

R.S.G.B.



BULLETIN

November 1951

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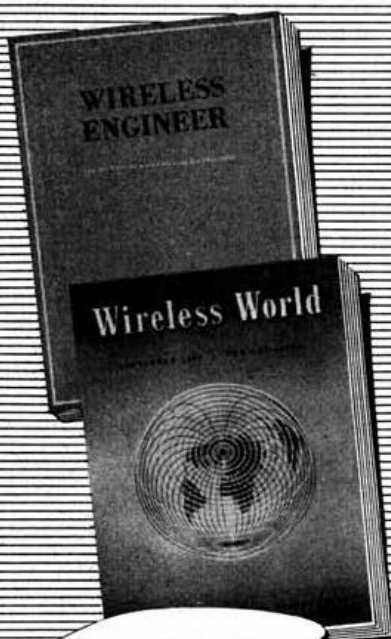
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Forthcoming Events

REGION 1

- Ashton-under-Lyne.—December 2, 3 p.m., New Jerusalem Schools.
- Blackburn & Darwen.—November 16, December 14 (A.G.M.), 7.30 p.m., Y.M.C.A., Limbrick, Blackburn.
- Blackpool.—November 20, 7.30 p.m., 33 Clarence Avenue, Cleveleys; December 18, 7.30 p.m., 5 Albion Avenue, Newton Drive, Blackpool.
- Bolton.—December 4, 8 p.m., Y.M.C.A.
- Burnley.—December 4, 8 p.m., Mechanics' Institute.
- Bury.—December 6, 7.30 p.m., Y.M.C.A.
- Chester (C. & D.A.R.S.).—December 6, 7.30 p.m., Y.M.C.A.; Tuesdays, 7.30 p.m., Y.M.C.A., The Tarren Hut.
- Liverpool.—November 10, 24 and December 8, The Mansion House, Queen's Drive, West Derby.
- Manchester.—December 3, 7.30 p.m., School of Technology, Sackville Street.
- Oldham.—Alternate Wednesdays, 7.30 p.m., Clegg Street, Civic Centre.
- Preston.—November 23, December 24, 7.30 p.m., Three Tuns Hotel, North Road.
- Rochdale.—December 2, 3 p.m., Drill Hall, Baron Street.
- Southport.—November 19, December 3 and 17, 8 p.m., Y.M.C.A., off Eastbank Street.
- Wirral (W.A.R.S.).—November 21, December 5, 8 p.m., Y.M.C.A., Whetstone Lane, Birkenhead.

REGION 2

- Barnsley.—November 23, December 14, 7.30 p.m., King George Hotel, Peel Street.
- Bradford.—November 20, December 4, 7.30 p.m., Cambridge House, 66 Little Horton Lane.
- Catterick.—Tuesdays, 7 p.m., Loos Lines, Catterick Camp.
- Darlington.—Thursdays, 7.30 p.m., 129 Woodlands Road.
- Doncaster.—December 12, 7.30 p.m., Black Bull, Market Place.
- Gateshead.—Thursdays, 7 p.m., Y.M.C.A., Sutherland Hall, Durham Road.
- Kingston-upon-Hull.—November 28, 7.30 p.m., R.E.M.E. Canteen, Walton Street.
- Leeds.—Wednesdays, 7.30 p.m., Swarthmore Settlement, Woodhouse Square.
- Middlesbrough.—Thursdays, 7.30 p.m., Joe Walton's Boys' Club, Faversham Street.
- Newcastle-upon-Tyne.—November 19, 8 p.m., British Legion Rooms, 1 Jesmond Road.
- Rotherham.—Wednesdays, 7 p.m., Cutlers' Arms, Westgate.
- Scarborough.—Thursdays, 7.30 p.m., L.N.E.R. Rifle Club, West Parade Road.
- Sheffield.—November 28, 8 p.m., Dog and Partridge, Trippet Lane; December 12, 8 p.m., Albreda Works, Lydgate Lane.
- Slaithwaite.—Fridays, 7.30 p.m., 3 Dartmouth Street.
- Spennorth.—November 21, December 5, 7.30 p.m., Temperance Hall, Cleckheaton.
- York.—Wednesdays, 7.30 p.m., Club Rooms, Y.R.S., Fetter Lane.

REGION 3

- Coventry.—November 24, 7.30 p.m., Priory High School, Wheatley Street.
- South Birmingham.—December 2, 16, 10.30 a.m., Stirchley Institute.
- Stourbridge (S. & D.R.S.).—December 4, 8 p.m., King Edward's School.

REGION 4

- Derby (D. & D.A.R.S.).—November 21, 28, December 5, 12, 7.30 p.m., Derby School of Arts & Crafts, Green Lane.
- Leicester.—November 26, December 10, 7.30 p.m., Holly Bush Hotel.
- Mansfield (M.D.R.S.).—December 2, 3 p.m., Swan Hotel.
- Newark.—November 25, December 9, 7 p.m., Northgate House, Northgate.
- Northampton.—Fridays, 6 p.m., Clubroom, 8 Duke Street.
- Retford.—December 2, 3 p.m., Community Centre, Chapel Gate.
- Worksop.—December 3, 7 p.m., King Edward VII Hotel.

REGION 5

- Chelmsford.—December 4, 7.30 p.m., Smith's Radio Shop, 184 Moulsham Street.

REGION 6

- High Wycombe.—November 27, 7.30 p.m., G3DQC, 6 Peterborough Avenue.
- Oxford (O. & D.A.R.S.).—November 21, December 5 & 19, 7.30 p.m., Magdalen Arms, Iffley Road.

