have to be obtained to own a communications receiver. These are not easy to obtain unless one happens to belong to the same "club" as those in authority! It is interesting to note that a communications receiver, in the eyes of the authorities, is *any* receiver in a metal box which has a few knobs, irrespective of whether it has a BFO, noise limiter, S meter, variable selectivity or band spread. It is this ignorance on the part of the authorities that causes so much trouble in amateur circles. Readers will thus appreciate that if they work an SV station with a Greek at the key, or at the mike, he is operating "under cover," and for that reason care must be exercised in sending QSL cards. There are, however, plenty of "pirates" using SV calls. So Beware!

Improvisation

The preceding remarks apply only to Greek Nationals. For Services personnel things are somewhat different, as they are allotted a SV0 prefix, and it is a simple matter to tell whether they are genuine or not because they are either British or American operators. During my stay in Greece, I was fortunate enough to obtain the first SV civilian licence issued, and if my experience is anything to go by, the real SV amateurs will have a tough time when they do get permission to go on the air. No transmitting gear may be imported unless it is ordered for one of the Ministries, so the amateur has to "carve his gear out of the solid," so to speak. As a civilian, I did not have access to Service equipment, so everything had to be made at home. It was quite true when I used to tell my friends over the air that I was using two 6L6's in a "dubious sort of Class B." The driver transformer was an old modulator transformer of unknown make, with a step down ratio, and the modulator comprised a mains transformer using the two 110 volt primaries as the anode load, and the whole of the H.T. secondary as the modulation winding. Scraps of metal, old iron, and rare pieces of aluminium were drilled and bent to form chassis, and the whole transmitter was housed in a tin box found on a junk heap. Fortunately the gear worked, the signals were readable, and some people even said that the quality was good!

With my return to "G," the civilian SV calls have been halved by 50 per cent., and, by the time this appears the only remaining civilian station—that of SV1RX—will have closed down too as he (Norman Joly) is due to arrive in England shortly. This leaves just one Service station (SV0AE) to provide the much coveted SV card. It seems a bit hard that, having distributed some 700 SV1 cards myself, I shall not now be able to obtain one to confirm a contact from "G." I still have my logs so if any amateur has not received his SV card, he should apply for a duplicate. I say "duplicate" because every QSO has been confirmed. To all others who want an SV card and who have not worked SV1WE, the price is 5 guineas each, payable to the R.S.G.B. Benevolent Fund!

A Simple 100 kc/s. Oscillator

By JOHN B. ROSCOE, M.A. (Physics) Oxon. (G4QK)

THE oscillator to be described consists of a straightforward E.C.O., using a *Wearite* coil (type PA 1) (Fig. 1). The two windings are connected in series, the junction providing the tapping point for the cathode (Fig. 2). The total tuning capacity required is just under ·001 μF, and though this can be obtained by using a two-gang standard tuning condenser, it is more convenient to use a combination of fixed and pre-set condensers, together with a 50 pF trimmer.

The oscillator may conveniently derive its power supply from the V.F.O. power pack, since the H.T. consumption is only about 7 mA.

The oscillator is used in conjunction with a normal broadcast receiver tuned to the frequency of Droitwich (200 kc/s.). The second harmonic of the oscillator beats against the carrier of this station, and even when the latter is modulated, the beat frequency can be reduced to less than 1 c/s, giving an accuracy of 1 part in 200,000. With continuous monitoring in this way, the long-term stability of the oscillator is unimportant.

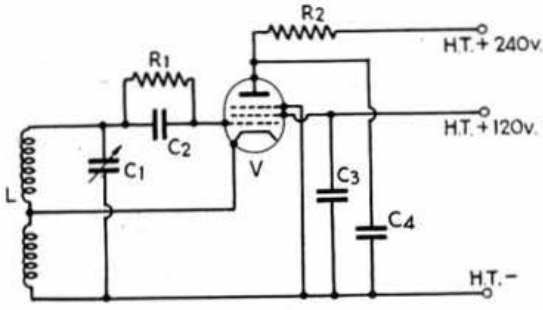


Fig. 1.
Circuit of simple 100 kc/s. Oscillator.

C1, L See text.
C2 300 pF Mica.
C3,4, ·01 μF Paper.
V 6J7, EF36, etc.
R1 270,000 ohms ½ watt.
R2 25,000 ohms 1 Watt.

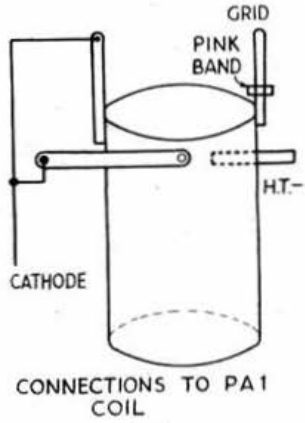


Fig. 2.
Method of Connecting-up the Coil.

Normally, harmonics up to the 100th (10 Mc/s.), at least, should be strong enough for calibration purposes, but when necessary, a separate harmonic amplifier can be used, or the output can be fed through a small condenser into the V.F.O. buffer stage.

For the average receiver, with a reasonably linear relationship between frequency and dial reading, 100 kc/s. calibration points are adequate: a 10 kc/s. multivibrator stage can always be added if desired.

When used with a stabilised power supply the stability was found to be good: the stability of a transitron oscillator tried at the same time was probably better, but in this case the harmonic output was entirely inadequate.

The author has never seen the P.M.G.'s definition of an "Approved Type" of calibrating oscillator, but if the one described above, when used in the manner suggested, does not meet with official approval, he would be interested to know why.

Air Ministry Daily Weather Report

For the information of those members who are interested in meteorological information we give below brief details of the Air Ministry Daily Weather Report Service.

The Report is reproduced by Lithography and is issued daily in three sections, *viz.*: (1) *British Section* (2) *International Section.* (3) *Upper Air Section.*

A Monthly Supplement is issued on the first day of each month.

Subscription rates including postage, are as follows:

	Any one section.	*Any two or all three sections.*
One Calendar Month ..	5s.	9s.
One Quarter	13s.	25s.
One Year	50s.	90s.

Subscriptions should be sent to H.M.S.O., Kingsway, London, W.C.2, from which address fuller details can be obtained.

British Industries Fair

RADIO manufacturers were well represented at the 1948 British Industries Fair held simultaneously in London and Birmingham. Known as "Britain's Shop Window," this year's Fair covered a million square feet of floor space and there were 26 miles of exhibition stands. With a declining sellers' market, manufacturers were eager to show new technical developments and to prove that "British Made" is still the mark of quality and craftmanship. At Olympia, it was noticeable that not only broadcast receivers but communications equipment and navigational aids were prominently displayed. Television and test instruments were also featured along with automatic counters, and other industrial electronic devices.

V.H.F. Communication Equipment

The introduction of "Business Radio Licences" has focused attention on V.H.F. mobile equipment. Not only police, fire and medical services, but press correspondents, taxi hire firms and even the London Underground are now installing two-way radio operating on spot frequencies between 40 and 170 Mc/s. Suitable equipment was shown by several firms. For example the *Mullard* GME 501 has a coverage of 65—165 Mc/s. with a power output of 20 watts up to 100 Mc/s. and an average of 12 watts at higher frequencies. Crystal control is employed in the transmitter and in both oscillator stages of the double-superhet receiver. Frequency modulation with a deviation of plus or minus 15 kc/s is used and an automatic modulation control ensures that transmitted speech is kept to the optimum level. A squelch circuit in the receiver suppresses the random noise under no-signal conditions. Weight of the entire unit which runs off a 6 or 12 volt battery is approximately 50 lbs. For civil aircraft, *E. K. Cole* have developed a V.H.F. transmitter-receiver weighing only 14 lbs. *Marconi* V.H.F. Diversity and Linking equipment as used in police communication networks was also on show. Such apparatus permits signals from mobile sets to be picked up by any of three units located in different parts of a city. These are automatically linked to the control centre whilst outgoing messages follow a similar route thus overcoming difficulties of screening from hills or buildings.

Navigational Aids

Commercial applications of radar technique continue to be developed rapidly. A number of interesting navigational aids were shown by *Cossor Marine Radar Ltd.* including a replica of the shore-based radar system recently installed at the Seacombe Ferry which annually carries 20,000,000 passengers across the River Mersey. A plot of the river and landing stages may be seen on a PPI (plan position indicator) screen and full information on the position of the ferry boats and other vessels passed to the Captains by continuous V.H.F. telephony link. Operators with local knowledge are able to estimate distances to within 20 feet and even better results should be obtained when the present 9 inch screen is replaced by modified equipment containing two 15 inch cathode ray tubes. *Cossor* also showed their "Gee" airborne equipment which makes use of the pulse system of hyperbolic navigation. Important reductions of size and weight have been achieved. The *Marconi* airborne beam-approach unit consists of two 30–40 Mc/s. receivers in one case. Miniature components are used and the whole assembly—although very compact—is readily accessible for servicing purposes. It is claimed that this unit is less than one-quarter the weight and occupies less than one-quarter the space of any equivalent apparatus on the market. The *E.M.I.* "Rebecca" interrogator operating between 170 and 240 Mc/s. also contains miniature components and special light alloys. It provides "heading" and "distance" information from a ground or an airborne responder beacon.

Special arrangements were made by the exhibitors and the *Radio Industry Council* to allow overseas visitors to view television programmes in and around London. At Olympia, *Cinema-Television* demonstrated their complete equipment for the televising of films. Three 20 inch picture tubes—under normal lighting conditions—enabled the films to be viewed by a large audience. The standard B.B.C. definition of 405 lines was employed with "flying spot scanning." Interesting items in broadcast equipment included a midget *Masteradio* personal receiver, fitted with a deaf-aid earphone to conserve batteries and a *Goodman's* dual matched loudspeaker unit with cross-over filters and a 40 to 12,000 cycles response.

The amateur, soon to be faced with the problem of frequency meters for the new V.H.F. and U.H.F. bands, was able to obtain some useful tips from the *Marconi* range of four absorption meters covering 40–2000 Mc/s., with an accuracy of ·1 to ·2 per cent. Above 200 Mc/s., loaded concentric lines and all-metal construction gave remarkably sharp discrimination.

Marconi-Kemp Memorial

A Memorial Plaque in honour of Guglielmo Marconi and George Kemp, erected by the Rotary Club of Cardiff, was unveiled and dedicated at St. Lawrence Church, Lavernock, near Penarth, on May 12, 1948, to commemorate the first successful radio transmission over water between Lavernock and Flat Holm on May 11, 1897, and between Lavernock and Brean Down one week later. The proceedings were recorded and broadcast later in the day.

The Society was represented at the ceremony by Wing Commander Cyril H. Parsons, R.A.F.(S.) R., (GW8NP), County Representative for Glamorganshire, but due to an oversight he was not informed of the arrangements until a few days before the event was due to take place.

AFFILIATED SOCIETIES

The following Societies and Clubs are in affiliation with the Incorporated Radio Society of Great Britain:

ADMIRALTY (BATH) ELECTRONICS SOCIETY, c/o Mr. D. Houston, A.M.I.E.E., D.E.E. Dept., Admiralty, Bath.

