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# R.S.G.B. Bulletin

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EDITOR: JOHN CLARRICOATS, O.B.E., J.P., G6CL
ASSISTANT EDITOR: JOHN A. ROUSE, G2AHL
EDITORIAL OFFICE: NEW RUSKIN HOUSE, LITTLE RUSSELL STREET, LONDON, W.C.1
*Telephone : HOLborn 7373*

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# CURRENT COMMENT

## The Mixture as Before—or Not?

BY the time these words appear the 1955 National Field Day, although almost two weeks back in the past, will still be the subject of vivid memories and much discussion and eager exchanging of scores between one group and another. Writing before the event, we had better maintain a discreet silence on weather prospects in view of what happened on N.F.D. *last* year!

All the animated debate and discussion which goes on for many weeks following what is easily the most popular Amateur Radio event of the year, helps bring forth ideas and suggestions for its future conduct. The enormous amount of experience which has been accumulated in respect of N.F.D.—after all, the first National Field Day took place as long ago as 1933—has all gone towards making this just about the ideal form of radio contest, with the added stimulus and competitiveness of team spirit behind each entry.

The last major change of the rules was the restriction of input power to 5 watts—unless, of course, one regards the limitation of aerial construction as another equally major modification. Apart from this, though, the rules for N.F.D. have well stood the test of time; but it would be sad to think that, year after year, every Field Day was going to be exactly like the one before it (except possibly for the weather!). In other words, is "the mixture as before" precisely what participants like to have? Or should not the individual group inquests after each year's Field Day not include a certain amount of heartsearching and enquiry whether, on a national basis, the event could not be bettered?

Now it is hardly fitting for the individual who undertakes the self-imposed task of writing *Current Comment* to air his views on the future conduct of National Field Day. The views should come from the membership at large. Every R.S.G.B. group which entered a station in 1955 should set aside one date, if not more, in the future for a detailed appraisal of the existing rules, their interpretation and execution, with a view to bettering this already mightily popular occasion.

Let it not be thought that the Contests Committee or the Council—or anyone else, for that matter—will frown upon sensible suggestions intended to lead to such an improvement. The contest was initiated for the enjoyment and practice of skill by groups up and down the country. And it is for *them* to say either "No tampering," or "Here's how National Field Day may be made even better than it is at present."—J. H.

## The Lopping of Operators

IT is too early to say at this moment of writing whether or not a shortage of operators for National Field Day was experienced this year. It is quite on the cards that there *was* such a shortage, for several hundred would-be operators were lopped off the Society's records only a month before that first weekend in June.

This lopping of operators came about as the result of the removing of almost 10 per cent of the Society's membership in the form of those who, electing to pay their subscription by Bankers' Order, have *not* elected to notify their bankers of the increase in subscription.

It is too late now to attempt to shame the people who apparently tried to "get away with it"; they no longer have a chance to read the BULLETIN.

Members who did not try to avoid their just dues but were prepared to pay the statutory full rate of subscription will naturally want an assurance that the deliberate cutting away by the Council of 10 per cent of the membership was something that had to be done. That assurance is readily given. The Council was indeed faced with a pretty sticky dilemma. For many months it had seen the Society's membership steadily dropping, following the increase in subscription 18 months ago, and the lapsing of interest to the tune of 1,000 relinquished transmitting permits per annum. The decline in membership was being arrested and the figure looked like stabilizing itself around 8,000 when the distasteful business of arrears under Bankers' Orders became urgent. Every member who had not amended his Bankers' Order continued to receive the BULLETIN and all other advantages of full Corporate membership, so he was politely informed that "the subscription *has* gone up, you know, old man."

The reaction to this approach was not remarkable. In consequence a series of announcements of increasing prominence and urgency was published in the BULLETIN; in addition, Regional and local representatives personally undertook the ticklish task of chasing, in their various areas, individual members who were still in arrears. Debt-collecting was certainly one of the last things they ever expected to have to do as voluntary representatives of the R.S.G.B., and they couldn't be blamed if they said so.

After all this effort the number of members who declined to amend their Bankers' Orders was still 800, and inevitably the axe had to fall, as from May 1.

All of which adds fresh emphasis to the suggestion made here just before Christmas that every member of the R.S.G.B. should endeavour to enrol at least one new member each year—or more if possible! The present subscription level for full Corporate Membership is ridiculously low and represents outstanding value for money for the benefits enjoyed.

There are now 11 months ahead in which to replace those lapsed operators.—J. H.

**CORRESPONDENCE WITH HEADQUARTERS**

**When writing to Headquarters, members are asked to print their names in block letters as there is frequently considerable difficulty in deciphering signatures. Enquiries requiring the attention of the Secretarial, Editorial, Sales and Subscriptions sections of Headquarters should, preferably, be written on separate sheets of paper.**

# An Effective Speech Amplifier Clipper Filter Unit for The Elizabethan

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

THERE is no doubt that for DX working, or for breaking through the severe QRM experienced on most of the amateur bands, a reasonably high degree of speech clipping is desirable in a telephony transmitter. Especially is this true if n.b.f.m. is used and particularly so if the distant receiver is not fitted with a discriminator-detector and has to rely, therefore, on slight detuning to one side of the carrier. Such procedure inevitably results in a loss of some 6 to 10 dB in signal strength compared with the reception of an amplitude modulated carrier of the same power. However, provided that 10 to 15 dB of speech clipping at the transmitter can be achieved, this loss can be more than compensated for; in other words, there is a considerable effective gain.

In order to be able to use heavy speech clipping without radiating serious distortion, a low-pass speech filter must be used between the clipping stage and the following speech amplifier-modulator circuit. This article is intended to present a simple but effective low-level clipper filter unit in practical form. The unit described, which is the result of a number of trials and experiments embodies the best features of several different circuits.[1] Although it has been designed for use with *The Elizabethan*[2] transmitter (either working directly into the n.b.f.m.[3] unit or into a suitable amplifier-modulator unit for a.m.), it is equally suitable for use with any amplifier-modulator. The unit is simply used as a microphone pre-amplifier, preferably with its own small power supply.

* *184 Galleywood Road, Chelmsford, Essex.*

A three-quarter view of the unit in its case. The clipping level control (P1) is at the top centre of the front panel with P2 — the "straight" pre-set volume control — below. Bottom left is the microphone input socket with the clipper circuit switch (S1) bottom right.

## Circuit

The circuit of the unit is shown in Fig. 1. V1 is a normal high-gain pentode amplifier stage. The function of the 10 H midget choke CH1 is to modify the frequency response of V1 by effectively reducing its anode load at low frequencies, but it is not essential and may be omitted if desired. V2a acts as a further stage of amplification to produce sufficiently large speech voltage peaks at its anode to enable the double-diode speech clipper V3 which is biased (or delayed) by about 2 volts, to operate effectively. V2b follows the clipper valve (V3) and acts as a further stage of amplification.

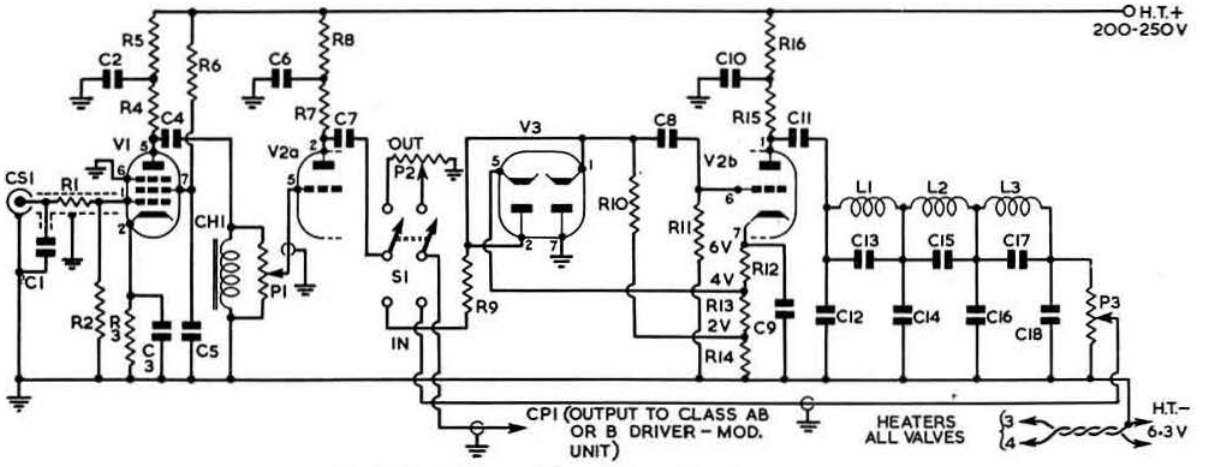



Fig. 1. Circuit diagram of the speech amplifier-clipper filter unit.

C1, 47 $\mu\mu$F ceramicon.
C2, 6, 8 + 8 $\mu$F 350 V electrolytic.
C3, 9, 10 $\mu$F 50 V, T.C.C. "Picopack."
C4, 7, 8, 11, 0.01 $\mu$F tubular paper.
C5, 0.1 $\mu$F tubular paper.
C10, 8 $\mu$F 350 V electrolytic.
C12, 13, 15, 0.015 $\mu$F tubular paper.
C14, 0.03 $\mu$F tubular paper.
C16, 0.05 $\mu$F tubular paper.
C17, 0.003 $\mu$F tubular paper.
C18, 0.06 $\mu$F tubular paper.
CH1, 10H midget a.f. choke (primary of Wearite type 202 midget a.f. transformer suitable).
CP1, Co-axial plug (Belling-Lee).
CS1, Co-axial socket (Belling-Lee).
L1, 2, 3, 125 mH filter coils (Denco (Clacton) Ltd.).
P1, 500,000 ohms potentiometer.
P2, 10,000 ohms potentiometer.
P3, 2500 ohms potentiometer.
R1, 4700 ohms ½ watt.
R2, 1 Megohm ½ watt.
R3, 12, 1000 ohms ½ watt.
R4, 7, 9, 10, 100,000 ohms ½ watt.
R5, 8, 16, 10,000 ohms ½ watt.
R6, 11, 470,000 ohms ½ watt.
R13, 14, 1200 ohms ½ watt.
R15, 47,000 ohms ½ watt.
S1, D.p.d.t. toggle switch.
V1, EF91/6AM6/Z77 (EF86 or 6BR7 would be better as these valves have extremely low noise and hum. They are, however, B9A based).
V2, ECC91/6J6.
V3, EB91/6AL5/D77.

Since the speech waveform appearing at the grid of this section of V2 is severely flattened or "squared" in both positive and negative directions it is, of course, full of harmonics which must be removed before the signal reaches the normal speech-amplifier-modulator unit. The severely clipped waveform is restored to its original shape by means of a low-pass filter.

The filter shown in Fig. 1 has an excellent performance. Its response—shown graphically in Fig. 2—is reasonably "flat" up to about 2,500 c/s, above which it attenuates very rapidly indeed. At 4,000 c/s the response is 50 dB below that at 400 c/s. Such performance is sufficient for the purpose of clipping and furthermore, adequately meets the Post Office requirements for the suppression of modulation frequencies above 4 kc/s when n.b.f.m. is employed [4]. Usually, the difficulty in constructing filters of this kind is the winding of the coils. A coil having an inductance of 125 mH is not easy to construct at home. Thanks to Denco (Clacton), Ltd., who have co-operated wholeheartedly with the writer in this matter, very satisfactory filter coils of this type are now available from that firm at a a reasonable price.

By means of S1, the unit may be switched either for clipping or "straight" (*i.e.* non-clipping) operation at will. It is generally unnecessary to employ clipping for relatively local contacts.

The usual care should be exercised in wiring to avoid unwanted feed-back or regeneration in the high-gain (V1) section of the circuit. In particular, a *fully screened* coax type plug and socket must be used for the microphone connection and a screened wire run from the socket right up to the control grid of V1. A neat and effective method of providing suitable screening for the grid lead is illustrated in Fig. 3.

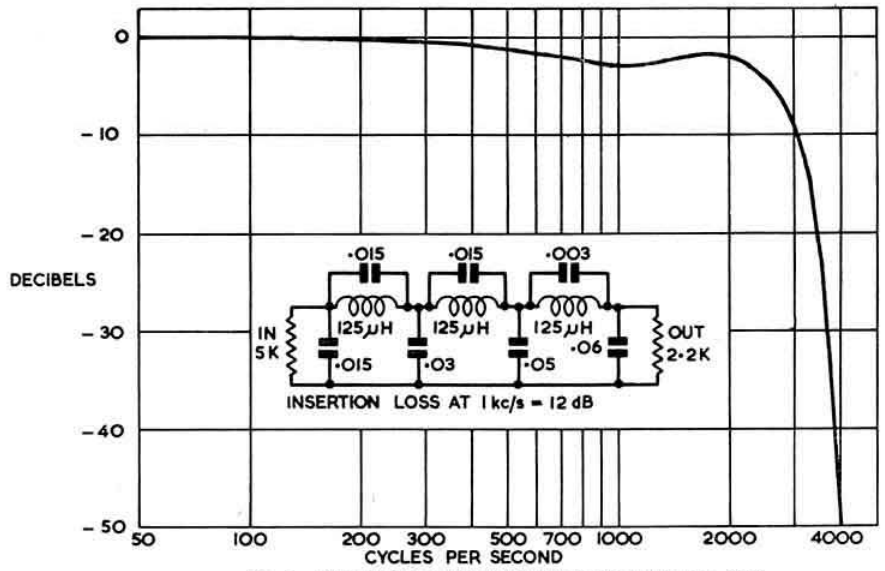



Fig. 2. Characteristic curve of the three-section-low pass filter.

## Construction

Details of the mechanical layout and construction may be seen in the photographs. A small No. 18 s.w.g. aluminium box was used, with one side removable. The box measures 8 in. by 5 in. by 3 in. wide and all the components fit comfortably into this space. The various tubular paper fixed condensers used in the low pass filter may be seen mounted on the face side of the lower of the two tag boards supported on the fixed side of the box. The three filter coils L1, L2 and L3 are mounted on the opposite side of this tag board which is fixed to the side of the box by four 1½ in. long 6B.A. screws, or suitable lengths of 6B.A. studding and nuts, with spacer pieces to provide room for the coils between the tag board and the side of the box. The coils are held to the board by 1 in. long 6B.A. screws passing through the centres or axis of the coils. A suitable washer or 1 in. long strip of paxolin or bakelised linen is used under the head of each screw to clamp the coils in position. The three 6B.A. nuts for these screws may be seen in the side elevation photograph of the unit along the line of holes on the centre of the tag board.

It will be noticed that some of the fixed condensers are mounted in "clusters" where necessary to make up the required special values of capacity using standard values easily available. In the bottom left-hand corner of the box the miniature 10 H anode choke (CH1) for V1 may be seen in front of a small 8 + 8 μF electrolytic condenser (C2, C6). The third 8 μF anode decoupling condenser (C10) may be seen in the top right-hand corner of the box.

Various small resistors and condensers are mounted on the upper tag board. Spare tags are used to anchor the incoming 3-wire supply cable (h.t.+, "live" 6.3V and "earthy" 6.3V, to which is also connected the negative h.t.). The potentiometer, P1, which is the clipping-level control, is mounted on the front end of the box above P2, the modulation level setting control. The latter is pre-set for "straight-through" operation (*i.e.* non-clipping) to a convenient value so that the overall gain of the unit is the same whether clipping is used or not. Beneath this control may be seen S1 which switches the speech clipper in or out of circuit. Immediately to the rear of V3 is the potentiometer P3 which is used to set the modulation level when speech clipping is used. The 2 ft. length of UR32 coaxial cable, the far end of which is terminated with a Belling-Lee coax plug for connection to the n.b.f.m. unit or to the main amplifier-driver-class B modulator unit in the transmitter, can be seen running along the base of the box and leaving *via* the rubber grommetted hole together with the supply cable.

## Operation

When the circuit wiring has been carefully checked and the l.t. and h.t. supply switched on, an initial check with a suitable high resistance voltmeter (AVO or similar) should be made. In particular, the correct bias voltages for the clipping diodes (V3) should be obtained. If necessary, the values of the biassing resistors R12, R13 and R14 should be altered slightly in order to achieve the desired bias voltages. However, if the design is faithfully followed it should be unnecessary to alter these resistors.

To familiarise oneself with the correct adjustment of the three potentiometers, it is a good idea to connect

a pair of high resistance headphones across the output plug on the coax cable in order to be able to listen to the speech output. This is much better than trying to adjust the unit from scratch with the transmitter on the air—and your friends will like you better! Proceed as follows:—

(1) Commence with S1 in the "straight" or non-clipping position. Set all three potentiometers at zero.

(2) With a crystal microphone plugged into the unit and a pair of headphones connected to the output, advance the pre-set gain control, P2, while talking into the microphone, until fairly loud clear speech is heard. Observe that hum level is so low as to be negligible, *i.e.* faintly audible when not talking.

(3) Switch to clipping position on S1 and set the clipping modulation level control, P3, at about half way. Advance clipping level control, P1, while talking into microphone, until speech begins to sound noticeably distorted; then reduce setting until distortion is negligible. Speech should sound crisp and clear with an overall quality similar to that of a normal Post Office telephone circuit. Increase or decrease the gain by adjustment of P3 to obtain a convenient level of volume in the headphones.

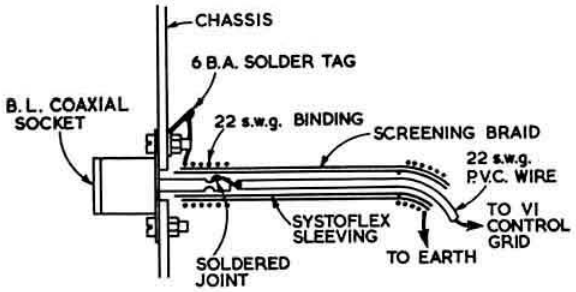



**Fig. 3. Method of screening the microphone input lead. When this method is adopted, C1 and R1 may be omitted. If they are used, a small screening can should be mounted over the spigot of CS1 with C1 and R1 inside.**

(4) Make a careful note of the optimum settings of P1, P2 and P3.

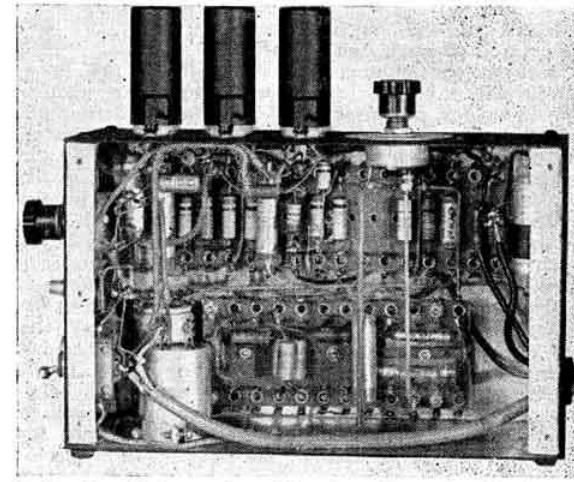
(5) Now plug the output from the unit into the normal speech-amplifier-modulator unit used to modulate the station transmitter and repeat tests (2) and (3) *using a dummy load or artificial aerial circuit* while monitoring the transmitted speech on a receiver or monitor. Re-adjust the settings of P1, P2 and P3 to achieve clear-cut speech quality and sufficiently full modulation both on straight operation and with clipping. If it is possible to employ a cathode ray oscillograph to check modulation, so much the better. If not, it should be borne in mind that a 10 per cent rise in r.f. feeder or aerial current *on normal speech modulation* indicates approximately 100 per cent peak modulation.

Remember that the classic figure of 22.5 per cent current rise indicates 100 per cent modulation when the transmitter is being modulated by a *sustained sine wave source, i.e.* a clear whistle or a tone from an l.f. oscillator. However, when using speech clipping a visible increase of some 15 per cent in feeder current with speech modulation is permissible since the *average* modulation level will now be considerably higher. Similarly, the usual upward kick of class B modulator anode current will be somewhat greater when clipping is used. Care should be taken to see that the visible "peaks" of anode current so observed are not allowed to exceed a reasonable value, otherwise the modulator valves will have a short life due to their being driven too hard with consequently excessive values of peak grid and anode current.

Since the ratio of *peak* to *average* anode current for a class B modulator valve (assuming a continuous sine wave input signal) is 3:1, a continuous whistle (or low frequency tone) modulation which produces, say, a 200 mA reading on the class B modulator anode milliammeter produces, in fact, a *peak* anode current of 600 mA total, or 300 mA *per valve*. An inspection of the valve manufacturer's figures will show whether this is excessive or not.

It will be appreciated that the maximum upward "kick" of the modulator anode milliammeter is not a direct measure of the *peak* anode current but is simply an indication of the *peak average* value of the anode current, since the inertia of the meter movement prevents the meter needle from registering the true peak value of the current. A typical speech wave-form is inherently very "peaky" but these peaks are of very short duration and for much of the transmission time the amplitude of the speech wave is very much below that of the peak value. For this reason, with "straight" speech modulation, the average value of the modulator anode feed, as read on the d.c. milliammeter, must be kept *below* the average reading that would result from a sine-wave modulation *having the same peak value* (*i.e.* that peak value which just causes the transmitter to reach 100 per cent modulation), or serious over-modulation will result. When using fairly heavy speech-clipping the modulator anode milliammeter may, however, be permitted to kick up to a value approximately equal to the manufacturer's quoted figure for the *average* value permissible for sine-wave modulation. This is because the clipper tends to maintain the modulation at peak-level for much longer periods during a given speech cycle. The average value of the speech wave is thus increased with a consequent increase in the observed value on the anode meter.

The above explanation has been given at some length because it is felt that insufficient emphasis on the importance of understanding what the modulator anode current meter actually indicates, has been made in the many articles dealing with modulation and modulators which have appeared from time to time in the various Amateur Radio journals.



**A side view of the speech amplifier clipper filter unit with the cover plate removed, showing the component layout. The miniature choke (CH1) may be seen to the right of S1 on the front panel.**

To sum up: on normal speech modulation when not using speech clipping the modulator anode feed milliammeter should not be allowed to kick up more than about 50 per cent of the maximum sine-wave value for a pair of valves quoted by the valve manufacturer for class B operation (*e.g.* for a pair of 807s in class B at *Ea*=750V the *maximum signal* d.c. anode current is given as 240 mA. Thus, on normal speech modulation the anode meter should not be allowed to kick up more than about 120 mA). The peak power output under these conditions will be 120 watts. Allowing 20 per cent power loss in the modulation transformer, 96 watts of peak audio power will be delivered to the p.a. This is sufficient to modulate 100 per cent a p.a. input power of 192 watts.

When reasonably heavy speech clipping (12 to 15 dB) is employed, the anode milliammeter may be allowed to kick up to about 200 mA when modulating a 150 watt p.a.

**Conclusion**

Finally, it only remains to be said that the construction of this little unit will be found to be well worthwhile and will enhance the DX-capability of any telephony transmitter. Using it in conjunction with *The Elizabethan* employing n.b.f.m, excellent phone contacts have been obtained with Japan, Chile, Argentina, Brazil, U.S.A. and New Zealand to mention only a few of the DX countries worked. If desired, a high-level negative speech-clipper and splatter suppressor circuit may be used in addition to the present unit when using high-level a.m. in order to gain a further slight advantage, but this is not essential.

**References**


(1) "Let's Not Overmodulate—It Isn't Necessary!", Smith and Hale, *QST*, November, 1946. "The Little Slugger," Rand, *QST*, February, 1949. *The Radio Amateur's Handbook*, 1950 Edition, p. 280. "Filters for Speech Clipping," Dunn, R.S.G.B. BULLETIN, November, 1950.

(2) "*The Elizabethan*," Varney, R.S.G.B. BULLETIN, July and September, 1953.

(3) "*A Narrow Band F.M. Unit for The Elizabethan*," Varney, R.S.G.B. BULLETIN, May, 1954.

(4) R.S.G.B. BULLETIN, January, 1953, p. 310.


### Proceedings of the London U.H.F. Group

TO mark the occasion of the International V.H.F./U.H.F. Convention held in London on May 14, 1955, the London U.H.F. Group produced the first issue of its *Proceedings*. Devoted entirely to practical articles on u.h.f. equipment, this attractive publication runs to 20 pages and gives details of an easily built 70 cm transmitter, a simple 70 cm receiver, a 23 cm tripler, a miniature 70 cm mobile transmitter and a novel crystal controlled signal generator for 70 cm. Copies may be obtained, price 1s. 3d. post paid, from the Editor, C. E. Newton (G2FKZ), 105 Underhill Road, Dulwich, London, S.E.22.

### Around the Trade

"PRINTED Circuits" is the title of an interesting folder describing the use of "Plasmet" continuous copper etched wiring circuits. Copies may be obtained from Printed Circuits, Ltd., Whadcoat Street, London, N.4.

* * *

Cosmocord, Ltd., Waltham Cross, Herts., has issued a booklet entitled *The Cosmocord Story* which is intended to "present a portrait of Cosmocord, the organisation which stands behind the name Acos."

### Civic Honour for the General Secretary

MEMBERS everywhere will join with the President and Council of the Society in offering hearty congratulations to the General Secretary, Alderman John Clarricoats, O.B.E., J.P., on his election as Mayor of the Borough of Southgate—his home town in North London.

His election, unopposed and unanimous, took place at Southgate Town Hall during the evening of May 24, 1955, at a meeting of the Borough Council and in the presence of a large number of invited guests. The Society was represented by two Past-Presidents, Mr. Leslie Cooper (G5LC) and Mr. Arthur O. Milne (G2MI), and by Mr. D. C. Jardine (G5DJ) of Southgate, all with their ladies.

*(Photograph by John Stapley, Southgate, N.14)*

After being installed with due ceremony, Alderman Clarricoats delivered his inaugural address, in which he spoke about the importance of youth in a modern society and stressed the unrivalled educational facilities which are available to the young people of Southgate.

The good wishes of all their friends were summed up in a glowing tribute by the High Sheriff of Middlesex (Mr. C. William Skinner, D.L., J.P.), who not only congratulated the new Mayor and Mayoress on the great honour which had been conferred upon them but also congratulated the Borough on making so wise a choice in the selection of their first citizens for the ensuing year.

A.O.M.

### Salaams de SU1SG !

FRANK Pettitt, very active pre-war as SU1SG, of Cairo, and now resident at 1 Via Ciceroni, Flat 3, Tripoli, Libya, sends greetings to all old friends. He would welcome letters from them.

# The Antennamatch

## *Part 2—Construction and Use*

By F. HICKS-ARNOLD (G6MB)*

**General considerations underlying aerial matching and the design and use of The Antennamatch were described by the author in Part 1 of this article which was published in the May, 1955, issue of the Bulletin.**

FOR amateur use, the original circuit devised by Virgil True has been considerably simplified and is now as shown in Fig. 4, an inspection of which reveals that the complete unit is divided into three screened sections, each being further sub-divided so that all r.f. components actually in series with the transmission line are screened from those components which carry d.c. only. The mechanical layout and construction can be seen in the accompanying photographs.

### The Impedance Detector Components

C2 in the impedance detector section is made up of a 500 $\mu\mu$F ceramic feed-through type condenser with 250$\mu\mu$F in parallel, making a total of 750 $\mu\mu$F. This provides better by-passing and filtering out of r.f. from the line to D2 whilst performing its original function as part of the capacity divider C1-C2.

The 1 ohm resistor R1 is made up of ten 10 ohm one watt composition resistors in parallel mounted on the outside of a paxolin tube 1 in. in diameter and 1½ in. long. The 300 $\mu\mu$F condenser (C13) and D1 (CG6E) crystal associated with R1 are mounted inside the paxolin tube with the connection to R2 brought out at right angles to the axis of the tube. The complete assembly is mounted directly between the coaxial input socket CS1 and the end of the rod forming L1 (see the description of the Phase Angle Detector). RFC1 is a standard 2.5 mH receiving type r.f. choke directly connected between one end of R1 and earth. It provides the d.c. return path from R1 thus completing the bridge circuit.

The galvanometer M1 can be mounted remote from the impedance bridge as it only carries d.c.; it is decoupled by RFC2, C6 and C7. C4 and C9 are of the ceramic feed-through type, serving both as decoupling condensers and as feed-through connections.