REGION 7

- Barnes & Richmond.—December 11, 7.30 p.m., 308 Upper Richmond Road, East Sheen.
- Bexley (N.K.R.S.).—November 26, December 10, 7.30 p.m., Freemantle Hall.
- Brentwood.—November 23, December 14, 8 p.m., Scout Hut, Pilgrims Hatch.
- Bromley (N.W.K.A.R.S.).—December 7, 8 p.m., Shortlands Tavern, Station Road, Shortlands.
- Chingford.—November 22, December 6, 8 p.m., A.T.C. H.Q., Pretoria Road.
- Chiswick.—Tuesdays, 7.30 p.m., A.E.U. Rooms, 66 & 68 High Road, W.4.
- Croydon (Surrey R.C.C.).—December 11, 7.30 p.m., Blacksmiths Arms, South End.
- Dulwich & New Cross.—December 3, 7.45 p.m., Kentish Drovers, Rye Lane, Annual General Meeting.
- East Ham.—November 20, December 11, 8 p.m., 57 Leigh Rd.
- East London District.—November 18, 3 p.m., Town Hall, Ilford. "U.H.F. Propagation," by W. A. Scarr, M.A. (G2WS).
- Edgware (E. & D.R.S.).—Wednesdays, 22 Goodwin Avenue, Mill Hill.
- Enfield.—November 18, December 16, George Spicer School, Southbury Road.
- Finsbury Park.—November 20, 7.30 p.m., 164 Albion Road, Stoke Newington, N.16.
- Gravesend.—Wednesdays, 7.30 p.m., 30 Darnley Road.
- Grays.—November 16, December 14, 8 p.m., Baird's Cafe, Orsett Road.
- Guildford & Woking.—November 25, 3 p.m., Royal Arms Hotel, North Street.
- Hayes & Uxbridge.—December 7, 7.30 p.m., "The Vine," Uxbridge Road.
- Hoddesdon.—December 6, 8 p.m., "The Salisbury Arms."
- Holloway (Grafton R.S.).—Mondays, Wednesdays & Fridays, 7.30 p.m., Grafton School, Eburne Road, N.7.
- Ilford.—Thursdays, 8 p.m., G2BRH, 579 High Road.
- Kensington & Shepherds Bush.—December 14, 8 p.m., 38 Royal Crescent, W.11.
- Lewisham (R.A.R.C.).—Wednesdays, 8 p.m., Durham Hill School, Downham.
- New Barnet (B. & D.R.C.).—Wednesdays, 8 p.m., Hopedene, The Avenue.
- Norwood.—December 15, 7.30 p.m., 35 Grangecliffe Gardens, South Norwood.

(Continued on Page 231)



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0-250 "	0-500 "
0-500 "	
D.C. Current	Resistance
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R.S.G.B. BULLETIN

Official Journal of the

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NOVEMBER 1951

UNBALANCE

FROM correspondence recently received at R.S.G.B. Headquarters, it is clear that throughout the country those of our members who have seen copies of the October issue of *The Short Wave Magazine* have been surprised at the tone of the Editorial signed by Mr. Austin Forsyth, under the title "Balance."

The writer, after stating that the progress of the hobby depends upon the Club movement, rather than on any central organisation, goes on to assert that many gaps and cracks are appearing in the structure of "the National body"; quite obviously referring to this Society. He draws attention to "declining membership," "currents of rebellion," "dissension within the ranks," and the lack of wise direction and strong management.

Those who are in a position to place their views before the public bear a heavy responsibility for accuracy, which should override all other considerations, a fact which our contemporary would appear to have overlooked. Does anyone honestly believe that the privileges and facilities enjoyed by British radio amateurs could have been won by the individual and unorganised efforts of single amateurs, or separate clubs or even by a commercial magazine?

The General Post Office, like most Government Departments, is used to dealing with recognised representative bodies. It will certainly not treat with individuals in matters of general policy. The rapid restoration of transmitting licences after the war, the more liberal regulations on power, and the recent Amateur Television Licence are only a few of the many benefits made possible by the existence of a strong and united National Society which has won the respect—and the confidence—of officials of the Post Office and other Government Departments.

Let us examine the writer's other points. During the war our membership had a phenomenal growth. The Council expected a rapid decline would follow, but nothing like the expected decline has in fact occurred. At the present time membership shows every sign of stabilisation. Other societies, in particular the A.R.R.L., have suffered a much larger percentage decrease.

During recent months there has been much discussion and exchange of ideas within our ranks. The action of the Council in publishing the full

story, their immediate efforts to obtain the views of the membership and the published declaration of policy can hardly be called "weak direction." If the Editor of *The Short Wave Magazine* is under the impression that such widespread interest in the Society's affairs on the part of the membership betrays a split in their ranks, he is gravely misinformed. Even our sternest critics were, and still are, staunch members of R.S.G.B., and several have already expressed resentment at what they regard as outside interference.

For a very long time we have been conscious of a most curious attitude towards the Society on the part of the Editorial direction of the *Magazine*. We feel that this is most unfortunate, particularly in view of the efforts which the Council has made to co-operate. Apparently our very name must not be mentioned in its pages!

The *Magazine* has its rightful place and could be a most valuable asset to the Society and amateurs in general if it so wished. Although from time to time the Society has been accused of lack of co-operation, yet the *Magazine's* quite unnecessary QSL Bureau was launched without a word of consultation with the R.S.G.B. Immediately after the Council meeting at which it was decided, in principle, to produce the *R.S.G.B. Amateur Radio Call Book* the Council gave instructions for the editors of a number of journals, including the *Magazine*, to be informed, asking for their co-operation. Replies were received by return of post from all but *The Short Wave Magazine*. Two weeks elapsed before their reply was received. This stated that their own plans for producing a Call-book were nearly complete. Once again we were accused of non-co-operation and the suggestion was made that we should drop the project.

It seems clear from our perusal of recent issues of *The Short Wave Magazine* that its editorial policy is, by a somewhat insidious process of suggestion, to introduce as much doubt and uneasiness within our membership as possible, particularly among the younger and less experienced generation of radio amateurs who do not fully realise what they owe to the efforts of the Society on their behalf.

It is regrettable, but the impression is becoming clear, that the Editor of *The Short Wave Magazine* regards himself as the pre-destined power behind

an opposition society for which two titles—according to a recent issue of the *Magazine*—already have been registered.

Just as no one is compelled to belong to the R.S.G.B., so it is true that none of us is compelled to buy *The Short Wave Magazine* if we dislike its policy, a fact which will no doubt be admitted by the directors of the company which owns it. Commercial ventures are run primarily for the financial advantage of their backers. *The Short Wave Magazine*, as a commercial product, cannot be compared with the Radio Society of Great Britain, the whole of whose assets are held in trust for its

members.

Mr. Forsyth indicates that what Amateur Radio needs is a strong, independent press to safeguard its interests. Is *The Short Wave Magazine* truly independent?—or for that matter can any commercial magazine be regarded as independent?

His prime responsibility is to his Board of Directors and shareholders, and for their benefit to promote the sales of his magazine as widely as possible. Let him do just that and leave the democratic representation of British radio amateurs to the R.S.G.B., which has been performing this function for nearly 40 years. A.O.M.

LICENCE MATTERS

Power Rating of Super-Modulation Transmitters

IN the February, 1951, issue of the R.S.G.B. BULLETIN (p. 292) there was reported an agreement with the Radio Branch, G.P.O., as to the means to be employed when rating amateur stations using single-sideband suppressed carrier, television and high-efficiency grid-modulated systems, known as "Super-modulation."

Discussions on this subject have recently been reopened with the G.P.O., as a result of representations made by several members who are particularly interested in high-efficiency grid-modulated systems. Systems which fall into this category are the Taylor and Terman circuits in which a symmetrically-modulated carrier wave is produced by the use of grid modulation but with an anode efficiency in the modulated R.F. amplifiers similar to that obtained with normal anode modulation.