AYLESBURY AND DISTRICT RADIO SOCIETY, c/o Mr. J.G. Penrice, 31 Prebendal Avenue, Southcourt, Aylesbury, Bucks.

BENTON RADIO CLUB, c/o Mr. D. King, 60 Haw Lane, Yeadon, Nr. Leeds.

BOURNEMOUTH AND DISTRICT AMATEUR RADIO CLUB, c/o Mr. F. C. White, Chester House Hotel, Chine Crescent, Bournemouth.

BRITANNIA RADIO CLUB, c/o Lt.-Cdr. K. A. Cradock-Hartopp, M.B.E., R.N., Royal Naval College, Dartmouth, Devon.

CHELTENHAM AND DISTRICT AMATEUR RADIO SOCIETY, c/o Mr. H. Brislin, 52 Cleevemount Road, Cheltenham, Gloucester.

COVENTRY AMATEUR RADIO SOCIETY, c/o Mr. J. W. Swinnerton, 118 Moor Street, Coventry, Warwickshire.

DERBY AND DISTRICT AMATEUR RADIO SOCIETY, c/o Mr. A. C. Steadman, 230 Chellaston Road, Shelton Lock, Derby.

EDGWARE AND DISTRICT RADIO SOCIETY, c/o Mr. Newland, 3 Albany Court, Montrose Avenue, Edgware, Middlesex.

GRAFTON RADIO SOCIETY, Grafton L.C.C. School, Eburne Road, Holloway, London, N.7.

GRAYS AND DISTRICT AMATEUR RADIO CLUB, c/o Mr. E. F. Read, 26 Hillside, Little Thurrock, Grays, Essex.

HARROGATE AND DISTRICT SHORT WAVE RADIO SOCIETY, c/o Mr. A. Wilson, Flat 1, 16 St. George's Road, Harrogate, Yorks.

HOUNSLOW AND DISTRICT RADIO SOCIETY, c/o Mr. A. H. Pottle, B.Sc., 11 Abinger Gardens, Isleworth, Middlesex.

I.E.M.E. TECHNICAL SOCIETY (AMATEUR RADIO SECTION), Walsingham, Manor Park, Chislehurst, Kent.

ILFORD AND DISTRICT RADIO SOCIETY, c/o Mr. C. E. Largen, 44 Trelawney Road, Barkingside, Ilford, Essex.

ISLE OF MAN AMATEUR RADIO SOCIETY, c/o Mr. W. Lawson, 39 Allan Street, Douglas, Isle of Man.

***JAMAICA AMATEUR RADIO CLUB**, c/o Mr. T. Myers, 10 Temple Lane, Kingston, Jamaica, B.W.I.

KYNOCH SOCIAL AND RECREATION CLUB, c/o Mr. G. E. Nicholls, Time and Motion Study Dept., I.C.I. Ltd., Metals Division, Witton, Birmingham, 6.

LAUREL LODGE RADIO CLUB, c/o Mr. E. H. Alford, 25 Beechwood Street, Bloomfield, Belfast.

MAIDSTONE AMATEUR RADIO SOCIETY, c/o Mr. F. Harris, 114 Boxley Road, Maidstone, Kent.

MANCHESTER AND DISTRICT RADIO SOCIETY, c/o Mr. H. Marshall, 14 Greenway Close, Sale, Cheshire.

MARLBOROUGH COLLEGE WIRELESS SOCIETY, c/o Mr. E. M. Kenber, Marlborough College, Wilts.

MIDLAND AMATEUR RADIO SOCIETY, c/o Mr. W. J. Vincent, The Grange, Warwick Road, Solihull, Birmingham.

***NORTH EAST AMATEUR TRANSMITTING SOCIETY**, c/o Mr. J. W. Hogarth, 4 Fenwick Avenue, Blyth, Northumberland.

NORTH KENT RADIO SOCIETY, c/o Mr. J. Bowes, 20 Broomfield Road, Bexleyheath, Kent.

OSWESTRY AND DISTRICT RADIO SOCIETY, c/o Mr. A. D. Narraway, Lamorna, Pant, Oswestry, Shropshire.

PYE SHORT WAVE RADIO SOCIETY, c/o Mr. J. Parish, Radio Works, Cambridge.

QUEEN MARY COLLEGE AMATEUR RADIO SOCIETY, c/o Mr. H. House, Mile End Road, London, E.1.

RADIO SOCIETY OF HARROW, c/o Mr. J. Pikett, 93 Whitmore Road, Harrow, Middlesex.

R.A.E. AND FARNBOROUGH DISTRICT AMATEUR RADIO SOCIETY, c/o Mr. R. J. Corps, Armament Dept., R.A.E. Farnborough, Hants.

READING RADIO SOCIETY, c/o Mr. L. Watts, 817 Oxford Road, Reading, Berks.

ROMFORD AND DISTRICT RADIO SOCIETY, "The Ham Shack," Y.M.C.A. Masonic Hall, Western Road, Romford, Essex.

ROYAL AIR FORCE AMATEUR RADIO SOCIETY, c/o Mr. N. Davis, No. 1 Radio School, R.A.F. Cranwell, Lincs.

SLADE RADIO SOCIETY, c/o Mr. C. N. Smart, 110 Woolmore Road, Erdington, Birmingham, 23, Warwickshire.

SOUTH HANTS RADIO TRANSMITTING SOCIETY, c/o Mr. J. S. K. Stephens, 65 Ebery Grove, Copnor, Portsmouth, Hants.

SOUTH SHIELDS AMATEUR RADIO CLUB, c/o Mr. W. Dennell, 12 South Frederick Street, South Shields, Co. Durham.

STOURBRIDGE AND DISTRICT AMATEUR RADIO SOCIETY, c/o Mr. W. A. Higgins, 35 John Street, Brierley Hill, Staffs.

STROUD AND DISTRICT AMATEUR RADIO CLUB, c/o Mr. K. D. Ayers, 1 Victoria Villas, Whiteshill, Stroud, Gloucestershire.

SUNDERLAND RADIO SOCIETY, c/o Mr. J. Rose, 16 North Bridge Street, Sunderland.

SURREY RADIO CONTACT CLUB, c/o Mr. L. C. B. Blanchard, 122 St. Andrews Road, Coulsdon, Surrey.

SUTTON AND CHEAM RADIO SOCIETY, c/o Mr. B. J. Blount, 5 Priory Crescent, Cheam, Surrey.

TORBAY AMATEUR RADIO SOCIETY, c/o Mr. K. J. Grimes, 3 Clarendon Park, Tor Vale, Torquay.

WATFORD AND DISTRICT RADIO AND TELEVISION SOCIETY, c/o Mr. J. C. Warren, 29 Market Street, Watford, Herts.

WEST BROMWICH AND DISTRICT RADIO SOCIETY, c/o Mr. W. G. Johnson, 22 Lynton Avenue, Hately Heath, West Bromwich.

WEST CORNWALL RADIO CLUB, c/o Mr. R. V. A. Allbright, Greenacre, Lidden, Penzance, Cornwall.

WEST MIDDLESEX AMATEUR RADIO CLUB, c/o Mr. C. Alabaster, 34 Lothian Avenue, Hayes, Middx.

WOLVERHAMPTON AMATEUR RADIO SOCIETY, c/o Mr. H. Porter, 221, Park Lane, Fallings Park, Wolverhampton, Staffs.

WORCESTER AND DISTRICT AMATEUR RADIO CLUB, c/o Mr. J. Morris Casey, c/o Brookhill Farm, Ladywood, Droitwich, Worcestershire.

YEOVIL AMATEUR RADIO CLUB, c/o Mr. K. R. Gilbert, 48 Chilton Grove, Mudford Road, Yeovil, Somerset.

Honorary Affiliated Societies

The undermentioned Empire Societies are in Honorary Affiliation with the Incorporated Radio Society of Great Britain:

HONG KONG AMATEUR RADIO TRANSMITTERS' SOCIETY, c/o Mr. A. N. Braude, Hong Kong Telephone Co., Exchange Buildings, Hong Kong.

MONTREAL AMATEUR RADIO CLUB, c/o Mr. S. Chapman, 4711 Earnscliffe Ave., Montreal 28, Canada.

NEWFOUNDLAND AMATEUR RADIO ASSOCIATION, P.O. Box 660, St. John's, Newfoundland.

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS, c/o P.O. Box 489, Wellington.

NORTHERN RHODESIA AMATEUR RADIO SOCIETY, P.O. Box 95, Kitwe, Northern Rhodesia.

RADIO SOCIETY OF EAST AFRICA, c/o P.O. Box 1246, Nairobi, Kenya Colony.

SOUTH AFRICAN RADIO LEAGUE, P.O. Box 7028, Johannesburg, South Africa.

WIRELESS INSTITUTE OF AUSTRALIA, P.O. Box 2127L, Sydney, New South Wales.

* *No recent information available.*

Errors or omissions should be communicated without delay to the General Secretary, R.S.G.B., New Ruskin House, Little Russell Street, London, W.C.1.

A.R.R.L. rejects new 14 Mc/s. Phone Band Proposals

The A.R.R.L. Board of Directors at its recent Annual Meeting rejected the proposal—as published in the February issue of *QST*—to increase the 14 Mc/s. phone band allocation. A proposal to allow phone operation in the 7 Mc/s. band was also rejected. The Board agreed however to ask the F.C.C. to approve a 50 kc/s. phone extension in the 3·5 Mc/s. band.

As soon as the proposals regarding the 14 Mc/s. phone band extension were published, the R.S.G.B. made strong representations to the A.R.R.L. pointing out that such changes were definitely against the interests of International DX as a whole. A copy of the Society's letter was sent to each Director before the Board Meeting. It seems probable that the R.S.G.B. viewpoint may have influenced the Board in its decisions.

South African Food Parcels

Headquarters acknowledges with thanks remittances and stamps from members who were fortunate recipients of South African food parcels. It had been anticipated that *Carter Paterson's* would indicate on each parcel their charge for carriage, but this was not done. Most members however realised that the cost would be in the region of 1/– and refunded accordingly.

Although letters of appreciation have been received from many members, there are still hundreds who have neither acknowledged receipt of the parcel nor remitted the carriage charge to Headquarters. £25 IS STILL OUTSTANDING. *Verb Sap!*

R.S.G.B. Publications

Secretaries of Affiliated Societies are invited to place orders for R.S.G.B. Technical Publications. A special discount will be allowed on all orders exceeding £2 in value.

THE MONTH ON THE AIR

By A. O. MILNE, G2MI*

FORTHCOMING R.S.G.B. CONTESTS

July 3– 4	Five Metre Field Day.
Sept. 4– 5	Five Metre Contest (Second Section).
Sept. 20–25	Low Power Contest.
Nov. 27–28	Top Band Contest.

B.C.I.

IT is a curious thing that large numbers of amateurs in this country seem to think that Broadcast receivers are immune from interference at weekends! There are those who cheerfully work all through a Sunday evening on 1·7 Mc/s. who would not dream of doing so during the week, for fear of B.C.I. Hence the congested state of our bands at weekends made worse by those who for other reasons are unable to work during the week. This matter of B.C.I. is something to be tackled and overcome, not shirked. If you know you are causing QRM, then get cracking and cure it. If you don't know, then go on the air, give your call-sign, name, address and telephone number and invite anyone troubled with interference to get into touch right away. A good many amateurs will be surprised to find that they are causing no interference at all. Those who are not so lucky should get down to it, seek the co-operation of the B.C.L. and clear the trouble. If they just stay off the air they are not worthy to hold a licence. These remarks refer to ordinary Broadcast listeners, T.V.I. is a rather more difficult matter but much can be done. In any case there is no sense in closing down until you know you are causing trouble. Why not come up on low power for a change or try 1·7Mc/s. which does not cause much trouble to T.V. Receivers? Be a man my son and face it!