All components other than R1, R2, C4, D1 and RFC1 are mounted above the screened compartment.

### The Phase Angle Detector Components

Inductances L1 and L2 are, in fact, two brass rods. L1 consists of a ¼ in. rod 5½ in. long, suspended between feed-through insulators or bushes at opposite ends of the screening box. The diameter of the rod is not critical, although its size will affect the capacity coupling between L1 and L2. The sampling loop L2 is another brass rod ⅛ in. in diameter bent into a "U" shape, with legs 2½ in. long and a centre portion 4 in. long, which is mounted with the two vertical legs through feed-through insulators in the upper side of the screening box. The horizontal portion is placed above and parallel to L1 to provide inductive coupling to the latter. Spacing between the inductances is approximately $\frac{1}{16}$ in.

*"Sixty-four," Garrick Close, Walton-on-Thames, Surrey

The legs of L2 are threaded where they pass through the chassis feed-through insulators and are held in position by nuts above and below the insulators. By adjusting the position of the nuts, the coupling between L1 and L2 can be varied as necessary. The centre tap connection to L2 is passed through the upper side of the screening box by means of the 500 $\mu\mu$F feed-through condenser C9.

A rather simpler method of constructing L1 and L2 is to use a 6 in. length of co-axial cable, terminating the outer copper screening about an inch from each end, with the inner polythene insulation extending slightly beyond the outer screen. Connections are then made to the centre conductor, which acts as L1 and is connected directly into the line (as in the case of the ¼ in. diameter brass rod used in the first method of construction). The outer screening becomes L2. Such construction has all the essentials of the original, *i.e.*, a length of line forming L1 closely coupled to a centre tapped loop L2. Whilst it is not possible to adjust the coupling, the arrangement works well and is certainly far simpler to make.

All other components, including the diodes D3 and D4, are mounted outside the inductance screening box. As they carry d.c. only, their exact arrangement is not critical but a symmetrical layout is desirable.

CG6E crystal rectifiers were selected for use in the phase angle detector because their high value of back-resistance made it easier to zero the indicating meters. If only lower back-resistance crystals of the 1N34 type are available, it is suggested that each should be shunted by a resistor of about 220,000 ohms as recommended by the General Electric Co. Whichever type of crystals is used, all should have approximately the same back-resistance in order that a zero output at balance may be obtained.

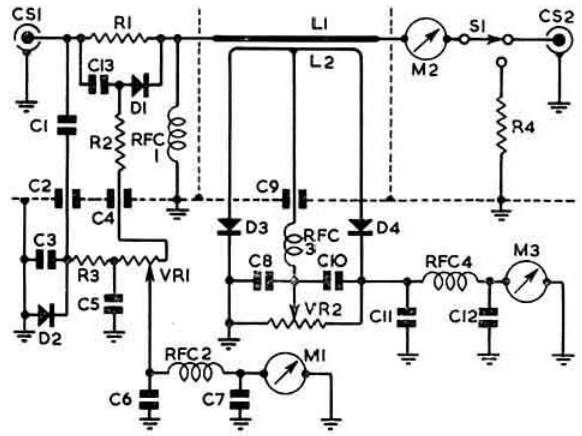



**Fig. 4. Complete circuit diagram of The Antennamatch. C1, 10 $\mu\mu$F; C2, see text; C3, 250 $\mu\mu$F; C4, 9, 500 $\mu\mu$F, feed-through type; C5, 500 $\mu\mu$F; C6, 11, 470 $\mu\mu$F; C7, 12, 1000 $\mu\mu$F; C8, 10, 13, 300 $\mu\mu$F; CS1, input co-axial socket; CS2, output co-axial socket; D1, 2, 3, 4, type CG6E crystal diodes; L1, 2, see text; M1, 3, see text; M2, 0–2A r.f. meter; R1, 1 ohm (see text); R2, 3, 33,000 ohms; R4, 75 ohms, Morganite type 701 (see text); RFC1, 2, 3, 4, 2.5 mH; S1, loading selection switch (see text); VR1, 50,000 ohms; VR2, 250,000 ohms.**

**Output Section**

The output section consists of an r.f. ammeter, a low loss switch and a dummy aerial of 75 ohms impedance.

The r.f. ammeter should have a full scale deflection of about 2 amps and be of the type having an external thermocouple which can be placed inside the screening box close to the switch. Placing the thermocouple directly in the line carrying the r.f. current introduces as little disturbance of the impedance of the line as possible and permits the meter to be placed remote from the line.

**R.F. Voltmeter**

If such an ammeter with separate thermocouple is not available, an equally useful indication of power output into either artificial load or aerial may be obtained from a simple r.f. voltmeter connected across the line to read the voltage developed. If accurate power readings are not required, the r.f. voltmeter need not be calibrated. Circuit values should be arranged so that power in the artificial aerial, *i.e.*, 75 ohm load, gives about half-scale deflection. Provided the reading when switched to the aerial position is the same, that is all that is required for comparison of power into the dummy load or into the aerial system.

A simple circuit for such an r.f. voltmeter is given in Fig. 5 (g). As large voltages should not be applied to a crystal diode, a resistance network to reduce the applied voltage should be used across the total r.f. voltage in the line. For good linearity of scale deflection when using a 1 mA meter, the network should be made up of two resistances, the upper one being the line impedance times 100 and the lower being the line impedance times 10, *i.e.*, 7500 ohms and 750 ohms for a 75 ohm line. This network together with the crystal diode, r.f. choke and decoupling condensers (1000 $\mu\mu$F), should be placed as close to the output switch as possible. The lead carrying the d.c. output to the meter can then be of any convenient length without disturbing the impedance of the line or carrying r.f. currents outside the screening box.

The complete r.f. voltmeter network may be seen in the photographs above the screening deck at the right-hand end.

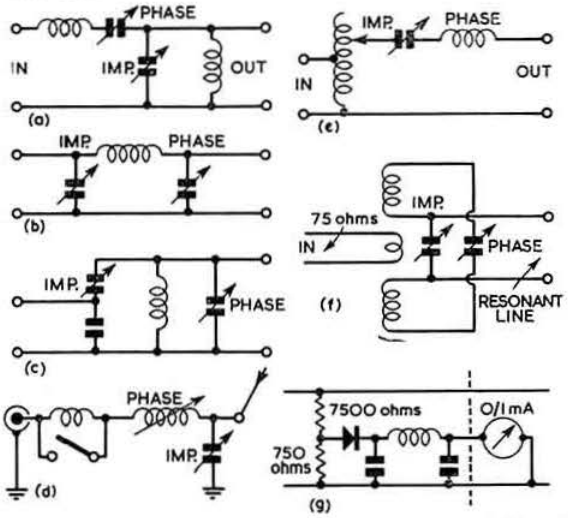
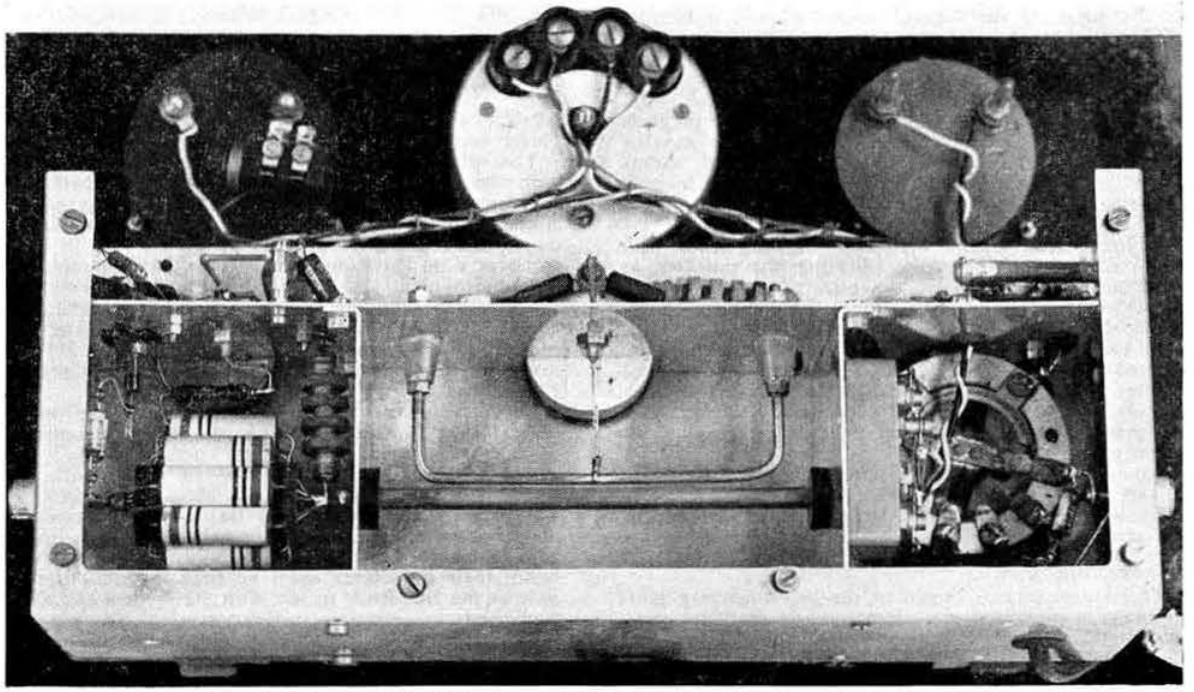



**Fig. 5. Aerial matching networks for independent variation of impedance and phase angle. (a) Cantilever network. (b) Pi-network. (c) Capacitance division. (d) Low-high match. (e) Auto transformer. (f) Link and pi-network for high impedance tuned lines. (g) Simple r.f. voltmeter. The crystal diode should be a type CG6E, the two condensers 1000 $\mu\mu$F and the r.f.c. 2.5 mH.**



**Close up view of the interior of the screening box showing the construction of R1 and L1 and L2.**

**Aerial Loading Switch**

The switch for selecting artificial load or aerial proper should be a low loss type capable of carrying an r.f. current of 2 amps, that used in units of the TU5 series being ideal.

**Artificial Load**

The artificial load must, as far as possible, have only a resistive element capable of dissipating at least 100 watts. The type 701 heavy duty resistors made by the Morgan Crucible Co. Ltd. are suitable for such use in high frequency circuits as they are non-inductive and have a high surge capacity. These resistors are rated at 90 watts for a rise of 200° C for continuous loading and can be obtained in exact values from 20 to 2000 ohms direct from the makers for about 20/- each. However, supplies have been, and are believed still to be, available on the surplus market for a value of 80 ohms —near enough to the required 75 ohms to be satisfactory in The Antennamatch.

Such resistors are a homogeneous mixture of conductors and ceramic bonds and are of their stated resistance at full dissipation rating only. The resistance cold is somewhat different from the "hot" value; this point should be borne in mind if any attempt is made to check the values of those obtainable as surplus.

The resistor used in The Antennamatch described in this article can be seen in one of the photographs. It is mounted externally to the screening box and between it and the front panel. One end is earthed directly to the box by means of a spring supporting clip, the other end being insulated and connected to the aerial loading switch.

**Indicating Meters**

Whilst any form of centre zero reading meter of about 100 $\mu$A full-scale deflection may be used, there are available on the surplus market very suitable meters in the form of the "Left" and "Right" indicators used with R.1155 receivers. These meters have a full-scale deflection of around 45 $\mu$A when all internal shunts have been removed.

The type to be preferred is designated Ref. No. 10Q/2 —this has two complete movements with two magnets and balance adjustments on both ends of the moving coil pivots. The built-in series and parallel shunts should be removed and connections from the moving coils made direct to the terminals on the back of the case.

Centre marks should be made on each scale with white ink or paint before adjusting the pointers to these marks by means of the external zero adjusting screws. When this has been done, the complete movements should be withdrawn from the case and the back hair spring tensions adjusted to balance the pressure exerted on the pointer by the adjustment to the front springs. By repeated adjustments to front and back springs, balance should finally be arrived at such that the pointers remain at the centre scale marks with the meter placed in any position.

No attempt should be made to adjust the front springs with the movement removed from the case, as difficulty may be experienced in locating the zero adjusting screws in reassembly if this is done.

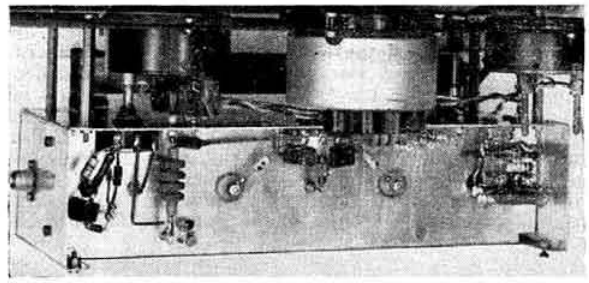
**The Screening Box**

The Antennamatch shown in the accompanying photographs is contained in a screening box of 12 in. overall length, internal screening being provided to form three compartments of 3 in., 6 in. and 3 in. in length, 3 in. in width and 4 in. in height. A further compartment extends along the full length of 12 in. and is approximately 2 in. in height. The construction can be clearly seen in the illustrations and forms a complete and compact unit. The dimensions are not critical but are given as a guide to constructors. The box may be made of 18 s.w.g. aluminium or tinned mild steel.

As can be seen, the unit is mounted on the back of a standard rack panel using stand-off pillars to allow the type 701 dummy load resistor to be held between the panel and screening box. Co-axial connectors are fixed on each end of the box. For ease of component assembly and wiring the top and back should be covered by removable plates.

**Using The Antennamatch**

Some form of aerial matching unit in which it is possible to vary both the load impedance and the reactance thrown back is essential in order to gain the maximum benefit from all the information provided by The Antennamatch. Various suitable networks which enable both these conditions to be varied are shown in Fig. 5. The circuits are suitable for both single ended and twin line feeders. All have been used by the writer with success, but particular attention is drawn to network F, which is very suitable for use with all forms of centre fed aerials normally fed with tuned lines. It



**The mounting of the artificial aerial resistor between the screening box and the front panel can be seen in this picture. The double movement impedance and reactance meter is in the centre, the r.f. voltmeter on the left, and the r.f. ammeter on the right.**

permits accurate matching with wide variations of feeder lengths and impedances.

The split coil should be wound on a suitable former with the two halves approximately $\frac{1}{2}$ in. apart. The inner ends are taken to the feeders and are across the condenser marked "impedance." This should have a maximum capacity of approximately 250 $\mu\mu$F in order to cover wide variations of impedance and should have a plate to plate spacing great enough to prevent r.f. arc-over at maximum power and voltage. The condenser marked "phase," connected across the outer ends of the split coil, should be of approximately 150 $\mu\mu$F maximum capacity and of sufficient spacing to prevent r.f. arc-over.

Between the two halves of the split coil and on the same former is wound the link coil which is connected to the transmitter by 75 ohm co-axial cable. The Antennamatch should be placed in series with this feeder. For all bands above 3.5 Mc/s a one turn link should be sufficient but two turns may be necessary on 3.5 Mc/s to give correct impedance and loading at zero reactance. Separate coils should be used for each band; their inductance must be such that it will resonate at the frequency in use with the feeders and aerial connected.

In operation the transmitter should be tuned up with the output switched to the artificial load with the p.a. loaded to the design figure. Both centre zero meters

**(Continued on page 570)**

# A Hybrid Tee Balanced Mixer and Impedance Bridge for 10,000 Mc/s

By J. A. BLADON, B.Sc. (G3FDU)*

**The 10,000 Mc/s band, the highest allocated to the Amateur Service in the United Kingdom, presents a great challenge to the pioneer worker. In this article the author describes how some of the necessary "plumbing" may be fabricated at home and shows that such construction need not deter the real enthusiast.**

THE purpose of the present article is to describe the simplified theory and construction of a device for use at 10,000 Mc/s for both reception and the adjustment of various apparatus. No apologies are made for extreme simplification (of both theory and design) which is deliberate so that those interested in communication in the 3 cm amateur band may better be able to reproduce the gear with limited workshop facilities.

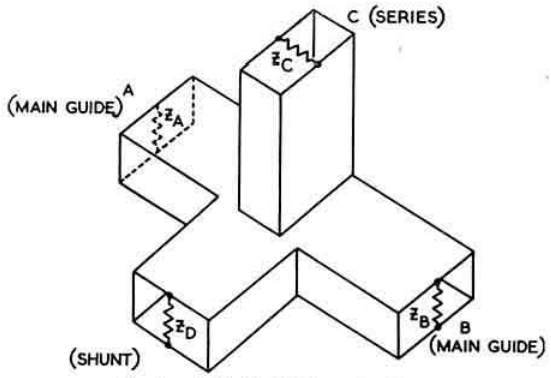



Fig. 1. A simple hybrid tee junction.

A diagrammatic view of a simple hybrid tee junction is shown in Fig. 1, from which it may be seen that the junction is made up of four rectangular waveguides A, B, C and D. A and B are the main guides with a series (E plane) junction C and a shunt (H plane) junction D on a common centre line. Simplified forms of the equivalent circuit are shown in Fig. 2; if the four branches are terminated so as to appear as impedances $Z_A$, $Z_B$, $Z_C$, $Z_D$, the circuit is readily recognised as the familiar impedance bridge circuit. This leads to one important property of the hybrid tee junction, that if the two main arms A and B are terminated in equal impedances, in particular by their characteristic impedance ($Z_A=Z_B=Z_O$), power fed into either of the side branches is completely dissipated equally in the two main branches A and B and no power flows into the fourth branch. This suggests a use for a junction of this sort as an impedance measuring device. By extension of the simple theory, it can be shown that if all branches are correctly terminated, power fed into any one passes only into the two adjacent branches and there is no coupling into the fourth branch. In this condition the matched hybrid tee is sometimes known as a "Magic Tee" and is but one of many devices with similar properties.[1]

Consideration of the directions of the vectors representing the electric and magnetic fields at the junction, leads to a further important property. If power is fed into the series branch C, the resulting electric fields in the main branches A and B differ in phase by 180°.

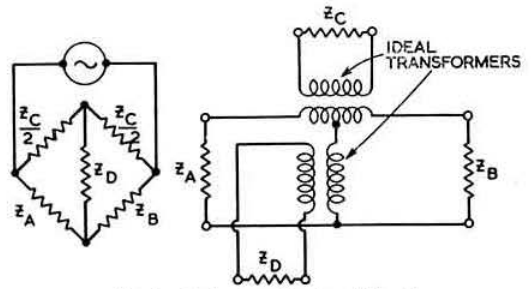



Fig. 2. Equivalent circuits of Fig. 1.

If power is fed into the shunt branch D, the resulting electric fields in the main branches A and B are in phase. This property is used when the junction is employed with suitable crystals as a balanced mixer in a microwave superhet receiver.[2]

The output of a klystron local oscillator, such as is used at frequencies above 3,000 Mc/s, carries a degree of noise modulation. If used with a simple mixer this noise will be added to the signal and will detract from the receiver noise figure. The use of a balanced mixer allows the out-of-phase components of noise due to the local oscillator to cancel at the i.f. amplifier input. This may be done by introducing the local oscillator power into the shunt branch D, and the signal from the aerial into the series branch C (Fig. 3). The two signals divide equally between the main branches A and B where mixing takes place in the silicon crystal terminations. The resulting outputs are combined at the input of the first low noise stage of the i.f. amplifier, but because of the phase differences between the r.f. and local oscillator signals, the oscillator noise voltages can-

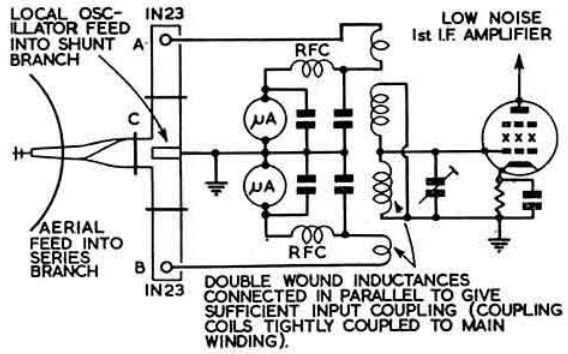



Fig. 3. Balanced mixer connections.

*"Madresfield", Jack Lane, Davenham, Northwich, Cheshire.

cel whilst the received signals reinforce. Since local oscillator noise can be of the same order of magnitude as a weak signal, an appreciable improvement, about 2-3 db, in noise factor may result. Other advantages resulting from the use of a balanced mixer are due to the lack of coupling between the local oscillator and signal inputs, and the fact that the local oscillator works into a reasonably matched load.[3]

**Impedance Matching**

The simple tee junction may be improved by arranging that when branches A and B are correctly terminated, the branches C and D "see" their characteristic impedances when looking into the junction. When this condition is fulfilled there will be maximum power transfer from the branches C and D into the main branches A and B. This matching of a hybrid tee is a problem which may be solved in several ways, one method involving the use of quarter wave transformers of reduced waveguide section in the main branches.[4] A second method, which is simpler in construction, involves the use of an inductive post and an inductive iris for approximate matching at the junction. This and similar methods allow the symmetry of the junction to be corrected by slight movement of the inductive post about the common centre line. The iris and post matching is used in the tee junction shown in detail in Fig. 4, but no provision is made for correcting any asymmetry of the junction.[5]

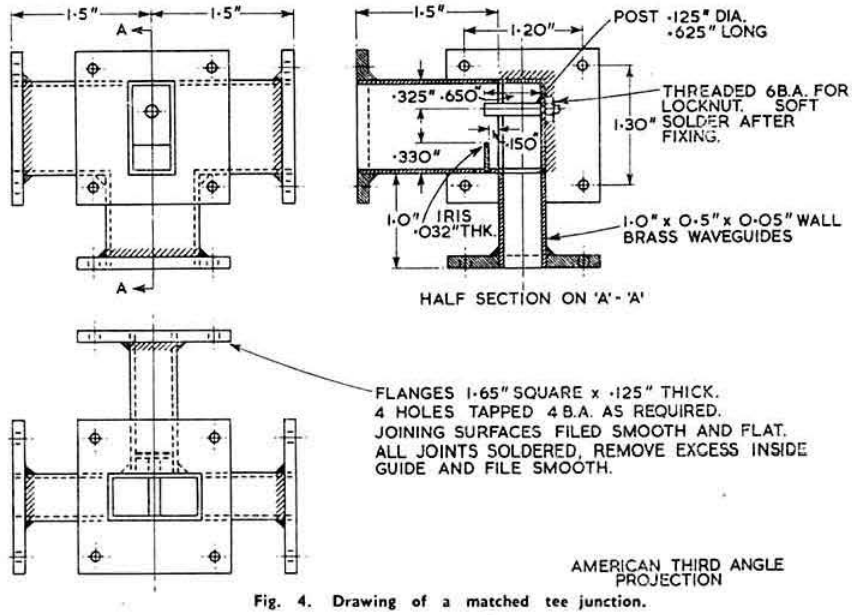



Fig. 4. Drawing of a matched tee junction.

**Construction**

The construction of a satisfactory waveguide component is largely dependent upon the materials and facilities available and the technique of the constructor. Waveguide components have been constructed, which although appearing crude when placed beside the commercial article, have proved quite satisfactory for amateur communication. The tee junction described can be constructed using simple tools and techniques, and the following materials:—

Standard RG-52/U American waveguide ½in. x 1in. x 0.05in. wall.

¼in. thick brass plate for flanges.

0.032in. brass sheet } for matching devices.
0.125in. brass rod }

Solder for jointing.

Of these materials, only the waveguide is non-standard, but there is plenty to be found in junk shops and scrap yards.[6] It is possible that the same sources might yield a supply of plain or choke flange couplings and these should be used in preference to the home-made variety. The latter are substitutes for the UG-39/U and UG-40/U couplings, and with the exception of the 4BA threads, will mate satisfactorily with them.

The balance and matching of the hybrid tee are dependent upon true right angles and accurate centring of the branches, and in this respect the constructor cannot be too accurate. When the component parts have been completed they should be soldered together, care being taken that the insides of the joints and guides are quite flush and smooth. The flange couplings should be filed smooth and plane so as to make good contact with adjacent waveguide components without leakage. The matching devices should be fixed last after all excess solder has been removed. The iris is placed in a sawcut as shown using the minimum of solder necessary to

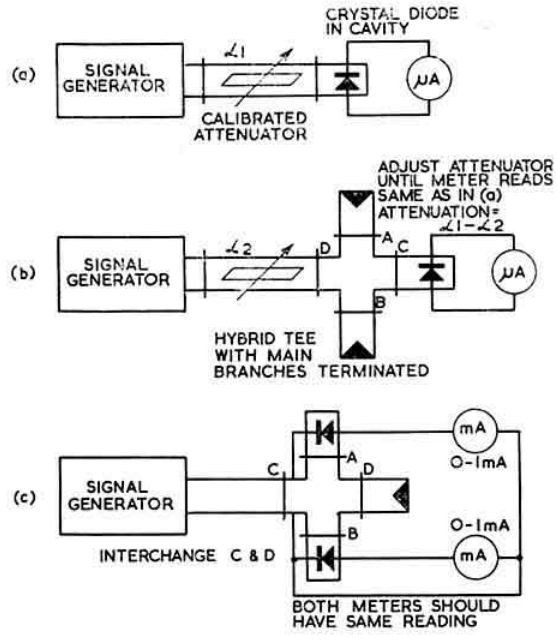



Fig. 5. Test arrangements.

fill in all the gaps. The hole for the post may be drilled and tapped 6BA at an early stage and when ready for fixing, the post may be inserted through the series branch and screwed into the guide to the correct depth. A locknut is screwed on to the shank outside the guide and solder run carefully round the nut and base of the post to hold them in position.

The accuracy and method of making a check of the balance depends upon the test gear available. The simple test illustrated in Fig. 5 (c) consists of feeding power into one of the side branches and simultaneously measuring the rectified crystal currents in the mixers terminating the main guides. These should be approximately equal. The test is open to criticism as individual crystal characteristics vary widely, particularly in home-made mounts, and an apparent unbalance may be due to several factors.

**Testing the Hybrid Tee**

A better test of the hybrid tee may be made by checking the transmission between the series and shunt branches when the main branches are correctly terminated, and comparing the apparent attenuation with that to be expected from consideration of the voltage standing wave ratios (V.S.W.R.s) of the matched loads employed. For this test the following equipment would be required:—

(a) A microwave signal generator, preferably with output monitor and calibrated attenuator.[7]

(b) A microwave receiver. In its simplest form this may consist of a mixer cavity and crystal diode with a d.c. microammeter to indicate output power.

(c) Two matched radio frequency loads. These may be resistive loads, bolometer cavities or high value matched attenuators. In the absence of anything better, mixer cavities or even aerial feeds of the horn variety might be used. Those utilising slot or dipole radiators are very frequency sensitive and should be avoided.[8]

The test arrangement is illustrated in Fig. 5 (a) and (b). The receiver is first connected directly to the signal generator and the output adjusted to give a convenient level by varying the attenuator of the signal generator. The terminated hybrid tee is then introduced between the generator and receiver and the output measured either by re-adjusting the attenuator to give the reference level or by direct reading on the output meter, which may be roughly calibrated for this purpose. An attenuation across the tee better than about 20 db would indicate satisfactory operation in a balanced mixer, but for use in an impedance bridge an attenuation better than 30-40 db would be desirable. The figures obtained should be checked by interchanging the two matched loads and again noting the attenuation, which should be substantially unchanged.