It is a fact that the previous ruling, by which the input power was determined by measuring the D.C. power to all the valves in the output stage at full modulation, penalises the users of such transmitters, relative to those using orthodox anode modulation, since in the latter the input power does not increase during modulation. For this reason the Technical Committee of the R.S.G.B. has approached the Radio Branch of the G.P.O. with a view to eliminating this anomaly. The existing ruling is still held to apply to single-sideband suppressed carrier and television transmitters but

high-efficiency grid-modulated transmitters (using circuits such as the Taylor or Terman arrangements) will be rated by measuring the D.C. input power to the anodes of all R.F. valves in the output stage in the unmodulated condition. All the normal precautions to avoid modulation in excess of 100 per cent. must be taken.

This method of measurement has been agreed for a trial period in order that the G.P.O. can confirm that transmissions are not producing excessive out-of-band harmonic and distortion products.

Frequency Modulation

THE following is a copy of the notice dealing with Frequency Modulation which appeared in the *London Gazette* under date of October 16, 1951:—

"The Postmaster-General hereby gives notice that those licences granted by him for the establishment of Amateur Wireless Stations which authorise the use of A2 and A3 types of emission shall be read, construed and take effect as if those licences authorised the use of F3 (Frequency Modulated Telephony) type emissions for frequencies within the band 144.5 Mc/s. to 145.5 Mc/s. (207.61-206.19 centimetres wavelength) so long as interference is not caused with stations operating other services in the band.

"The power used must not exceed that which

the licensee is authorised to use on frequencies 144-146 Mc/s. with Amplitude Modulation."

Pulse Modulation

THE following is a copy of the notice dealing with Pulse Modulation which appeared in the *London Gazette* under date of October 16, 1951:—

"The Postmaster-General hereby gives notice that all licences granted by him for the establishment of Amateur Wireless Stations shall be read, construed and take effect as if the licences authorised the use of the type of emission P1 (Pulse Modulation Telegraphy without the use of modulating audio frequency) for frequencies within the bands 2350-2400, 5700-5800, and 10050-10450 Mc/s. (12.72-12.50, 5.2-5.17, and 2.98-2.87 centimetres wavelengths respectively) and that those licences granted by him which authorise the use of A2 and A3 types of emission shall be read, construed and take effect as if they authorised the use of P2d, P2e, P3d and P3e (Pulse Amplitude and Pulse Width Modulation, Telephony and Telegraphy) types of emission for the same frequencies.

"The power used for the before-mentioned types of emission shall not exceed 10 watts mean D.C. input and 1 kW. peak power where the licensee is not authorised to use power exceeding 10 watts with Amplitude Modulation on the same frequencies or 25 watts mean D.C. input power and 2.5 kW. peak power in other cases. Means shall be provided at the station to determine the ratio of pulse width to space width."

Gee Chain Interference

MEMBERS living within a few miles of certain Air Ministry Gee Chain stations have complained to the Society that the reception of signals in the band 28-30 Mc/s. is rendered extremely difficult due to interference from the relatively broad signal radiated by such stations.

The G.P.O. has informed the Society that it is not possible, at present, for the Air Ministry to reduce further the degree of interference brought about by these transmissions which are made on frequencies just outside the amateur band.

The G.P.O. point out that the Gee Chain is part of an important navigational aid service and as such must continue in operation without interruption.

Commercial Stations Operating in Amateur Bands

THE Society has again drawn the attention of the G.P.O. to the continued operation of commercial stations on frequencies in bands which were allocated internationally, at the Cairo Conference in 1938, to amateurs.

The G.P.O. is aware of the difficulties which amateurs are experiencing due to the presence of these intruders, but regret that nothing can be done to improve the position until such time as the frequency table drawn up at the Atlantic City Conference in 1947 is fully implemented.

HIGH-EFFICIENCY GRID MODULATION

By L. A. MOXON, B.Sc., A.M.I.E.E. (G6XN)*

PART II - The Terman-Woodyard System

Following on last month's analysis of the Taylor system of high-efficiency grid modulation, G6XN here describes the Terman-Woodyard circuit, and makes a careful comparison of their relative advantages and disadvantages. This important article will help to clarify many points about a new technical development that is not, at present, widely understood.

THE essential difference between the Terman-Woodyard and the Taylor circuits lies in the insertion of an impedance-inverting circuit between the carrier valve and the load, so that, when the quiescent valve supplies power—and thus makes the load look like a higher impedance to the source from which the carrier power P is coming—the carrier valve itself sees a lower impedance, and supplies more power instead of less. At the 100 per cent. modulation peak, the two valves deliver equal powers $2P$ to the load with full efficiency, the peak current through each valve being the same as in an anode-modulation circuit with identical carrier power.

Although the lower peak current is not unimportant, the main advantage of the Terman-Woodyard system seems to be the gradual manner in which the quiescent valve adds to the power and at the same time helps the carrier to supply more power. This is in contrast to the violent transition from one operating regime to an entirely different regime which is characteristic of the Taylor circuit, and which makes it so difficult to obtain a really linear characteristic combined with high efficiency.

Against these advantages, however, Villard and others have ruled out this system on the grounds that the quarter-wave delay lines used for impedance-inversion and phase-correction are difficult to tune—"almost prohibitively so, from a ham point of view." This conclusion is by no means obvious from a careful study of Terman's description,† nor is there any indication that the critics have actually tried the system. It must be admitted that delay lines and their adjustment are outside the run of normal amateur experience, but it is possible to use a somewhat different angle of approach, and the difficulties then disappear. Careful inspection of the delay lines will show that they bear a remarkable resemblance to pairs of coupled circuits using top-end capacitance or inductance coupling, and it is only a short step from this to the realisation that ordinary mutually-coupled circuit pairs have the same properties as are required from the delay lines.