Notes and News

ZD9AA in Tristan da Cunha is the latest victim of the " catch 'im seize 'im " boys. He was literally driven off the air the other evening by a lot of ill-mannered " spivs," many of them old timers who should be setting a good example! Now, ZD9AA is a permanent station licensed from South Africa and is situated at the Meteorological station. The operators may change but the station will continue, so there is plenty of time. The next mail boat calls in February so don't try to snag him because you want one more card for Empire DX! QSL *via* the R.S.G.B. Bureau or Box 4887 Johannesburg. He has promised to QSL 100 per cent.—in due course. Don't make him disgusted with Amateur Radio before some of us get a chance to work him. He is on 14035 kc/s. and listens 15 kc/s. higher, says GW3ZV.

G2CNN tells us the Gatti-Hallicrafters Expedition give a QSL address as Derby Lane, Vermont, U.S.A.

G5WI has a four-element fixed 20 metre beam lined upon W6. He maintains a daily schedule with W6AY and since May last year they have made contact on 300 days. Each holds a stock of the other's QSL's and many W6's have been puzzled at getting a card from Britain inside 24 hours. Pan American Airways got the credit but modestly disclaimed the honour because " we are not yet operating rocket mail services!"

VQ3EDD famous for his wonderful aerials and S9 signal is back in England and will soon be active as G5YM. G6KU has had a spell on 14 just to show it can still be made to yield the DX. HP4Q, VP8AM, C2KT, J3AAD, VP4TO are some of the plums, with lots more besides.

Will VS2BG please write to G2MI? His original letter was accidentally destroyed and the QSL Bureau has only half his address! A fairly heavy packet of cards awaits you o.m.

A.R.R.L. after exhaustive enquiries has decided not to recognise MD5 as a country separate from SU so that is that chaps.

ZB1AI, now on his way home, has QSL'd every contact but offers to duplicate any which may have gone astray. G3BMY says LJ2B is a special call-sign used by the Seamen's School at Hargesund Norway on 7 Mc/s. SV0AD is now back in England and also offers to cover any lost QSL's. Write to Mr. G. E. Willey, 120, Thornhill Rd., Streetly, Near Birmingham.

VQ5WCP says the recent report that he is active as VQ3WCP is incorrect. He has not used that call sign since January 1947.

G2AYQ who works 7 Mc/s. only has had a lot of cards for the pirate who works 3·5 Mc/s. On 7 Mc/s. he has worked SM7GI with 3 watts and I1LV with 5 watts. W9WCE recently worked PX1B and a few days later had a S.W.L. card from one " Hans " in Cologne Germany who unwittingly gave himself away. Don't bother QSL'ing PX's we put them all in the waste paper basket. They are all phoneys.

G6RH has the following to offer. VP1AA T9 on 14045, EA8FT T9 on 14030, KM6AH T9 on 14035 and VP5AS T9 on 28510. VP1AA uses only 5 watts. BRS15937 tells us that OQ5CF very much wants to work GM. What about GM2UU or 8MN taking on this assignment? He uses 80 watts on 14380, in the early evenings. VS1CR wants contacts in Bristol on 14010.

G8WI/A relates how indignant someone was the other night at getting a T8 report and thinks a bit more candid reporting wou'd be a good thing, so do we. Even if we are Amateurs instead of experimenters, there is no reason why we should not be accurate in our reporting. GM3BUX, now G3BUX using only one crystal and 30 watts has worked C1AN, HH2BL, CO2BZ, CM6, VK3, PY4, KV4AA, and CR9 in a little over a week. You see what we mean? BRS11494, the ever faithful supporter of your humble scribe, comes up with another voluminous letter from which we can select only a few scraps of the very best from a wide selection. W6PJN/KG6 on Saipan, W0SQS on Iwojima and VQ1RX calling CQ at 1645. PK1ML and PK1MJ between 12.00 and 16.00 G.M.T. and lashings of KH6's on 14 Mc/s. HL1AB on 14200 is another nice one, and what price YS1ES, YS1CN and YS3PL?

MD4JG is O.K. in " Italian " Somaliland. He is ex VU2JG, VQ4CJG and G3CJG. QSL *via* R.S.G.B. Thanks G2YL and others for this. Americans in Trieste will use AC2 plus two letters in the series AA, AB, AC, etc.

MD3MB is a Doctor with a most appropriate call sign. Box 212 Asmara and QSL's. MI3ZJ will be leaving on June 24 and will not be returning to Eritrea.

Will XAEG please give his present address to the QSL Bureau? Who are FK8AB and AC4RF? asks G6RH.

An Apology

To ZP8AC who was listed a month or two back as a non-QSL'er. This was due to a confusion of call-signs. In fact he QSL's absolutely 100 per cent. including listener reports. Please accept our apologies o.m. His address is W. H. Chippendale, British Legation, Asuncion and he is active between 28350 and 28400 kc/s. almost every day between 17.00 and 18.30 G.M.T. and all day Sundays.

Polar Expedition

FBG or FBG2 are the callsigns assigned to a French Polar Expedition now in Greenland. Frequencies in use are 8,270, 14,487 and 29,200 kc/s. Amateurs answering calls from the Expedition should use frequencies at the low end of 7 and 14 Mc/s. Correspondence may be sent to R.E.F., Rue du Pont de Lodi, Paris 6, for forwarding.

New Prefixes

The following have been allocated:—ZS7 Swaziland, ZS8 Basutoland and ZS9 Bechuanaland, effective from April 1, 1948.

Parcels for Britain

G6BW has been doing sterling work in the West Country and the Mendip Rotarian Club is the first to organise the scheme amongst Rotarians. GM3PB has been busy in Scotland. This is a big thing fellows. Do your best to help it along. Write to G2WI if you are interested.

Next Month—A Personal Note

G2MI is having a holiday from Amateur radio this month and early in July. As M.O.T.A. would have to be written during the holiday period, one of Britain's best known DX workers has shown once again that he is a thoroughly good sport and offered to write this page for the July BULLETIN. Ladies and Gentlemen, Bert Allen, G8IG. Please see that he has plenty of dope at 76 Nightingale Lane, Bromley, Kent, before June 25. Thanks a million Bert and see you all in August.

G2MI.

Amateur Radio in Germany

Hopes are entertained that the occupation authorities in the western and southern parts of Germany will shortly authorise the German Post Office to issue licences. Applications are being invited from ex-amateurs and we understand that it is probable that licences will be issued in somewhat similiar terms to those now in force over here.

Nearly 2000 German Amateurs recently attended the second post-war amateur convention organised by D.A.R.C. at Bad Lauterberg in the Harz mountains on May 8 and 9. If confirmation were needed that D.A.R.C. with its 6000 members is representative of German Amateurs this was it.

Hopes were raised when a representative of the British Authorities summarised the present position and said that news of licences might be expected in a matter of weeks.

Large and small business meetings, lectures and lecturettes as well as characteristic rag-chews made the time pass all too quickly. The most popular feature of the exhibition section was the D2IY/A (British) station where many members experienced the thrill of making their first QSO.

Considerable attention was devoted to publicity and news reels. Press and radio reporters were present.

G2MI

Congrats

● To Mr. F. S. Rose, G2DRT, and his wife of Spalding, Lincs., on the birth of a son, David Francis.

● To Gerry Beaumont, D.F.C. (G4OY), and his wife on the birth of a son Paul, May 22.

* 29 *Keehill Gardens, Hayes, Bromley, Kent.*

AROUND THE VHF's

By W. H. ALLEN, M.B.E., G2UJ.*

50 Mc/s.

G6DH (Clacton-on-Sea) reports some excellent sporadic E openings over 50 Mc/s. during the early part of the month, and in consequence, the lack of activity was regrettable. On the 10th, the band was open from 13.00 to 16.00 continuously, but the only station which appeared to be working was W1PPH/MM, 200 miles west of Naples, on 51·25 Mc/s. He stated that he was hearing the Dutch experimental station PA1KWK (see last month's notes) at a steady S9. On the following day the opening, at 13.00, was more to the south, and although W1PPH was heard again, he was not so strong as the day before. The commercial radio-telephone station (either Portuguese or Spanish) on approximately 58·5 Mc/s. was heard by 6DH at S9 plus at that time. FA8IH was heard by 5BD of Mablethorpe calling CQ at 13·45 G.M.T. on May 20. Strength was 569.

58·5 Mc/s.

Conditions have certainly been looking-up on this band, and among a number of days when ranges were above normal the 7th, 10th and 19th were outstanding. Several sporadic E openings have occurred, but as is usual, at times when the majority of operators were unable to take advantage of them. G6ZQ is understood to have exchanged 579 reports with OK2MV at 13.10 BST on May 5, but the band was only open for a matter of 10 or 15 minutes. 2ADZ reports hearing the hissing phenomenon strongly in evidence at 19.00 BST on May 10, while on the 16th OK3BV/3 was heard on MCW just off the LF end of the band. Strength was S7 with rapid fading. No contact was effected, and the opening only lasted about ten minutes. Judging from the various incoming commercial signals, conditions should have been favourable on a south-easterly path from Oswestry at 15.00 B.S.T. on the following day, but no amateur stations were heard. The 20th provided nothing outstanding in the way of contacts, but during a QSO with G5BM the latter heard IRL on 59 Mc/s. at 20.37 B.S.T. This signal was not audible at the Shropshire station, but rumour has it that 3DA of Handforth, Cheshire, heard F9BG about the same time.

An interesting letter comes from G2PT of Northwood, Middlesex who is making an appearance on the band after, as he remarks, some coaxing from 8GX. 2PT is somewhat out of touch with modern 5 metre matters, as his last contact on the band took place 14 years ago when, he recalls, his gear consisted of a superregen receiver and a *Metro-Vick* "Red Spot" triode as self-excited oscillator. In fairness to 'PT we hasten to assure other users of the band that he has resuscitated his enthusiasm but not his gear, and the 1948 set-up is a three-valve converter into a BC 312, while the transmitter is a formidable row of valves starting with a VFO and followed by no less than six FD's with between 10 and 15 watts input to the last stage. The aerial in use at present is a dipole in the shack. Best DX so far is 6XM (Farnborough, Hants.) and 'PT would be glad to receive reports from anyone hearing his signals more than 50 miles away. He strongly recommends that those who have not operated on the band should do so while the going is good. This good advice seems to have been taken by a number of people judging by the new calls heard these days. One newcomer is G3CDG (Lingfield, Surrey) with 10 watts to a two-wave zepp on about 59 Mc/s. His receiver is a Type 26 converter into an R.1155. 2DBF (Northbourne, Bournemouth) is again active and looking for contacts and skeds. Joe is a mere 100 yards or so from the Dorset border, and intends to operate portable on July 4—*over* the border please, O.M., if you can make it! His rig is designed with an eye to 2 metre operation in the future, and the scheme adopted is worth consideration. For 5 metres a 7·3 Mc/s. crystal stage is followed by two 6V6's; the first a quadrupler and the second a doubler feeding an 815 P.A. By using an 8 Mc/s. crystal and operating the stages as trebler, trebler, doubler 144 Mc/s. RF is fed to an HK24 acting as a P.A. on that band.