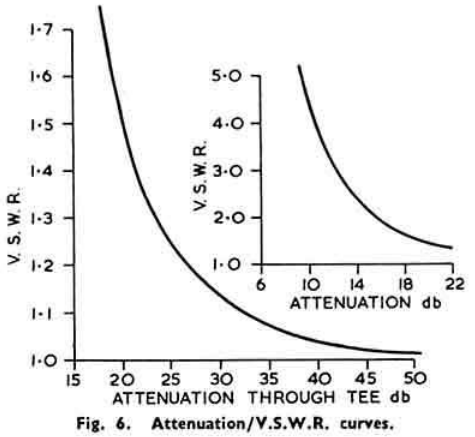



**Fig. 6. Attenuation/V.S.W.R. curves.**

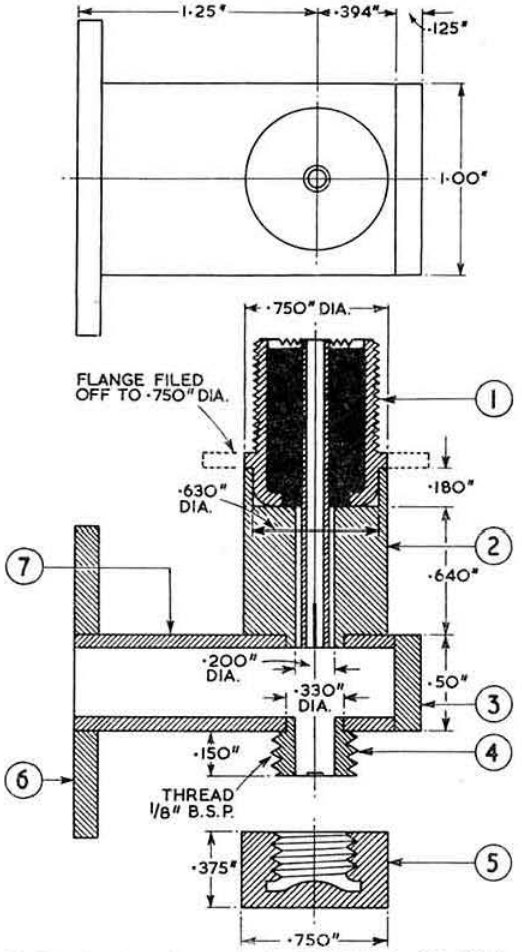



**Fig. 7. Drawing of a mixer cavity for 10,000 Mc/s. (1) U.h.f. type connector with stem. (2) Brass body, 0.87 in. long x 0.75 in. dia. (3) Brass end plate, 0.5 in. x 1 in., 0.125 in. thick. (4) Crystal mount, brass, 0.20 in. long x 0.40 in. diam. approximately. (5) Crystal nut, brass, 0.375 in. long x 0.750 in. diam. (6) Coupling flange, 1.650 in. square x 0.125 in. thick brass. (7) RG52/U waveguide, 1 in. x 0.5 in. x 0.05 in. wall.**

**Use as an Impedance Measuring Device**

When used as an impedance measuring device operation of the tee junction is very much as in the test described above, the difference being that one of the two matched loads in branches A and B is replaced by the component or waveguide system whose impedance is to be checked. As far as the amateur is concerned, only simple systems are likely to be used and it will normally be sufficient to adjust them for the optimum possible voltage standing wave ratio. Bandwidth requirements are not stringent as only about the lowest 150 Mc/s of the amateur band are likely to be used with presently available equipment, designed for use in the radar X band. This implies a 1.5 per cent bandwidth after modification for the amateur band, and is attained without special consideration.

In use, measurements may be made as in the test; reference to the curve in Fig. 6 will give the V.S.W.R. of the component, always assuming that the V.S.W.R. of the reference load in the opposite arm is small. In some cases it may be sufficient to set the arrangement up and adjust the unknown component to give minimum transmission across the tee junction, a procedure which does not necessitate calibration of either attenuator or output meter.

**Balanced Mixer**

In use as a balanced mixer the two main branches should be terminated by crystal mixer cavities as shown in Fig. 3. These should be individually matched if possible for optimum V.S.W.R. and balanced with their individual crystals. A suitable crystal is the American 1N23B; individual crystal currents should be adjusted to 0.5-0.6 mA, giving a noise figure close to the optimum. Rectified crystal current is adjusted by varying the local oscillator output or coupling.[9] Ideally, a klystron local oscillator should operate into a matched waveguide, oscillator coupling into the guide being adjusted to give a low V.S.W.R. in the oscillator output line. In this case local oscillator coupling to the mixer should be adjusted by the use of a matched attenuator inserted between the two.

A suitable home-constructed mixer cavity is shown in Fig. 7. This is made from materials similar to those used for the tee junction and the same notes regarding construction apply. The drawing is self-explanatory, but a note about the u.h.f. type connector might be in order. This is a standard American fitting incorporating the stem shown and has been available in fair quantities in surplus stores. Care should be taken when soldering these connectors as the connector flange metal has a low melting point and is liable to be damaged by excessive temperatures.

**Results**

A hybrid tee junction and mixer cavities have been constructed according to the information given. When terminated by two mixer cavities, individual crystal currents measured simultaneously agreed within 5 per cent. The measured attenuation across the junction with matched loads was better than 25 db, the test frequency being 9375 Mc/s.

In carrying out the tests, the signal generator and attenuator were built from TS146-UP components.[10] The matched loads were TS146-UP bolometer heads. The maximum V.S.W.R. was 1.08. A simple superhet receiver using a CV129 local oscillator and a valve voltmeter type S meter was used as the output measuring device to give the reference level.

The noise factor of the balanced mixer was not measured.

**References :**


[1], [2], [3], [9] "Microwave Mixers", Pound, M.I.T. Radiation Lab. Series, Vol. 16.

[4], [5] "The Technique of Microwave Measurements", Montgomery, M.I.T. Radiation Lab. Series, Vol. 2.

[6], [7], [10] "Amateur Microwave Experiments", Clift, R.S.G.B. BULLETIN, March, April and May, 1953.

[8] "Microwave Antenna Theory and Design", Silver, M.I.T. Radiation, Lab. Series, Vol. 12.


**LONDON MEMBERS' LUNCHEON CLUB**

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,

**at 12.30 p.m. on Friday, June 17 and July 15, 1955.**

Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

**The Time Has Come**

*The time has come, the OM said,*
*To talk of many things :*
*Of mod. and gain and metres read,*
*And what it is that sings.*
*Of DX skeds and local chat,*
*Of dipoles folded neat.*
*Of gadgets to do this and that,*
*And leads in yards and feet.*
*Of testing and condensers which*
*With valves that do not hum,*
*Enable him to pull the switch,*
*And speak to anyone.*
*Of shorter skips and longer ones,*
*Antennas great and small,*
*Of coils of wires and feeders' runs,*
*And aerials by the wall.*
*Of co-ax, masts and TVI,*
*And other things that please,*
*Before, heard with a blissful sigh,*
*"Goodnight, and seventy-threes"!*

"X.Y.L."

With apologies to Lewis Carroll.

**Mr. G. G. Blake**

OLD timers will join with us in offering warm congratulations to Mr. G. G. Blake who has just been awarded the degree of Bachelor of Science by the University of Sydney, Australia, in recognition of his work on applications of radio frequency to chemical analysis and conduction-metric measurement. Mr. Blake was the first both to suggest this line of research and to put it into effect. Since then it has been taken up in Universities and Chemical Laboratories nearly all over the world.

Mr. Blake was an early member of the Wireless Society of London and served on the Governing Body for some years.

**The Antennamatch** (Continued from page 566)

should be correctly zeroed, after which the output can be switched to the aerial proper.

Simultaneous adjustment must then be made to both the impedance and phasing controls until a point is reached where the aerial becomes resonant and takes power from the transmitter. There will be some interaction between the adjustment of these controls as the correct values are approached but with a little practice one adjustment can be worked against the other until a condition is reached where both the phase angle and impedance indicators have zero readings. In this condition, the r.f. power accepted by the aerial should be the same as that into the artificial load. The p.a. loading should also be equal to that when loaded into the dummy aerial.

Transmitter conditions (that is the values of C1, L and C2) should not be altered after being set up on the dummy aerial and all subsequent adjustments to bring about equal conditions must be made entirely with the matching network.

Experience has shown that with fairly large values of impedance and phase angle condensers widely varying conditions can be catered for. However, if reactance cannot be completely eliminated, *i.e.*, phase angle brought to zero, different values of inductances of the split coil should be tried.

Short acquaintance with The Antennamatch as an aid to correct matching and loading of the transmitter to the aerial will serve to prove its very valuable purpose and will make the user realise just how difficult it is to achieve optimum conditions without it.

# An Introduction to Amateur Transmitting

## *Part 5—Frequency Measurement*

By LORIN KNIGHT, A.M.I.E.E. (G2DXK)*

WHEN operating a transmitter it is important to have a fairly accurate idea of the frequency of the radiated signal. In particular we should always be quite sure that the signal does not lie outside the amateur band.

With a crystal controlled transmitter this presents no great difficulty because the frequency will be almost entirely dependent on the crystal. A new crystal is normally sold with a certificate of frequency but if using second-hand or government surplus crystals it is advisable to have their frequencies checked, either by another amateur who has suitable frequency measuring equipment or firms, such as H. Whitaker of Burnley, which advertise a crystal calibration service.

### The Absorption Wavemeter

Knowing the crystal frequency, however, is not in itself sufficient because there is the possibility that the final output from the transmitter may be on the wrong harmonic of that frequency. To ensure that this is not so, it is necessary to use an absorption wavemeter such as is shown in Fig. 22. This would be built as a compact portable unit and, to test the output frequency of any stage, would be held close to the relevant tuned circuit. With the wavemeter resonated to the circuit to which it is coupled some energy is absorbed from that circuit. If the wavemeter is held close enough the r.f. current induced into it will be sufficient to light the bulb. Thus, provided that the wavemeter has been previously calibrated, it is only a matter of tuning for a resonance indication on the bulb and reading off the frequency.

A convenient method of calibrating the wavemeter is to use a communications receiver. An aerial is connected to the receiver, the lead-in wire being loosely wound once or twice around the wavemeter coil on its way to the aerial socket. If a suitable station is then tuned in it will be found that at a certain setting of the wavemeter capacitor the strength of the received signal will fall. This will indicate that the wavemeter is absorbing some of the incoming signal and that it must therefore be tuned to the frequency of that station. By repeating this operation with a selection of stations a number of calibration points can be obtained and it will therefore be possible to prepare a calibrated scale to fit under the knob of the variable capacitor.

A low power stage may not be capable of providing enough r.f. power to light the bulb. Under such circumstances resonance indication can be obtained from the anode current which will rise when the wavemeter absorbs energy.

### Crystal Calibrator

When using a variable frequency oscillator the absorption wavemeter is still invaluable for checking that circuits are tuned to the correct harmonics but it is not capable of giving a sufficiently accurate reading of the actual frequency. It is essential therefore to compare the transmitter against a more accurate frequency standard and the obvious choice is a crystal-controlled oscillator.

A simple way of adding a crystal-controlled calibrating unit to a v.f.o. is shown in Fig. 23. The triode section of V1 is used for the crystal oscillator. The crystal behaves rather like a parallel tuned circuit and, when LC3 is resonated to approximately the crystal frequency, the feedback *via* the anode-grid capacitance causes oscillation. Grid 3 of the hexode (or mixer) section of V1 receives an r.f. voltage from this oscillator *via* the internal connection to the triode grid while grid 1 receives another r.f. voltage from the v.f.o. or, preferably, from the anode of a buffer stage following the v.f.o. Since grid 1 controls the electron flow of the entire hexode section, the alternating anode current due to the r.f. voltage on grid 3 will be modulated by that on grid 1. The alternating voltage appearing across R3 will consequently contain not only the two original frequencies but the sum frequency and the difference frequency, the latter two being equivalent to what are called the sideband frequencies when an r.f. voltage is modulated by an audio frequency.

Now it is the difference frequency which interests us because we know that when this is reduced to zero the v.f.o. must be tuned to the crystal frequency. Thus V2 is added to amplify the difference, or beat, frequency as it is often called, so that it can be heard in a pair of headphones. The two original radio frequencies and the sum frequency will, of course, be inaudible but C6 is included to suppress them so that they do not overload V2.

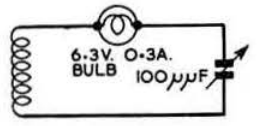



**Fig. 22. Simple absorption wavemeter. This might have three plug-in coils, on 1 inch dia. formers, wound as follows: 90 turns 32 s.w.g. enam. (approx. 1.5–4.5 Mc/s); 32 turns 22 s.w.g. enam. (4–12 Mc/s); 7 turns 22 s.w.g. enam. (11–33 Mc/s).**

Assuming that the v.f.o. tunes from 3.5 to 3.8 Mc/s, let us suppose for the moment that the crystal oscillator operates at 3.5 Mc/s. This would allow us to tune accurately the v.f.o. to that frequency by tuning it for a zero-frequency beat note in the headphones. As the v.f.o. approached the crystal frequency we would hear a beat note whose pitch became lower as the difference between the two frequencies became less. If we continued to rotate the v.f.o. tuning capacitor in the same direction there would be a momentary silence as we passed through the crystal frequency and then the beat note would start to rise in pitch again. Because of the deficiencies of normal headphones we may not hear any beat note lower than about 200 c/s and zero beat must be taken as being roughly in the centre of the silent zone. This may at first seem rather inaccurate but it must be remembered that even if we are as much as 200 c/s out in 3.5 Mc/s this only amounts to an error of 0.006 per cent.

Now if, as has just been supposed, the crystal frequency were 3.5 Mc/s, this would give only one check point which is not really sufficient. We could have a selection of crystals but this would be rather expensive. A more economical method is to have the crystal oscillator on 100 kc/s. It will then give harmonics at 3.5, 3.6, 3.7 and 3.8 Mc/s, thus giving several check frequencies with only one crystal. These harmonics, and the beat notes they produce, will be rather weak, but the circuit gives sufficient amplification for them to be easily audible on headphones, or even on a loudspeaker.

*28a Glebe Road, Letchworth, Herts

There will, in fact, be some other audible beats as well. When the v.f.o. is tuned to 3.55 Mc/s, for example, its second harmonic (7.1 Mc/s) will produce a beat with the 71st harmonic of 100 kc/s. Other beats will be similarly produced at 3.65 and 3.75 Mc/s. These three intermediate beats will be easily distinguishable from the main ones by their relative weakness. Still fainter beats may be heard at 3.533, 3.567, 3.633, 3.667, 3.733 and 3.767 Mc/s, these being caused by the third harmonic of the v.f.o. beating with harmonics of 100 kc/s.

When using the 100 kc/s crystal oscillator for the initial calibration of the v.f.o. care must be taken that the lowest v.f.o. frequency is really 3.5 Mc/s and not 3.4 or 3.6 Mc/s. The accuracy of the average absorption wavemeter is not adequate to make such a distinction and an additional check should be made by tuning in the v.f.o. on an accurately calibrated receiver. When doing this care must be taken not to feed too strong a signal into the receiver as this might sometimes lead to an erroneous result.

Although it has been assumed above that the v.f.o. output would be on the 3.5 Mc/s band the circuit of Fig. 23 could be applied to a v.f.o. operating in any other band. With the v.f.o. output in the 1.8 Mc/s band, for example, the crystal would give three main check points at 1.8, 1.9 and 2.0 Mc/s, together with additional check points at 1.85, 1.95, and possibly at 1.833, 1.867, 1.933 and 1.967 Mc/s.

### Checking the 100 kc/s Oscillator

In the British Isles we are fortunate in having an accurate 200 kc/s frequency standard available to all in the form of the B.B.C. long wave Light Programme transmissions. These are very convenient for checking the frequency of the 100 kc/s crystal oscillator, as a receiver can be tuned to 200 kc/s and, by suitably coupling the aerial wire to the crystal oscillator, an audible beat obtained between the second harmonic of the latter and the B.B.C. station.

Although the oscillator frequency will be primarily determined by the crystal it will be possible to effect a very fine control by means of the preset capacitor C5. Provided that the crystal has been purchased as being suitable for this type of circuit it will be possible by means of this capacitor to adjust the frequency to within 1 c/s of 100 kc/s. A 1 c/s beat note itself is, of course, inaudible but its effect on speech or music—a slow repetitive rise and fall in amplitude—is by no means inaudible.

### The Heterodyne Frequency Meter

Many amateurs do not have a crystal calibrator built in as an integral part of their transmitters but have what is usually called a heterodyne frequency meter as a separate instrument. This usually consists of an accurately calibrated v.f.o. complete with a crystal calibrator similar to that which has been described here. With some instruments the calibrated oscillator must be compared with the transmitter v.f.o. using a receiver. Others have facilities for accepting a small r.f. voltage from the transmitter, the comparison being effected by producing a beat note between the two frequencies within the instrument itself.

Many amateurs use an excellent American instrument of the latter type, the BC221, which was once readily obtainable on the surplus market. The newcomer, however, probably will not be lucky enough (or rich enough) to obtain one today. He could construct a similar frequency meter himself but it will often be simpler, and just as efficient, to add a crystal calibrator to the transmitter v.f.o.

### Use of 100 kc/s Oscillator Alone

It is possible to check the calibration of a v.f.o. against a crystal oscillator by using a receiver. The latter is tuned to the required harmonic of the oscillator and the v.f.o. coupled into the receiver input and tuned for zero beat. It is an unfortunate characteristic of a superheterodyne receiver, however, that a strong signal can be received at several spurious tuning points and it is not always obvious which signals are true harmonics of 100 kc/s and which are spurious. There are consequently possibilities for errors and the use of this method is not recommended.

### The Grid-dip Oscillator

Another type of frequency meter which is sometimes useful is the grid-dip oscillator. This is really nothing more than a calibrated oscillator which can be tuned over a wide range of frequencies and which has a moving-coil meter indicating the grid current. If it is coupled to an external tuned circuit the grid current meter will "dip" when the oscillator is tuned to the resonant frequency of that circuit. This is because the latter will absorb energy from the oscillator, thus reducing the amount of r.f. feedback to the grid and, in consequence, reducing the grid current.

Since the grid-dip oscillator provides its own r.f. energy it does not require the circuit being checked to be energized. It is therefore useful for checking the resonant frequency of tuned circuits, r.f. chokes, aerial systems, etc.

(Continued on page 575)

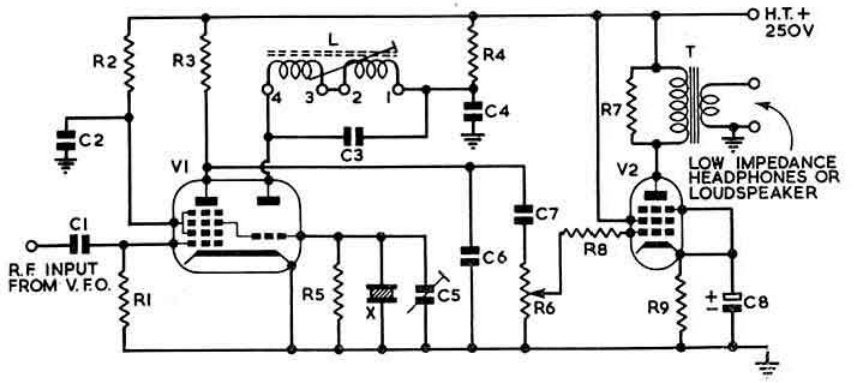



**Fig. 23. Simple crystal calibrator for adding to a v.f.o. C1, 20 μμF; C2, 0.25 μF 350 V; C3, 400 μμF; C4, 0.01 μF 350 V; C5, 25 μμF air-spaced preset; C6, 0.001 μF 350 V; C7, 0.1 μF 350 V; C8, 50 μF 12 V electrolytic; L, Osmor OA9. (The inductance must be increased a little by squeezing the windings closer together. The final adjustment of inductance can be made by varying the position of the core); R1, 1 Megohm ½ watt; R2, 68,000 ohms 1 watt; R3, 47,000 ohms 1 watt; R4, 33,000 ohms 1 watt; R5, 470,000 ohms ½ watt; R6, 500,000 ohms volume control; R7, 47,000 ohms ½ watt; R8, 22,000 ohms ½ watt (wired direct to valveholder to act as parasitic stopper); R9, 150 ohms ½ watt; T Output transformer (small pentode type); V1 ECH42, 6C10, X150, etc., V2 EF91, 6C12, Z77, etc.; X, 100 kc/s bar (give circuit details when ordering).**

# Empire DX Tour

## *G3IDC's DX Expedition Extraordinary*

By Sgt. FRANK JOHNSTONE, R.A.F. (G3IDC)*

DURING the 1954 R.S.G.B. Amateur Radio Exhibition someone suggested that it would be a good idea to see how Service amateurs were faring in the Far East. Group Captain C. C. Morton, C.B.E., readily agreed to allow me to travel with his aircraft, the R.A.F. Hastings *Iris II*, which takes inspection teams to overseas R.A.F. stations and radio navigational aids at least twice a year. So it was that when on February 12, 1955, *Iris II* took off from R.A.F. Benson bound for the Far East, Australia and New Zealand, I was one of the aircrew.

### Preparations

Before this, however, much had to be done. The most important job was to obtain permission to operate from the various countries we should be staying in for more than a night. To this end, W/Cdr. W. E. Dunn, O.B.E. (G2LR), Vice-President of the R.A.F. Amateur Radio Society, moved heaven and earth with the Commonwealth Telecommunications Board in London. Suffice it to say that the necessary permits arrived literally in the nick of time—just as we were waiting to take off from Benson!

As a special concession, I was allowed to take two transit cases containing an Eddystone 740 receiver, a miniature bandswitched 3.5 to 28 Mc/s transmitter, power supply, n.b.f. modulator, key, microphone, 300 ft of R4 aerial wire and spare valves.

### Malta

Our first overnight stop was at Malta where I had a land-line QSO with ZB1CH. The next day, on to Cyprus, the first country from which I had a permit to operate. It was there that I began my main job on the flight—to start up R.A.F. Amateur Radio clubs.

### R.A.F. Amateur Radio Clubs

A word about this scheme would not go amiss here. The R.A.F. and R.A.F.A.R.S. feel that ultimately there should be a complete network of R.A.F. Amateur Radio clubs on R.A.F. stations at home and abroad, starting with the major R.A.F. stations overseas and then broadening out to cover all stations no matter what size. When a member of the R.A.F. who is a radio amateur is posted abroad he has no weight allowance to carry anything bar his own Service and personal kit. What a boon if he could arrive at his destination and be able to continue with his activities without a break. In this way he would be able to start straight away with an application for a licence, and to operate from his R.A.F. Station. At the same time, arrangements could be made for some of his gear to be sent out from the U.K. Meanwhile, it would be possible to operate the club rig without being tempted to go on the air without a licence. The other aspect of course is that Servicemen who have a "yen" for Amateur Radio can see the hobby in operation instead of just reading about it.

### Eastwards Again

Whilst in Cyprus I met Cpl. Vic Cook (G3JKQ) at R.A.F. Haraklis, and Cpl. Hubbocks at R.A.F. Nicosia, both of whom are well on the way to obtaining ZC4 licences. I had several long QSOs with G8FC whilst on the island.

Sgt. Frank Johnstone (G3IDC) with the R.A.F. aircraft Iris II in the background.

At R.A.F. Khormaksar, Aden, where we were all glad to change from blue to khaki drill, the powers-that-be had put a "bunk" at my disposal. On the verandah there was about 15 ft of wire 10 ft high. Nothing loath, the gear was set up and fed into this "aerial." The first call resulted in a QSO with VQ4NU (Nairobi). Heartened by this success a longer length of wire—about 160 ft and 20 ft high—went up between the building and the N.A.A.F.I. While there I did some 'phone work, mostly locals such as VQ4 and 4S7, although CO2BL and CO2BK were worked with some help from VQ4AQ on a hit and miss basis!

Next we flew north-east, heading for three stops which all amateurs should look on as "paradise." I know that Cpl. Johnny Wheeler (ex-VS9AW), who is at present VS1GR but unable to operate, would agree with me when I say that R.A.F. stations Riyan, Salalah, and Mosirah Island, are perfect examples of where all Service amateurs would like to be posted! Work in the morning, swim in the afternoon, and then on the air!

### The Gem of the Indian Ocean

On next to Ceylon, where we landed at R.A.F. Negombo. This island, gem of the Indian Ocean, is another paradise for Service amateurs. Again, work in the morning, followed by cycle rides through picturesque villages, either to the sailing club close by, or further

A view of the ground radio workshop at R.A.F. Butterworth, Northern Malaya, during the visit of the "Iris" team. Sgt. Johnstone is in the foreground. *(Photo by VS1BP*

*R.A.F. Locking, Somerset

afield to silver sanded beaches fringed by waving palms. However, evening found me struggling to raise G8FC with an aerial about 20 ft long completely shielded by coconut palms far higher than I could get my piece of wire! Some measure of recompense though was to hear the charming voice of 4S7YL (Suma) who is a fairly constant inhabitant of the 14 Mc/s 'phone band in Colombo.

**Malaya**

After an all-too-short stay in Ceylon we went on to Penang (R.A.F. Butterworth), where we were welcomed by S/Ldr. Bennett (VS1BP, G8PF). Benny had flown up from Singapore to accompany the team on their journey round the F.E.A.F. stations. My pleasure at meeting Benny was heightened by finding that he had "arranged" a 250 ft long wire for my use. This was the first aerial in the clear that I had been able to use since leaving the U.K. Within a couple of hours of landing, G3IDC/VS2 was on the air. Naturally, the "shack," a small workshop, was always packed with hams-to-be!

The Sunday after our arrival, G3IDC/VS2 broke in on the Malay Amateur Radio Society 7 Mc/s 'phone net. The first contact with VS2DQ (James Pershouse) was quickly followed by chats with VS2DB, 2EF, 2DH, 2UW, 2EG, and 2EL. In the afternoon S/Ldr. Bennett and I had our first taste of Malayan amateur hospitality at VS2DQ's estate at Kuala Ketil, near Kedah. There we met his charming wife Marion who regaled us with typical West Country fare—a truly delightful surprise in that land of tinned foods.

**A view of the operating position at VS2DQ in Northern Malaya near the border with Siam. In 18 months' actual operation, 132 countries have been worked on 14 Mc/s phone. Aerials in use include a 3 element rotary beam for 14 Mc/s with a 4 element 144 Mc/s array above it.**

VS2DQ runs a Panda PR120V and an AR88 with a rotary beam on 14 Mc/s, in addition to doing quite a lot of operation on 144 Mc/s. He has some difficulty with his d.c. power supply which is generated on the Estate, having to be careful when switching on and off to balance the load with the house lighting, otherwise the generator behaves like a temperamental prima donna! Before dark we had to leave Kuala Ketil, the drive being punctuated by remarks from VS2DQ such as "This is where the last ambush took place."

**Hong Kong**

I had been warned of the difficulties of working from Hong Kong before leaving England, and seeing the forbidding mountains as we made our final approach at R.A.F. Kai Tak, did nothing to alleviate the misgivings I already had. A false start was caused by the powers-that-be having an aerial erected at the official transmitting station for my use. It was truly a grand sight, 70 ft high and nearly 500 ft long. The trouble was that I couldn't touch the feeder with bare hands and dare not put it on the receiver. The constant r.f. induced into the aerial and feeder was such that a 100 watt lamp was lit to full brilliance by connecting it between the feeder and my earthed rig. I therefore moved as far away from the transmitting station as possible. Even though the aerial situation was really poor and the equipment had to be carried up a vertical ladder, I could at least operate without being burnt! In spite of the mediocre aerial, the third and sixth contacts were with LA7NE and DJ2BC respectively. Although I worked many Europeans, I did not hear a single British station.

A miniature hamfest was arranged by the local amateurs for the weekend. Amongst the twenty or so present when we invaded the N.A.A.F.I. for beer and hot-dogs were VS6DG, 6DD, 6CT, 6DF, 6CW, 6DC and 6DB. The three clubs in the area, Little Sai Wan, Sek Kong, and Kai Tak (from where most of the R.A.F. boys operate with their own calls), are very active. I wished that I had found the same activity on my journey so far. In Kowloon itself I had the pleasure of meeting Pat O'Brian (VS6AE), one of the founders of the Hong Kong Amateur Radio Transmitting Society — a very active organization which holds regular meetings in Kowloon to which all visiting amateurs are made welcome.

Regretfully I left Hong Kong, and after a short stop at Saigon *Iris II* arrived at R.A.F. Changi, Singapore, where my last contact was with G8FC at 00.45 local time. After packing the gear I arrived at the transit hotel at Changi Creek just in time to meet the laddie coming round with our early call at 01.15 hours. As a result, one member of the crew was just a little tired when we arrived at Darwin (Australia) after eight hours' flying. The flight plan was across Australia in two hops with overnight stops at R.A.A.F. Amberley and R.A.A.F. Richmond, then on to New Zealand, landing at R.N.Z.A.F. Whenurpai, near Auckland, on North Island.