The basic circuit for the author's method of impedance inversion is shown in Fig. 4. At resonance, the impedance measured across AB is given by:

$$\frac{1}{R} \left(\frac{L}{\omega MC} \right)^2$$

In other words, it is inversely proportional to R , being equal to R when $L/M = \omega CR$ (i.e. when L/M is equal to the Q of the left-hand circuit). In applying this principle to high-efficiency grid modulation, R represents the loading of the left-hand circuit by the aerial (this circuit being connected to the anode of the quiescent valve,

while the right-hand circuit is connected to the P.A. anode). The coupling is adjusted so that with no modulation the P.A. valve is loaded for normal Class "C" operation. At the modulation peak the load resistance offered to the P.A. requires to be half of the no-modulation value, so that it absorbs twice as much power, and it must also equal the load "seen" by the quiescent valve. This equal sharing of the load means that each valve sees a load $2R$. The load presented to the P.A. valve at carrier level is therefore $4R$ —or, in other words, the loaded anode circuit impedance of the quiescent valve must be only a quarter of the value

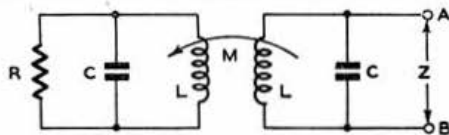


Fig. 4
Coupled-Pair Impedance Inverting Network. Both circuits tuned to resonance.

$$Z = \frac{1}{R} \left(\frac{L}{\omega MC} \right)^2$$

which would be used for normal Class "C" amplifier operation. This "normal" value is roughly two-thirds of the anode voltage/current ratio of the P.A. Thus, for example, with an 807 P.A. valve running at 600 volts 100 mA., the value of 1000 ohms is obtained for R , and a 40 watt 200 volt lamp will be suitable as a dummy load, since it should light-up at full brilliance, giving a "hot" resistance of 1000 ohms. If, with this load, the coupling from the P.A. is adjusted in the usual manner (with the other valve quiescent), then the required loading conditions for normal Class "C" operation with correct modulation will be satisfied automatically. The dummy load may then be removed, the aerial coupler being adjusted to provide equivalent loading. The coupling between the tank circuits must be either by direct mutual inductance or by a link of the type shown in Fig. 5. The kind of link with a coupling coil at each end will not give the correct phase relationships.

Adjustment

In the original Terman circuit, a quarter-wave delay line of impedance Z_0 transforms an impedance R into one of Z_0^2/R , while at the same time there is a 90-degree phase-shift which has to be counteracted by using another delay line to provide an opposite phase-shift in the grid circuit. Exactly the same phase change occurs in the present case (as anyone with knowledge of F.M. discriminators will appreciate) and to compensate for this, another coupled pair may be used for the

* Oaktree Cottage, Chase Lane, Haslemere, Surrey.

† Radio Engineers' Handbook (Terman), 1943 Edition, p. 538.

grid circuits. Tuning the second circuit of each pair to resonance then automatically ensures correct phasing. Fig. 5 shows an experimental circuit of this kind.

Adjustment of the excitation, bias, and modulation voltages on the two valves requires only a slight extension of familiar principles. The bias voltages are not unduly critical provided the excitation is adjusted to suit them, and *vice versa*. The tighter the coupling between the grid circuits, the less the drive to V_c , and the more the drive to V_m , up to a point beyond which the drive to both valves decreases. This point should give roughly equal drive to the two valves. It does not matter which grid is connected to which R.F. circuit, pro-

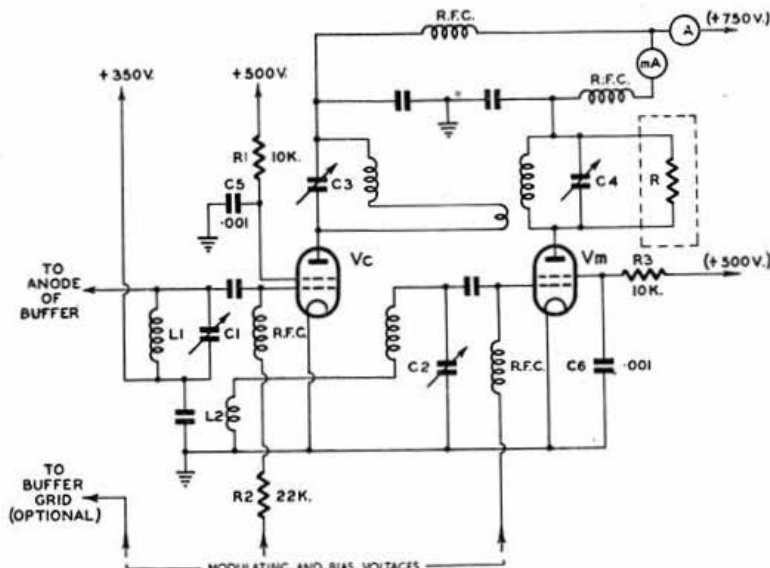
Comparison of Modulation Systems

When a carrier wave is fully modulated, the transmitted R.F. power increases by 50 per cent., so that if the overall efficiency is unchanged, the power input to the final stage must also increase by the same percentage. In the case of anode modulation the extra power is supplied in the form of A.C. from the modulator, rather inefficiently because of the loss in the modulator. With high-efficiency grid modulation the extra power is drawn (with comparatively little wastage) directly from the D.C. supply, so that there is an increase of the order of 50 per cent. in direct current consumed. With ordinary grid modulation, the extra power is obtained by increased efficiency. The fol-

Fig. 5

High-Efficiency Grid Modulation System based on the Terman-Woodyard Circuit.

V_c , V_m , and R as in Fig. 1. Screens may be fed from fixed voltage, but if dropping resistances are used, a short time-constant is essential for V_m , though not for V_c —which draws nearly constant current. Other component values are R_1 —10,000 ohms, R_2 —22,000 ohms, R_3 —10,000 ohms, C_5 —0.001 μ F, and C_6 —0.001 μ F.



vided the mutual inductance is of the appropriate sign: a reduction of R.F. output when the quiescent valve is allowed to draw anode current indicates that one of the coupling coils (either grid or anode) must be reversed.

A suggested procedure (not necessarily the best possible) for completing the initial adjustment of the system is to apply normal bias to V_c , and about twice as much to V_m . The bias on the buffer amplifier (or the tuning of C_1) and the coupling between the grid circuits are then adjusted together so that V_c has adequate excitation and V_m draws only a small current. Adjustable modulation voltages are then applied to the grid of V_m , and to either the grid of V_c or the grid of the driving stage, or both, the level being set to give the best shape of trapezium pattern on an oscilloscope monitor. The shape of this pattern is rather dependent on the tuning of C_2 , which should be checked as often as necessary. It may be worthwhile to try other values of bias on V_m , with appropriate alteration of the coupling between the grid circuits, while observing the oscilloscope pattern.

The overall efficiency varies with the modulation percentage and the curves given by Terman show a minimum efficiency of 66 per cent. at 50 per cent. modulation, assuming a carrier efficiency of 80 per cent. For modulation percentages between 50 and 100, valve losses are roughly constant and equal to about 20 per cent. of the R.F. carrier power for the quiescent valve, and 33 per cent. for the P.A.

lowing table compares these three methods of modulation on the basis of a number of different criteria, namely:

(a) Unmodulated carrier power output for 150 watts input.