So far we have not received many reports from listeners, but this month we welcome two BRS's—16749, writing from Grantham, and until recently serving with the RAF, and 3712. The former describes his first experiences on the band on the 7th and 8th of the month; both good days. The receiver was a Type 27 RF unit—the one with the EF54's and ganged tuning—into an RAF R.1358. Results were pretty encouraging what with the good conditions and the fact that the aerial was atop a 90 foot tower! Included amongst many G DX signals was GM3OL.

BRS 3712, Jubilee House, Long Stratton, Norfolk, is no newcomer to the V.H.F.'s, but owing to a low-lying position he has had nothing out of the ordinary to report up to date. However, the excellent conditions obtaining on the 18th and 19th brought the following:—G2AJ, FKZ, FZR, MR, MV, PU, XS, XV,3AEX, APY, BFP, BK, CBU, DCV, WW, 4IG, 5AM, BD, GX, JU, LQ, MA, PP, RP, 6DH, OS, OT, VX, XM, 8DV, RK, SM, and WV. Two receivers were available, one with EF54, EF50, 6J5GT followed by IF's on 4 Mc/s. and 465 kc/s. and the other employing a 954 acorn mixer with regeneration, a 955 oscillator and three stages of IF using EF50's at 10·5 Mc/s. Sensitivity and signal-to-noise ratio are about the same for both receivers, but the latter is rather more difficult to handle. Provision is made on the acorn model for reception up to 170 Mc/s., and various *Amphenol* 300 ohm folded dipoles are in use.

2HLF (Heathfield) sends his usual interesting report, and although not so active as in the past, managed to be about on the 19th when 35 stations were heard, including four F's and ON5G calling a PA. Among the 113 different stations heard and 75 worked to date are F8AA, 5BM (Cheltenham), 5JO (Cambridge), and 6YO (Bradford). 'HLF has found that when 20 metres is really lively in the early mornings, five follows suit in the evening. Is this experience shared by others?

Now for a few short items of interest. 3PZ (Gloucester) intends to operate from Herefordshire on July 4. The QTH will be 1000 feet up with best coverage north and east. 4KD of Edgware after many failures has at last got out to the north and QSO'ed 5BJ in Birmingham. 5BD has heard GM30L at 339 calling "G5JV" after 5JU of Birmingham had been heard calling him.

144 Mc/s. and above

We acknowledge with thanks a long and interesting letter from Mr. L. Smith, W3GKP, of Silver Spring, Maryland, on the subject of 144 Mc/s. written after more than two and a half years use of the band. He strongly approves of our urging the employment of first class equipment of modern design, and quotes from his experience that crystal controlled transmitters, selective receivers and high-gain aerials produce real results and help to relieve the congestion. We intend to refer at greater length to W3GKP's letter in an article to appear shortly.

GM3DIQ, who together with GM3DDE is all set for operation on 144 Mc/s., asks us to point out that the stable oscillator mentioned in our article "The Two Metre Band" in the April issue employs a DET 20 (CV 6) horned triode in place of the 6F4 which is virtually unobtainable in this country. Both these stations are equipped with R.1147 receivers on which the only modification found necessary has been to rewind the aerial tuning inductance. The oscillator now works higher instead of lower in frequency than the signal; the IF and all else remains unchanged.

New Commercial Equipment

An interesting piece of two-metre equipment was described in a lecture at the London Region O.R.M. on Sunday, May 23. This was the STR9 transmitter/receiver designed by *Standard Telephones and Cables* for use in Service and civil aircraft, and already fitted to certain jet 'planes. Provision is made for transmission and reception on any one of four crystal controlled spot frequencies, and it therefore follows closely the well known RAF TR.1143, but whereas the latter required 8 crystals—4 for the receiver and 4 for the transmitter—the STR9 achieves the same result with 4, plus a built-in crystal oscillator associated with the transmitting side. The circuit is naturally somewhat complicated, but reduced to basic detail we have, when in the receive position, a 7 Mc/s. crystal oscillator trebler, a trebler and a doubler injecting (if the crystal is exactly 7 Mc/s.), RF at 123 Mc/s. into the frequency changer. The I.F. is 9·72 Mc/s., and the receiving frequency therefore 135·72 Mc/s. In the transmit position output is taken from the second trebler at 63 Mc/s. and applied to a push-pull modulator into which is also fed the output from the built-in crystal oscillator at 4·86 Mc/s. This mixing produces an output with the sum and difference frequencies of 63 and 4·86 Mc/s. The former (67·86 Mc/s.) is selected and passed *via* a doubler to the TT 15 double tetrode P.A. at 135·72 Mc/s. *i.e.* identical with the receiving frequency. Amplitude modulation is used, and the power to the quarter-wave aerial, compensated by a shorted stub for the wide frequency range of 115 to 145 Mc/s., is of the order of 3·5 watts. All valves are of the button-based variety, and including a rotary converter, the weight is 22 lbs. Ranges are conservatively given as 100 miles air-to-ground and 200 miles air-to-air. It is not anticipated that this apparatus will make its appearance on the surplus market just yet!

As many members will have noticed, there are plenty of signals connected with aircraft operation to be heard between 100 and 130 Mc/s. or so, which are extremely useful for testing V.H.F. receivers. Mr. Peter Matthews, G3BPM, is in possession of up-to-date information from official sources regarding these signals and all those used for communication, radar and S.B.A. by air services in the United Kingdom details of which he will be pleased to pass on to anyone who is interested. Those desiring such data should send a stamped and addressed envelope to G2UJ, 32, Earls Road, Tunbridge Wells, Kent—the same address as for these notes—for forwarding to 3BPM. Members are reminded, however, that they may not pass on or make use of any messages they may receive while listening to these transmissions.

58·5 Mc/s. Stop Press

Sporadic E conditions occurred at the late hour of 23.30 B.S.T., on the 20th, and 2APW (Oswestry) heard OK2MV towards the NNW, ON4AK to the NW, and F9BG. 2ADR (York) has a 4 element beam in operation and is getting excellent results with the East and Midlands. He is willing to sked any stations between 20.00 and 23.45 B.S.T. Congratulations to 5JU of Birmingham on at last working GM3OL. The contact was on May 23, but 'JU was heard in GM on the three previous days, and by GW5YB in Bangor on the 20th at 569—right through (or over) Snowdon—nice work, Jerry!

**32 Earls Road, Tunbridge Wells, Kent.*

OFFICIAL REGIONAL MEETINGS

Re-union in Belfast

IT would be about 10 a.m. on a recent Saturday in Dublin's fair city that a bit of a stir was taking place. Seven men, each distinguished from ordinary mortals by a small black diamond-shaped badge bearing a strange device, were converging on two mechanically propelled vehicles the bonnets of which pointed along a road snaking Northwards. Elsewhere, in the counties of Antrim, Down, Armagh, Derry and in the City of Belfast similarly be-badged bipeds were hurrying towards railway stations and bus stops, all with the same intentness of purpose.

Now, 'tis a strange thing, but the roads in Ireland, laid in the pre-microwave era, are bi-directional—that is to say, they come and they go—so that providing you know whether you are coming or going it needs only a bit of wit to arrive, eventually, at the Presbyterian War Memorial Hostel, Howard Street, Belfast. And if the date and time should be Saturday, May 8, 2.45 p.m. and you were to take a seat in the Cuthbert Room, what then? You would be at the O.R.M. of Region 15 along with some thirty six others. And the seven men from South of the border? Why, the President, G5VM, and the General Secretary, G6CL, with their *E*iscort of five.

Thus we assembled. At 3 p.m. the meeting opened with introductions and a hearty welcome to our guests and those who had travelled from afar. G5VM now took the chair and in very pleasant style expressed the delight of himself and 6CL at being in GI. He spoke of the object and function of the O.R.M. and other Society matters, but added that a detailed account of much to everybody's amusement! Mr. A. J. H. Watson, G2YD dealt with finances very adequately, so much so that no questions arose from the audience.

The General Secretary, who asserted he was somewhat limited, in time as compared with some ORM's, covered many subjects. He also happened to fall naturally into the position of responder to the questions which did arise. He occupied his 45 minutes precisely: in fact the whole programme went off almost by the clock.

The period of 1½ hours reserved for questions and answers was characterised by the helpfulness of the speakers rather than by the exposition of destructive criticism, and not without several spots of humour.

Tea at 6 o'clock was quite informal, President and Council taking their tea just where they happened to find a seat, and the intermixing was apparently well appreciated. During the interval until 7.30, an Exhibition, arranged by regular trade supporters of our needs, was inspected, and the M.O.S. gear "shop" opened in the vestibule was stormed—there is no other word to describe the seething mass of Hamdon, fortunately forced into a one-way traffic. "Junko" (G2BRH) and his assistants, worked as no slaves would!

At 7.30 the meeting reopened with interesting lectures by Mr. Williams of *Standard Telephones and Cables Ltd.* on Selenium Rectifiers, and Mr. R. Jones (G3BFB) also of the same company on a new 22lb. all-in quality telephone trans-receiver, working on frequencies of the order of 135/146 Mc/s.: air range 100 miles service to ground, 200 miles service plane to plane. The

A few of the 250 members and friends who attended the London O.R.M. Seated (*left to right*): Mr. H. T. MacFarlane, G8SK (London R.R.), Miss A. M. Gadsden (Assistant Secretary), Mr. V. M. Desmond, G5VM (President), Mr. John Clarricoats, G6CL (General Secretary), Mr. C. H. L. Edwards, G8TL (Council Member).—*Photo: Sidney W. Baynton.*

R.S.G.B. activities would be given by the Secretary on whom he would now call. "Clarry" rose at 3.35 p.m. He sat down at 5 p.m. In between he talked! One hour and twenty-five minutes filled with interest and ranging over the entire spectrum of Amateur Radio. A fine effort appreciated by all. Discussion then took place which was only terminated by the announcement that tea was ready.

After tea a most excellent lecture on "Modulation" was given by Desmond Downing, GI3ZX and this with the discussion arising therefrom brought the official closing of the O.R.M.

Sunday morning was employed in station visiting, the first being to the B.B.C. with GI8WD as guide, followed by a call at GI3ZX where, apart from doing things on a somewhat smaller scale, the main difference seemed to be that 3ZX does not monitor his 'phone by loudspeaker.

In the afternoon G5VM and G6CL were taken for a bus run along the Antrim shore of Belfast Lough to Greenisland where a refreshing break was provided by Mr. H. W. Martin, GI5HV, and his wife, after which the party, now increased in number, proceeded on its way to the evening meal which was partaken within the shadow of the historic castle of Carrickfergus, where in 1210 A.D., that other John, of Magna Carta fame, was once put up for the night by the GI gang of that day.

And so with the return to Belfast came the final touches to a very pleasant week-end.