**New Zealand**

Arrangements had already been made by the R.N.Z.A.F. to enable the *Iris* team and crew to visit the thermal region of Rotorua—tourist centre of the area. Rangi, the senior guide, took us round the Maori village, the showpiece of Rotorua, with its boiling pools, geysers, and bubbling mud pools side by side with sparkling ice-cold streams.

On once more by car to R.N.Z.A.F. Wigram, near Christchurch, where in an afternoon we were conducted round this typical English city. The only unusual feature was provided by the pubs—they all close at 6 p.m.!

An overnight stay at Wigram and we took off for R.N.Z.A.F. Ohakea, near Wellington. The following day we travelled to Wellington itself where I was met by F/Sgt. Johnny Johnstone of the R.N.Z.A.F., himself a ham but not currently active. He in turn arranged a meeting with Jim Gorman (ZL2IY), Communications Manager of the New Zealand Association of Radio Transmitters. Jim, although very busy, drove Johnny and me up Victoria Peak and from the observatory there we saw the whole panorama of Wellington, its harbour and the surrounding mountains stretched before us.

In the evening ZL2IY took us to visit local amateurs.

I learned quite a lot about their Amateur Radio Emergency Corps, which is magnificently organized. Jim assured me that within five minutes of receiving notification from the local authorities the whole organization would be in action, either day or night. Perhaps R.A.E.N. could learn from the A.R.E.C. official operating manual which is extremely enlightening, covering as it does every possible contingency.

The other point which I found interesting in the N.Z.A.R.T. organization was the practical help which it gives to the "novice" amateur by a system of Official Observer Stations. These stations, on a prescribed frequency for a set period, are run on a voluntary roster system. All the novice has to do if he has any query, or perhaps a snag on his transmitter, is to call the listed Observer Station who will help all he can. The system helps to prevent newly licensed amateurs making mistakes which would reflect upon the amateur body as a whole.

The next day we returned to Ohakea where I visited and operated ZL2WP from the only active club station in the R.N.Z.A.F. This station, manned by ZL2WM, 2APK, and 1AJW, is at present only active on 3.5 and 7 Mc/s. However, 14 Mc/s will be used very soon. A limited spell of operating (four hours) and we were on our way once more to Whenurpai, from where DL, ON, I, PY, ZP, W, VE, G, GM, LA, EA, HB, JA, YJ, ZS, and OZ were worked.

**Australia**

From Whenurpai we retraced our route to the R.A.A.F. station at Richmond, 60 miles from Sydney. As it was Easter the R.A.A.F. arranged for the team and crew to stay at Bankstown, a suburb of Sydney. F/Lt. Frank Hynes (VK2QL) and Jim Corbin (VK2YC) soon made themselves known, and the time was spent very pleasantly meeting many Sydney amateurs. The highlight came when I visited Perc Healy (VK2APQ) who is a 2 m man. He suggested that a call on "two" from G3IDC/VK2 would liven things up a little. Never had Perc heard such a commotion on the band in all his experience! On the following Tuesday we left for R.A.A.F. Laverton, near Melbourne, from where, for four days, I had the pleasure of using an extended "Lazy H" array on 70 ft wooden self supporting poles! Darwin was our final port of call—this time the weather was more pleasant.

One thing which really stood out in both New Zealand and Australia was the wonderful hospitality extended to the visiting amateur by the locals. No trouble is too great, no detail too small. I did hear it mentioned, a number of times, that VK and ZL amateurs visiting the Old Country had been more or less cold-shouldered at the exhibitions which they attended. Could it be that amateur hospitality is wearing a little thin in the U.K.? It is perhaps a point to note at future shows.

**Singapore Again**

The pleasure of returning to Singapore was marred by learning that S/Ldr. Bennett (VS1BP) had left the previous day on a flying visit to the U.K. However, the 250 ft wire was still up.

R.A.F. Stations Tengah, Seletar and Changi are places we should be hearing much more about in the near future. Accommodation is a serious problem with club stations overseas but knowing radio amateurs the world over they always keep one eye open for a suitable site. Even though it is not always perfect, there is usually room to manage a decent aerial.

At this point I must thank the amateurs who very kindly changed frequency when I was working G8FC. "Pop" Seymour (G3GNS), who did the majority of the operating at G8FC during the trip, then had a chance to copy G3IDC. Others repeatedly called during QSOs with G8FC—I need not record what I thought. An RST and QTH is reasonably easy to copy through European QRM back here in the U.K., but taking copy is another thing altogether, yet "Pop" managed everything in fine style. (Even if at times I had to send a few words and then break to see if he had received them!)

**Homeward Bound**

Our route back was slightly different from the outward flight covering the navigational aids on the jet route. This took us, with overnight stops, via Bangkok and Calcutta. After a short stop at New Delhi we arrived at R.A.F. Mauripur (Karachi). Pakistan was the last country from which I had permission to operate. Needless to say full advantage was taken of the fact.

R.A.F. Habbaniya with its well-known club station—YI2AM—was our next landing place. Even though it was only an overnight stop the boys there—John Copson, Dick Pattinson and Brian Page—made me most welcome. A sure DX getter is the voice of the YL there, Rosemary (Nicky) Hutton, whose dulcet tones enhance the already attractive prefix YI2!

Forty-eight hours later *Iris* touched down at R.A.F. Benson after what was for me a most memorable journey of 30,000 miles—a unique opportunity to practise a most fascinating aspect of Amateur Radio: meeting people personally whom one only knew previously as a voice or a "fist." Above all, to find out that wherever a ham goes he is greeted as a friend.



**An Introduction to Amateur Transmitting**

Continued from page 572

**Bibliography**

Additional information on frequency measuring apparatus and techniques can be obtained from *The Radio Amateur's Handbook*, *The Radio Handbook* and *Simple Transmitting Equipment*, all of which were referred to last month, and from the following recently published articles.

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(*This series of articles will be continued in Volume* 31 *beginning July*, 1955)

# TWO METRES AND DOWN

By F. G. LAMBETH (G2AIW)*

IN recent times, economic and national conditions have led to the rise of the Planner—much praised by some, and equally vilified by others. Whatever one may think of the Planner, he is sometimes very necessary in the scheme of things. This truth was never more evident than in Amateur Radio. For instance, certain thoughtful people devised a 2 m Zone Plan soon after the band was opened to amateurs. In effect, it split the British Isles into mutually non-interfering areas, and indeed worked very well for a time in this fashion Why then, have some users of 2 m decided that this Plan is not for them? It is commonplace now to find stations in parts of the band which bear no relation to their Zone. As one of the benefits of Band Planning is the ease with which one can locate an area of operation, it is all the more necessary that the Band Plan should be adhered to. It may cost another crystal, but it does pay dividends to all concerned.

The foregoing remarks need not, of course, affect spot frequency operation as was envisaged last month, as these nets would certainly change frequency to their appropriate Band Zone if a normally unpopulated net frequency should suddenly "come alive". French amateurs have established a Plan similar in many ways to our own, which probably means that the British Plan is not so bad after all! If you do not conform to the Plan we ask that you do so as soon as possible. To those who do, the thanks of all are yours.

If, after all this, any member has a suggestion for improving the Band Plan, why not write and tell us your views ?

### 70 cm Mobile Work

Apropos 70 cm mobile records, we understand from G8TL that these were forestalled by activities in March, 1953, when a group consisting of G3ECA, 3IRR, 3HWG, and 2BRH had QSOs on 70 cms with '8TL, who transmitted on a portable licence whilst stationary and received whilst mobile. The area covered comprised Ilford, Hainault, Havering, and Ongar, Essex. Contact was lost after a few hundred yards and regained on and off afterwards according to terrain, and improved as G8TL/P proceeded nearer to the open country, when S8/9 signals were passed between the four fixed stations and G8TL. When at Havering Hill, it was found that on high ground there was no difficulty and contact was maintained at S8 even at 7 miles distance. The TX/RX was constructed according to G3ECA's circuits in the BULLETIN (self-excited equipment) and the aerial was a turnstile on the rear bumper 15 ft. high.

(Readers will appreciate that these tests took place before the G.P.O. agreed to issue mobile licences. The recent achievements still stand as official records.—ED.).

### Two Metres

Mid-April to mid-May is the time when the band should be improving apace, but it appears that "spring will be a little late" and the bands have suffered accordingly. No conditions worthy of note occurred between the opening on April 19 when G6XX worked SM6ANR and other continental stations (such as they were) until May 24-25.

Although the Two Metre Field Day was marred by very bad weather, many stalwarts did extremely well to operate under conditions of storm and lightning which must have daunted the hearts of lesser men. The portable stations running on low power are especially to be praised for the ingenuity which has led to such excellent equipment.

### Station reports—2 m

**B.R.S.19162** (Dewsbury), who is in favour of activity periods at almost any time up to 22.30, supposes that "activity period" means making CQ calls in various directions and not waiting for the other fellows to do this. In principle we agree, but there *has* to be someone listening as well, otherwise no QSOs! '19162 has completed his six-element outdoor stack. The best signal lately has been G6XM/P, 12 miles further away than

## *Two Metres Wide Open Again!*

WHITSUN weekend saw conditions on 144 Mc/s wide open for communication over Western Europe. Activity on both sides of the Channel was higher than ever before, being particularly so on May 29 and 30, and again on the 31st, although by then conditions had passed the optimum.

So many British stations made contact with continentals that it is impossible to mention more than a few calls, but an idea of the area covered by the belt of good conditions can be gathered from the following examples. GM2FHH (Aberdeen) contacted ON4BZ (Brussels) and worked eleven DLs. GM3EGW (Dunfermline) worked several continental stations. G5YV (Leeds) raised OZ2FR while G5TZ (Isle of Wight) had many QSOs including one with DL1FF (Kiel) who was later called by F9JY. Signals from many Belgian, Dutch, German and Danish stations never before even heard in the United Kingdom, were received at "wipe out" strengths. It is estimated that between 60 and 70 Europeans were audible in London and the Home Counties on May 30. During the evening of May 31, OZ7SP made contact with a number of stations in London and the Home Counties.

Similar conditions existed on 420 Mc/s. On May 29, G3KEQ (Sanderstead) worked PA0WAR at S9+ on phone, followed by G2FNW (Melton Mowbray) and G5YV (Leeds). G5YV worked ON4HN, PA0WAR and heard DL9QV (Brunswick) who was not equipped to receive on 70 cm. For the full story, see next month's ***Two Metres and Down.***

*21 Bridge Way, Whitton, Twickenham, Middlesex

usual, and 10-15 db stronger. G3IOE (Newcastle-on-Tyne) and G3CC (Keyingham, Hull) have been heard for the first time. **B.R.S.6327** (Earlsfield) was only able to listen during the month on eight evenings when conditions were fair, but activity low in the south. Forty-four stations were heard during the 2 m Field Day from 13.23 to 18.08 GMT. A four-element Yagi is now in use and will be raised to 30 ft. soon.

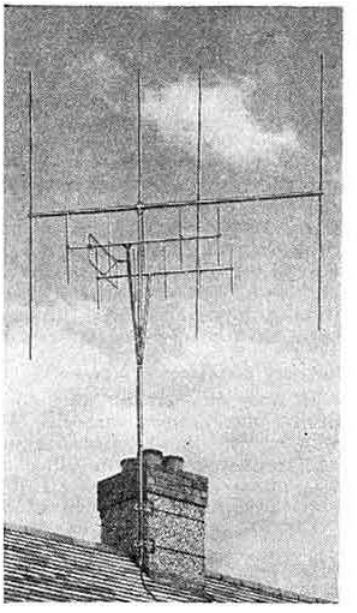
**G3FKO** (Bath) had 36 contacts on Field Day when, with G3FIH, he operated as G3FKO/P, 1,000 ft. a.s.l. 2 m n.n.e. of Wells, Somerset. During 7½ hours under appalling conditions, G6XM/P and '5YV were heard continuously but called in vain, as were GC2FZC, GW3GWA/P and many others. The equipment was again as described in the January, 1954, BULLETIN (3.5W to a pair of p.p. 6AK5s.). The aerial was a double slot with reflectors at 18 ft. No London stations were heard but several Birmingham stations were worked at about the same distance! **G4JJ** (Barnsley) having re-started his /P activities, will be heard from various parts of the country this season, but, he regrets, seldom in the "rare" counties. On Field Day '4JJ/P sited 1,250 ft. up at a spot 8 miles east of Buxton (Derbys.), worked 19 out of 20 portables heard, but nothing over 160 miles. G3FAN (Ryde, 200 miles) was called six times without success. **G2HIF** (Wantage) writes after a long absence to say he has been constructing new 2 m equipment. He has finished a neat little transmitter and receiver especially for 2 m, equally suitable for /A,/P, fixed or mobile. The transmitter gives 12½W on phone and 25W on c.w. This was easy enough, but the design and construction of the receiver was really difficult, owing to the problem of fitting all the components into a small box (8½ in x 5¾ in x 7 in), containing, *inter alia*, 15 valves and 2 germanium diodes. G2HIF expects to be /P in the Hull district in June and looks forward to QSOs with old and new friends from various locations.

**G3FIB** (Edenbridge), a newcomer to 2 m, started listening in February and transmitting in mid-April. Most of his activity has been portable; 16 stations were worked recently during five days in Lancashire. G5TZ (I. o. W.) is the best DX so far, being S9 + at 77 miles under poor conditions. The QRP equipment has a QV04/7 p.a. at 9 watts, G2IQ converter and four-element Yagi 6 to 12 ft high. '3FIB is very pleased with results so far and is looking forward to much more activity this summer. **G5MR** (Hythe, Kent) found conditions very poor during the Two Metre Field Day and only worked '3DIV/P and '3DVQ/P both at S9. G3ABA/P (Coventry), '6AG/P and '8KW/P were heard. The same weekend saw the V.H.F. Section of the "Coupe du R.E.F." event but conditions, which had been good, tailed-off on the Saturday, and only nine French stations were worked. The best contact was with F8ME (St. Brieuc), a distance of 245 miles. On the Sunday, most of the stations previously worked were heard again, but very few new ones, and no further QSOs resulted. '5MR had a pleasant surprise when '3CCH (Scunthorpe) made a personal visit to Hythe less than 14 days after their contact on 2 m. '3CCH was accompanied by G3EMU (Canterbury). '5MR agrees with '8LN's remarks regarding surplus gear and has always found it preferable to strip right down and re-build from scratch, rather than to modify. '5MR heard both sides of the GC2CNC-F8ME contact on April 12 and cannot understand '2CNC's difficulty in raising England. His signal was 559 at Hythe and he was called several times without success.

**G8VN** (Rugby), who has been ill, has worked G2ANS, '3GZM and '6OX for new ones since April 15. However, from his limited listening time '8VN feels that conditions have not been very good anyway with some exceptions, such as April 17-18, when G3AGS (Manchester) was strong, with G5TZ on the 22nd and G6FO on the 26th, all called but not raised. **G2CZS** (Chelmsford) found April 19 the best evening with three new stations (G2BVW, '3BJQ and '3GAV) and '3EPW and PE1PL worked. G2BMZ (Torquay) was again heard at S9 but could not be raised. '2CZS hopes to put up a new 3-over-3-over-3 soon.

**G5CP** (Chesterfield) had a few QSOs during 2 m Field Day but otherwise has little to report. Mobile operation is envisaged for the summer. **G3JGJ** (Plympton) has completed a 48 ft steel tower, and the problem now is to get it up! G2BSA (Looe, Cornwall) is expected to be on 2 m shortly; there are at least two listeners on 2 m in Plymouth. **G3KHA** (ex-B.R.S.20354, Bristol) is using 15W input to a 12BH7 p.a. and a Yagi beaming east. **G5BM** (Cheltenham) is moving to Highnam (Glos.) in August. Although the new QTH is only about 100 ft a.s.l. it is further west from the Cotswolds than Cheltenham, and better results are therefore expected to the east. The fixed station will be inactive after June, but the mobile/portable rig will be in operation. On the 2 m Field Day, '5BM went with '2DTD to the mountains one mile north of Blaenavon (Mon.) where their day was marred by the snapping of the aerial mast in the gales and rain.

**G2XV** (Cambridge) will be working from the summit of Snowdon during the R.S.G.B. Two Metre Open Contest (July 2-3). Phone and c.w. will be used and an additional fixed beam will be employed to overcome the blind spot (caused by the Cairn) in the London direction. It is hoped by this means to enable many London stations to contact the "rare" county of Caernarvonshire. **GW8UH** (Penylan, Cardiff) reports that conditions have been very poor recently, nothing having been worked over 75 miles. On Field Day no portables were heard over about 50-60 miles away. The beam is down for "spring clean" and when it goes back it should be 3 slots stacked 1 wavelength, but some thought has to be given to westerly gales! GW5BI is still off 2 m, the atrocious weather having delayed the erection of his beam. **G8LN** (Plumstead) is very interested in the Hertfordshire Net and thinks much of the idea for a short span omni - directional aerial for local work. '8LN often uses a 6 ft high dipole in the shack for locals on which G6LL is always S9. '8LN recently worked '3GOZ as a new one and '3DIV was an outstanding signal on 2 m Field Day, when all the "regulars" were heard. G3EIW hopes to be on soon with a new miniature rig. '8LN says sta-



**In this picture, the J-Beam Double Six Slot Aerial for Band III television can be seen mounted adjacent to a 4 element Band I array. It consists of a single skeleton slot with sets of 5 directors and 1 reflector at each end.**

tions should use c.w. more (a point often stressed in these columns) as many unreadable phone carriers could, if keyed, give a c.w. contact.

**G6XX** (Howden) found April 19 exceptional when, in addition to SM6ANR, he worked PE1PL, PA0FB, PA0DSW, PA0BP, DL3QH, DL1LB and ON4ZK. Contacts with G3FAN (Ryde) on April 26 and GW3GWA (Wrexham) on April 28 were the only other QSOs of note in a generally poor month. **GW3GWA** (Wrexham) has had first QSOs with G2HOP, '3BJQ, 3DKF, '3JZN, '3KEQ, '6LC, '6QT and '6XX. Conditions were best on April 18-19; otherwise they have been poor. Field Day was the same as everywhere else, with rain and gales, but 56 stations were worked, the most distant being G8UQ/P (Basingstoke).

**B.R.S. 16075** (Shirley, Southampton) says that 2 m signals have been sadly lacking lately. '16075 has sent some interesting charts made by G3BHS/P, G3GOP/P and G3ION/P showing Field Day station appearances (and the gaps in between). Nothing much was heard by '3ION/P until 15.00 G.M.T. when the clouds lifted and France and the GCs were heard at S9+. Later, northern stations came in better. A point noticed was the lack of QSB except for slight fade on GC3EBK and G3ABA. '16075 would like to know if any other stations kept special records on Field Day as to the effect produced by the rain belt. **G8PX** (Oxford) comments on the lack of c.w. signals (and the poor conditions) on Field Day. He also suggests that if points are given per mile of contact, there should be a bonus or multiplier in respect of power. '8PX very much enjoyed the V.H.F. Convention and received several new ideas therefrom, of which more later.

**GM2FHH** (Aberdeen) writes that GM3EOJ is active on 144.180 Mc/s with a 522 transmitter and 4 element Yagi. His location is good. '2FHH is active every night on 144.040 and 144.350 Mc/s with 120W c.w. and 100W phone to an 829B with a 12 element stack, and a crystal controlled converter to HRO receiver from a fair location. Aberdeen having been out of the news lately, '2FHH asks that beams (including those in Scotland) should be turned northward as he has heard many S5 carriers, probably from the Edinburgh and Glasgow areas. **GM6WL** (Glasgow) found the Two Metre Field Day very disappointing. The week before the event G3CCH, '6XM, '5YV, '3IUD and '6KK were very well received in Glasgow, yet at an ideal site 1,000 ft a.s.l., using a c.c. converter to an HRO, and a 12 element stack with "Super Aeraxial" low loss co-ax. only G3BW was received!

### Reception of W1AW's 2 m Signals

**GW8SU** has reported reception of an A.R.R.L. Official Broadcast on 2 m from the League's Headquarters station, W1AW. As soon as this news was received, a cablegram was sent to A.R.R.L. who, in reply, regretted that at the time quoted by GW8SU, W1AW was in contact with W9VVN on 7 Mc/s. Investigations are continuing, however, as the transmission might just possibly have been a re-broadcast by another station.

### Seventy Centimetre News

It was very encouraging to hear so many stations during the Contest on May 21-22, but it makes one wonder why there cannot be such activity every weekend, to say nothing of other times! The Ham Spirit was much in evidence. All 70 cm operators seem to know and appreciate each other.

**G2RD** (Wallington) has kindly sent us the usual 70 cm activity report: G2AIH (435.15), '2BVW (434.37), '2DD (434.82), '2DD/M (434.82), '2DDD (435.66), '2DSP (434.97), '2FKZ (435.95), '2HDJ (434.52), '2HDY (435.5), '2HDZ (435.17), '2MV (435.24), '2RD (435.53), '2WJ (436), '2WS (434.37), '2XV (435.1), '3ECA (434.85), '3EGV (435.9), '3EYV (435.06), '3FSD (435.42), '3FP (434.98), '3GDR (435.39), '3GZM/P (433.4), '3HBW (434.61), '3IRW (434.4), '3IZQ/P (434.8), '3JMA (435.3), '3JQN (435.05), '3KEQ (435.05), '3MI (434.13), '5CD (435.6), '5DT (434.9), '5KW (435.1), '6NF (435.66), '6YP (434.95), '8SK (435), '8SK/P (435).

**G2XV** (Cambridge) has erected a 40 element beam at 40 ft which should have made itself felt by the time these notes appear. A considerable advance on the 12 element stack previously used is hoped for.

**GM6WL** (Glasgow, W.2), reporting on activity in Scotland, says that GM3EGW (Dunfermline) has now received signals from GM3NG (Carluke); the latter station has received S8 phone from GM3GAB (Glasgow).

### Twenty-four Centimetre News

We break new ground with a 24 cm (1250 Mc/s) Activity Report also from **G2RD** (Wallington) who has heard signals on that band from G5DT (Wallington) who is using a CV90 cavity oscillator. G2RD hopes to be transmitting on 1250 Mc/s during June. Other stations actively interested in 24 cm include G2HDJ, G2MV and G3HBW. G3CGQ and G3FUL (both of Luton) have had QSOs on 24 cm over a distance of ¼ mile, whilst '3CGQ has heard G5RZ at 10 miles. This is real pioneering and deserves congratulations.

### 1215 Mc/s Record in Czechoslovakia

After some delay we have received a very full and welcome report from C.A.V. (the Czech Society) on the record reported in the November, 1954, issue of the BULLETIN. The contact was over a distance of 200 km (124.3 miles) between OK1KRC, Klinovec (1244 metres (4075ft.) a.s.l.) near Karlovy Vary (Carlsbad) and OK1KAX, who was located on Cerna hora (1247 metres (4085ft.) a.s.l.) in the Krkonose Mountains. The apparatus used was as follows:—

*OK1KRC* Super-regen receiver with German Army surplus valves types RD2.4Ta (regen stage) and RL2.4P2 (audio). The circuit of the triode RD2.4Ta was of the coaxial type, using tuned anode and tuned grid circuits with common grid. Although this valve was designed for u.h.f. it is of conventional construc-

**GW3GWA/P was in operation from Vroncysyllte Hill (1296 ft a.s.l.), approximately 8 miles south-west of Wrexham, Denbighshire, during the First Two Metre Field Day on May 1. The equipment had to be protected with plastic capes from the rain driven through the tent weave by the gale.**

tion with socket type terminals. The transmitter used a u.h.f. lighthouse triode type LD12, 25W input, anode modulation; the aerial comprised a parabolic reflector, one metre in diameter, with a double dipole radiator, using a disc reflector. Power was obtained from a petrol generator giving 220V a.c. This gear was used for the first Czech 1215 Mc/s QSO in 1952 (OK1VR/OK1KW, 4.6 km (2¼ miles)). *OK1KAX* Transceiver with S794 ("pencil" valve) 6B31, 8BC11, 6CC31, and 6L31 (all miniature valves). The aerial comprised a parabolic reflector, 1m in diameter with a double dipole and reflector using a slot balancing device. Contact was established on September 5, 1954, at 1004 G.M.T. during the first Czechoslovakian u.h.f. contest on 420 and 1215 Mc/s. It lasted until 1100 G.M.T. and was solid copy throughout, with reports RS57-9 both ways, using A2 and A3.

**G4KD (extreme right) with three overseas visitors—DL3FM, PA0BL, F9CQ—at the First International V.H.F./U.H.F. Convention held in London on May 14.**
*(Photo by the Tella Co. Ltd., London, W.C.1)*

### Manchester V.H.F. Dinner

A v.h.f. dinner is being arranged for Saturday, September 17, 1955, at the Grosvenor Hotel, Deansgate, Manchester. Tickets (15/- each) and full details can be obtained from H. B. Shields (G3GB), 10 Deal Street, Newton Heath, Manchester, 10, or from T. H. Davidson (G3AGS), 101 Grange Drive, Blackley, Manchester, 9. It is hoped that this function will lead to the formation of a v.h.f. group in Manchester and district.

### TV Signals Received in Middle East

B.E.R.S.896, who is in the R.A.F. at Abyad, M.E.A.F. 25, reports that on May 23, at 1555 local time he received the B.B.C.'s television and sound signals on 41.5 and 45 Mc/s from Alexandra Palace, and on 48.25 and 51.75 Mc/s from Holme Moss. The London signals peaked to S8 with slow fading, and were still readable when the station closed down after *Children's Television*. No further signals were heard when the evening transmission began. The receiver in use was a Hallicrafters S27. G3GPD, who is also serving in the R.A.F., was present at the time.

### "Worked and Heard on Two"

The feature *Worked and Heard on Two* has succeeded beyond expectations, and as so many are now reporting the pressure on space is becoming acute. In future, correspondents are asked to confine their lists to stations 40 miles or more away.

* * *

Reports for July would be appreciated by June 21 *latest* please, especially those from portable holiday makers!

## Worked and Heard on Two

**B.R.S.6327** (Earlsfield) Mainly May 1, 1955.
*Heard:* G2AHP, 2AIW, 2ANT, 2AST, 2BDP, 2CZS, 2DTO/P, 2DVD, 2HDY, 2HDZ, 2LW/P, 2TP, 2YV, 3ABA/P, 3BHJ/A, 3CGO, 3CLW, 3DF, 3DIV/P, 3DVQ/P, 3EGV, 3EVV, 3FEX/P, 3FNL, 3FQS, 3FRG/P, 3FSG/M, 3FT/P, 3FUL, 3FYY, 3GHI, 3GOZ, 3GSE, 3GSM, 3GVF, 3HII, 3HZJ, 3IAM, 3MI, 3ISA, 3IUK, 3IUL, 3IUO, 3JMA, 3JXN, 3KEQ, 3XC/M, 3YZ/P, 4CI, 4GT, 4KD, 4RO, 4SA, 5DT, 5KW, 5KW/P, 5MA/P, 5TP, 5YU, 6AG/M, 6AG/P, 6BO, 6FO, 6LL, 6NB, 6NF, 6OX, 6SG, 6TA, 8KZ, 8RW, 8SC, 8SK, 8UQ/P, 8VR, F3LP.

**B.R.S.19162** (Dewsbury) May 1-18, 1955.
*Heard:* G2HHV/M, 3AYT/M, 3CC, 3IOE, 3IWJ, 5AU, 5ML, 6MN, 6PJ, 6XM/P.

**G2AIW** (Twickenham) April 25-May 24, 1955.
*Worked:* G3DIV/P, 3FEX/P, 3FRG/P, 5BD, 5KW/P (Watlington), 5YV. *Heard:* F3LP, G2ATK, 2FTS, 2HCG, 3EPW, 3IOE, 4MW, 5TZ, 6CW, 6SN, 8BP, 8PX/P (near Oxford).

**G2CZS** (Chelmsford) April 19-May 11, 1955.
*Worked:* G2BCB, 2BVW, 2HDY, 3ANB, 3BJQ, 3CLW, 3CVO, 3EPW, 3EYV, 3FKJ, 3FNL, 3GAV, 3GGJ, 3GOZ, 3IIT, 3IJB, 3JXN, 3KEQ, 6OX, 6TA, 8KW/P, 8LN, PE1PL. *Heard:* G2BMZ, 2FTS, 3CGQ, 3DIV/P, 3FEX/P, 5YV, 6FO, 6XM, ON4ZK.