(b) Carrier power output on the basis of a nominal D.C. input of 150 watts at full modulation. This, according to a recent issue of the BULLETIN, is the basis on which power is at present assessed for licence purposes, although the product of voltage and current read on D.C. meters is not, of course, a true measure of power when (as in this case) one or both of these quantities has an A.C. component. It will be seen that this

Comparison of Anode, Grid and High-Efficiency Grid Modulation.	Anode modulation, (Class B)	High-efficiency grid modulation	Ordinary grid modulation
Carrier power for 150 watts unmodulated input	120	120	60
Carrier power for 150 watts input as defined for licence purposes	120	75	60
Carrier power as percentage of total H.T. wattage (average)	55-60	65	40
(100% mod.)	45	50	40
Carrier power for P.A. dissipation 50 watts	130	130	33

procedure severely handicaps high-efficiency grid modulation. (See statement dealing with power rating of super-modulation transmitters published on page 192—Ed.)

(c) *Carrier power output as a percentage of the total drain on the H.T. supply.* This is often the main consideration, and is the truest measure of efficiency. It also favours the new methods. The figures in this case are rather approximate and assume (i) that at any given instant all values of modulation percentage are equally likely, and (ii) continuous 100 per cent. modulation, as may be approximated by speech-clipping.

(d) *Carrier power output for a dissipation of 50 watts in the P.A. valve*—assuming the worst percentages of modulation.

Experimental Results

(a) *The Taylor Circuit.* The modulation can be applied in various ways, for example, to the grids or screens of the P.A. and quiescent valve, or to the grid, screen, cathode or anode of the doubler, or any combination of these methods, and the author (in search of a linear modulation characteristic) has tried most of the possibilities, with some degree of success in each case. Among the points which emerged was the vital necessity of an oscilloscope when experimenting with this type of circuit. Prior to using a 'scope some passable results were obtained, but it was impossible to repeat adjustments or track down defects. A trapezium pattern can be obtained without any elaborate circuitry, and with cathode-ray tubes available for only a few shillings on the surplus market, a simple monitor can be rigged up quite easily.

The pattern shown in Fig. 6 (d) is typical of the result likely to be achieved if adjustments are made by ear, or by observing meters, and illustrates most of the prevalent faults. The flattening on the extreme left is due to insufficient drive, too loose coupling to the aerial, or insufficient tapping-down of the quiescent valve on the anode circuit. The flattening to the left of the centre has already been discussed. The flattening on the right is due to insufficient bias, or too much drive to the P.A. Fig. 6 (a) shows the most typical pattern among those obtained when the efficiency at the carrier-level was high; (b) shows the modulation pattern of the

buffer stage when using it to correct the distortion in (d); and (c) shows the overall effect of (a) and (b). With this arrangement, the R.F. output on 14 Mc/s. was sufficient to light a 60-watt lamp at nearly full brilliance with no modulation, the input to a pair of 807's in parallel being 100 watts. For Vm another pair of 807's was used. At continuous full modulation the total arithmetic mean anode current rose by about 55 per cent., while that of Vc alone fell to about a third, coinciding with a slight drop in H.T. voltage, and a 75-watt lamp was lit at full brilliance. Reports confirmed that the distortion and frequency spread were not excessive. If the average efficiency is unchanged, the input power at full modulation should rise to 50 per cent. above the unmodulated carrier value—a larger rise indicating reduced efficiency, and a smaller rise increased efficiency. The effective rise in the above example would be greater than the figures indicate, since a D.C. meter reads the arithmetic mean current, whereas power is proportional to R.M.S. current.

It is possible that better linearity might have been obtained using screen-grid modulation, but after a few preliminary tests this system was discarded on the grounds that it placed a non-linear load on the final audio stage which would be expected to generate a lot of harmonics unless a swamping resistance were used—a measure very wasteful of audio power.

It was found quite easy to adjust the Taylor system so that it provided ordinary efficiency modulation, and the characteristic was then much more linear. Incidentally, any alleged "Taylor circuit" which does not employ either some form of tapped circuit or different H.T. voltages on the two valves comes under this heading.

In adjusting the circuit, it was found possible to compensate to a large extent for variations of drive voltage by altering the bias, and *vice versa*. The best method of adjustment was, with no drive, to bias Vc to about cut-off, which, because of the screen dropper, would be about twice cut-off when the drive was applied; then adjust the drive to Vc so that the grid was only just drawing current, finally tuning the anode circuit to resonance. About 50 to 100 per cent. more drive voltage than this was applied to Vm, its bias being adjusted for an anode current of 10 to 20 mA. Modulation voltage applied to the grid of Vm, and the aerial coupling, were then adjusted together—using the trapezium pattern—to produce a peak swing equal to twice the carrier amplitude. Finally, the modulation voltage and bias on the buffer stage were adjusted together to give the best possible trapezium shape.

Other less successful arrangements included modulation of Vc and Vm grids only, and also anode modulation of the buffer stage only (which, for some unexplained reason, was the least satisfactory).

Using a 4-element fixed beam, and employing many different variations of the circuit, contact was made with Australia every morning for about three weeks. Results in general were noticeably inferior to those previously obtained with 120 watts (anode modulated) but this was possibly not altogether a fair test, as the best arrangement was only in use for a very short time before changing over to the Terman-Woodyard system. The latter, at the time of writing, is giving results indistinguishable from those obtained with anode modulation.

(b) *The Terman-Woodyard Circuit.* In comparison with the Taylor system, the circuit of Fig. 5, tested with a lamp load, has given an appreciable increase of efficiency, and also much

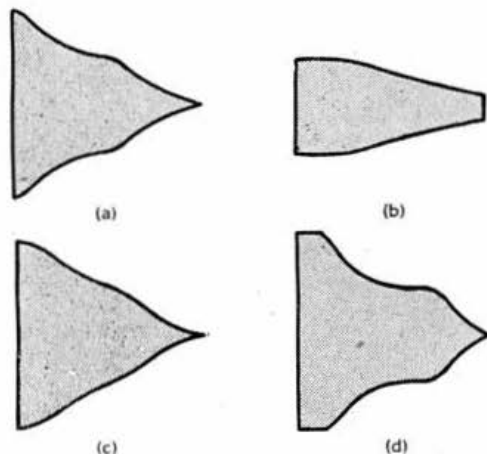


Fig. 6

Oscilloscope Trapezium Patterns—Taylor Circuit.