"SUSANJOHN"

London Meeting Breaks Records

THE fact that a great many stations were silent on Sunday, May 23rd, was due to one of the greatest "Grid" breakdowns in history and not to the Region 7 O.R.M. being held in Ilford at the same time. The lack of "juice," however did hamper many on their way to the O.R.M., because both trolley bus and "Underground" services were affected.

Of the number present—something just short of 250—many came and were welcomed from N.,S.,E. & W., and also from well outside the Region.

Rather than the "shot firing" coming from the floor of the hall, as is usual, Council opened fire with the President Mr. V. M. Desmond, G5VM in the Chair. Mr. I. Auchterlonie, G6OM appealed for the continuance of the "Ham Spirit" and the more intelligent mode of operating. He also gave news on Band Planning, which was later countered by Mr. A. O. Milne, to be recountered by G6OM, back again to G2MI, and back to G6OM, set, inspected later, is certainly a credit to *S.T.C.* and British workmanship: almost like the inside of a watch.

To wind up the day, the East London D.R. (G2CD) in his shirt sleeves, assisted by Mrs. Scottin of the green—or should it be nimble—fingers, dipping into the lucky box, and the R.R., distributed gifts to about 30 per cent. of the participants in the O.R.M., as well as two transmitters put up by the East London District to aid their N.F.D. funds.

It is felt that that which we aimed to do and should have been done, was done, to everybody's satisfaction.

Copies of the Group photograph can be obtained from S. W. Baynton, 4 Newbury Parade, Newbury Park, Ilford, Essex. 10 in × 8 in., 4/–; 8 in. × 6 in., 3/–; 6½ in. × 4½ in., 2/–.

"SEEDY"

Congrats

● To Mr. H. Bilteliffe, G5HB and his wife on the safe arrival of a daughter—Veronica Ruth.

● To Mr. L. J. McDougall, GM3CIX and his wife of Muirhead, Troon on the birth of a daughter, their first "Junior Op."

NEWS FROM HEADQUARTERS

COUNCIL, 1948

President:
VICTOR M. DESMOND, G5VM.

Executive Vice-President: W. A. Scarr, M.A., G2WS.
Hon. Secretary: K. Morton Evans, O.B.E., G5KJ.
Hon. Treasurer: A. J. H. Watson, F.S.A.A., G2YD.
Hon. Editor: Arthur O. Milne, G2MI.
Immediate Past President: S. K. Lewer, B.Sc., G6LJ.

Members: I. D. Auchterlonie, G6OM, G. F. Bloomfield, Ph.D., A.R.I.C., G2NR, F. Charman, B.E.M., G6CJ, D. N. Corfield, D.L.C.(Hons.), A.M.I.E.E., G5CD, C. H. L. Edwards, A.M.I.E.E., G8TL, R. H. Hammans, G2IG, J. W. Mathews, G6LL.

General Secretary: John Clarricoats, G6CL.

G.P.O. Liaison Officer: Arthur E. Watts, G6UN

April Council Meeting

Resume of the Minutes of the Proceedings of a Meeting of the Council of the Incorporated Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Tuesday, April 13, 1948 at 6 p.m.

Present.—The President (Mr. V. M. Desmond, in the Chair), Messrs. Auchterlonie, Bloomfield, Corfield, Edwards, Evans, Hammans, Lewer, Mathews, Milne, Watts and John Clarricoats (General Secretary).

Apologies
Apologies for absence were submitted on behalf of Messrs. Charman, Scarr and Watson.

Second Amateur Radio Exhibition.
Mr. H. Freeman was appointed Manager of the Amateur Radio Exhibition to be held in London from November 17 to 20, 1948. It was reported that the Royal Hotel had increased their hire charges by 25 per cent.

Delegates Meeting.
Resolved to inform the Regional Representatives that as the Finance and Staff Committee have budgeted for a possible loss of £1,200 on the year's work the Council is unable to approve the holding of a Delegates Meeting during the current financial year. It was estimated that the cost of holding such a meeting would be between £200 and £300.

Aircraft Distress Signals.
It was agreed to write and suggest to the Ministry of Civil Aviation that the crew of aircraft engaged on long distance flights should be provided with facilities which would enable them, in the event of an emergency, to operate their transmitting equipment on amateur frequencies.

Affiliated Societies.
Resolved to grant affiliation to the Isle of Man Amateur Radio Society and the Worcester and District Amateur Radio Club.

Membership.
Resolved:
(*a*) to elect 149 Corporate Members, 38 Associates and 7 Junior Associates (Total elected 194).
(*b*) to grant Corporate Membership to 8 Associates or Junior Associates who had applied for transfer.
(*c*) to grant Life Membership to Mr. R. G. Greenwood, BRS5386.

Band Planning.
It was reported that a number of letters had been received from members criticising the R.S.G.B. Band Plan. It was agreed to refer the correspondence to the Codes of Practice Committee for their comments.

Affiliated Societies Contest.
Resolved to inform the Contests Commit ee that the Council is unable to approve a proposal that the 1948 N.F.D. should be used as the occasion for a competition between affiliated societies.
It was pointed out during the discussion that if the proposal were adopted certain Town Groups would find difficulty in entering teams as many members of such groups are also members of local affiliated Societies and forces would thus be divided.
The Council agreed to record that they would be prepared to authorise the organisation of some new competition open only to affiliated societies.

Articles of Association Committee.
In view of the difficulties which had been experienced in calling together a full meeting of Members, it was resolved to disband the Articles of Association Committee and to invite Messrs Watson and Edwards to confer with the Secretary with a view to presenting a full report to the Council covering proposed revisions of the Articles of Association.

U.S. Telephony Band Plan.
Resolved to write to the A.R.R.L. expressing disagreement with the proposals put forward by the A.R.R.L. Planning Committee and published in the February, 1948, issue of *QST*.
It was reported that the Canadian Government had recently opened up additional frequencies in the 3·5, 14 and 28 Mc/s. bands for exclusive A.M. and narrow-band F.M. telephony operation.

Contest Results.
Resolved to record that the result of any Contest may be disclosed at any time after the Report of the Contest in question has been accepted and approved by the Council.

Contest Reports.
Resolved to record that in view of the pressure on BULLETIN space only lists of competitors shall in future be published, and that items of interest concerning a particular contest shall be communicated by the Contests Committee to the appropriate regular BULLETIN contributor.
It was agreed that the above Resolution shall not apply to N.F.D. and the B.E.R.U. Contest, both of which will be fully reported as hitherto.

Representation.
Resolved that no member shall hold two offices under the scheme of representation.
The meeting terminated at 9.55 p.m.

Experimenters' Contact Bureau

The Council has decided that, with the inauguration of Scientific Observation Groups, the need for an Experimenters' Contact Bureau no longer exists and the Bureau has accordingly been disbanded.
If, in the future, groups of members express interest in a specific subject not catered for by the Scientific Observations Committee, the Council will be prepared to approve the formation of a Technical Study Group. In the meantime the Council desires to record its thanks to all who have participated in the work of the Bureau, and in particular to those members who have acted as Group Leaders.

QSL Bureau—Important Notice

As the QSL Manager will be away on holiday between June 24 and July 12 both dates inclusive, members are earnestly requested not to post any cards to the Bureau which would arrive between those dates. Arrangements are being made for unavoidable incoming mail from abroad to be dealt with but British Isles members and any others who may see this in time will be rendering the QSL Manager a much appreciated service by strictly adhering to this request. Please note the dates carefully.

Associate Numbers

The Council has decided to issue a number (beginning at A1001) to Associates and Junior Associates who use the R.S.G.B. QSL Bureau. Associates and Junior Associates who wish to avail themselves of this new facility are invited to write to Headquarters.
In future no Associate or Junior Associate will be permitted to use the QSL Bureau unless he possesses an A number. Envelopes for the return of QSL cards should bear the appropriate A number in the left-hand corner.

American Publications

Apropos the notice published in our last issue we are pleased to announce that orders for the "Radio" Handbook can again be accepted. *Editors & Engineers Ltd.*, the publishers of this book, have agreed to extend a long credit to the Society until such time as the present irksome restrictions are lifted.

OLD TIMERS

Have you reserved a place at the SECOND RE-UNION DINNER to be held in the Autumn? If not send a post-card without delay to Headquarters

UNIQUE RSGB PUBLICATIONS

VITAL LINKS

CONTENTS—

Voltage Amplifiers.

A.F. and R.F. Power Amplifiers.

Multipliers, Oscillators and Detectors.

Frequency Changers.

Power Rectifiers—Noise.

Valves for use at V.H.F.

3/6 *By Post* 3/9

CONTENTS—

Introduction to Microwaves.

Circuit Elements — Components.

Circuit Design Problems.

Cavity Resonators—Wave Guides.

Transmitters-Receivers.

Valves — Aerials — Measurements.

2/- *By Post* 2/3

CONTENTS—

Propagation at V.H.F.

Aerial Systems—Design.

Transmitter Circuits.

Receivers and Valves.

Measurements at V.H.F.

Frequency Modulation.

3/6 *By Post* 3/9

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INCORPORATED RADIO SOCIETY OF GREAT BRITAIN

NEW RUSKIN HOUSE, LITTLE RUSSELL ST., LONDON W.C.2. Tel. HOLborn 7373

London Meeting

Last month, for the first time in the history of the Society, the lecture announced for a London (I.E.E.) meeting failed to mature. Mr. W. S. Barrell, Managing Director, *E.M.I. Studios, Ltd.*, was due to speak on High Quality Reproduction, but at the last moment he was unable to fulfil his obligation.

Mr. H. A. M. Clark, B.Sc. (Eng), G6OT (Chairman of the Technical Committee) stepped into the breach at very short notice and opened a much-appreciated discussion on Television Interference problems. Mr. Clark gave valuable advice to those who are experiencing difficulties due to the presence of television receivers in the near proximity of their transmitting stations.

The Chair was taken by Mr. S. K. Lewer, B.Sc. (G6LJ), Immediate Past-President, and a vote of thanks to the speaker was proposed by Mr. Phil Thorogood, G4KD, who suggested that greater publicity should be given by the R.I.C. to their recently-announced campaign for suppressing car-ignition radiation.

About 100 members were present at this, the last meeting of the 1947–8 session. Suggestions for lectures during the 1948–9 session should be sent to the General Secretary as early as possible.

NORTH WALES REGIONAL — MEETING —

SUNDAY, JUNE 20th, 1948

Morville Hotel, East Parade, RHYL

Assemble	12.30 p.m.
Lunch	1 p.m.
Business Meeting	2 p.m.
High Tea	4.30 p.m.
Informal discussions and Station visits ...	5.30 p.m.

Tickets (price 10/-) from E. G. Foulkes, Crown Hotel, Rhyl, not later than June 12th, 1948.

Society Officials visit Dublin

Prior to attending the Region 15 O.R.M. in Belfast the President and General Secretary of the R.S.G.B. were entertained in Dublin by the President (Dr. Denis O'Farrell, EI6F) and other members of the Executive Council of the Irish Radio Transmitters' Society.

During their visit the Society's Representatives discussed with Dr. O'Farrell and his colleagues many matters of mutual interest as between the two Societies, particular consideration being given to Band Planning problems and Licencing Regulations.