**G3FKO/P** (Wells, Somerset) May 1, 1955.
*Worked:* G3DO, 3MA/P, 3NL/P, 3YH, 3YZ/P, 4AP, 4GR, 4JJ/P, 4SA, 5BM/P, 6JK/P, 6WF, 8BP, 8DA, 8DM, 8UQ/P, 2ATK/P, 2BMZ, 2BRR, 2DTO/P, 3ABA/P, 3ANB, 3BHS/P, 3CVK, 3EES, 3EXV, 3GBJ, 3GOP/P, 3HSD/P, 3IER, 3ION/P, 3IRA/P, GW8SU, 8UH, 2ACW, 3KEN. *Heard:* G3CC, 3FD/P, 5HB, 5JU, 5KW/P, 5YV, 6XM/P, G3DIV/P, 3FDX, 3FEX/P, 3FWW, GC2FZC, GW3GWA/P.

**G3ION/P** (Shaftesbury) May 1, 1955.
*Worked:* G2LW/P, 2NM, 2UN, 2YB, 2ATK/M, 2BMZ, 2DDD, 2DTO/P, 3MA/P, 3NL/P, 3YZ/P, 3ABA/P, 3AUS, 3BHS/P, 3DIV/P, 3DVQ/P, 3FAN, 3FKO/P, 3FQS, 3GHO, 3GOP/P, 3GVF, 3HSD/P, 3HXZ, 3IER, 3IRA/P, 3JFR, 4GR, 4SA, 5BM/P, 5KW/P, 6JK/P, 6NB, 6OU, 6OX, 6ZH, 8DA, 8IL, 8UQ/P, F8TZ/P, GC2FZC, 3EBK, GW2ACW, 8UH. *Heard:* G2BRR, 2FJR, 3CQC, 3EGG, 3FEX/P, 3GAV, 3HQZ, 4AJ, 4KD, 5HB, 5MA/P, 5TP, 6TA, 8VR.

**G3KHA** (Bristol) April 19-May 19, 1955.
*Worked:* G2YB, 2AHX/P (Calne), 3YH, 3FIH, 3HSD, 3HXS, 3KEQ, 4SA, 6NB, 6OZ, GW8UH. *Heard:* G2MM, 2XV, 2AAT, 2ADZ, 2AIW, 2DVD, 3WS, 3DJX, 3EES, 3FAN, 3FKO, 3GNJ, 3GVF, 3IIT, 3IRA, 3JKY, 4GR, 4KD, 5HB, 5KW, 5TZ, 6OX, 6RH, 6TA, 8DM, 8IL, 8WI, GW2ACW, 3EJM, 8SU.

**G4JJ/P** (Derbyshire) April 17-May 1, 1955.
*Worked:* G2AK, 2ATK, 2ATK/P, 2AVQ, 2CRL, 2DCI, 2FCL/P, 2FNW, 2HCJ/P, 2HOP, 2YB, 2YM, 3ABA/P, 3AGS, 3APY, 3ATZ/P, 3BA, 3BJQ, 3BJQ/P, 3CC, 3CCH, 3DBP, 3DKF, 3DO, 3DQQ, 3DVK/P, 3EGE, 3EJO, 3ELG/P, 3EPW, 3FDF, 3FDF/P, 3FFC, 3FKO/P, 3GFW, 3GGJ, 3GHO, 3GHU, 3GSO, 3GUD, 3HAZ, 3HHD, 3HTY, 3HWJ, 3IUD, 3IVF, 3JKO, 3JZG, 3KFD, 3MA/P, 3NL/P, 3YZ/P, 5CP, 5HK, 5JU, 5KW/P, 5MA/P, 5ML/P, 5YV, 6CW, 6FK, 6JK/P, 6MN, 6QT, 6SN, 6WF, 6XA, 6XM, 6XM/P, 6YU, 8DP, 8NM, 8UQ/P, 8VN, GW3GWA. *Heard:* G3FAN, 3IOE, 3DP, 6NB, 8PX/P.

**G5MR** (Hythe, Kent) April 20-May 18, 1955.
*Worked:* F3JN, 3LP, 8GH, 8LO, 8ME, 8OL, 8TZ/P, 9DI, 9JY, 9NW, G2JF, 3DIV/P, 3DVQ/P, 8BJ, 8RK. *Heard:* F3ND, 8RK, 9RL, 9TV, G2FTS, 2HCG, 2KF, 2UN, 3ABA/P, 3BSU, 3GVF, 3IEF, 3IIZ, 3IRW, 3JXN, 3VI, 4SA, 5RO, 5TZ, 5YV, 6AG/P, 6FO, 6NB, 6YP, 8KW, 8KW/P, GC3EBK.

**GW3GWA** (Wrexham) April 14-May 18, 1955.
*Worked:* G2FJR, 2HGR, 2HOP, 3AGS, 3ATK, 3BJQ, 3BJP/A, 3CHH, 3GUZ, 3DA/P, 3DKF, 3EPQ, 3FMI, 3GHU, 3GPT, 3HII, 3IOO, 3IWJ, 3JZN, 3KEQ, 5YV, 6FK, 6LC, 6TA, 6WF, 6XM, 6XX, 8BP, 8VN. *Heard:* G2BVW, 2FNW, 2FTS, 2HCG, 2XV, 3CC, 3DMU, 3GHO, 3JZY, 4AU, 5BD, 5JU, 5TZ, 6NB.

**GW3GWA/P** (Wrexham) May 1, 1955.
*Worked:* G2AK, 2AVQ, 2ATK/M, 2CVD, 2FCL/P, 2HCJ/P, 2NV, 2NY, 2YM, 3ABA/P, 3AGS, 3ASC, 3AUC, 3AYT/M, 3AZT/P, 3BJQ/P, 3BPJ/A, 3BY, 3CLG, 3CSC, 3CVK, 3DKF, 3DO, 3DQQ, 3EJO, 3EPW, 3FMI, 3FRY, 3HAZ, 3HII, 3HSD/P, 3HTY, 3IER, 3IOO, 3IUD, 3IWJ, 3JZN/P, 3MA/P, 3NL/P, 3PY, 3YZ/P, 4JJ/P, 4SA, 5AU, 5JU, 5ML/P, 5YV, 6FK, 6JK/P, 6QT, 6SN, 6WF, 6XM/P, 8ML, 8PX/P, 8UQ/P.

**GW8UH** (Cardiff) April 20-May 20, 1955.
*Worked:* G2ADZ, 2AIW, 2BMZ, 3MA/P, 3NL/P, 3WS, 3EES, 3EXW, 3FIH, 3FKO, 3GOP/P, 3HSD, 3HSD/P, 3ION/P, 3KHA, 5BM/P, 8KW. *Heard:* 2DDD, 3CGE, 3CQC, 5ML, 5TZ, 6NB, 6OZ, 6RH, 6TA, 8DA.

**LONDON U.H.F. GROUP**

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,

**at 7.30 p.m., July 7, 1955.**

All u.h.f. enthusiasts welcome.

# First International V.H.F./U.H F. Convention

MORE than 125 v.h.f. and u.h.f. enthusiasts attended the First International V.H.F./U.H.F. Convention held at the Bedford Corner Hotel, London, W.C.1, on May 14, 1955. Right from the start the gathering, organized by the London U.H.F. Group, was a success, a wonderful spirit of good humoured "ham" camaraderie being manifest throughout.

The proceedings commenced with an informal get-together during which many v.h.f. and u.h.f. battles were fought again and "faces fitted to call-signs" to the accompaniment of much amusing comment. A small but representative exhibition attracted considerable attention.

An excellent lunch was enjoyed by nearly 90 members and visitors, after which the Convention got down to business. G2DD gave an interesting talk on 70 cm mobile work which led to some spirited discussion. Following a talk by G3HBW (Wembley) about his 1240 Mc/s power tripler, G3CGQ (Luton) gave details of the self-excited equipment with which he has had contacts on 1240 Mc/s with G3FUL at a distance of about ¼ mile. G3FZL and G2FKZ (London) demonstrated a very effective stub tuner and aerial matching device which aroused much interest. G5CD (Hendon) ended this part of the proceedings with a detailed analysis of current trends in Brimar v.h.f. and u.h.f. valves.

There followed a short period of informal rag-chews during which guests took part in a quiz for various prizes. Others took the opportunity to visit local radio shops.

### Convention Dinner

Dr. R. L. Smith-Rose, D.S.I.R. (Radio), Patron of the International V.H.F. Society, was the guest of honour at the dinner in the evening, attended by about 100 members and guests. In his speech, Dr. Smith-Rose exhorted those present to experiment still further in order that knowledge of v.h.f. and u.h.f. techniques might be augmented. He pointed out that much was being done officially with transmitters carried aloft by balloons and kites and suggested that radio amateurs could probably use light-weight equipment in this way. Other speakers included Harry Wilson (EI2W), Founder Member of the International V.H.F. Society, Phil Thorogood (G4KD), President of the I.V.H.F.S., James Hunter (GM6ZV) from Glasgow, and the continental representatives—DL3FM, F9CQ and PA0BL, who gave *résumés* of v.h.f./u.h.f. activities in their own countries.

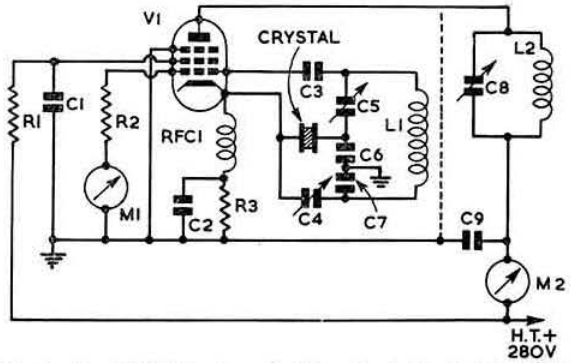
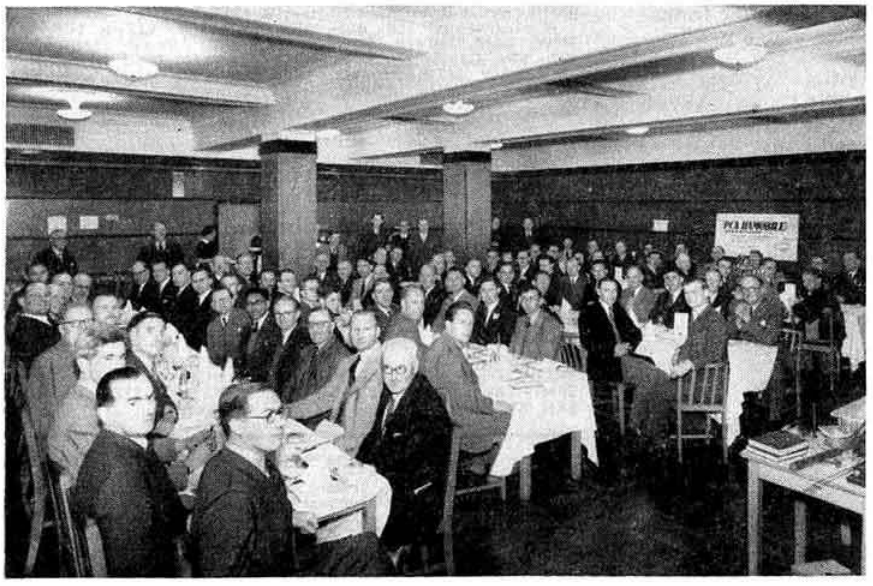



**Fig. 1. The "Phi" Overtone Oscillator circuit described by PA0BL of the Netherlands Government Station PE1PL. C1, 2, 9, 2200 $\mu\mu$F mica; C3, 25 $\mu\mu$F silver mica; C4, 5, 3-30 $\mu\mu$F; C6, 7, 47 $\mu\mu$F silver mica; C8, 25 $\mu\mu$F trimmer; L1, to tune to 24 Mc/s with C5, 6 and 7; L2, to tune to 48 Mc/s; M1, 0-500 $\mu$A; M2, 0-30 mA; R1, 27,000 ohms; R2, 100,000 ohms; R3, 100 ohms; RFC1, 2.5 mH; V1, EL83 or EF91.**

Following a draw for raffle prizes, conducted by Dr. Smith-Rose, PA0BL, representing the Netherlands Government Station PE1PL, played back a tape recording of signals from three British (G6LI, G5YV and G2HCG) and two German stations (DL3VJ and DL9ARA). After this most interesting demonstration, PA0BL described the "Phi" overtone oscillator (Fig. 1) in use at PE1PL. In this circuit, L1 is tuned to 24 Mc/s—the fifth harmonic of 4.8 Mc/s crystals or third harmonic of 8 Mc/s units. L2 is tuned to 48 Mc/s. When putting the circuit into service, C4 is first tuned for zero reading on M1 with C5, C6, C7 and L1 *off tune*. C5 is then used to tune L1 to 24 Mc/s and C4 carefully readjusted for zero current. C8, L2 is adjusted to 48 Mc/s as indicated by a dip in the reading on M2. L2 is tightly coupled by a link to the grid circuit of the following stage which may be a QQE06/40, 832, 829B or 7193, used as a tripler to 144 Mc/s. At PE1PL a QQE06/40 drives a pair of 24Gs or 3C24s in push-pull and produces 39 mA at −110 volts.

The valve used in the oscillator circuit at PE1PL is an EL83 but the EF91 is also suitable for lower power operation. The EL41 and EL84 should not be used. An



**The Convention luncheon was attended by nearly 90 v.h.f. and u.h.f. enthusiasts.**
*(Photo by the Tella Co. Ltd., London, W.C.1)*

EL83 will produce 4 mA drive through 33,000 ohms in the grid circuit of a QQE06/40 which, as a tripler to 144 Mc/s, gives 12 watts output with 280 volts on its anode and 15 watts with 400 volts h.t.

Following PA0BL's talk, which aroused much interest, a vote of thanks was accorded to all who had helped to arrange the Convention. Special references were made to Phil Thorogood (G4KD), Charlie Newton (G2FKZ), Frank Smith (G2DD) and D. C. Thatcher (B.R.S.15458).

Those who attended the Convention from long distances included DL3FM, EI2W, EI5Y, F9CQ, PA0BL, PA0KC, ZL1RV, G2ADZ, 2AHL, 2ATK, 2BVW, 2DDD, 2DSP, 2FS, 2HCG, 2UJ, 3ABA, 3AGS, 3CCH, 3CGQ, 3FUL, 3GGJ, 3HII, 3IWJ, 3WW, 3YH, 4FO, 5BD, 5ML, 5SK, 6FK, 6FO, 6SN, 8BP, 8PX, GM3EGW, 6ZV. F.G.L.

### Staffordshire County Meeting

ON May 15, at the Swan Hotel, Lichfield, Council Members C. H. L. Edwards and H. W. Mitchell (G2AMG) with the General Secretary (Mr. John Clarricoats, O.B.E., G6CL) represented Headquarters at the first county meeting held in Staffordshire. Others present included J. Timbrell, G6OI (Region 3 Representative), Dr. E. S. K. Vance, G8SA (Region 4 Representative), G3FZW (T. R. for Cannock and Lichfield), G3AQW (T.R. for Stoke-on-Trent) and G2FQR (T.R. for Walsall). Mr. J. Hunter (G6HU) of Ilford was responsible for providing much-appreciated transport for Messrs. Edwards and Clarricoats. The meeting, attended by more than 70 members, was opened by W. A. Higgins (G8GF), County Representative for Staffordshire who offered congratulations to the General Secretary on becoming Mayor-elect of Southgate.

In his address, Mr. Clarricoats spoke on a variety of subjects including: Licensing, Frequency Allocations, R.S.G.B. Finance, R.A.E.N., Representation and the BULLETIN. Messrs. Edwards, Mitchell and Timbrell also addressed the meeting.

A wide variety of questions put by G3ABG, G2FPR, G8RY, G3DO, G2FQR, G3ESW, G3HGI and G2COP were answered by the General Secretary. G3FZW and G8GF spoke briefly about R.A.E.N. and solicited support.

Following the business meeting, the Mullard film *The Manufacture of Radio Valves* was shown. Other attractions included a raffle and an exhibition of equipment made by local members.

**In this group photograph can be seen a few of the 70 members who gathered at The Swan Hotel, Lichfield, on Sunday, May 15, 1955, for the first-ever Staffordshire County Meeting. Part of beautiful Lichfield Cathedral can be seen in the background.**

### Mr. Harold Bishop—a new Knight

MR. Harold Bishop, C.B.E., Director of Technical Services, British Broadcasting Corporation, was amongst the new Knights named in the Queen's Birthday Honours List. Mr. Bishop, who was one of the chief speakers at the Bristol R.S.G.B. Convention in 1954, is currently President of the Radio Industries Club, and the City and Guilds Radio Society. He was President of the Institution of Electrical Engineers last year.

### Medway Hamfest

THE annual Medway Hamfest will be held at the Franklin Rooms, Franklin Road, Gillingham, Kent, on July 17, commencing at 2.30 p.m. An excellent programme has been arranged in addition to the famous raffle.

A steward will be on duty at Gillingham Station to direct visitors to the venue. Tickets, price 1s. 6d. (family tickets 2s. 6d.), may be obtained from W. E. Nutton (G6NU), 42 Richmond Road, Gillingham, or at the door. Refreshments, including drinks, will be free.

In 1954 well over 300 people attended this Hamfest but the organizer is hoping for an even larger gathering this year.

### Chelmsford Group Supper

NON-MEMBERS of the Chelmsford R.S.G.B. Group are cordially invited to attend a buffet supper at 7.30 p.m. on Friday, July 8, 1955, at "The Running Mare," Galleywood. The price of tickets, available at the door, will be 3/6.

### S.R.J. Convention

THE Jugoslav Society of Radio Amateurs (S.R.J.) is to hold a National Convention in Zagreb between August 4 and 6, 1955. Lectures, competitions, code speed tests, excursions and a hamfest will be in the programme. There will also be an exhibition of Amateur Radio equipment.

Amateurs from other countries will be warmly welcomed.

Further details can be obtained from S.R.J., Beograd, Trg Republike 5-IV, Postanski FAH 324, Yugoslavia.

### Coil Abacs

HEADQUARTERS will be pleased to hear from any member in a position to prepare a set of Abacs for the winding of coils on small formers such as Aladdin, with both iron and brass slugs, and the range of inductance covered in each case.

### Bob Ford Released

THE China News Agency announced on May 28 that Robert Ford had been released after nearly five years as a prisoner of the Chinese Communists. Bob—well known as AC4RF—operated from Lhasa for some time just after the war. He was later captured by the Communists and accused of spying. He had been held a prisoner in a Chungking jail.

The news of Bob Ford's release will bring pleasure to his many friends in Amateur Radio circles.

### Around the Trade

A THIRD and completely revised edition of "Modern Solders" has been issued by Multicore Solders, Ltd., Multicore Works, Hemel Hempstead. The booklet, which runs to 22 pages, contains a number of articles on the uses of solder and other information. It is fully illustrated.

# THE MONTH ON THE AIR


By S. A. HERBERT (G3ATU)*

MOST correspondents this month have found DX conditions rather quiet on the whole. The advent of B.S.T. and the advancing season have had their usual effect on the bands. Interest now centres on the higher frequencies, indeed, there is a complete absence of comment on happenings on Top Band. However, some good openings have occurred on ten and, especially, on fifteen.

**Ten Metres**

Most of the DX was from S. America, but Africa also comes into the picture; an occasional 4X4 has also crept through.

**G3BID** (Abbotsbury) found an opening on April 29 when he worked CX2CO, LU8DJB, CT1 and EA. **ZD3BFC** called CQ on a " dead " band at 1830 on May 2 and promptly worked G8RO! **B.R.S.20135** (Newport, I.o.W.) logged phone from VQ2NS, OQ5RU, KT1UX, ZB1JRK, LU, CX and short skip Europeans. **A.1291** (Ashtead) heard VQ2AT, VQ2JB, ZD3 and LU, while **A.1290** (Blackheath) picked up 4X4DK (1710), OQ5BW and ZD3BFC. **R. J. R. Crocker** (Plymouth) logged 4X4DK (1730), CX4CS, ZD3, DL, OH, OZ and LU.

**Fifteen Metres**

This band is now showing distinct signs of life, sometimes from early morning until late at night. Indeed, there are reports of activity until well after midnight on occasion.

**G3AAE** (Barnet) worked CO1AF at 0030 B.S.T., when HP3FL was also on. Other phone contacts were made with SU1CN, ZD3BFC, EA6AF, ZB2A and CR4AS, but VP8, VS1 and EA0 escaped. **G3EMY** (Ventnor), active on phone worked twenty-eight countries in six weeks, including eight VQ4s, six ZEs and twelve ZSs. A daily sked with ZS1BV at 1145 has been 75 per cent. successful so far. The gear in use comprises a Panda PR120V, an Eddystone 680 receiver and a 3 element beam, but a sea-level QTH and surrounding hills limit the latter's effectiveness to between 90 and 220 degrees.

**B.R.S.20106** (Petts Wood) has heard on phone PZ1RM, VQ5EK, FQ8AK, EL2X, KZ5AS, 5MB and MP4KAC, while c.w. produced EA0AC, OQ5, LU and KP4. **B.R.S.20135** used evening openings to log OD5AB, VP6FR, CE3RN, PJ2AP, VU2EG, VS6CL, FY7YE, TA3US, ZS and W on phone. **A.1291** reports VP5SC, M1B, EL1OA, KV4BD, VS2UW (1525), VQ5BVF, CR6BH, ZP5HX and more usual ones, while **A.1290** mentions CO2BL, CR4AP, EA8AZ, HC1FS, OQ0DZ, FQ8 and VQ4EU, all received on a quarter-wave vertical. **R. J. R. Crocker** remarks that, being on shift work, he may have an unfair advantage over most people! The band, although still under populated, provided him with phone signals from PY5EK, OA5G, 4CL, 4DR, 4X4DK, SV1AB, CR4AI, VP7NJ, CP5EK, CE6AB, VP8AQ, SU1CN, VS1FR, ZS3A, ZP9AY (who is ex-ON4AP), MP4BBL, TI3LA, 2VJ, 2ACQ, VP4LL, 4FF, VP9L, 9BO, HK2GO, W7VEY and maritime mobiles W2MWF (S. Atlantic), W2HXE (Gulf of Oman), W5EWS (Gulf of Mexico), W1RIT (65°N-28°W) and SM8BID (off the Azores). **G2MI** worked ZD6RM (ex-(GM3EAK) at 11.45 on 21050 kc/s. QSL to P.O. Box 472, Blantyre, Nyasaland.

**Twenty Metres**

The period under review started quietly enough with the usual DX coming through, often accompanied by terrific signals from Europe. From mid-day onwards, Far Eastern stations were often audible for hours, and occasionally something from the S.E. Pacific would break through. Mornings produced little except the usual non-amateur effusions but towards the end of May an encouraging change occurred with the band opening to W6 and 7 around 0600, followed sometimes by quite reasonable signals coming over the North Pole from KH6, FO8, KJ6 and the like. Afternoons and evenings have also seen seasonal outbursts of sporadic E, with little to be heard save S9 U.K. signals. On these occasions the DX is there too and people have been heard trying to work it, but that really is doing things the hard way.

**G3KBN** (Stockport) finds the going tough with only a single crystal and 17 watts input, but he gets a kick when he does get through the QRM. His best DX so far is a QSO with KH6ARA, who came back to a CQ call; another good one was KZ5BC. With the help of G6YQ, '3KBN'S signals were picked up by VK4YP, who gave him an RST219 report! **G3JFF** is now in Portsmouth on a course lasting until September, but before leaving home he put his score up to ninety-eight countries by working ZD3A. Other c.w. QSOs were with VK2FU, VP6AM (whom he had met in February), W7AH (Ariz.), W7GBW (Ore.), ZL2IJ and W6. From


*Roker House, St. George's Terrace, Roker, Sunderland.

VE1KM (R.C.N. Electrical School), Mike learned that the prefix VE0 has been issued to maritime mobile stations, including R.C.N. ships. They can operate in all Canadian maritime ports, but in other countries only with prior permission from the appropriate Licensing Authority. '3JFF missed YK1AK, M1B and FB8BR and wondered about HB4FE which is, in fact, a Swiss Army amateur station, working under conditions similar to the Swedish SLs. **G3AAE** missed CR9, JZ0, FB8 and ZD9, but made up for it by working PJ2AR, ET3GB, MP4QAL, CE7ZJ (Antarctic) and YN0YN. The latter is on Corn Is., but unfortunately does not count as a new country. John mentions KG1AA (Thule) and VP5DC, who is with the R.C.A. on Turks Is. and expects to stay there for a year. **B.R.S.19240** (Bristol), who sends his first phone report, has done well with VE6NX (0740), TF2WAF, SU1CN, MP4QAI, LU and VS5CT. The latter will shortly be active as VS4CT. Interesting QSLs have come from TF2WAB (U.S.A.F. H.Q., Iceland), PE1LC (Weather Ship *Cumulus*), W7PZ (Ariz.) and VK9SP (Papua), whose incoming QSLs are dropped by parachute!

**B.R.S.20317** (Bromley) found new ones in KH6ES (1735), KR6AF, ZD2DCP and UQ2KAA on c.w., with CE5AW, CP3CA, 5EP, ZD3A and LX1RB while on phone, VK9GV was new. FM7, LB8YB (Greenland), OQ0DZ, VP2DN, 2KM, VP5AK, VQ4AA/P, VS5CT (14182 kc/s), ZS3AB, YI2AM and W1KGH/VE8 (Baffin Is.), helped to put his score to 141 countries. **B.R.S.20249** (Sutton) found European QRM irksome but logged VS1FO—a new one for him. TF2WAF and EL2X on A3 and CE5AW on A1 were also pulled in. A Danish listener with whom he corresponds has been hearing AP5TM and AC4LM on phone, though the AC4 sounds somewhat on the doubtful side. **B.R.S.20416** (London, S.E.12), reports FO8AB on phone most Sundays at 0730. He heard VQs, MP4KAB, JA1AC, AP2AB and KG4AP, also on A3. Bill, who was with the Trieste Club station MF2AG, would like to hear from other old members. He remarks that **G3FXG,** using a mobile rig, almost worked a W3 for his first QSO. **B.R.S.20487** (N. Finchley) logged 4S7FG, FF8AK, W7SEA, ZP and ZL4LZ on phone, while the same medium netted **B.R.S.18017** (Warwick) AP2U (1755), MP4QAI, ZD3BFC, HC2AB, VP5AR, CX and TI2DZ. On c.w., John pulled in KG1AA, ST2GB, ET3GB, KZ5, VQ6LQ and UA0KKB (Zone 19). **P. M. Crawford** (Darlington) says he still awaits some DX of note. Meanwhile, he combed the phone band for VE5HL, VE8ME, VS6CG, '6CW, OA3WE, KL7ZG (at 1954, while beaming over the North Pole!), AP2U, HZ1AA, VK, ZL2BE and KC6UZ (Truk).

**B.R.S.20106** has heard 176 countries this year and hopes to reach 200 before December. (The last time this happened was in 1951.) Norman says the Russian phone contest on May 8 should have provided some rare districts, but not having swotted Russian, the only ones he could be sure about were a couple of LZs! Phone DX he *could* identify included FB8BZ, PX1YR, ZD4BO, VP4TI, VE6NX, KL7ADR and KL7BEW. C.W. produced rather more DX, with VK2, 3, 4, 5, KH6, FO8AL (1700), CE7ZJ (1900), YN0YN, KL7, VE7HM, VE8EC, ZL4EF, KA, VS2, FY7YE, FM7WP, EL2P, UI8 and VU2MA. ZK1BG known to be active has not yet been heard. There is talk of BV1QL (ex-W6DQY), active from Formosa on 14250 phone. **B.R.S.20135** heard VS5CT on phone and also added VP4TI, HZ1TA, EL2X, ZS6 and VS1 and 2 to his list. **R. J. R. Crocker** heard an interesting phone station in VQ4AA/P who was operating from a railway carriage! Also mentioned are VK7AZ, ZL4LZ, TI7RAC, FM7WF, YS1MS, YN1LB, ST2DB, VU2RC, VP9G, KA and KL7. **G3ATU** was delighted, finally, to work ZS7C, after years of trying, but was not quite so happy about VR4SWL, worked on c.w. at 1737. He'll probably turn out to be perfectly genuine, but what a peculiar call!