(a) Usual pattern when P.A. was adjusted for high efficiency; (b) Distorted modulation of buffer amplifier, used to compensate for distortion of (a); (c) Combination of (a) and (b); (d) Typical patterns illustrating several of the more common defects.

better linearity. The principles of adjustment have already been outlined, and there is little to add beyond the fact that they have worked out in practice exactly as expected. Although there are two extra R.F. circuits to adjust, these are not unduly critical, and all circuits would probably be ganged together in the final design. The circuit adjustments having most effect on the modulation pattern are the tuning of C2, and the coupling between L1 and L2. The other circuits need little or no adjustment for frequency changes of plus or minus 100 kc/s. (approx.)—enabling most of the 14 Mc/s. 'phone band to be covered. The need to adjust the coupling only arises because of poor design of the doubler stages, which have pre-set tuning, and do not provide a sufficiently constant output.

Conclusion

The author believes that high-efficiency grid modulation has an important future in Amateur Radio, particularly in the hitherto neglected Terman-Woodyard form. The advantages of the new circuits are obtained at a price—in so far as there are more quantities to be adjusted than in the case of conventional methods of modulation—but this drawback is of negligible importance providing the procedure is straightforward, and confined to the initial setting-up of the system. On the other hand, it would be unacceptable if several quantities have to be re-adjusted whenever the frequency is changed slightly.

R.S.G.B. Publications

IN the past many large orders for R.S.G.B. publications have been received from Town Representatives and representatives of Affiliated Societies. Such orders have been despatched carriage paid by the Society and the invoice has allowed a trade discount of 20 per cent. on sales in excess of £2.

Unfortunately, on several recent occasions a large proportion of an original order has eventually been returned to the Society with many copies soiled and damaged.

The Council has now decided, reluctantly, that the Society cannot continue to incur the losses involved in sending books to Town Groups and Affiliated Societies on a sale or return basis nor continue to allow members who attend town meetings to purchase books at reduced prices. The Council is prepared, however, to allow affiliated societies a trade discount on *bulk orders* provided the books are sold at the retail price. All orders, whether from Town Groups or Affiliated Societies must, in future, be accompanied by a remittance.

To assist those who wish to offer R.S.G.B. publications for sale at Exhibitions, the Council has decided that copies remaining unsold after such events shall be credited in full, provided they are returned to the Society in perfect condition within seven days of the close of the Exhibition.

The *R.S.G.B. Amateur Radio Call Book* cannot be supplied on a sale or return basis to Town Groups, Affiliated Societies or the trade.

Members are reminded that an appreciable saving is effected by purchasing R.S.G.B. publications through their Town Group or Affiliated Society. For instance the cost of purchasing a single copy of the Call Book from Headquarters amounts in all to 4s. 1d. (3s. 6d. plus 3d. for

The present position can be summed up by saying that experiments with the preferred system are at an early but very promising stage: it has been shown to be a workable proposition, and the outstanding problems do not appear to be very formidable. Ganged tuning has already been suggested as one line of attack, and another which seems theoretically feasible is to use broad-band high L/C ratio circuits throughout, with adequate screening and low-pass filtering to prevent radiation of harmonics. In this way, all tuning adjustments could be eliminated—except for the V.F.O., of course.

In spite of the highly experimental nature of the equipment (which leaves room for many improvements), results over a three-month period have been very satisfactory as regards both DX performance and stability of adjustments. Although operation has been confined mainly to 14150-14200 kc/s., it became possible to move to any part of the 14 Mc/s. band within a few seconds.

Every effort has been made to ensure scientific accuracy and fairness in the presentation of the basic facts, but it is hoped that some of the opinions expressed will prove sufficiently controversial to stimulate discussion. The author would be particularly interested to hear from anyone.

Acknowledgements are due to other amateurs who have co-operated in tests and particularly to Mr. J. J. Payne (G3DVM), whose patience has been inexhaustible.

postage and packing, 2½d. stamp on the letter and 1½d. poudage on the postal order). Sevenpence is saved by purchasing from the Town Group or Affiliated Society.

RADIO SOCIETY OF GREAT BRITAIN

Senior Assistant to the General Secretary

APPLICATIONS are invited for the above newly created post on the Headquarters Staff of the Society.

Applicants (male only) should possess knowledge of Amateur Radio affairs and have had experience of Short Wave Radio work. Preference will be given to those between 25 and 32 years of age.

The Council hopes that the successful candidate will become a permanent member of their staff and will in time qualify himself to take over the duties of General Secretary when the present holder of that position retires.

Salary will be on a scale commencing at £500 per annum and rising to not less than £1,000 per annum. After a probationary period, the officer may join a contributory pension scheme. A service agreement will also be offered after two years of satisfactory service.

Applicants, who must be British, should submit references and give full details of their qualifications and previous experience. A copy of a recent photograph should also be furnished.

All applications must reach
The General Secretary,
The Inc. Radio Society of Great Britain,
New Ruskin House,
28/30 Little Russell Street,
London, W.C.1.

by December 1st, 1951, and marked "Private and Confidential."

Canvassing will be a disqualification.

HOME-MADE WIDE-BAND COUPLERS

Constructional details of wide-band coupling transformers for the "Switched Wide-band Exciter" described in the January and February 1951 issues of the Bulletin

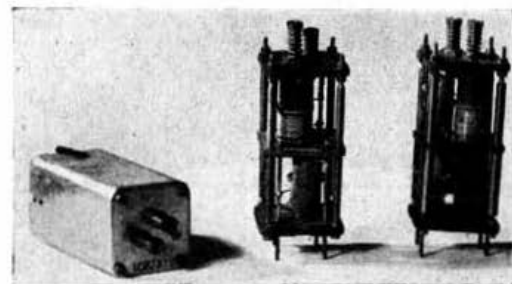


Fig. 1

Left: 10 Mc/s, surplus transformer (ex-R1143) complete with can. Centre: Inside view of transformer as manufactured. Right: Transformer modified as 7 Mc/s, wide-band coupler.

IN the original articles on the "Switched Wide-band Exciter" referred to above, details were given for modifying commercially available amateur band couplers. It was realised that a complete transmitter embodying these couplers in both the exciter and P.A. stages might easily cost upwards of £10—a sum comparable with the total remaining cost of the equipment. Since then, however, the author has completed the design work in modifying a certain type of I.F. transformer, used in the R.A.F. receiver type R1143, which is readily available as surplus. The photograph in Fig. 1 will aid in recognition of this component.

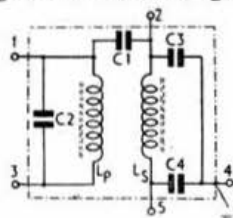


Fig. 2

Circuit diagram of transformers T2, T3, T4 and T5. For component values and winding data see Table 1.