Shortly after their arrival in Dublin by air G5VM and 6CL were given the opportunity of talking back to G2MI in London from the station of Capt. Andrew Woods (EI3L). Capt. Woods is the Hon. Secretary of I.R.T.S.

The President and General Secretary record their thanks to Dr. O'Farrell, Capt. Woods, Dr. Frank Whyte, EI8G, Howard Coombes, EI6J, Hal Hodgens, EI5F, and Tom Green, EI9N, for their warm hospitality.

Arrangements are in hand to hold an Irish Amateur Radio Convention later in the year.

Windscreen Stickers

Windscreen stickers of the R.S.G.B. official badge are again available from Headquarters. A stamped and addressed envelope will ensure prompt despatch.

Side-slip

An error occurred in Fig. 2 of the article "A Modified Micromatch" as published on page 211 of the May BULLETIN. The condenser C3 should be connected across the variable resistance R2–5K and not across the tops of the R.F. chokes.

EASTERN REGIONAL — MEETING —

SUNDAY, JUNE 27th, 1948

Cannon's Restaurant, Chelmsford

(Facing L.N.E.R. Station)

Assemble	12.30 p.m.
Lunch	1 p.m.
Business Meeting	2.30 p.m.
Tea	4.30 p.m.

Tickets (price 10/-) from L. J. Fuller, G6LB, 85 High Street, Chelmsford; S. J. Granfield, G5BQ, 47 Warren Road, Cambridge; or G./Capt. H.W. Evens, G6CH, Elm Cott., Underhill Road, South Benfleet, not later than June 19th. No admission at the door. Ladies welcomed but circumstances may prevent organisation of special afternoon programme for them.

Visitors to Headquarters

Any member resident in the London Region who is willing to extend hospitality to visiting radio amateurs, is cordially invited to communicate with Headquarters so that his name, address and telephone number can be included in a list which is in the course of preparation. Brief details should also be given of public transport facilities and the most suitable hours for a visit.

Representation

Following the announcement made in the April issue, nominations for the vacant position of Bournemouth T.R. were received on behalf of Mr. J. F. Squires, G2DBF, and Mr. J. D. Kay, G3AAE. Corporate Members resident in Bournemouth are invited to record their vote in favour of one of the above candidates and to forward same, on a postcard addressed, to the General Secretary by not later than *June 30, next.*

* * *

Mr. George Brown, G5BJ, having resigned as County Representative for Warwickshire, a vacancy now exists.

Nominations for his successor, made in the form prescribed in the September, 1947, issue of the BULLETIN, should be forwarded to reach Headquarters by not later than June 30 next.

* * *

The following are additions to the list of Town Representatives published as a Supplement to the February issue.

County Representatives

Region 7.
South London ..H. G. Hughes, G4CG, 57 Kingswood Road, Wimbledon, S.W.19.

Region 9.
Wiltshire .. R. A. Hiscocks, G6LM, 22 Woodstock Gardens, Melksham.

Town Representatives

Region 1.
Wallasey .. J. Wylde, G8BM, 23 Harvey Road.

Region 3.
Cannock .. K. R. Boot, G2FZG, 75 Beech Tree Lane.

Region 7.
Welwyn Garden City G. G. Gibbs, G3AAZ, 81 Codicote Road, Welwyn.

Region 13.
Kirkaldy .. W. G. Hopcroft, GM4AN, 48 Croft Crescent, Markinch.

Slow Morse Transmissions

Mondays 20.00 B.S.T. 1900 kc/s. G2AJU (Stowmarket).
Tuesdays 22.00 B.S.T. 1896 kc/s. G8TL (Ilford).
Thursdays 22.30 B.S.T. 1803 kc/s. G30B (Manchester).
Fridays 20.00 B.S.T. 1900 kc/s. G2AJU (Stowmarket).
Fridays, 20.30 B.S.T. 1835 kc/s. G8LZ (Gravesend).

Further volunteers for this service are required. Details to Mr. C. H. L. Edwards, G8TL, 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

Ministry of Supply Sales

A comprehensive list of forthcoming Ministry of Supply sales, which include any Radio or Electrical equipment, has been circulated to Regional Representatives. Members interested in attending should approach their R.R. for details of Government Sales in their locality.

W.A.C. Certificate Endorsements

Changes in the rules governing the issue of special endorsements to the W.A.C. certificates have been announced from the Headquarters of the International Amateur Radio Union. As from June 30, 1948, 28 Mc/s. endorsements will be discontinued.

The award was originally instituted to encourage 28 Mc/s. operation, at a time when the long-distance potentialities of the band were not widely appreciated; it is now felt that such an incentive is no longer required. In its place, a new sticker will be issued for qualifying contacts made exclusively on 50 Mc/s. The Telephony endorsement will be continued but members are reminded that cards submitted for this certificate must clearly indicate that the contacts were made on *telephony*.

WEST REGIONAL — MEETING —

SUNDAY, JULY 18th, 1948

GRAND HOTEL ∴ ∴ ∴ BRISTOL

Assemble	1 p.m.
Luncheon	1.30 p.m.
Business Meeting	2.15 p.m.
Tea	4.30 p.m.
Station Visits	5.30 p.m.

Tickets (price 10/-) from the R.R., Mr. A. A. Uppington (G2BAR), or Local Representatives by not later than July 12th, 1948.

HIC ET UBIQUE

Aylesbury and District Radio Society

Regular meetings are held at 7.30 p.m. on the first Thursday of each month at the Cafe Paris, Aylesbury, when a warm welcome will be extended to all newcomers. The Hon. Secretary is Mr. J. G. Penrice, BRS6882, 31 Prebendal Avenue, Aylesbury, Bucks.

Bangor Dinner

The 1st Annual Dinner-Meeting for Anglesey and Caernarvonshire will be held at the Waverley Hotel, Holyhead Road, Bangor, on June 21 at 7 p.m. The inclusive charge is 7s. 6d. and reservations should be made immediately to GW2DLK, Radio House Llangefni, Anglesey. The Executive Vice-President and General Secretary will be present.

Cumberland and Westmorland

It is planned to hold a Hamfest in Carlisle during the coming Autumn and in order that full publicity may be given to this venture, members in Cumberland and Westmorland are cordially invited to send a post-card to the C. R., Mr. J. R. Huggon, G3HJ, "Ballachree," Dunmail Drive, Carlisle, not later than June 30 giving name, address and callsign. Members in the South of Scotland who wish to receive details of this function are also invited to write to G3HJ.

FORTHCOMING O.R.Ms.

June 20	...	Region 11	...	Rhyl.
June 27	...	Region 5	...	Chelmsford.
July 18	...	Region 9	...	Bristol.
Sept. 5	...	Region 2	...	Newcastle.
Sept. 19	...	Region 1	...	Manchester.
Oct. 24	...	Region 13	...	Edinburgh.

Grimsby Amateur Exhibition

A unique ceremony took place at Grimsby Town Hall on May 7 when the Mayor (Councillor W. B. Bailey, J.P.) presented an *Eddystone* "640" receiver to Mr. Roger Jennison G2AJV, the winner of the recent essay competition organised by *Stratton & Co., Ltd.* To mark the occasion, the Grimsby Amateur Radio Society staged an Amateur Radio Exhibition which was open to the public. Many examples of amateur constructed equipment were shown and the Club station (G3CNX/A), operating on the 3·5 Mc/s. band, made many contacts during the evening.

North Buckinghamshire

Members living in the Bletchley and Wolverton district of North Bucks are asked to contact Mr. B. Hayes, BRS 9600, 8 Althorpe Cres., New Bradwell, Bletchley, Bucks with a view to forming a local group.

South London and District Radio Transmitters Society

The former Hon. Treasurer of the S.L.D.R.T.S., Mr. J. D. Chisholm, G2CX, has received a letter from *The Wireless for the Blind Fund* asking that grateful thanks be conveyed to all past members of the Society for the donation of £8 7s. 11d., representing the balance of funds when S.L.D.R.T.S. was disbanded.

Sunderland Newsletter

More and more local groups are finding that a newsletter forms the ideal way of encouraging club activities and co-operation as well as providing a link with members living away from home. One of the latest—and most successful—of these journals is the four page "*Newsletter*" of the Sunderland Radio Society containing editorial comment, local news, hints and tips of interest to newcomers and transmitters, and a liberal sprinkling of topical verse. With the active support of a number of contributors, this useful magazine can be sure of a warm welcome in the Sunderland district.

West Middlesex Amateur Radio Club

The Club continues to make good progress and membership is increasing steadily. A timely lecture on battery portable equipment was given by Mr. Bostock (G3BWC) at a recent meeting.

Efforts are still being made to find a permanent Headquarters where a workroom and equipment can be set up. Plans for the Club transmitter are well in hand.

Meetings are held on the second and fourth Wednesdays of every month at 7.30 p.m. in the Labour Club Rooms, Uxbridge Road, Southall, Middlesex.

Belgium Hamfest

The U.B.A. (Belgium National Society) will celebrate the 25th anniversary of its formation by holding a Hamfest in Ostend on August 8 next. British amateurs are cordially invited to support this function which will be preceded by a visit to the maritime radio station OST situated in Middlekerke.

The Hamfest will take place at the Hotel Central, Place d'Armes.

Further details can be obtained from Marcel Dupuis, ON4EY, Rue du Velodrome, 46, Ostend.

B.B.C. V.H.F. Stations

The B.B.C. announces that work on the first high power European F.M. station has already begun near Wrotham, Kent. It is anticipated that this 25 kW transmitter will be the forerunner of a number of F.M. stations to be erected throughout the country in order to improve the coverage of the Third, and later the Light, Programmes. The frequency will be in the region of 100 Mc/s.

Construction has also begun on the new television station at Sutton Coldfield, near Birmingham. The power of the vision transmitter will be 35 kW and that of the sound transmitter 12 kW. This constitutes twice and four times the powers of the respective transmitters at Alexandra Palace. The range of the station is expected to be about fifty miles, serving a population of about six millions. The London programme will be conveyed to the new station by means of a special cable or by radio link.

Radio makes News

British newspapers have been quick to take advantage of the recent decision of the G.P.O. to allocate frequencies for news-gathering purposes. *World's Press News* reports than on the day following receipt of the licence, press correspondents of *Kemsley Newspapers* employed a two-way VHF mobile unit to send back to their editorial office more than 5,000 words of comment on the 1948 Cup-tie scenes. The equipment—provided by *Marconi's Wireless Telegraph Co., Ltd.*—consisted of a "walkie-talkie" carried by the reporter and a more powerful transmitter - receiver installed in the luggage boot of a saloon car for relaying messages to the headquarters station over distances up to 20 miles. *Muirhead-Jarvis* fascimile apparatus enabled on-the-spot photographs to be successfully transmitted. To comply with the terms of the licence only messages intended for publication are permitted.

Telecommunication Training

Starting next September, at Norwood Technical College London, the *London County Council* is to provide a new course to train up to 60 young men for careers in electronics and telecommunications engineering. During the two years of the course students will have at least six weeks' practical experience with one or more firms producing telecommunications equipment, and many of the lecturers will be specialists from industry and technical establishments. The course leads to the final certificate examination in Telecommunications Engineering of the City and Guilds of London Institute—the passport to electrical engineering posts in line telecommunications as well as to technical posts in the radio industry.