The c.w. band has produced one or two unusual calls, such as VP1FL, often on around 2230 (Frank Lock, Telecom. Dept., Belize, Br. Honduras), VP5BM (Grand Turk Is.), MP4JO (QTH near Gida: QSL to W2PCI),

# Frequency Predictions for June, 1955

PREPARED BY J. DOUGLAS KAY (G3AAE)

| BAND | NORTH AMERICA | CENTRAL AMERICA | SOUTH AMERICA | SOUTH AFRICA | NEAR EAST | MIDDLE EAST | FAR EAST | AUSTRALIA |
|---|---|---|---|---|---|---|---|---|
| 28 Mc/s | 2130 | 2200 | 1930—2030 | 1600 | 2000 | 1800 | 0700 | 0700 |
| 21 Mc/s | 2130 | 2015—2300 | 1530—2130 | 0900—1700 | 0800—2100 | 1800 | 0700 | 0700 |
| 14 Mc/s | 1130—0100 | 1000—0100 | 1000—0130 | 0600—2030 | 0600—2330 | 1000—2015 | 1100—1630 | 0700—0900<br>2100—0000 |
| 7 Mc/s | 0000—0700 | 0200—0500 | 0200—0830 | 2200—0400 | 2200—0400 | 2200—0100 | 2100—2300 | 1800—2100 |
| 3.5 Mc/s | 0400—0600 | 0400 | 0800 | 0400 | 0000—0200 | 2230 | 2200 | 2030 |

*These Predictions are based on information provided by the Engineer-in-Chief of the Post Office. All times are G.M.T.*

It should be noted that between May and September propagation by sporadic E may result in short skip contacts on the 14, 21 and 28 Mc/s bands. The incidence of sporadic E is unpredictable but is most pronounced around midday and dusk.

audible almost daily, trying to pass traffic to the U.S.A., through hordes of calling Europeans, FD8AB (1730), FO8AB (0800, 14080) and KJ6BG. EI and SM stations were calling ZK1BG at the somewhat peculiar time of 1430, when Ws were trying to attract the attention of ZC2PJ. Later, FD8AC came in for similar attention. Those in need of New Mexico will find K5ADQ (Los Alamos) active and willing to oblige with a quick QSL.

**Forty Metres**

A single reference to forty shows that all is not yet lost, even with static added to the more permanent hazards on the band. **B.R.S.20106** logged ZLs 1AH, 2FI, 2HV, 2QN, W6MOJ, W6HZN, all early morning. HR1JZ, CX2BP, KP4 and LU.

**Overseas News**

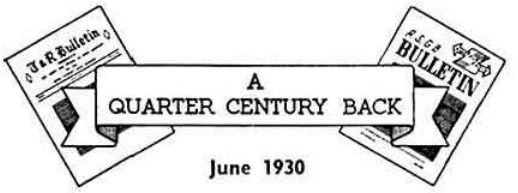
In a note to Headquarters, **ZL2ARL** reports that Dave Laing, Port Vila, New Hebrides, is active with the call **YJ1DL.** He runs 50 watts crystal controlled on 7000.5 and 14001 kc/s. His cards, home-made by his XYL, are despatched by airmail! (W6s are working him and his QSLs are arriving already. Early morning is the time to catch him, but he usually closes down at 0730). **ZD3BFC** reports what is probably a unique feat. On May 2, in the space of 2½ hours, he worked the U.K. on five bands. Details are as follows:—1750, G3BCC on 14 Mc/s phone; 1815, G3CCN on 21 Mc/s phone; 1833, G8RO on 28 Mc/s phone; 1913, G3IRR on 7 Mc/s c.w.; at 2035, G3JNQ was worked on 3.5 Mc/s c.w. Incidentally, '3BFC worked G3AAE on March 1, for what was probably the first ever ZD3/G 3.5 Mc/s QSO. Top Band DX'ers will be particularly interested to know that '3BFC will soon be up there, too.

The Amateur Radio Club, 25 Armoured Brigade Signal Sqdn., M.E.L.F.1 (ex-5A2CJ), is active from Tripoli with the call-sign **5A4TZ.** GM3ITN is now operating from Oldenburg as **DL2YI.** He runs 25 watts c.w./phone on 3.5 and 7 Mc/s and is looking for U.K. QSOs. **VP1GG** closed down at the end of May, and will be on leave in the U.K., before taking a post in Fiji, where he hopes to start as a VR2 in January, 1956. Activity in VP1 is surprisingly high, with VP1AA (c.w. only), 1AB, 1SJC, 1BOY (waiting for ten metres to open!), 1SD, 1VR, 1PS, 1ZU and at least three others. VP1AA is in charge of the local QSL Bureau.

Phil Bird, **VS2CP** (c/o 14 Cousens Gr., Southsea, Hants) on leave at the moment hopes to meet many of the lads who put such good signals into Malaya. The only stations with 14 Mc/s beams—VS2s CP, DQ, and EB—will all be off the air by June, which may give a wrong impression of conditions to that part of the world. Phil was the lucky owner of a four element rotary with a 42ft. boom, 40ft. up. He was relieved when it came down quietly and without fuss! **VS2DQ** writes with details of the Malayan Amateur Radio Transmitters' Society (M.A.R.T.S.). Membership is open to amateurs in Malaya, Singapore, British North Borneo, Brunei, Sarawak, Cocos-Keeling Is. and Christmas Is. (ZC3). ZC3AC and VS5CT are both members. British amateurs visiting these Territories should write to the Hon. Secretary, c/o the QSL Bureau, who will gladly assist with enquiries regarding licences, equipment, etc. The Society produces a large bi-monthly newsletter, which could be available to ex-VS2 amateurs at a small cost.

* * *

And that is that for yet another month. Please send reports and comments to arrive by June 20. Good luck and good hunting. 73.




FROM the Editorial "The pessimists have been proved wrong again. All those who declared the Washington Convention to be the death knell of Amateur Radio cried before they were hurt. We have had over two years now to become accustomed to operating under comparative difficulties, as they once appeared to be; but these difficulties have slowly vanished, chiefly due to the successful way in which we tackled the major problem of increased interference in narrowed bands. The average amateur of today possesses a transmitter which is far and away better than that in general use two years ago. His transmitter may be as a mouse to a lion, when compared with some of the high power commercial stations of today, but it is effective in its own province; further, many of the commercial stations are operated in a condition such as no amateur would tolerate."

* * *

Station Description No. 6 described G5ML—one of the best known DX stations of that day. "Situated on the outskirts of Coventry in flat, open country, the station has an excellent locality as far as radio is concerned—making G5ML's 60 ft mast quite the most important object on the landscape. On 7 Mc/s an SW1 valve is used but for 14 and 28 Mc/s T250s are in use. During the 1928 A.R.R.L. tests G5ML was able to work something like 100 American stations in 10 days and succeeded in getting second place with 277 points."

*(G5ML is still active on the DX bands and can frequently be heard on 2m. He won the R.S.G.B. Low Power Contest in* 1952.)

* * *

G. G. Livesey, FO3SRB, and R. A. Hill, FO3SR, described the erection, operation and performance of the Zeppelin Voltage-Fed Antenna. "The main trouble is undoubtedly the length to which the top span should be cut. Authorities diverge widely on the correction factor which has to be used to make allowance for the inductance and capacity due to the length of wire employed. There is no doubt that (for 7 and 14 Mc/s operation) the individual site of each antenna requires a particular length which varies between limits of 10 ft from approximately 62 ft to 72 ft."

* * *

P. D. Walters, B.R.S.273, contributed Part I of an article on Television. E. L. Owen, G2OW, described the principle of voltage doubling in valve rectifiers. "Inconnu" explained the transformer in action.

* * *

It was announced that the pilots of "The Southern Cross" transatlantic aircraft would carry with them a transmitter working on 33–31 metres using the call VMZAB. R.S.G.B. members were asked to listen for T5 signals from this plane and report immediately to Croydon Aerodrome.

*(A number of Old Timers recollect hearing signals from VMZAB whilst it was flying the Atlantic.)*

# Radio Amateur Emergency Network

By C. L. FENTON (G3ABB)*

GENERAL interest in the Network continues undiminished and many groups are planning exercises to take place during the summer months.

In the last R.A.E.N. column a proposed E.C.O.'s Net on 3.5 Mc/s was mentioned. It is surprising that, despite our request, not a single letter has been received referring to this proposal in any way. The suggestion is, therefore, deemed to be of no interest, and no action will be taken to initiate such a Net.

**News From the Groups**

*East Riding of Yorkshire.* The County Controller (G2ACD) has recently moved to Bridlington (for address, see later), and is at present in the throes of reorganising. G5GX (E.C.O., Leven) is now fully mobile using a ZC1. He recently travelled from Hull to Flamboro to visit G3DQ, with whom he was in contact throughout the journey. Another county exercise is being arranged for Saturday, June 18. *Broadstairs.* Efforts are being made to stimulate interest in surrounding areas, and it is hoped to have a group operating in the Deal area shortly. *Chelmsford.* An exercise, known as "Exercise Marshland" took place on April 3, as a rehearsal for a larger event to be held in the autumn. It was assumed that flooding had taken place in the coastal and river estuary areas, and that R.A.E.N. had been warned to stand by. Ilford, Romford, Brentwood, and Chelmsford groups co-operated in this exercise. Control station G3ABB alerted all E.C.O.s at 14.00 G.M.T. and cars were despatched towards Chelmsford. Sixteen mobile or portable stations were in the field, seven fixed stations co-operated as stand-by or sub-controls; approximately sixty people were involved. An area of approximately 200 square miles was covered, the control station being in touch with all cars throughout the exercise which was planned by G2AJF (R.A.E.N. Committee Chairman). Many valuable lessons were learned. *Leicester.* On April 17 an exercise took place in conjunction with Staffordshire and Wirral groups. Each area had its own net in operation, and Staffordshire sent a mobile unit to Crewe. Stations participating were G3AFZ, G3ATL/M, G3AWM, G3HAN, G3FDF, G8CZ and G3GXZ. *Lichfield.* During "Exercise Porter", mentioned above, three cars went forty miles from South Staffs to Barhill where portable stations were erected in a field. The third car continued to Crewe. Some trouble was experienced at one stage by QRM between 1.8 and 3.5 Mc/s stations operating on adjacent sites. This, however, was rectified by re-erecting aerials at right angles to each other. Two mobile stations attempting to rendezvous in the Crewe area could not find each other, being strangers to the district. G3DTD in Crewe broke into the QSO, and directed the two cars so that they did eventually meet. As a result of this exercise many lessons were learned which will be put into practice in future. Stations participating were G3DZT, G2COP, G2FDT/M, G2HKS, G3UD, G3FZW/M. Special thanks are due to Mr. B. Large for transport facilities. An excellent News Sheet has just been issued to members. *Oxford* Valuable publicity for R.A.E.N. in the local paper should stimulate interest in this area. *Stamford, Lincs.* All stations are now either fully mobile or portable and practice nets are well attended. It is hoped to organise an exercise in the near future. *Sussex.* New E.C.O.s have recently been appointed in this County; Mr. B. C. Oddy (G3FEX) has been appointed Acting County Controller. Instead of appointments being on a town basis, the County has been divided into areas with an E.C.O. for each area. Regular Sunday nets take place at 10.00 and 11.00 B.S.T. on 144.138 Mc/s and 1.920 Mc/s respectively. Meetings are held at Fishersgate on the third Saturday in each month. *Wirral, Cheshire.* Wirral participated in "Exercise Porter" with Leicester and Staffordshire groups. G3ERB is using a ZC1 with good results, but employs a Mic. No. 13 instead of the recommended No. 7, and thinks that this is an improvement. *Armoy, N.I.* Equipment available now comprises a pair of G3JAM-type Handy-Talkies, and two mobile rigs (including one ZC1). *Londonderry, N.I.* One 28 Mc/s walkie talkie has been constructed and another is under way; preparations are being made to install a 19 set in a car.

Some of those who took part in "Exercise Marshland" on April 3.

**Surplus Equipment**

During recent months certain surplus equipment has become available, and has been offered to E.C.O.s for distribution to their members. Now that the requirements of the E.C.O.s have been met, applications can be considered from members resident in areas where no E.C.O. has yet been appointed. The equipment becoming available comprises obsolete lifeboat emergency transmitter-receivers. These are offered to R.A.E.N. members at bare cost of collection and despatch; applications should be addressed to the Hon. Secretary.

**Emergency Communications Officers**

Although a few more E.C.O.s are being appointed—and we are glad that an E.C.O. is at last in office in Cornwall—the response to our appeals for such officers is still disappointing. We still require many more and the Hon. Secretary will be pleased to hear from, and to advise, volunteers.

It is disappointing to have a complete absence of reports from some E.C.O.s, so that we are completely out of touch with what is happening in their areas. Although appeals have been made in the past for regular reports, some officers still fail to submit reports. Will all E.C.O.s please try to let the Hon. Secretary have an activity report at least every alternate month. Even a report of no activity does tell us that you still

*Hon. Secretary, R.A.E.N. Committee, "Niarbyl", Gay Bowers, Danbury, Chelmsford, Essex. (Tel.: Danbury 518.)

have interest, but complete silence leaves us very much in the dark.

**National Rally—September 18, 1955**

Subject to the approval of the Council a large-scale national Rally is being planned for September 18, with awards for the leading stations. It is hoped to publish full details in a forthcoming issue of the BULLETIN.

**R.A.E.N. Dinner**

A suggestion has been made that an R.A.E.N. Dinner should be held in London later this year, probably during the period of the Society's Annual Exhibition in November. In order that an assessment may be made of the likely attendance, the Hon. Secretary will be pleased to hear from members who would possibly attend such an event, indicating whether or not they would wish to bring a guest.

**P.A.R.E.C.**

A constructional contest for low power and portable equipment, known as P.A.R.E.C. (Portable Amateur Radio Equipment Contest), is announced by the QRP Society. It is felt that this contest will be of particular interest to R.A.E.N. members, with their specialised equipment requirements. Full details are obtainable from the Hon. Secretary, QRP Society, J. Whitehead, 92 Rydens Avenue, Walton-on-Thames.

**Change of Address**

Lt.-Col. A. C. Dunn, G2ACD (County Controller, East Riding, Yorks), is now resident at 57 Promenade, Bridlington, Yorks.

**E.C.O. Appointments**

*Penryn, Cornwall.* H. Wright (G6LV), 2 Garland Place, Penryn, Cornwall.
*Bath.* A. G. Blackmore (G3FKO), 5 Rivers Street, Bath, Somerset.
*North West Sussex.* W. L. Rimmington (G2DVD), Batwells, Slinfold, nr. Horsham.
*South West Sussex.* F. Robins (G3GVM), 104 Congreve Road, Worthing.
*Central South Sussex.* D. E. Nunn (G3JMJ), 7 Bigwood Avenue, Hove, 4.
*Middlesbrough.* J. B. Harding (G3JYH), 16 Junction Road, Norton-on-Tees, Co. Durham.

**County Controller**

B. C. Oddy (G3FEX), Bonigen, Maudlyn Close, Steyning, Sussex, has been appointed Acting County Controller for Sussex. (Mr. Oddy relinquishes his appointment as E.C.O. for Steyning.)

* * *

Reports for inclusion in the next R.A.E.N. feature, which will appear in the August issue of the BULLETIN, should reach the writer by July 20.

## Emergency Calling Frequencies for R.A.E.N.

**The following calling frequencies will be used by R.A.E.N. stations in the event of an emergency:**

| | |
|---|---|
| 1980 kc/s | 14100 kc/s |
| 3600 kc/s | 21150 kc/s |
| 7050 kc/s | 28200 kc/s |

145 Mc/s

These frequencies are published as calling frequencies for use in emergency only. Stations will call CQ QRRR DE G..... and QSY to a mutually agreed frequency immediately after establishing contact. Contacts should not be continued on emergency calling frequencies. All frequencies should be monitored as much as possible.

## Slow Morse Practice Transmissions

| B.S.T. | Call | kc/s | Town |
|---|---|---|---|
| **Sundays** | | | |
| 09.00 | G3GYV | 1900 | Hartford, near Northwich |
| 09.30 | G3BKE | 1900 | Newcastle-on-Tyne |
| 10.00 | G6MH | 1990 | Southend-on-Sea |
| 10.30† | G3DGN / G3GZB | 1930 | North London |
| 11.00 | G2FXA | 1900 | Stockton-on-Tees |
| 12.00 | G3LP | 1850 | Cheltenham |
| 12.00 | G3JBU | 1850 | Northampton |
| 12.00 | GI5UR | 1860 | Belfast |
| 14.00 | G5AM | 1900 | Witnesham, Ipswich |
| 21.00 | G2FIX | 1812 | Nr. Salisbury |
| 23.30 | GI3CFI | 1900 | Coleraine, N.I. |
| **Mondays** | | | |
| 19.00 | G3NC | 1825 | Swindon |
| 19.00 | G3JBU | 1850 | Northampton |
| 21.00 | G3BLN | 1900 | Bournemouth |
| 21.00 | G3FSM | 1900 | Brentwood |
| 22.15 | G2BRH | 1900 | Ilford |
| **Tuesdays** | | | |
| 18.30 | G2FXA | 1900 | Stockton-on-Tees |
| 18.30 | G3JMP | 1875 | Bristol |
| 20.30 | G3GDZ | 1905 | Kingsbury, N.W.9 |
| 21.00 | G3EFA | 1855 | Southport |
| 22.30 | G3IIR | 1915 | Norwood |
| 23.30 | GI3CFI | 1900 | Coleraine, N.I. |
| **Wednesdays** | | | |
| 19.00 | G3HUB/A | 1902 | Chelmsford |
| 22.30 | G3FBA | 1910 | Bath |
| 23.30 | GI3CFI | 1900 | Coleraine, N.I. |
| **Thursdays** | | | |
| 19.00 | G3NC | 1825 | Swindon |
| 19.15 | G2FRX | 1850 | Plymouth |
| 20.00† | G2CPS / G2CNX / G3GWT | 1910 | Hull, Yorks. |
| 20.30 | G3JQM | 1878 | Barwick, Yeovil |
| 22.30 | G3ADZ | 1940 | Southsea |
| 23.00 | G3LA | 1915 | Brentwood |
| 23.30 | GI3CFI | 1900 | Coleraine, N.I. |
| **Fridays** | | | |
| 18.00 | G3GEN | 1900 | Gloucester |
| 19.00 | G3BLN | 1900 | Bournemouth |
| 20.00† | G3CSG / G3EGX / G3ERB | 1875 | Wirral |
| **Saturdays** | | | |
| 13.00 | G2FXA | 1900 | Stockton-on-Tees |

† *Alternately.*

**Slow Morse transmissions are organised by Mr. C. H. L. Edwards (G8TL), 28 Morgan Crescent, Theydon Bois, Essex. Members using the service are requested to send listener-reports to the stations concerned.**

# Society News

### National Radio Show

THE General Secretary will be pleased to hear from any member who is prepared to lend a hand on the Society's stand during the period of the National Radio Show at Earl's Court. The Show will open on Tuesday, August 23 and close on Saturday, September 3. Members willing to help are asked to state the date (or dates) and period of the day (or days) they will be free to undertake stand duty.

Because of the duration of the Show—a period of 11 days—a good many volunteer helpers are required.

### Amateur Radio Exhibition

THE Ninth Annual R.S.G.B. Amateur Radio Exhibition will take place at the Royal Hotel, Woburn Place, London, W.C.1, from Wednesday, November 23 to Saturday, November 26.

The Exhibition will be opened at 12 noon on the 23rd by the Director of the Radio Industry Council, Vice-Admiral J. W. S. Dorling, C.B.

Vice-Admiral Dorling was associated with the Society in the early days and it was largely due to his good offices that the Society was able to exhibit at the Radio Show, Earl's Court, last year.

Firms desirous of taking space at the Exhibition are invited to contact the Exhibition Manager, Mr. Phil Thorogood (G4KD) at 35 Gibbs Green, Edgware, Middlesex.

### Radio Amateurs' Examination

IN order to meet requests from examination centres and professional bodies for some indication of the relation between First and Second Class Passes, the City and Guilds of London Institute has decided to inform enquirers that the City and Guilds normal practice is 50 per cent approximately to pass and 66 per cent or more to qualify for a First Class award. The effect of this decision is that success in the Radio Amateurs' Examination denotes that a student has attained 50 per cent of the total marks that could be gained.

This change in policy has been agreed upon since the Institute realises that professional bodies particularly are able more fully to judge a student's capabilities and to make satisfactory comparison with other awards, if they have some idea of the various standards adopted in the examination.

The actual marks gained by individual students are not divulged, and no correspondence relating to a particular award can be undertaken.

* * *

ORGANIZERS of courses of instruction for those intending to take the Radio Amateurs' Examination in May, 1956, are invited to send full details as soon as possible for publication in the BULLETIN. By securing such publicity, prospective students and organizers will be able to make their plans well in advance.

### Revised Prices for A.R.R.L. Publications

THE following list of revised prices for A.R.R.L. publications is effective immediately:—

| | | |
|---|---|---|
| *A.R.R.L. Antenna Book*, 1955 *Edition* | .. | 18 6 |
| *Single Side Band for the Radio Amateur* | .. | 13 6 |
| *Learning the Radiotelegraph Code* | .. .. | 4 6 |

All prices include postage.

A few copies of the 1954 Edition of the *A.R.R.L. Antenna Book* are available from stock, price 13/6 post free.

### CQ Magazine

AS from July 1, 1955, the foreign subscription rate for *CQ Magazine*, published by Cowan Publishing Corporation, New York, will be increased to $6.00 (equivalent to £2 4s. 0d. Sterling).

### Editors and Engineers Ltd. Publications

THE Society regrets that it is no longer able to accept orders for the publications of Editors and Engineers Ltd., Summerland, California, U.S.A.

### Service Stations

RECENTLY the Society wrote to the G.P.O. quoting instances of Service stations apparently making improper use of amateur frequencies.

The following official statement has now been received from the G.P.O.:—

"Non-amateur stations are not authorised to communicate with amateur stations except in an emergency or, if they are Government stations, if it should be necessary to inform an amateur station that it is causing interference. If an amateur station is called by a non-amateur station under any other circumstances, communication should not be established but the incident, with full particulars, should be reported to the Radio Branch, Radio and Accommodation Department, Post Office Headquarters, London, E.C.1."

The Society has asked the G.P.O. to state how Government stations can be identified by amateur stations.

### Skeds with PE1PL

Amateurs in the British Isles who are situated 200 miles or more from The Hague and who are interested in 2 m and 70 cm skeds between 0830 and 1630 BST, are invited to write to station PE1PL at the following address: Physical Laboratory RVO-TNO, c/o Mr. S. Gratame, Vlakte Van Waalsdorp, The Hague, Holland.

## Silent Keys

### WILLIAM S. DAVISON (G5WD)

The sudden death, at a comparatively early age, of W. S. Davison (G5WD), of Sutton Coldfield, will be deeply regretted by his many friends. Will Davison, first licensed as GI5WD, of Belfast, in 1927, afterwards lived in Coleraine and then in Portrush. He was a well-known and active amateur on most bands before the war. After the war, on taking a post with Messrs. Stratton & Co., Ltd., he lived in Birmingham. A few years ago he bought a market-gardening business in Sutton Coldfield, and though his interest in Amateur Radio remained, he found his time fully occupied. His passing, on April 27, has taken from us a real amateur of the old school.

Will Davison was a man of great originality in thought and action, of great kindliness and modesty, of sturdy commonsense. His humour and conversation were a joy to his friends and memories of evenings with GI5WD, long ago, will always be treasured.

Our sincere sympathy is offered to his widow and to his son and daughter.

T.P.A.

### GEORGE EXETER (G6YK)

With deep regret we record the death, at the age of 56, of George Exeter (G6YK), of Liss, Hampshire. George joined the Society in 1926 and within a few months was appointed London District Manager, an office he held for several years. At that time he lived in the Notting Hill Gate area and it was from there that he and Douglas Walters, G5CV, carried out some pioneer experiments on 5 metres. When G5CV organised the first plane-to-plane and plane-to-ground tests on 5 metres, G6YK provided the best ground signals.

During the war Mr. Exeter was at H.M. Signal School at Portsmouth. Later he took over control of an Admiralty Research Establishment in Scotland. In more recent years he was in charge of a similar establishment in Hampshire.

Our heartfelt sympathies are extended to Mrs. Exeter and her family in their great loss.

J. C.

# Council Proceedings

*Résumé of the Minutes of the Proceedings at a Meeting of the Council of the Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Tuesday, April 19, 1955, at 6 p.m.*

*Present:*—The President (Mr. H. A. Bartlett in the Chair), Messrs. L. Cooper, C. H. L. Edwards, D. A. Findlay, R. H. Hammans, J. H. Hum, R. G. Lane, W. H. Matthews, W. R. Metcalfe, A. O. Milne, W. A. Scarr, R. L. Varney and John Clarricoats (General Secretary).

*Apologies for Absence* were received from Messrs. W. H. Allen, A. C. Gee and F. Hicks-Arnold.

* * *

*Dr. A. C. Gee*

The Secretary submitted a letter from Dr. A. C. Gee in which he intimated that, due to pressure of professional duties, he would be unable to continue as a Member of the Council.

*Resolved* (a) to accept, with regret, Dr. Gee's resignation; (b) to discuss at the May, 1955 meeting of the Council the question of filling the casual vacancy thus created.

*Membership*

(a) *Resolved* (i) to elect 38 Corporate Members and 8 Associates; (ii) to grant Corporate Membership to 19 Associates who had applied for transfer, including 3 whose original application had neither been proposed by a Corporate Member nor supported by references; (iii) to waive for a period of 12 months the subscription of Mr. John Taplin (G3HRI) on the ground that he suffers from blindness.

(b) The Secretary reported that of the 725 members whose subscription became due on January 1, 1955, 132 became overdue on March 1, 1955. Of this number 26 were London, 74 were Country and 14 were Overseas Corporate Members and 18 were Associates. Of those overdue 14 London, 46 Country and 10 Overseas members held call-signs.

The Secretary submitted details of the 26 members (including 5 Associates) who had written to resign during the five weeks ended April 16, 1955. Of this number 1 had resigned on financial grounds, 13 gave no reason, 8 stated they had lost interest. The remainder gave various reasons for resigning.

*Amateur Radio Exhibition*

It was reported that Mr. P. A. Thorogood had accepted the Council's invitation to organise the 1955 Amateur Radio Exhibition at the Royal Hotel, London, W.C.1.

It was agreed to inform Mr. Thorogood that the Council (a) accepts his suggestion that the Exhibition should centre around a theme; (b) is prepared to give further consideration to his suggestion that a prize be awarded to the person submitting the most meritorious piece of home-constructed equipment; (c) not to support his suggestion that a competition be staged in connection with the display of home-constructed equipment.

The Secretary was instructed to explain to Mr. Thorogood that if a competition, as such, were organised, every member of the Society would be entitled to submit an entry; considerable difficulty might be caused if a large number of entries was received.

*Regional and County Meetings*

*Resolved* (a) to authorise the Secretary to invite the Regional Representatives to submit a list of possible venues for either Regional or County meetings; (b) that from the list so produced the Council would select a certain number of venues for meetings during 1955 and 1956.

*Mr. A. Barlow (G3IOL)*

Mr. W. R. Metcalfe reported at length on his visit to Ramsbottom to interview Mr. A. Barlow (G3IOL) and representatives of the Ramsbottom Urban District Council.

*Resolved* (a) to place on record the thanks of the Council to Mr. Metcalfe for the effective manner in which he had dealt with the case; (b) to instruct the Secretary to write to the Clerk to the Ramsbottom Urban District Council thanking him for the courtesies extended to Mr. Metcalfe during his recent visit to Ramsbottom to investigate the Barlow case; (c) to enquire from the Clerk to the Ramsbottom U.D.C. whether the notice which was given to Mr. Barlow to close down his station within one month has been withdrawn.