Rewinding Data

The R1143 is a V.H.F. receiver with an I.F. of 10 Mc/s., and the transformers consist of an aluminium can with two adjustable $\frac{1}{2}$ in. iron-cored plungers with spindles projecting through holes in the top of the can for screwdriver adjustment. Internally, two $\frac{1}{2}$ in. diameter formers are arranged with their axes slightly displaced to provide a certain fixed inductive coupling. This coupling is increased in the modified version by adding a small "top capacity" (C1 in Table 1 and Fig. 2). As manufactured there are 14 turns of No. 24 S.W.G. double silk-covered wire on each former, wound in grooves spaced thirty to the inch. Examination of the table will show that for 14 Mc/s. the windings are left as originally constructed (i.e.—with 14 turns). For 21 and 28 Mc/s. a few turns are removed, whilst for 7 Mc/s. the original windings are removed completely, the winding space over the full $\frac{1}{2}$ in. length of the former being filled with

wire of the same gauge close-wound to 21 turns.

When rewinding for 7 Mc/s., it is necessary partially to dismantle the transformer, but careful examination of the method of construction will reveal the correct way to do this, and to re-assemble the component afterwards. Difficulty may be experienced in rewinding with close spacing over the top of the original grooves: it is better to file these smooth, or turn them off in a lathe. Alternatively, a strip of paper may be glued over the grooves before rewinding is commenced. The same process applies in the case of T1 (Fig. 3).

Practical Points

Table 1 shows all details of the intervalve couplers numbered T2, T3, T4 and T5 in the original circuit diagram of the wide-band exciter (Fig. 5, page 248, January 1951 issue). As T1 was the step-up transformer from the 100-ohm, 3.5 Mc/s. input, details of this coupler are not shown in the table, because its function differs from the others. Modification data for T1 is given in Fig. 3. It should be noted that a thinner gauge of wire is used for this component: this is necessitated by the limited winding length available, and it will be found just possible to include the requisite number of turns in one layer.

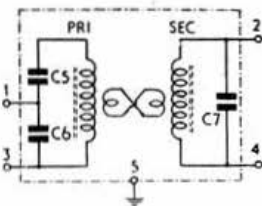
Connections for the coils and condensers within the can, and to the soldering tags at the base of the can, are shown in Fig. 2 and 3. The various fixed condensers should be selected for minimum size, preferably to within a few per cent. in capacity tolerance (although a fair degree of latitude is permissible, as the iron dust cores will provide a considerable tuning range). In all windings, the ends nearest the centre of the can are made low potential so that stray capacitive coupling is kept at a minimum. The coil nearest the top of the can is made the primary, while that nearest the base is the secondary.

It will be noticed that these surplus transformers have only four tag connections, whereas the couplers specified in the previous articles had five pin connections. Consequently, it is necessary to utilise the earthed can as one of the original five connections.

The author received a number of enquiries for winding data to assist in constructing wide-band couplers from "scratch." The information in Table 1

Fig. 3

Input transformer T1 (3.5 Mc/s.). Primary and secondary are rewound with 30 turns each of No. 28 S.W.G. enamelled wire close-spaced.



Components

C5—265 μ F. (existing 115 μ F. plus 150 μ F.); C6—0.001 μ F. mica; C7—215 μ F. (existing 115 μ F. plus 100 μ F.); Link—two full turns of P.V.C.-covered wire around low potential ends of both primary and secondary windings.

* 28 Tudor Way, Petts Wood, Orpington, Kent.

is generally applicable, so that even if R.1143 transformers are not available, satisfactory couplers may be constructed from odd coil formers, etc., which may be found in the spares cupboard.

Experience, after modifying several sets of these

Corrections

Finally the author would like to make two corrections to errors which crept into the original articles previously mentioned. First, referring to Fig. 3b on page 247 of the January issue, the ter-

TABLE I

Band Mc/s.	Component Number**	Primary Lp		Secondary Ls		C1*	C2*	C3*	C4*
		No. of turns	Approx. winding length (inches)	No. of turns	Approx. winding length (inches)	$\mu\text{F.}$	$\mu\text{F.}$	$\mu\text{F.}$	$\mu\text{F.}$
7	T2	21	1/2†	21	1/2†	12	90	115	470
14	T3	14	7/16†	14	7/16†	4	30	50	250
21	T4	11	3/8†	12	3/8†	3	10	30	115
28	T5	8	5/16†	10	5/16†	2	8	20	100

Coil-winding Data for Wide-band Coupling Transformers

All windings are of No. 24 S.W.G. (0.022" diameter) enamelled or D.S.C. wire on $\frac{1}{4}$ " diameter former, with iron-dust core $\frac{1}{4}$ " diameter. † Close-wound; ‡ Turns spaced 30 per inch; ** Refers to numbering in circuit diagram (Fig. 5, page 248, January, 1951, issue). * See Fig. 2.

couplers, has proved that the performance is, if anything, better than the vastly more expensive commercial product. There are various sources of supply for these surplus I.F. transformers which are currently available at between 6d. and 1s. each.

minimal marked "E" should have been shown joined to the metal shield. Second, in Fig. 5, the R.F. connection to T1 from "U" on the band-switch should have been shown going to terminal 1 instead of 5.

A Useful Mobile Work Bench

By P. A. MANCHEE (B.R.S. 12480)

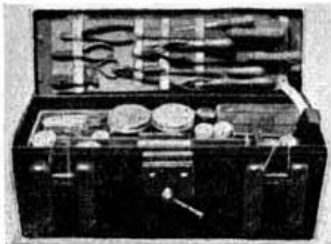
IN these days of cramped accommodation there are many amateurs who do not possess a shack and in consequence have to do the best they can on the kitchen table (amidst much domestic QRM!) The writer overcame this problem to a certain extent by working on a "mobile" basis, with experience gained from service with the Royal Air Force in World War II.

A large ex-Army metal box (actually a D.D.T. container case) was obtained for a few shillings and modified in the following manner. A piece of stout wood was screwed into the lid, with tapes tacked in position to hold a variety of tools in common use (e.g.—screwdrivers, pliers, files, etc.) The dimensions of the wood should be a little smaller than the inside measurements of the lid, so that the box will close freely.

Next the front of the box was drilled to take a small vice (Fig. 1), this being screwed through

the metal into a block of wood mounted inside. The vice can be easily removed when required, but when in position is quite firm and secure.

Two trays were then made to fit inside the box—plywood being a suitable material for this purpose. The upper tray should be shallow and sufficiently recessed to allow the lid to close, and should be cut away at front centre to allow the vice to move in and out. The trays may then be partitioned to take small tins or jars of screws, drills and other miscellaneous items.



The mobile work bench constructed by B.R.S. 12480, showing layout of tools and top tray.