There are only two qualifications: students must be over 16 and possess a School Certificate with credits in English, Mathematics and Physics (or have reached the equivalent standard). Further information can be obtained from the Principal, Norwood Technical College, Knights Hill, London, S.E.27.

Television Servicing Examination

The *Radio Trades Examination Board*, 9 Bedford Square, London W.C.1 proposes to hold an examination in Television Service work during May 1950 should there be sufficient candidates. Success in the Radio Servicing Certificate Examination of the Board will be an essential qualification for admission to this examination which will consist of a written paper and a practical test. Further details may be obtained on application to the above address.

OUR FRONT COVER

THIS month's front cover illustration shows a Model 7 Universal AvoMeter being used to check bearings by visual indication of audio output from a "Coastray" Marine Direction Finder. The makers of the Direction Finder, Messrs. Coastal Radio, Ltd., of Edinburgh, have some 15 AvoMeters in daily use for checking stages in the manufacture of marine radio telephones, direction finders, and receivers. Photograph submitted by Mr. James B. Inglis of Edinburgh.

FORTHCOMING EVENTS

REGION 1

Accrington.—July 14, 7.30 p.m., Cambridge Street Sunday School.
Ashton-under-Lyne.—July 4, 2.30 p.m., New Jerusalem Schools.
Bolton.—July 6, 8 p.m., Y.M.C.A.
Burnley.—July 7, 7.30 p.m., Mechanics' Institute, Manchester Road.
Bury.—July 8, 7.30 p.m., Atheneum, Market Street.
Darwen and Blackburn.—July 9, 7.30 p.m., Weavers' Institute, Darwen.
Manchester.—July 5, 7.30 p.m., Reynold's Hall, College of Technology, Sackville Street.
Rochdale.—July 4, 3 p.m., Drill Hall, Baron Street.

REGION 2

Barnsley.—June 25, July 9, King George Hotel, Peel Street.
Bradford.—June 29, 7.30 p.m., Cambridge House, 66 Little Horton Lane.
Catterick.—Tuesdays, 7 p.m., S.T.C., H.Q. Block, Vimy Lines.
Doncaster.—Tuesdays and Wednesdays, 7.30 p.m., 73 Hexthorpe Road.
Harrogate.—Wednesdays, 7.30 p.m., rear of 31 Park Parade.
Huddersfield.—June 30, July 14, 7.30 p.m., Plough Hotel, Westgate.
Kingston-on-Hull.—June 30, 7.30 p.m., Imperial Hotel, Paragon Street.
Leeds.—Fridays, 7 p.m., Swathmore Settlement, Woodhouse Square.
Middlesbrough.—June 21, 7.30 p.m., Cleveland Scientific and Technical Institute, Corporation Road.
Newcastle-on-Tyne.—June 28, 8 p.m., British Legion Rooms, 1 Jesmond Road.
Sheffield.—June 23, 8 p.m., "Dog and Partridge," Trippet Lane. July 14, 8 p.m., Albreda Works, Lydgate Lane.
South Shields.—Fridays, 7.30 p.m., Trinity House, Laygate.
Spenborough.—June 23, July 7, 7.30 p.m., Temperance Hall. Cleckheaton.
Sunderland.—Wednesdays and Fridays, 7 p.m., Prospect House, Prospect Row.
York.—Wednesdays, 8 p.m., 29 Victor Street.

REGION 3

South Birmingham.—June 20, 10.30 a.m., Stirchley Institute.

REGION 5

Chelmsford.—July 6, 7.30 p.m., 184 Moulsham Street.

REGION 7

Barnes and Putney.—July 13, 7.30 p.m., 28 Nassau Road, S.W.13.
Barnet.—July 17, 7.30 p.m., Bunny's Restaurant, 15 Station Road, New Barnet.
Chingford.—June 24, 7.45 p.m., G2XG, 7 Cranworth Crescent (near "Bull and Crown"). July 8, 7.45 p.m, G3DGM, 21 Mornington Road.
Croydon (Surrey R.C.C.).—July 13, 7.30 p.m., "Blacksmith's Arms," South End.
Edgware.—June 16, 23, 30, July 7, 14, 21, Orchard Cafe, Broadway, Mill Hill.
Enfield.—June 20, July 18, 3 p.m., A and B Cafe, Southbury Road (junction with Ladysmith Road).
Finsbury Park.—July 6, 7.30 p.m., 164 Albion Road, Stoke Newington, N.16.
Peckham.—July 5, 7.30 p.m., "The Kentish Drover," Rye Lane.
Slough.—June 17, July 15, 7.30 p.m., Congregational Church Hall, Church Street.
Southgate.—July 2, 7.30 p.m., Merryhills Hotel (near Oakwood Station).
Welwyn Garden City.—July 6, 8 p.m., Council Offices, Welwyn Garden City.

REGION 8

Southampton.—July 3, 7.30 p.m., 22 Anglesea Road, Shirley.

REGION 9

Bristol.—June 18, 7.15 p.m., Keen's Cafe, Park Row.
Exeter.—July 10, Y.M.C.A., 41 St. David's Hill.
Plymouth.—June 19, July 17, 7 p.m., Tothill Community Centre, Tothill Park, Knighton Road, St. Judes.

W.A.VE Certificate

Mr. Douglas Edwards, G3DO (Region 3 Representative), has been awarded the first W.A.VE. Certificate issued to a United Kingdom amateur.

LETTERS TO THE EDITOR

Band Planning

DEAR SIR,—Further to your recent leading article on Band Planning. I feel I should write to you on behalf of the 40 odd members of the Tops C.W. Club.

I think I can safely speak for all as I believe they are 100 per cent. behind Band Planning.

The fact of the matter is that we have all noticed that it is nearly two years now since a "gentleman's agreement" re band planning was advocated and the position now appears to be worse instead of better.

I could give a very long list of 'phone stations who are regularly using 'phone in the semi-official C.W. bands and most are QRO.

No one relishes further additional restrictions to our licences, but I am sure all C.W. operators would welcome an official clause re 'phone and C.W. bands, as we consider we have waited long enough for the "gentlemen"!

My suggestion is: split all the bands in half. C.W. on L.F. half 'phone on H.F. half then everyone should be satisfied. If the phones complain there's not enough room for their carriers, let them do a bit of brass-pounding.

Finally, surely it would be best to put our own house in order first (make B/P official in the British Isles) then one could approach the other countries concerned, by saying: "Well, we've now arranged official band planning. How about you?"

Even if other countries won't co-operate we shall have achieved a measure of success. I believe the offending stations are the type who say: "We've paid our licence so let's work where we're entitled to." We could *all* say this with just as much right, but where would we be? If the majority are willing to waive their rights and follow B/P, then why tolerate the few who are awkward?

Thanking you in anticipation of the opportunity of stating the case for a few of the "Brass Pounders."

Yours faithfully,

J. PHILIP EVANS, GW8WJ.

P.S.—Whilst writing to you I might as well add another "sore point" I've noticed amongst members.

How about a bit more QRP for inter-G contacts? It's not really necessary to use 150 watts 'phone for a 50 mile contact!

* * *

DEAR SIR,—I should like to protest in the strongest possible terms against the suggestion that 7 Mc/s. might be reserved exclusively for c.w. work. Those of us who use 'phone on this band regard it as our most reliable frequency for inter-G working. If one really did want to be aggressive in the matter it might be suggested that the 7 Mc/s. band should be reserved exclusively for 'phone, but personally I believe the Codes of Practice Committee has made a very reasonable division.

I wonder would it be worth while approaching our Post Office with a view to retaining use of 7150 to 7300 kc/s. in this country?

Experience would appear to show that low-power amateur stations do not cause any trouble to broadcast on shared bands.

Yours faithfully,

J. D. PARKE, D.Sc.(G8PA)

Can You Help?

Mr. C. Lambert, G2FXY, 3 Broadway East, Carlton, Notts would appreciate information on the RL85 receiver which has a frequency range of 28 to 84 Mc/s.

Mr. A. Malaika, BRS 15644,29 Bryn Ogwen, Penrhos, Bangor,) N. Wales requires details of the Type A Mk III (B 2 Minor trans-receiver.

Mr. H. Whelton, BRS 13777, 6 Abingdon Road, Davyhulme, Urmston, Lancs. asks for information concerning the Radio Mine Detector number 4A type ZA 27932.

Mr. K. Chorley, G3BQS, 19 Fairbridge Road, Upper Holloway, London, N.19 has the circuit diagram of the Bendix BC 639 A (A.M. type R 5032 A) but requires information that will enable him to re-align this receiver.

Mr. D. B. Johnson, BRS 12587, 65 Brockham Rise, Bromley, Kent wishes to acquire a copy of "A.M. and F.M. Direct Coupled Amplifiers" by A. C. Shaney.

Mr. T. Clark, BRS 16351, Sgts. Mess, RAF Fairford, Nr. Cirencester, Glos. seeks details and operating data for the Bendix TA 12 D transmitter.

Mr. J. M. Miller, G4MM, 51 Toothill Road, Loughborough, Leics. is anxious to obtain details of the American AR 11 transmitter-receiver.

Mr. T. Knight, G2FUE, Caxton House, High Street, Hoddesdon, Herts, requires the circuit and details of amateur modifications for the American ASB—8 receiver.

Mr. F. Bray, BRS13352, "Rob Roy," Netherthong, Nr. Huddersfield, requires circuit details of the BC375.

Offers

Mr. A. J. White, BRS14856 (ex-2FCI), Little Pleasance Western Road, Ashburton, S. Devon, offers to help members who require circuit diagrams of the AR88, HRO, R201, and W/S Nos. 18, 19, 21, 22 and 38.

EXCHANGE AND MART SECTION

Due to paper restrictions advertisements are only accepted "for insertion when space is available." No advertisement must exceed 50 words. Rates: Members Private Advertisements 2d. per word, minimum charge 3/-. Trade, 6d. per word, minimum charge 9/-. Use of Box number 1/6 extra. Send copy and payment to Parrs Advertising Ltd., 121 Kingsway, London, W.C.2.

ALL Items. 6L6G, 8s.; 6V6G 7s.; 6K7 6s.; 6R7 4s.; 6SH7 4s. 6d.; 6SR7 4s.; VP23 2s. 6d.; ATP4 3s. 6d.; 2½ in. moving coil meters. 0–30 mA, 5s. 6d.; 0–5A R.F. 5s.; 5 in. P.M. Speaker with trans: Mail order only.—OMEGA RADIO SALES, 107 Rolleston Drive, Nottingham. [46

AMATEURS Spring Clean, valves, relays, meters, gears of all sorts. Send for list; all answered.—BROWN, 103 Woodmansterne Road Carshalton Beeches, Surrey. [42

AR88D Perfect condition, handbook, tuning tools, "S." meter. Any test. £50 or offer.—DENNY, 69 Sandhurst Road, Orpington, Kent. [53

BACK Numbers *Wireless Engineer*, Vol. I, except 1 and 4; Vol. II, 13 to 23 and 25, 26. Offers.—SPEAKE, Farmhouse, Finchfield, Wolverhampton. [67

BAKER'S 14 in. Triple cone in heavily lined baffle, as new, £5. C.fwd. Couphone B3 super tuning unit S.M.L. knobs, dial, 4 valves 6K7, etc. All aligned for connection A.F. amplifier, £7. —G3CPT, 97 Duncombe Street, Bletchley. [28

BC–348 Comm. Receiver for sale. New and unused. 2 R.F. 3 I.F. Separate osc. Switched crystal. 200kc–18Mc. Circuit diagram, £20.—MORETON CHEYNEY, Darkhouse Lane, Coseley, Staffs. [49

BRAND new B.C. 348s, also 342s and 312s, from £18 10s. K.A.A.R. transmitter and P.R.S. receiver, excellent for television. U.H.F. 16 valve double superhet. H.T. supply 1000 volts and heater windings. 25 and 50 watt public address amplifiers and modulators. Details of these and many other lines a pleasure.—BARTON, 41 Bedminster Down Road, Bristol, 3.