*I.E.E. Lectures and Meetings 1955-56*

*Resolved* to authorise the Secretary (a) to reserve accommodation at the Institution of Electrical Engineers on the following dates for Society Lectures and Meetings: October 28, November 11, December 16 (A.G.M.), 1955; January 27, February 24, March 23, 1956.

*Letters to the Editor*

Consideration was given to correspondence received from members in reference to the controversy which had arisen following the publication of Mr. G. Jessop's article in the January, 1955, BULLETIN.

After discussion it was agreed to authorise the Editor to publish (a) one or two of the Letters from members in the May, 1955, issue of the BULLETIN together with a brief Letter from Mr. Varney; (b) a note at the end of Mr. Varney's Letter to the effect that the correspondence is now closed.

Arising from the foregoing discussion it was agreed to request the Technical Committee to consider the technical policy to be observed in checking technical articles.

*Balance Sheet*

The Honorary Treasurer submitted a draft Balance Sheet covering the nine months ended March 31, 1955. This showed that income exceeded expenditure by £472. Mr. Findlay expressed the view that the balance in hand at the end of the financial year would probably be about £600.

*Reports of Committees*

Due to the lateness of the hour it was decided to defer consideration of the Reports of Committees until the next meeting of the Council.

The meeting terminated at 10 p.m.

**Casual Vacancy on Council filled by Mr. L. E. Newnham**

MR. L. E. Newnham, B.Sc. (G6NZ), of 17 Washington Road, Emsworth, Hants, has accepted an invitation extended to him by the Council to fill the casual vacancy on the Governing Body created by the resignation of Dr. A. C. Gee (G2UK). Mr. Newnham polled the highest number of votes among the unsuccessful candidates at the Council Election held in December, 1954.

# Tests and Contests

### Two Metre Open Contest, 1955

MEMBERS equipped for 144 Mc/s operation are again invited to take part in this contest, the rules for which remain the same as last year. Mobile stations will be permitted to enter, provided they operate from a fixed site and sign /P.

**Rules**

*1. The Contest is open to fully paid-up members of the R.S.G.B. resident in Europe.*

*2. Only the entrant will be permitted to operate his station during the event.*

*3. Contacts may be made on telephony, c.w. or m.c.w.*

*4. An entrant must operate in accordance with the terms of his licence.*

*5. The station must be operated from the same site for the duration of the event. The National Grid Full Six-figure Reference must be given in all entries from G, GD, GM and GW. In all other cases, entries must show the latitude and longitude of the station location.*

*6. Only one contact with a specific station will count for points.*

*7. Contacts with unlicensed stations will not be permitted to count for points. Proof of contact may be required.*

*8. Entries should be written on lined foolscap or quarto paper, or typed on plain paper, and must be set out in the form shown below:*

**Two Metre Open Contest, July 2-3, 1955**

Name..... Call-sign.....

Home Address..... Claimed Score.....

Site of Station (if different from above).....

National Grid Full Six-figure Reference (or latitude and longtitude—see Rule 5 above) .....

Transmitter ..... Aerial system.....

Receiver .....

| Time G.M.T. | Call-sign of station worked | My report on his signals | His report on my signals | Location | Estimated distance (miles) | Leave blank |
|---|---|---|---|---|---|---|
| *1705* | *G3——* | *579* | *569* | *Oxford* | *40* | |
| *1710* | *G2——* | *559* | *459* | *Bedford* | *55* | |
| *1718* | *EI2——* | *569* | *549* | *Dublin* | *200* | |
| | | | | Claimed score..... | | |

*Declaration: I declare that my station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the ruling of the Council of the R.S.G.B. shall be final in all cases of dispute.*

Signed.....

*9. The event will start at 1700 G.M.T. on Saturday, July 2, and finish at 1900 G.M.T. on Sunday, July 3, 1955.*

*10. An exchange of RST or RS reports as well as location will be required before points for the contact may be claimed.*

*11. For each contact, points may be claimed equal to the number of miles between the two stations.*

*12. Entries should be addressed to the Hon. Secretary, R.S.G.B. Contests Committee, New Ruskin House, Little Russell Street, London, W.C.1, England, and must bear a postmark not later than Monday, July 11, 1955.*

*13. The Mitchell-Milling Trophy will be awarded to the winning entrant. A Certificate of Merit will be awarded to the entrant placed second.*

### Direction Finding Contests, 1955

DETAILS of the Peterborough D/F Qualifying Event, to be held on Sunday, July 10, are as follows:—

*Organizer:* Keith Gasson (G3EPT), 21 Hankey Street, Peterborough, Northants.

*Call-sign:* G3EPT/A.

*Frequency:* 1915 kc/s.

*Assembly Point*: Lutton Church, six miles east of Oundle (N.G.R. 112878).

*Map:* Ordnance Survey, New Popular Edition, Sheet 134.

*Assembly Time:* 13.30 B.S.T.

Intending competitors should notify the Organizer by Monday, July 4, stating the number in their party requiring tea. Competitors will be advised of the venue for tea when their entries are acknowledged.

* * *

H. W. J. DRURY (Romford) was the winner of the Southend D/F Qualifying Event held on May 1. Mr. Drury found the transmitter at 14.53, followed by J. K. Finch (High Wycombe) at 15.13; R. D. Charlton (Twickenham) at 15.15; T. C. Reynolds (Rugby) at 15.19; G. T. Peck (High Wycombe) at 15.19½; R. K. Seabrook (Southend) at 15.49, and J. M. S. Watson (Burgess Hill) at 16.28. J. J. Grant (Rugby) and A. C. Glozier (Barking) also took part.

Messrs. Drury, Finch and Charlton qualify for the National Final to be held on September 11.

### Region 1 Annual Field Day

THE Region 1 Field Day will take place on Sunday, August 28, 1955. Rules can be obtained on application, by any individual group in Region 1, from the Regional Representative, Mr. Basil O'Brien (G2AMV), 1 Waterpark Road, Prenton, Birkenhead, Cheshire.

### ZD9AD, Gough Island

P. J. MULLOCK (G3HPM) of Cambridge University Wireless Society, who will be the wireless operator with the Gough Island Scientific Research Expedition due to leave England shortly, has been licensed to operate an amateur station in connection with the Expedition under the call-sign ZD9AD. He will be active on all bands from 1.8 to 21 Mc/s. Contacts with U.K. stations will be particularly appreciated.

The Expedition, led by Mr. J. B. Heaney, will carry out an extensive scientific survey of Gough Island, 260 miles south-east of Tristran da Cunha in the South Atlantic. Daily weather reports will be sent to South Africa. The Expedition has the support of the Scott Polar Research Institute, the Royal Geographical Society, the British Museum of Natural History, and the Weather Bureau, Pretoria.

## Contests Diary

**1955**

| | | |
|---|---|---|
| June 19 | - - | D/F Qualifying (High Wycombe)* |
| July 2–3 | - - | Two Metre Open† |
| July 10 | - - | D/F Qualifying (Peterborough)§ |
| August 7 | - - | Two Metre Field Day (No. 2) |
| August 7 | - - | D/F Qualifying (Edgware) |
| August 21 | - - | D/F Qualifying (Salisbury) |
| September 4 | - | Low Power Field Day |
| September 10–11 | | 420 Mc/s Contest (No. 2) |
| September 11 | - | D/F National Final |
| September 24–25 | | 420 Mc/s Contest (No. 2) |
| October 1–2 | - | Low Power |
| November 12–13 | | Top Band (No. 2) |

**For details, see page 540, R.S.G.B. BULLETIN, May, 1954.*
*†For rules, see above.*
*§For details, see above.*

# Letters to the Editor

## QSL Cards

DEAR SIR,—I would like to crave space in your columns to utter a strong protest at the second part of Mr. Hum's *Current Comment* in the April issue of the BULLETIN. I refer not to the somewhat astounding belittling of the QSL card but to his remarks concerning listener reports.

Council members, old timers and amateurs who can cast their minds back into the 'twenties or 'thirties for their radio reminiscences seem occasionally to forget the eager yet half-timid approach of the young newcomer to amateur activity. Perhaps they entered radio as pioneers, or else from the profession; either way, they did not meet the established and somewhat mysterious hobby which now confronts the young short-wave enthusiast in his first few weeks on the amateur bands. They forget that behind the " worthless listener card " from down the road or over the hill there lies a potential amateur who only needs a friendly note with the QSL card or perhaps a 'phone call to put him on the right track.

Surely all amateurs would do far better to reply to reports in a friendly spirit—in the Ham Spirit indeed—rather than to ridicule such efforts from the non-licensed member in paragraphs of scathing rhetoric in the BULLETIN.

On Mr. Hum's comments regarding the QSL-seeking amateur I will say nothing. I merely ponder his astounding lines in my sorely amazed soul and I leave further protest to the " 100% QSL " men—old and new timers—who, I am sure, will regard this editorial as an attack on their most treasured principles.

Yours faithfully,
Sutton, Surrey. NIGEL HARVEY (G3IRU).

DEAR SIR,—In the April issue, under *Current Comment*, J. H. " trails his coat " on the subject of QSLs. Perhaps Mr. Hum does not collect; he has probably got over the craze. As he rightly states, it is a passing phase for most amateurs. Quite a few never seem to tire of the hobby of collecting cards however, and most of us like to see that odd DX card now and again. The question of Listener Reports is different. To some licence holders it may be annoying to receive stacks of meaningless cards, bearing a request for a card in return. Most cards of this type mean very little, except to the chap who hopes for your card. I always oblige, for the majority of S.W.L. cards come from behind the curtain around the satellite countries, and evidence of cards is probably justification for being permitted to listen to the " ham " world outside, and all that is meant thereby. So to J.H. and those others who frown when they get requests for cards from OK, SP, HA, and the like, stop a minute and consider the position of the " would be " ham the other end. Maybe the QSL card has a value that most of us do not think about ! In any case, I expect the majority of us have done quite a lot of " unrequited listening " before we were licensed.

Yours faithfully,
Bath, Somerset. W. J. GREEN (G3FBA).

DEAR SIR,—May I suggest that J. H. (your " Current Comment " contributor to the April BULLETIN) should be a little more tolerant of the QSL card collector. Working DX and collecting those bits of coloured pasteboard is interesting to many of us, and our nervous tick is no more pronounced than that of the devotees of v.h.f. or single sideband.

Let us remember that Amateur Radio is primarily a hobby and that only a small number of members are technically qualified to carry out useful scientific research. The great majority indulge in contests, rag chewing or just plain dabbling and the amateur down the road is far more likely to be " working DX " for which he hopes to get a QSL card, than carrying out some vital experiment.

The QSL craze, the contest craze and all the other crazes are equally important to us, and any pretence that we are all members of a scientific body engaged in highly skilled experiments is ludicrous.

Yours faithfully,
(CAPTAIN) JACK TURNER (VS1FK).
c/o G.P.O. Singapore, Malaya.

## Is the S Code Out-dated?

DEAR SIR,—I would suggest that the established method of reporting signal level is now out-dated and requires rationalising.

When the nine S-point system was introduced the carrier powers were lower than those in use today; furthermore the receiver noise was higher. The nine S-points, each of 6 db, covering a total range of 54 db, were probably adequate then but the carrier level range today, due to higher powers, particularly as the frequency, too, has increased, and to improved signal to noise ratios, approaches 100 db.

I would therefore suggest that a system using 10 S-points each of 10 db, would avoid this silly business of reporting " S9 plus 20 db." At the same time, it would be as well to define the reference level, in terms of a standard which can be easily measured by the amateur. To start the discussion ball rolling, I suggest the lowest discernible signal when judged audibly on headphones might be considered the reference level. Alternatively it might be the lowest discernible signal visible on an agreed design of carrier level meter.

It would be interesting to have other views on this subject.

Yours faithfully,
Rugby, Wores. HAROLD TURNER (G8VN).

## Has the European Band-plan Fallen Down ?

DEAR SIR,—Recently, owing to a major breakdown in the A transmitter, I have been doing some listening on the 80 metre phone band.

I was very much surprised at the number of c.w. stations who were working in the " Phone " section of the band. In two weeks I heard a G2/2, G2/3 (4 of them), G3/2 (2), G4, G5, G8, several G3/3, two GM and a GI.

When I joined the R.S.G.B. I received a printed postcard setting out the various bands and showing the c.w. and phone sections. I should explain that I am a c.w. enthusiast and not really interested in phone—but if a phone station came up in the c.w. section of the band I should be most annoyed. Some of the stations checked were—according to their call-signs—old hands and should know better.

Let's have some better co-operation between the two sections. There's enough " commercial " interference without our own members causing more.

Yours faithfully,
Ripon, Yorks. F. A. GRANT (G3FTV/A).

## Subscriptions Paid by Bankers' Order

DEAR SIR,—I feel that part of the cause of the Society's loss of income in this respect may be due to the failure of banks to implement member's notification of the increase. Members who have received the Society's recent circular would do well to check their statements to ascertain whether their bankers have paid the increased subscription.

My personal experience was that, after notifying my bankers in November, 1953, to pay the extra 12/6d. and endorsing the mandate at that time, I forgot about the matter. Imagine my surprise when in March this year I received the Society's circular drawing my attention to the fact that the sum of 12/6d. was four months overdue. Before writing a " snorter " to Headquarters I decided to be sure of my facts and checked off on my Bank Statement. There it was:—" R.S.G.B. = 15/- ". On telephoning my bank they acknowledged the error and arranged payment of the deficit at once. There must be other similar cases. Knowing the general attitude to Headquarters of many members, some of these cases may not have been investigated but merely shrugged off with an " It's about time Headquarters pulled up its socks, let 'em find out I've altered my Order."

We may lose members because of inefficiency at banks, so can my case be given publicity before its too late ?

Yours faithfully,
E. ARNOLD MATTHEWS (G3FZW).
Area Rep.:—Lichfield, Cannock & District.
E.C.O.:—South Staffs.
Lichfield, Staffs.

[*Editorial Note.*—Several other members have advised Headquarters that their instructions to bankers have not been carried out in respect to the renewal of subscriptions.]

## Radio and Television Interference

DEAR SIR,—The whole question of interference caused to and by radio and television receivers and other electrical equipment is the cause of much concern at the moment and should be thoroughly tackled from all angles.

It is totally unfair that one section of the public should be threatened by fines when causing interference to television receivers when at the same time the majority of those instruments are also guilty of interference to sound radio. All owners of television sets which cause such interference are breaking the law, and if the Post Office cannot (or will not) enforce their own licence conditions, then the relevant conditions regarding interference should be taken out altogether. The Post Office could then sort that one out.

So far the whole matter has been tackled from one side only. If a vacuum cleaner is causing trouble, then the Post Office quite rightly sorts out the offending equipment. If, however, the offender is a television receiver, then that is the last place the Post Office will consider. Instead, the person complaining is told to acquire an efficient aerial/earth system which has nothing whatever to do with the fact that the owner of the television set is breaking the law.

It is to be hoped that a lot of publicity can be given to this matter. Perhaps then the responsible authorities will awake from their lethargy and become quite fair about it.

Yours faithfully,
Basford, Nottingham. J. RAYNER.

## Improving the National HRO

DEAR SIR,—I feel sure that the article printed on page 477 of the April BULLETIN has inspired a number of amateurs to think about, if not to act upon, the result of the work carried out by the author, Mr. O. M. Derrick. When in Kuala Lumpur some years ago, I replaced most of the fixed condensers, some of the fixed resistances, the first r.f. by a 6SG7, the second r.f. by a 6K7 and the mixer by an EF54. The 6SG7 was disconnected from the a.v.c. line and a variable resistance of 2,000 ohms wired in the cathode circuit in addition to the usual cathode resistor. The r.f. gain control of 10,000 ohms I found too large for good control and this was replaced by one of 5,000 ohms. The power unit burned out and was rebuilt using a Gardners' Radio mains transformer type R107 and a choke type C223. These components fitted nicely into the metal case.

Reading Mr. Derrick's article, it was decided to give the HRO a complete rebuild. Accordingly the following valves were fitted: V1, V2, 6BA6; V3, V4, V8, EF36; V5, V6, KTW61; V7, DH63; V9, 6F6. After considerable experiment, it was decided to leave V1 disconnected from the a.v.c. line and to use the manual control of 2,000 ohms—mounted at the left side of the receiver. Incidentally, I had already observed, to my great surprise, that only one by-pass condenser was used on the screens of the two r.f. and two i.f. valves. Three by-pass condensers of 0.01 $\mu$F were added to the relevant screens and one decoupling resistor was wired in the screen circuit of the first i.f. valve. A " scratching " noise on the 28 Mc/s band was found to be due to a bad rubbing contact on the oscillator section of the tuning condenser (*i.e.*, the right hand section of the main gang). This was cured by soldering a piece of flex wire from the moving spindle to earth. To round off the work, a 5Z4 was fitted in the power unit and a fuse box on the face of this unit. The fuses were wired in the mains input leads.

The alignment of bandspread coils can be a laborious job without the instructions on the subject—the writer's coils are General Coverage ones with the bandspread fitting incorporated.

The HRO crystal was taken out of its holder, cleaned and replaced—quite a major operation on this particular model of the HRO. It should be superfluous to end by stating that the receiver is now working extremely well.

Yours faithfully,
J. MACINTOSH (GM3IAA, ex-VS1AA).

Cradlehall, Inverness.

## In Defence of Top Band

DEAR SIR,—In the May issue of the BULLETIN, G2AIW made out an excellent case for promoting interest in 2m, while in the April issue, B.R.S.19162 pleaded for more evening activity on this band, comparing its apparent emptiness with the humming activity on 1.8 Mc/s. I was recently asked to take part in a debate, as the mover of a proposition that some of our higher frequencies above 440 Mc/s " are a useless amateur allocation." Knowing that nothing in this world is entirely useless, I would have preferred the word " dead loss " but the die being already cast, I made a light-hearted attempt to put the proposition over, knowing full well that, worded as it was, and opposed by one of our leading v.h.f. experts, it was almost certainly foredoomed to failure—a surmise which proved abundantly correct. I did, however, make one serious comparison between the reliability of the lower frequencies, and the notorious unreliability of the high—and I do not exclude 144 Mc/s from this criticism, but in view of the way in which the proposition was " shot down in flames " I am a little surprised that pleas such as the two I have mentioned are necessary, since they are by no means the first of their kind.

I do not in any way decry the v.h.f.'s, for they provide excellent playgrounds for the experimenters and those who love " doing it the hard way " but it cannot be denied that to get the best out of them, specialised equipment, plus a complicated rotatable aerial, is necessary, and I think that herein lies the whole crux of the matter. Furthermore, I am convinced that I am not alone in my opinion that for a random evening on the air, with the absolute certainty of at least a few contacts, our much despised lowest frequency, with all its noise and clamour, can still show its more-fashionable, capricious, rock-bound, " rich relation " a *very* clean pair of heels.

Yours faithfully,
L. J. FULLER (G6LB).

Great Baddow, Chelmsford.

## Cathode Keying

DEAR SIR,—Mr. Knight (G2DXK) rightly comments in his " Introduction to Amateur Transmitting " that cathode keying can cause electrical breakdown between the heater and cathode. He does not, however, mention a simple means of preventing this. The function of the key is to interrupt the signal, and this can usually be done by inserting some resistance in the cathode lead, *i.e.*, by increasing the cathode bias, without actually interrupting the cathode current and putting the cathode " up in the air." With most high-slope receiving valves the signal will cease long before the recommended heater/cathode rating is exceeded. In the interests of spark suppression, this resistor should, presumably, be straight across the key. Provided that there is no alteration in the drive to the keyed stage, a fixed resistor is adequate: otherwise a variable resistor should be used, and adjusted to the point where the signal just ceases. In the case of an EF50, for instance, five thousand ohms should be ample.

Yours faithfully,
JOHN ROSCOE (G4QK).

South Croydon.

## Slow Morse on Two Metres

DEAR SIR,—I would very much like to see permission granted for slow morse practice transmissions on the two metre band. At present only Top Band is used for this purpose and although this is reasonably satisfactory, I think " two " would be better in several ways. With crossed dipoles at 45ft and an input of 15 watts a reliable range is about 25 miles over normal terrain, assuming the receiving aerial to be a dipole at 30ft or so and the receiving equipment of average construction, thus giving a larger " service area " which is not dependent on the time of day. With a typical Top Band aerial and 10 watts the reliable day range seems to be about 15 miles. There is little or no interference caused to reception on two and none given, as far as I am aware. Furthermore, more newcomers would be encouraged to use the band.

I have mentioned this idea to several amateurs not working on two and invariably their first remark is " What about the cost and complexity of the gear? ". This is a drawback admittedly but not really a very big bogey as a one valve converter (say a 12AT7 as a mixer/oscillator—a suitable circuit may be obtained from the manufacturers) for *local* use, can be made in an evening or two and an aerial made in a few minutes. The first aerial made here consisted of two 19in. lengths of 20 s.w.g. copper wire strapped to a piece of dowelling, fed with a length of TV coax, and lashed to the top of a clothes prop fixed on the roof of the garden shed. This worked very well for local signals but had a short life as the mast was forcibly removed!

In conclusion a set of regular transmissions from most parts of the British Isles, using fixed aerial systems, would be a most valuable guide to nearly every user of the v.h.f. bands, whether for assessing " conditions " or setting up and testing receiving equipment.

Yours faithfully,
G. I. TURNER (G3DGN).

New Barnet, Herts.

## Mobile Operation

DEAR SIR,—I have read with interest the various opinions on the legality and advisability of Mobile Operation. As a driver-operator travelling some 15-20,000 miles per year several points occur to me.

The Highway Code suggests one should make signals when turning, stopping, starting, being overtaken, etc. In addition one operates accelerator, clutch, brakes, gears, steering wheel, horn (not necessarily in that order!).

To sit with both hands on the steering wheel requires nothing less than automatic, fluid-drive transmission which is only fitted to the very expensive models and is not for the humbler amateur. I suggest that after setting the rig to the required frequency all further operation can be, and in most cases is, controlled with a microphone fitted with a " press-to-talk " switch, held in the left hand, or alternatively, a foot switch and a throat microphone.

After all, one does not have to stop when adjusting or listening to the B.B.C. on a car radio, nor yet do all police radio patrol cars carry a radio operator.

I should say " Drive first, carefully, then operate." When working that weak or difficult station, stop and pull off the road completely.

Yours faithfully,
JOHN D. GRAHAM (G3HDT).

Duddo, Berwick-on-Tweed.

## B.R.S. Reports

DEAR SIR,—We read fairly frequently in the BULLETIN of the lack of information in reports sent to licensed amateurs, but we are rarely told what type of report is required.

May I suggest that someone takes the trouble to write and tell the B.R.S. members exactly what reports are required? I for one would be pleased to assist in giving something more than RST599.

Yours faithfully,
D. H. COLLINS (B.R.S.19638).

Hanham, Bristol.

## In All Seriousness

DEAR SIR,—In the April issue you published the answer given by the Assistant Postmaster General to a question asked by a Member of Parliament concerning radio amateurs and commented that Headquarters had no knowledge of the reason which prompted the question.

As there is no mention of the matter in the May issue, I would like to suggest, in all seriousness, that one reason could well be that the M.P. had listened to one or two of the telephony nets on 80 metres.

Yours faithfully,
VINCENT PENFOLD (G3JZ).

Cuckfield, Sussex.

## TVI in Reverse

DEAR SIR,—I agree entirely with the remarks of your various correspondents regarding the noise radiated by some TV receivers and the havoc they cause to amateur and domestic reception.

One point, however, seems to have escaped everyone regarding the reluctance of the G.P.O. to take any action. The answer is surely plain. Having just acquired a fleet of television pirate detector vans, would any sane person then take action which would promptly render this effective and, presumably, remunerative service useless ?

Yours faithfully,
A. C. WHITEHILL (G3IRK)

Cranwell, Lincs.

# Forthcoming Events

### REGION 1

**Blackpool (B. & F.A.R.S.).**—June 28, 7.30 p.m., 25 Abbey Road.
**Bury.**—July 14, 7.30 p.m., 52 The Drive, Seedfield, Bury.
**Chester (C. & D.A.R.S.).**—Tuesdays, 7.30 p.m., Tarran Hut, Y.M.C.A., Chester.
**Crosby.**—Tuesdays, 8 p.m. over Gordon's Sweetshop, St. John's Road, Waterloo.
**Isle of Man (I.o.M.A.R.S.).**—June 15, July 6, 20, Manor Guest House, Victoria Road, Douglas.
**Lancaster (L. & D.A.R.S.).**—July 6, 7.30 p.m., "George Hotel," Torrisholme.
**Liverpool (L. & D.A.R.S.).**—Tuesdays, 8 p.m., St. Barnabas Hall, Penny Lane, Liverpool, 15. **(M.R.S.).**—June 22, July 13, 27, 8 p.m., Larkhill Mansion House, Queen's Drive, Liverpool, 13.
**Manchester (M. & D.R.S.).**—July 4, 7.30 p.m., Brunswick Hotel, Piccadilly, Manchester. **(S.M.R.C.).**—Fridays, 7.45 p.m., Ladybarn House, Mauldeth Road, Manchester, 14.
**Preston.**—June 17, July 1, 15, St. Saviour's Parish Hall, Manchester Road.
**Rochdale (R.R.T.S.).**—Fridays, 7.45 p.m., 1 Law Street, Sudden.
**Southport.**—Thursdays, 8 p.m., Sea Cadet's Camp, Esplanade, Southport.
**Stockport (S.R.S.).**—June 22, July 6, 20, 8 p.m., "Blossoms Hotel," Buxton Road.
**Warrington (W. & D.R.S.).**—June 16, July 7, 21, 7.30 p.m., "Kings Head Hotel," Winwick Street, Warrington.
**Wirral (W.A.R.S.).**—June 15, July 6, 20, 7.45 p.m., Y.M.C.A., Whetstone Lane, Birkenhead.

### REGION 2

**Barnsley.**—June 24, July 8, 7.30 p.m., "King George Hote," Peel Street.
**Bradford.**—June 28, 7.30 p.m., Cambridge House, 66 Little Horton Lane.
**Catterick.**—Wednesdays, 7 p.m., Loos Lines, Catterick Camp.
**Darlington.**—Thursdays, 7.30 p.m., 129 Woodlands Road.
**Doncaster.**—July 13, 7.30 p.m., Y.W.C.A., Cleveland Street.
**Gateshead.**—Mondays, 7.30 p.m., Mechanics' Institute, 7 Whitehall Road.
**Hull.**—June 28, July 12, 7.30 p.m., "Rampant Horse," Paisley Street.
**Leeds.**—Wednesdays, 7.30 p.m., Swarthmore Educational Centre, Woodhouse Square.
**Middlesbrough.**—Thursdays, 7.30 p.m., Joe Walton's Boys' Club, Feversham Street. **(T-S.A.R.C.).**—June 17, July 1, 8 p.m., Settlement House, Newport Road.
**Pontefract.**—June 16, 30, July 7, 8 p.m., "Fox Inn," Knottingley Road.
**Rotherham.**—June 15, July 6, 7.30 p.m., Photographic Society's Room, 11 The Crofts.
**Scarborough.**—Thursdays, 7.30 p.m., B.R. Rifle Club, West Parade Road.
**Sheffield.**—June 22, 8 p.m., "Dog and Partridge," Trippet Lane, July 13, 8 p.m., Albreda Works, Lydgate Lane.
**Slaithwaite.**—Fridays, 7.30 p.m., 3 Dartmouth Street.
**Spenborough.**—June 29, July 13, 7.30 p.m., Temperance Hall, Cleckheaton.
**York.**—Thursdays, 7.30 p.m., Club Rooms, Y.A.R.S., Fetter Lane.

### REGION 3

**Birmingham (South).**—July 4, 7.30 p.m., Friends Hall, Watford Road, Cotteridge. **(M.A.R.S.).** June 21, 6.45 p.m., Midland Institute. **(Slade).**—June 24, July 8, 7.45 p.m., Church House, High Street, Erdington.
**Coventry.**—June 24, 7.30 p.m., Priory High School, Wheatley Street. **(C.A.R.S.).**—June 20 ("V.H.F.", G3BAK), July 4, 7, 9 Queen's Road.
**Kenilworth, Warwick, Leamington.**—June 16, 7.30 p.m., Dalehouse Lane.
**Malvern.**—July 4, 8 p.m., "Foley Arms."
**Redditch.**—June 30, 8 p.m., 10 Woodland Road, July 12, 8 p.m., "Scale and Compasses," Birchfield Road.
**Rugby.**—July 3, 7.30 p.m., B.T.H. Recreation Club, Hillmorton Road.
**Solihull.**—June 27, July 11, 7.30 p.m., Defence H.Q., Sutton Lodge, Blossomfield Road.
**Stoke.**—June 29, 8 p.m., "Lion's Head," John Street, Hanley.
**Stourbridge (St.A.R.S.).**—July 5, 8 p.m., King Edward VI School.
**Walsall.**—June 22, July 13, 8 p.m., Technical College, Bradford Place.
**Wolverhampton.** — June 20, July 4, 8 p.m., Steckwell End, Tettenhall.
**Wrekin.**—Venue and dates from G. Myatt, 12 Swan Street, Broseley.

### REGION 4

**Alvaston.**—Tuesdays, Thursdays, 7.30 p.m.; Sundays, 10.30 a.m., Nunsfield House, Boulton Lane, Alvaston, Derbys.
**Chesterfield.**—Tuesdays, 7.30 p.m., Bradbury Hall, Chatsworth Road.
**Derby (D. & D.A.R.S.).**—Wednesdays, 7.30 p.m., Derby College of Arts & Crafts, Subbasement, Green Lane.
**Ilkeston (I. & D.A.R.S.).**—Thursdays, 7.0 p.m., Room 5, Ilkeston College of Further Education, Field Road.
**Leicester (L.R.S.).**—June 20, 7.30 p.m. Holly Bush Hotel, Belgrave Gate.
**Lincoln (L.S.W.C.).**—July 6, 7.30 p.m., Technical College, Cathedral Street.
**Mansfield (M. & D.A.R.S.).**—No meeting in July.
**Newark.**—July 3, 7.0 p.m., Northgate House, Northgate, Newark.
**Northampton (N.S.W.C.).**—Fridays, 7.0 p.m., July 1, 6.0 p.m., Clubroom, 8 Duke Street.
**Nottingham.**—June 17, July 15, 7.30 p.m., Sherwood Community Centre, opposite Woodthorpe Drive, Sherwood.
**Peterborough.**—July 6, 7.30 p.m., 21 Hankey Street.
**Retford.**—No meeting in July.

### REGION 5

**Chelmsford.**—July 7, 7.30 p.m., Marconi College, Arbour Lane. **(B.A.T.C.).**—July 14, 7.30 p.m., 19 Baddow Place Avenue, Great Baddow.
**Lowestoft and Beccles (L. & B.A.R.C.).**—June 22, July 13, 7.30 p.m., Y.M.C.A., Lowestoft.

### REGION 6

**Cheltenham.**—July 7, 8 p.m., Great Western Hotel, Clarence Street.
**Gloucester (G.R.C.).**—Thursdays, 7.30 p.m., The Cedars, 83 Hucclecote Road, Gloucester.
**Jersey, C.I.**—June 28, 7.45 p.m., Chamber of Commerce, Royal Square.
**Oxford (O. & D.A.R.S.).**—June 22, July 13, 7.30 p.m., "Magdalen Arms", Iffley Road.
**Portsmouth.**—Tuesdays, 7.30 p.m., British Legion Club, Queen's Crescent, Southsea. (Clubroom open every evening.)
**Southampton.**—July 2, 7 p.m., 1 Prospect Place.
**Stroud.**—Wednesdays, 7.30 p.m., Subscription Rooms.

### REGION 7

**Acton, Brentford and Chiswick.** — Tuesdays, 7.30 p.m., A.E.U. Rooms, 66 High Road, W.4.
**Barnes, Putney and Richmond.**—July 1, 337 Upper Richmond Road, S.W.14.
**Bexleyheath.** — June 23, July 14, 7.30 p.m. Congregational Hall, Chapel Road, Bexleyheath.
**Bromley (N.W.K.A.R.S.).** — July 1, 8 p.m., Shortlands Hotel, Station Road, Shortlands.
**Chingford.** — June 24, July 8, Venue from G4GA (SIL. 5635) or B.R.S.19765 (SIL. 6055).
**Chislehurst and Sidcup.** — July 13, "Seven Stars," High Street, Footscray.
**Croydon.**—July 5, 7.30 p.m., "Blacksmith Arms," 1 South End, Croydon.
**Dorking.**—Tuesdays, 7.30 p.m., 5 London Road.
**East Ham.**—Tuesdays, 8 p.m., 12 Leigh Road.
**East Molesey (T.V.A.R.T.S.).**—July 6, 8.30 p.m., "Carnarvon Castle Hotel". ("Thirty Years of R.A.F. and Amateur Radio", W./Cdr. W. Dunn, O.B.E., G2LR).
**Ealing.**—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway, W.5.
**Enfield.**—June 19, 3 p.m., George Spicer School, Southbury Road, Enfield.
**Finsbury Park.**—June 21, 7.30 p.m., 16 Albion Road, Stoke Newington, N.16.
**Gravesend (G.A.R.S.).**—Thursdays, 7.45 p.m., Terrace Hotel.
**Hendon and Edgware.**—Wednesdays, 8 p.m., 21 Goodwins Avenue, Mill Hill.
**Hoddesdon.**—July 7, 8 p.m., "Salisbury Arms".
**Holloway (G.R.S.).**—Mondays (R.A.E.), Fridays, 7 p.m., Grafton School, Eburne Road, N.7.
**Ilford.**—Thursdays, 8 p.m., G2BRH, 579 High Road.
**Kingston (K. & D.R.S.).**—Alternate Wednesdays, 7.45 p.m., Penryhn House, Penryhn Road.
**Lewisham (R.A.R.C.).**—Wednesdays, 8 p.m., Durham Hill School, Downham.
**London (L.M.L.C.).**—June 17, July 15, 12.30 p.m., Bedford Corner Hotel, Bayley Street, off Tottenham Court Road, London, W.C.1.
**London (U.H.F. Group).**—July 7, 7.30 p.m., Bedford Corner Hotel, Bayley Street, off Tottenham Court Road, London, W.C.1.
**Norwood.**—June 18, Windemere House, Weston Street, Crystal Palace. (N.F.D. Inquest.)
**Southgate and Finchley.** — July 14, Arnos School, Wilmer Way.
**Slough.**—July 5, Venue from G2HOX or G3BTP, 13 Quaves Road, Slough.
**Sutton and Cheam (S. & C.R.S.).**—June 21, July 19, "The Harrow", Cheam Village.
**Welwyn Garden City.**—July 5, 8 p.m., Council Office, Welwyn Garden City.

### REGION 8

**Brighton (B.D.R.C.).**—Tuesdays, 7.30 p.m., "Eagle Arms", Gloucester Road.
**Chatham (M.A.R.T.S.).**—June 20, July 4, 7.30 p.m., "Services Rendered Club", 14 High Street, Brompton, Chatham.
**Hastings (H. & D.R.C.).**—June 28, July 12, 26, 7.30 p.m., Saxon's Café, Denmark Place.
**Isle of Thanet (I.o.T.R.S.).** — Fridays, 7.30 p.m., Hilderstone House, Broadstairs.
**Maidstone (M.K.A.R.S.).**—Tuesdays, 7.30 p.m., Elms School, London Road
**Sussex (R.A.E.N.).**—June 18, July 16, 7.30 p.m. "Kings Head," Fishersgate, nr. Brighton.
**Worthing (W. & D.R.C.).**—July 11, 7.30 p.m., Adult Education Centre, Hawley Street.

### REGION 9

**Bristol.**—June 17, July 15, 7.15 p.m., Carwardine's Restaurant, Baldwin Street, Bristol 1.
**Exeter.**—July 1, 7 p.m., St. David's Hill.
**Falmouth (W.C.R.C.).**—June 16, July 7, "The Fifteen Balls," Penryn.
**North Devon.**—July 7, G2FKO, 38 Clovelly Road, Bideford.
**Torquay.**—June 18, July 16, 7.30 p.m., Y.M.C.A., Castle Road.
**Weston-super-Mare.**—July 5, 7.30 p.m., Y.M.C.A., Weston-super-Mare.
**Yeovil.**—Wednesdays, 7.30 p.m., Grove House, Preston Road.

### REGION 10

**Cardiff.**—July 11, 7.30 p.m., "The British Volunteer", The Hayes, Cardiff.
**Neath and Port Talbot.**—July 5, 7.30 p.m., "Royal Dock Hotel", Briton Ferry.

### REGION 13

**Dunfermline.**—Thursdays, 7.30 p.m., behind 34 Viewfield Terrace, Dunfermline.
**Edinburgh.**—June 23, 7.30 p.m., Chamber of Commerce Rooms, 25 Charlotte Square, Edinburgh.

### REGION 14

**Falkirk.**—June 24, July 8, 7.30 p.m., The Temperance Café, High Street, Falkirk.
**Glasgow.**—June 24, 7.15 p.m., Christian Institute, 70 Bothwell Street, Glasgow, C.2. (V.H.F. Demonstration.)

# Regional & Club News

**CHELMSFORD AMATEUR TELEVISION GROUP.**—" Test Gear for Amateur TV " will be the subject of a talk by R. Martyr at 10 Baddow Place Avenue, Great Baddow, on July 14. All interested in Amateur Television are invited to attend.

**CAMBRIDGE & DISTRICT AMATEUR RADIO CLUB.**—At the recent A.G.M. the following officers were elected: *President:* C. H. Babbs (G5LG); *Chairman:* L. Gostelow (G2FOW); *Hon. Treasurer:* P. Broom (G5DQ); *Hon. Secretary:* F. A. E. Porter. Meetings are held at the " Jolly Waterman ", Chesterton Road, Cambridge, at 7.30 p.m., on the fourth Friday in each month—the next is on June 17.

**GLASGOW.**—Parties of members visited Kirk O'Shotts TV station on May 6 and 14. The V.H.F. Group is giving a demonstration at the meeting on June 24 (see *Forthcoming Events*).

**ISLE OF MAN AMATEUR RADIO SOCIETY.**—L. Higgins (GD3FOC) was elected a Vice-President at the A.G.M. held at the Manor Guest House, Douglas, on May 4. A very successful social evening was held on May 7. A N.Z. ZC1 Mk. II transmitter-receiver having been obtained the Society hope to use it as a portable station during the summer. The President (H. Grist, GD3FBS) has provided accommodation for the club station GD3FLH. *Hon. Secretary:* M. R. Thompson (GD3JIU), 146 Ballabrooie Drive, Douglas.

**LANCASTER & DISTRICT AMATEUR RADIO SOCIETY.**—At the A.G.M. in May, the following were elected: *Chairman:* F. B. Kyle; *Hon. Treasurer:* C. Bennett; *Hon. Secretary:* B. Smalley, 8 Windermere Road, Carnforth; *Committee Members:* R. P. Mackrell (G3AEP) and B. Parker.

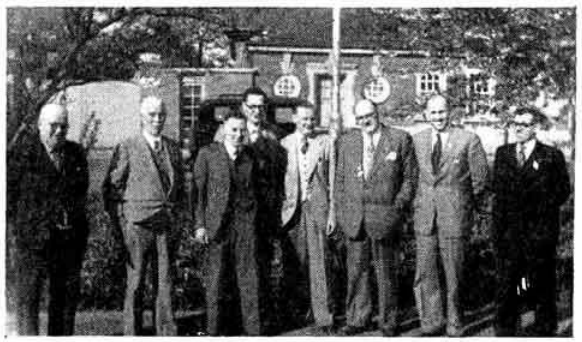
**MIDLAND AMATEUR RADIO SOCIETY.**—Trevor Tallboys (G2ATK) recently gave a much appreciated lecture on 2m mobile equipment. Forthcoming talks include " High Fidelity Equipment ", by H. Buckley (June 21), and " Transistors ", by J. Missen, G.E.C. Research Laboratories (July 19). The society's field week-end will take place at Barr Beacon, Staffs., on July 2-3. Meetings are held on the third Tuesday in each month at the Birmingham and Midland Institute, Paradise Street, Birmingham. *Hon. Secretary:* D. Hall, 144 Hill Village Road, Sutton Coldfield.

**NORWOOD.**—At a meeting on May 21, a motion that a local radio club should be formed, within which the Norwood R.S.G.B. Group would continue to function, was adopted after a lively discussion.

**NOTTINGHAM AMATEUR RADIO CLUB.**—Meetings of this club, which is a section of the Sherwood Community Association, are held on Mondays, at 7.30 p.m., at Woodthorpe House, Mansfield Road, Nottingham. Morse and technical instruction classes for those taking the Radio Amateurs' Examination in 1956 are to be arranged. The club station is active on Top Band, for which a half-wave dipole has been erected. *Hon. Secretary:* N. D. Littlewood, 129 Stand Hill Road, Nottingham.

**QRP SOCIETY.**—This society, now in its sixth year, extends a welcome to all low-power enthusiasts. There are groups specially catering for those interested in v.h.f., t.r.f. receivers and transistors. Details of membership and a specimen copy of the society's journal, *QRP*, may be obtained from the *Hon. Secretary:* John Whitehead, 92 Rydens Avenue, Walton-on-Thames.

**ROMFORD AND DISTRICT AMATEUR RADIO SOCIETY.**—A workshop is now available. Members took part in N.F.D. and will be operating again during the next 2m field day. Meetings are held at 8.15 p.m. on Tuesdays at R.A.F.A. House, Carlton Road, Romford. Visitors are cordially invited to attend. *Hon. Secretary:* N. Miller, 55 Kingston Road, Romford.



**Staffordshire County Meeting, Lichfield, May 15, 1955**
**From left to right, E. S. G. K. Vance, G8SA (R.R. No. 4), J. Timbrell, G6OI (R.R. No. 3), Arnold Matthews, G3FZW (T.R., Lichfield), N. W. Austin, G2FQR (T.R., Walsall), Alec Higgins, G8GF (C.R., Staffs.), John Clarricoats, G6CL (General Secretary), H. W. Mitchell, G2AMG (Zonal Representative), Dan Poole, G3AQW (T.R., Stoke-on-Trent).**

**ROTHERHAM.**—Meetings are held on the first and third Wednesday in each month in the Rotherham Photographic Society's room at 11 The Crofts, commencing at 7.30 p.m. *Town Representative:* H. N. Gubby (G3ELG), 37 Sough Hall Road, Thorpe Hesley, Rotherham.

**SHEFFORD & DISTRICT AMATEUR RADIO SOCIETY.**—The society, now in its seventh year, meets on Fridays, at 8 p.m., in Digswell House. Prospective members and visitors are always welcome. G2DUS/T—a regular lecturer—recently gave a talk on his TV Monoscope. Other recent talks have included " Wire Recording ", by G3GDH, and " The Manufacture and use of Quartz Crystals ", by J. Johnson. *Hon. Secretary:* G. R. Cobb (G3IXG), Lilac Cottage, 7 Hitchin Road, Shefford.

**TEES-SIDE AMATEUR RADIO CLUB.**—At the recent A.G.M. the following were elected: *Chairman:* J. B. Harding (G3JYH); *Hon. Treasurer:* E. Moon (G3KBM); *Hon. Secretary:* B. B. Wilson (B.R.S.19449), 297 Linthorpe Road, Middlesbrough. The club station (G3HUG) should be active soon.

**TORBAY AMATEUR RADIO SOCIETY.**—At the May meeting, R.S.G.B. members discussed final arrangements for N.F.D. The chairman's " spring clean " resulted in a junk sale in aid of N.F.D. expenses. Visitors to the area during the summer are invited to contact the *Hon. Secretary:* L. H. Webber (G3GDW), 43 Lime Tree Walk, Newton Abbot, or W. H. Baker (G3JD), 46 Dower Road, Torquay. The next meeting will be at 7.30 p.m., on June 18, at the Y.M.C.A., Torquay.

**WORTHING & DISTRICT AMATEUR RADIO CLUB.**—The club's Annual " Bucket and Spade " Party will be held on July 17, 1955, at the Kiosk, west end of Beach House Park, almost on the beach. The party will last all day but the official welcome will be at 3 p.m. *Hon. Secretary:* J. F. Wells, Atickwa, 37 Salvington Gardens, Worthing.

**The Third Annual Dinner of the Tees-side Amateur Radio Club was held recently at the Masham Hotel, Middlesbrough. In this picture can be seen (front row), left to right, G3HSL, G3CKC, G3CEP, G3JSB, G. MacAteer; (middle row), G3GEJ, G3KBM, G3JVD, G3JOO, G3IEN; (standing), G3TO, G3JMO, G3JYH, G3KBD, G3JZU, G3CHJ, G5YP, G3INP, L. Arrowsmith, G3INQ, G3AWL, B.R.S.20204, B.R.S.19449.**
*(Photo by Davids Studio, Stockton-on-Tees)*

## Can You Help ?

● C. B. Raithby (G8GI), School House, Martin, Lincoln, who would like to acquire the circuit diagram and/or manual (English or German) for the German battery communication receiver type TORN, E.B.?

● W. E. Gates (G3ENB), 67 Broad Street, Dewsbury, Yorks, who seeks to obtain the manual for the Collins receiver type R105a/ARR15 which covers 1.5 to 18.5 Mc/s?

● G. V. Haylock (G2DHV), 63 Lewisham Hill, London, S.E.13, who requires the circuit diagram and/or handbook for the B2 Minor (Army Mk III) transmitter-receiver?

● J. Swinnerton (G2YS), 29 Station Avenue, Filey, Yorks., who requires information and circuit data concerning the R.C.A. marine receiver type AR8506B which covers 85 kc/s to 25 Mc/s, omitting the medium wave bands?

● R. Thurlow (G3WW), North House, Wimblington, Cambs., who wishes to borrow the maintenance manual for the New Zealand ZC1 Mark II transmitter-receiver?

● D. W. Blythe (G3KCT), Radio School, R.A.F. Cosford, near Wolverhampton, Staffs., who requires the manual for the U.S. aircraft transmitter type T47 ART13?

● D. W. Robinson (G3FMT), 6 Kingsway, London, S.W.14, who requires the manual for the LM17 frequency meter?

# For Your Bookshelf and Shack

## R.S.G.B. PUBLICATIONS

**A GUIDE TO AMATEUR RADIO.** (Sixth Edition.) Complete information for the Newcomer. Chapters include An Introduction to Amateur Radio, Simple Equipment (Receivers and Transmitters), How to Obtain a Licence, The Radio Amateurs' Examination, Learning Morse, Operating an Amateur Station, Amateur Abbreviations and International Prefixes. **Price 2/6 (by post 2/9).**

**R.S.G.B. AMATEUR RADIO CALL BOOK.** The most up-to-date directory of United Kingdom and Irish Amateur Radio stations. Indispensable to Newcomer and Old-Timer alike. **Price 2/6 (by post 2/9).**

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**SIMPLE TRANSMITTING EQUIPMENT.** Full constructional details for three simple but effective transmitters, a stable v.f.o. unit, and a crystal-controlled frequency standard. Information on simple transmitting aerials is also included. (52 pages.) **Price 2/-.**

**TRANSMITTER INTERFERENCE.** A survey of methods currently used for minimising interference to broadcast and television reception caused by amateur transmitters. A companion volume to the "Television Interference" booklet. (32 pages.) **Price 1/3.**

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**TELEVISION INTERFERENCE TECHNICAL DATA SUPPLEMENT.** This contains a comprehensive list of television receivers which have been produced since "Television Interference" was published in 1951. It lists the intermediate, oscillator and image frequencies of nearly 350 different receivers. **Price 6d.**

**VALVE TECHNIQUE.** Explains in a clear logical manner what the radio amateur needs to know about the use of modern receiving and transmitting valves, from diode to klystron, with emphasis on practical applications and circuit design data. (104 pages.) **Price 3/6.**

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## AMERICAN PUBLICATIONS

*Orders for certain of the following American publications can only be accepted from residents in the United Kingdom and British Empire. Prices quoted include cost of postage and packing.*

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20674 *A. ANNING, 17 Parish Ghyll Road, Ilkley, Yorks.
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20677 *G. SEWELL, 243 St. Helens Road, Bolton, Lancs.
20678 *P. F. CUSHING, 141 Warwick Way, London, S.W.1.
20679 J. T. PINSENT, 4 Plympton Avenue, Brondesbury, London, N.W.6.
20680 †D. LANGDALE, 18 Buckley Avenue, Beeston, Leeds, 11, Yorks.
20681 B. HOSKEN, "Hyfield," Hendra Barton, Truro, Cornwall.
20682 E. N. ASHWORTH, 2 Edward Street, Rishton, Blackburn, Lancs.
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## New Books

**REMOTE CONTROL BY RADIO** (Second Edition), by A. H. Bruinsma. 104 pages, 74 illustrations. Page size 8in. by 6in. Published by Philips of Eindhoven and available in the U.K. from Cleaver-Hume Press, Ltd. Price 8/6.

The first edition of this book, which is part of the Philips Technical Library, was written in answer to many requests for information about the author's famous radio-controlled model ships. The book gives a description of the two systems Mr. Bruinsma has adopted in the construction of his models. These are an amplitude modulation system with two independent channels and an impulse modulation system with eight channels. The new edition gives details of a number of modifications and improvements to earlier circuit designs.

**WIRELESS AND ELECTRICAL TRADER YEAR BOOK.** Radio, Television and Electrical Appliances 1955, 26th Edition. Published at 12/6 (with a reduction to subscribers to *Wireless and Electrical Trader*), by Trader Publishing Co., Ltd. Size 8¼ in. by 5¼ in. 304 pages. Bound paper boards.

The *Wireless and Electrical Trader* Year Book is regarded in the radio and electrical trade as a standard guide for all connected with sales or services. It is also of considerable assistance to overseas buyers wanting to contact British sources of supply.

Features of the 1955 edition include condensed specifications of nearly 300 current commercial television receivers and information on valve and cathode ray tube base connections, with over 300 valve base diagrams.

For ease of reference the book is divided into sections printed on distinctively coloured paper and each section is separated by a stout card, with thumb index, giving details of contents.

**TELEVISION PRINCIPLES AND PRACTICE** (Second Edition), by F. J. Camm. 214 pages, 144 illustrations. Page size 8½ in. by 5¼ in. Published by George Newnes, Ltd., Price 25/-.

This is a fully illustrated authoritative work on the underlying principles of television transmission and reception. It covers every aspect of the subject including servicing and installation. An exhaustive dictionary of television terms adds value to the book.

Contents include the B.B.C. Television System—the Television Camera—from Transmitter to Receiver—Projection Receivers—Stereoscopic and Colour Television—Time Bases—D.C. Receivers—Aerials—London-Birmingham Convertor — Servicing — Interference — Pattern Generators—Choice of Receiver.

This book should prove of considerable value to technician, student and amateur alike.

**BRIMAR RADIO VALVE AND TELETUBE MANUAL (No. 6).** Published by Standard Telephones and Cables, Ltd. 272 pages. Price 5/-.

The Sixth Edition of the Brimar Manual contains information on all Brimar products including new types for Frequency Modulated and Band III Television transmissions. The valve types are arranged in alphabetical order.

**RADIO AMATEUR OPERATOR'S HANDBOOK.** Second Edition. 48 pages. Published by Data Publications. Price 3/-.

The new edition of this useful little *vade mecum* has been fully revised and amplified. The contents include a list of amateur prefixes, radio zone boundaries, call areas, local time conversion, mileage table, amateur codes, QSL Bureaux and Standard Frequency Transmissions. H. E. Smith (G6UH) contributes an article on the V.H.F. Bands, whilst R.S.G.B. BULLETIN contributor, S. E. Herbert (G3ATU), writes on Amateur Bands and DX Operating Techniques.

An essential publication for the short-wave enthusiast.

#### Panel Signs

Set No. 3 (Panel Wording) is the latest in the series of permanent paint transfers issued by *The Radio Constructor*. The set consists of four sheets containing wording for use on receivers, amplifiers, transmitters, test equipment and other radio apparatus.

Panel Signs can be obtained from Data Publications, 57 Maida Vale, London, W.9, price 2/6 per set.

# EXCHANGE AND MART SECTION

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A B2 (transmitter only), 4 coils, £5, R1155A good condition, £5; p.p. 30/-. Glenn, "Innisfree," Sandy Lane, Tilford, Farnham, Surrey. (699

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AR77E, £27 10s. o.n.o., re-aligned and re-valved metal valves. Case repainted. Buyer collects. Hardy, 24 Whippendell Way, St. Paul's Cray, Kent. (Footscray 5429.) (684

AR88D. Good condition; unmodified; RCA instruction manual, £50 cash. D. A. Furzey, telephone Watford 2148, 7-7.30 p.m. (G6TH.)

AR88D like new, spare valves, service manual, two speakers. Delivery free 100 miles Liverpool. £50 o.n.o. G2HKA, 4 Hildebrand Road, Liverpool 4. (668

AR88D wanted. Must be in mint condition unmodified. With original S meter preferred. Will collect London/Home Counties area. Richards (AP2CR), "The Close," Swineshead, Bedford. (619

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BARGAIN, Canadian C.43 R/T Transmitter, new and unused, complete with all valves (2) 813's in P.A., and manual. Range 2-12 Mc/s, easily modified to cover 14 Mc/s. Requires power supply. Owner sick, unable to cope. Quick sale desired. Accept nearest offer to £24. Also R1132 with p.u., £5. Buyer to collect. G2DS, 39 Knoll Road, Bexley, Kent. (Tel.: Bexleyheath 754.) (669

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BC312M and p.p. good condition; s.a.e. for full details. All correspondence answered. £14 10s. 74 Hawkesley Mill Lane, Northfield, Birmingham, 31. (690

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*(Continued on page 599)*

G2NS wants two 117Z6, five 117N7 or 117P7 or mixed ditto. Spooner, Seven Foxholes Road, Southbourne, Bournemouth, Hants. (687

G3DDV gone QRT. Complete station for sale including 6ft rack 2m transmitter 25W, top band transmitter cw/phone, 7/14 transmitter 75W as used at VP8AP and VP8AD, B2 p.p, Eddystone 640, 2m converter 813's, TZ40's and many others and a host of useful components. For details write 5 Worston Lane, Burnham-on-Sea, Somerset.

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McELROY Bug key wanted, standard model, good condition, G2OC, 119 High Road, Beeston, Notts. (672

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METERS: 2in, at 5/- each, RF 0-350mA (4), 0-4A (1), 0-8A (1); a.c, 0-15V (1), d.c, 0-200mA (1), 2½in, at 6/- each: a.c, 0-300V (1), 0-250V (1), d.c, 0-3mA (4), 0-100mA (1), 0-300mA (1), 2½in, at 12/6: d.c, 0-1 mA (1). Valves: At 2/6: 6AC7 (3), 6J7G (2), 6K6G (1), 6N7 (2), 6SH7 (4), 6SK7 (5), 12SG7 (1), EF50 (4), At 3/6: 5U4G (3), 5Z4G (2), 6L6 (4), 6J5G (3), 6SN7G (3), 6V6G (2), 80S (1), EL35 (1), ECC31 (1), At 5/6: 807 (3), 808 (1), 8012 (2), At 10/-: 832 (2), R.S.G.B. BULLETINS, 1942-54, Offers? Briggs, 28 Hardwick Street, Cambridge. (683

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QSLs and log book (P.M.G. approved). Samples free. State whether G or B.R.S. Atkinson Bros., Printers, Elland. (400

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TWO METRE transmitter 70W input. Built-in power pack, 829B final, Overtone oscillator. Spare valves, £10. 30 unboxed valves, £3, Box 688, National Publicity Co., Ltd., 36/37 Upper Thames Street, London, E.C.4. (688

UNDULATOR, Marconi, high-speed morse slip recorder, d.c. mains, £2 10s. R107 receiver in good condition, delivered reasonable distance, £7 10s. Ross 3-draw telescope. 30 diameters, £5 10s. G3DGM, 21 Nelson Road, E.4. (689

*(Continued on page 600)*

## EXCHANGE AND MART SECTION (Cont.)

WANTED BC. 610 Hallicrafters, E.T.4336 transmitters and spare parts for same. Best prices. P.C.A. Radio, Beavor Lane, Hammersmith, W.6. (626

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