B2 Transmitter (unused), 38 set, 18 MK2. Receiver, 1134 amplifier, two 1730 P. Motors, Transformers, meters, etc. Sixty Bulletin's P.W.'s, £10 or separate offers.—BRS12605, 31 Winchester Road, Bath. [44

COIL Packs, long, med., short. Manufacturers surplus. Fully aligned, with circuit, 23s. 6d. each. Govt. surplus Coil Turrets (12–400 metres in 4 bands). Complete with switch, knob and geared drive, 2s. 6d. each.—G3CWR, Berystede, St. Helen's Road, Leamington Spa. [59

CRYSTALS in holders 7005, 7126, £1 each. Eddystone 598 Dial unused 15s. Choke 20H 100 mA, 10s.; 3 in. Goodman's speaker as new, 15s.; 32/300V, 66mA E.D.C. rotary, £2. Stamp for full list. No reasonable offer refused.—21 Lomond Avenue, Stretford, Manchester. [45

CRYSTALS.—QCC 10 kc., 25s.; RCA 500 kc., 20s.; Brookes 7013, 7112, 7028, 17s. 6d.; QCC 7141, 7245, 7149, 1734, 1795, 1800, 1805, 1s. each. Resolve moving coil mike, £3. Browns Type A phones, 35s.; TZ40 valves (pair), £3; mod. transformer p.p. 807 to p.p. 807, £2. Triplett 666H multi-range meter, £5.—Box 52, PARRS, 121 Kingsway, London, W.C.2. [52

EDDYSTONE 358X with built-in power pack, ranges 0·6–1·25, 4·2–23 Mc/s. Also 2–807's. Offers.—Box 66, PARRS, 121 Kingsway, London, W.C.2. [66

EDDYSTONE 358X Wanted. Complete set of coils for this receiver, instruction manual, power details, information.—BRADFORD, 18 Newey Road, Wyken Coventry. BRS16796. [63

EDDYSTONE 358X Receiver, good condition, coils, and power pack, noise limiter, aligned, £35. Two brand new crystal pickups, De luxe models, £2 each.—HOLLAND, 42 Selwyn Road, New Malden, Surrey. [41

EXCHANGE.—Have B2 Transmitter with coils and circuit; want complete set of coils for Eddystone Battery Superhet. Type L.P.C. Sell.—R1481, good condition, £4; R.C.A. AVT 15B, as new, £3; Lexington Junior pick-up, new, £3 10s.; Transformer 350.0.350 250mA., massive job, new, £1 10s.—63, Erlanger Road, New Cross, S.E.15. [61

EXCHANGE R107 Receiver, perfect condition, for medium powered V.F.O. transmitter with power pack. Must be in good condition and cover general amateur bands.—F. N. KENDRICK (G3CSG), 25 Doreen Avenue, Moreton, Wirral. [29

FLAT—Keen Radio Amateur (University Graduate, age 27) offers half share in flat in Hampstead to another radio amateur. Share in expenses, about £12 per month. Good facilities for amateur work. Write in first instance, giving particulars to Box 37, PARRS, 121 Kingsway, London, W.C.2. [37

FOR SALE.—R103A, £8 10s.; R1147B with circuit, £2; Yew laboratory voltmeter, 3/30/300 volts, 6 in. scale, £3 10s.; Yew 250v. megger, £7 10s.; G.E.C. 50 mA., 500 mA., 5A meter, 4 in. scale, £3 10s.; 6 in. Celestion energised speaker, £1; Universal Avominor, £6; D.C. Avominor, £3.—WINCHCOMBE, G6ZH, 4 Estcourt St., Devizes, Wilts. [57

HALLICRAFTER SX–28 Receiver. 14 valves 545 kc/s.–42 Mc/s. Also Hallicrafter Skychampion, 550 kc/s.–43 Mc/s., 8 valves. What offers?—Box 48, PARRS, 121 Kingsway, London, W.C.2. [48

HIGH Activity Crystals in holders, ½ in. pin spacing, 7055, 7061·3, 7144 and 7196·2 kc/s., perfect, 20s. each. *Wireless Worlds*, from Jan. 1943, to March, 1948, inclusive. Wanted HRO Senior receiver with set of Bandspread coils, no fancy price.—M. W. PARRY, 32 Harstoft Avenue, Worksop. [53

MCR1 Midget Receiver 15 Mc/s—150 kc/s. Complete with power pack 97–250v. A.C. D.C. perfect, good DX'er, offers, £6. Carriage paid.—D. E. H., The Nook, Ware Road, Hailey, Herts. [36

MODIFIED R1155 with internal A.C. power pack and output stage. Also speaker and convertor for 12V battery, £20.—Box 27, PARRS, 121 Kingsway, London, W.C.2. [27

NATIONAL H.R.O., 8 coil packs. Power pack. B.F.O. crystal gate, little used, £45 or offer.—3 Haig Place, Morden, Surrey.

NEW 1A7GT, 1N5GT, 1C5G, 6C5G, EF36, 6s.; EF50, EF54, EC52, 6SG7, VR150/30, 8s.; 6L6, GT1C, 10s.; others also many transmitting and receiving components, stamp for details. —G3AAV, 1 Welburn Avenue, Leeds, 6. [26

OSCILLATOR type 145 (2–7·5 Mc/s., 1½ watts RF), new, offers. Stabilized power pack 300v. at 500 mA, £10; Magnificent "Quality" Radiogram, with speakers and two cabinets, by Hartley Turner, 100 gns. Wanted: T1154, TR1430 or other R.A.F. transit cases to take standard chassis.—G2BB, Roza, Reading Road, Yateley 3257, Hants. [65

PYE Communication Receiver, 12–42, 40–130, 190–560 m, 100/250 A.C. brand new £20. Coils H.R.O. £2. Eddystone 10s.—FRANKLIN, 52 Station Road, Broxbourne, Herts. (Hoddesdon 2522). [74

QSL's and log books (P.M.G. approved). Samples free; state whether G or BRS.—ATKINSON BROS., Printers, Elland.

R.C.A. High fidelity ribbon table microphone, £7; 1155 power pack 200/250v. 6·3, 250v., £2; 50 microamp 3 in. M/C flush meter, £2 5s. Two tapped fluorescent chokes 200/250v., £1 each. 200 approx. British 7-pin V/Holders, new, £2.—SINGLETON, 179 Stoke Road, Guildford, 61749. [50

RECEIVER Type R1116 in wooden carrying case, £4; Eddystone transmitting condenser type 614 Split Stator (100 + 100 uF), brand new, unused, 25s.; Milliameters, Pullin, 2½ in. dial square front, 2 0–50, 1 0–100, brand new, unused, 25s. Eddystone No. 1130 Microdensers 100 pF, unused, 5s.—G5IQ, Old Farmhouse, Finchfield Lane, Wolverhampton. [31

R1116, Re-aligned, new valves, including QP25 with adaptor, slow-motion head, supply cables, etc, £5. H.T. Eliminator, stabilised by VS130 and switched by 2-volt relay, 25s. Wanted, for W/S 19 MK111, Handbook, supply cable, variometer assembly.—Box 25, PARRS, 121 Kingsway, London, W.C.2. [25

SALE.—Hallicrafter-Sky Buddy S.19. What offers?—RUSSELL, Binfield Road, Byfleet, Surrey. [71

SALE.—Transmitter-Receiver TR9D with instruction book, brand new, £5, or exchange wavemeter.—G3CXI, Easton Grey, Malmesbury. [38

SALE.—Two 813, two 805, all 25s. each. Excellent condition, reserve by postcard.—Box 60, PARRS, 121 Kingsway, London, W.C.2. [60

SELLING UP.—Receiver 25 watt Transmitter A.C./D.C. amplifier two speakers, other gear. Cheap. Send for details.—G3BV, 68 Marshall Drive, Bramcote, Notts. [39

SURPLUS Components going really cheap. Please send stamped envelope to—G6CB, 7 Caxton Road, Wimbledon, S.W.19. [34

TAYLOR 65B Signal Generator, as new, £11 10s. VCR517, £2. —146 Icknield Way, Letchworth, Herts. [33

TOP band C.W. transmitter wanted, operate from 120 volts., State price to: Box 58, PARRS, 121 Kingsway, London. W.C.2. [58

TRANSFORMER 1500–1000–0–1000–1500, 120 mA. 7½V6A. 10V6A, 4V 7A, 230V, £4. Also 10 watt station; dismantling. All parts cheap. Example: Brookes Crystal 3537 and Crystal holder, 12s. 6d. S.A.E. list.—Box 47, PARRS, 121 Kingsway, London, W.C.2. [47

TUNING Unit T.U.6.B., 16/–. Receiver BC433, £6.—BRS15354, 601 Chamber Road, Oldham. [40

TYPE 145 Oscillator £5. Crystals 7 Mc/s., 3·5 Mc/s., 12s. 6d. each, mounted. State approx, freq.—G5DF, 32 Church End Lane, Tilehurst, Reading. [73

UNUSED VALVES.—Boxed 6C4, 10s. each. Also a few EF50's, 4s. each, and (2) 4074B British equivalent of RK34 (12v. heaters), 12s. each.—G3CGL, 42 Anderton Park Road, Modeley, Birmingham. [56

URGENTLY Required.—Instruction and Maintenance Manual for Hazeltine Electronic Corp. U.S. Navy Transmitter–Receiver TCS/6 or TCS/12. Will pay good price.—MANNING, 3, Copperhill Terrace, Hamble, Hants. [69

VALVES.—Send us your enquiries for any British or American types (S.A.E. please).—DALE ELECTRIC CO., 105 Bolsover Street, London, W.1. [30

VALVES.—1L4 (5), 1R5 (9), 1S4 (3), 1S5 (2), 1T4 (12), 3A4 (3), 10s. each; 3A5 (5), GT1C (2), DLS10 (1), 12s. 6d. each; 42 (4), 6s. each; Universal Avominor, £5; 4V32A transformer 35s.—Box 32, PARRS, 121 Kingsway, London, W.C.2. [32

V55R Receiver, perfect order, re-aligned and crystal calibrated. Delivered Yorkshire, £25 or near offer.—G3APV, 5 Mayo Road, Bankfoot, Bradford. [70

WALTERS CONLEY High-Speed tape recording machine built in 230v. power, complete with valves, brand new in Maker's packing with manual, £27 10s.—HARRIS, Strouds, Pangbourne, Berks. [51

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