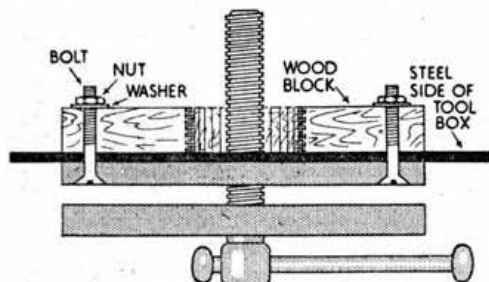


Fig. 1

Method of mounting vice to front of metal tool box.

The writer found this arrangement invaluable. Maximum use is made of the space within the box, which can be placed anywhere, the vice being used for light electrical and radio work. As an added refinement, a short length of metal tubing (about 1in. in diameter) may be cleated vertically to one of the inner sides of the box to act as a stand for the soldering iron, when in use.

For travelling purposes the vice may be easily removed and placed inside. The writer travelled to Australia with the box in this way, and it is still giving good and useful service "Down Under."

THE FIRST DX

By V. E. HUGHES (G3AVG)

ON December 12, 1901, three men sat in a barrack room at Signal Hill, Newfoundland, waiting for the first DX. Prior to this date, wireless transmissions had been successful only over short ranges of a few miles, and the suggestion that longer distances were possible was treated by the eminent scientists of that day with scepticism. The idea that wireless waves could be transmitted and received over two thousand miles of sea was never even considered, for Guglielmo Marconi—the young man whose genius and initiative made wireless possible—prepared for the great attempt in secrecy.



Marconi in the room at Signal Hill, Newfoundland, with the equipment with which he received the first transatlantic wireless signals on December 12, 1901.

This was barely four years after Marconi had first demonstrated his invention to Sir William Preece, Engineer-in-Chief of the British Post Office, and had formed the first wireless company in the world—*Marconi's Wireless Telegraph Co., Ltd.*

Site Selection

First consideration was given to the sites for the sending and receiving stations. The transmitter was at Poldhu, near Mullion, Cornwall, a point high on the cliffs overlooking the Atlantic. South Wellfleet, Cape Cod, Massachusetts, was decided upon as a suitable receiving point.



Some of the early apparatus at the Poldhu wireless station, used in sending the first transatlantic wireless signals. On the left are the transformers; banks of condensers are carried in metal containers on the wooden rack (centre); and on the extreme right is the spark-gap, consisting of two steel spheres mounted on insulating rods.



Preparing the kite which supported the aerial on which the first transatlantic signals were received in Newfoundland.

So far, all transmissions had been made by the *Marconi Company* on a scale which, Marconi realised, would not be sufficient. At least one hundred times the power of the biggest transmitter yet built would be needed . . . 25 kilowatts.

In October, 1900, the building of the Poldhu station commenced. Technicians, under the guidance of their far-sighted leader, started to design the transmitter. Their scientific adviser—co-opted because of his unrivalled knowledge of the production of high-voltage electricity—was Prof. J. A. (later Sir Ambrose) Fleming, F.R.S., who in a few years was to win world-wide recognition as the inventor of the thermionic valve.

Aerial Trouble

The aerial system at Poldhu was to be an inverted cone of wires supported by twenty 200-ft. masts in a circle 200 ft. in diameter, with the transmitter buildings in the centre. Work on a similar array was begun at Cape Cod. Shortly after these aerials were completed, a heavy ocean gale wrecked all the masts at both sites. As so much time had already been spent on these constructions, it was felt that a simpler array should be adopted at Poldhu, and the receiving site was changed to Newfoundland. The new aerial at Poldhu was a fan-shaped array suspended between two 170-ft. masts.

The 170' masts with the 60-wire fan-shaped aerial at Poldhu, used for Marconi's first transatlantic experiment in 1901.

(Photographs by courtesy of the Marconi Co., Ltd.)



On November 27, 1901, Marconi, together with two of his assistants, Kemp and Paget, sailed on the *S.S. Sardinian* for Newfoundland. They arrived on December 5, and were met with the offer of every possible help from the Governor, Sir Cavendish Boyle, and the Prime Minister, Sir R. Bond.

A room in the Barracks Hospital of Signal Hill was placed at their disposal, but here, too, trouble was experienced with aërials. The wavelength to

be used was around 1800 metres, and Marconi realised that an extremely long aerial would be required. A balloon was used to elevate it—but unfortunately was carried away by a strong wind. The following day—December 12—another aerial, 500 ft. in length, was raised on a large kite, but within an hour, this too had gone with the wind! The small group persevered, however, and sent up another kite. This one was more successful, and held.

The First Signals

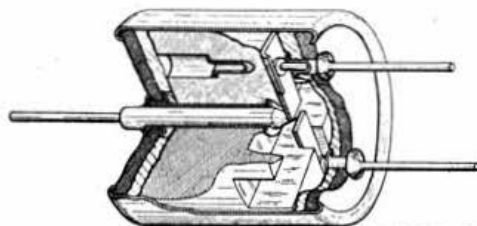
All was ready, and in the manner which we know so well, a listening watch was started—the

nerve-racking wait for signals. A schedule had been pre-arranged, and it was while Marconi himself was listening out, at 12.30 p.m. on December 12, 1901, that he took off his headphones, handed them to Kemp, and asked him what he could hear. Kemp heard all the mush in the world; the splatter and the gangle of background and static—but through it all quite clearly came faint scratchy triplets of man-made noise ... the Morse letter "S." Calmly, his own hearing having been confirmed, Marconi entered in his diary—"Sigs. at 12.30."

The first signals had been heard at DX!

The Germanium Triode

GERMANIUM triodes are descendants of the crystal detectors used in the early days of radio, and have the same essential feature of a metallic crystal to which contact is made by means of points. Known also as "crystal triodes" or "transistors," they are a relatively new development, and are not as yet commercially available, though they are being produced by several companies, including the *British Thomson-Houston Co.*, *Standard Telephones and Cables, Ltd.*, and the *General Electric Co.* At the National Radio Show held in September, G.E.C. exhibited an experimental valveless receiver employing germanium triodes throughout, capable of 50 mW. output on local stations.



[Courtesy of G.E.C., Ltd.]

Fig. 1.

Germanium crystal triode, cut away to show internal structure.

The design of the germanium triode manufactured by G.E.C. is illustrated in Fig. 1. It consists of two phosphor-bronze blades 0.003 in. thick and 0.04 in. wide, supported in a moulded insulator. The gap between the blades is very critical and is obtained by mounting a single strip across a channel in the moulding and subsequently shearing a gap a few thousandths of an inch wide with a specially designed cutter. The germanium is soldered to the tip of a metal stub, and is ground to a point with an angle of 60 degrees. The cone thus formed is inserted into the gap between the blades, forming the essential two-way contact, with a spacing which can be very accurately controlled. The three electrodes are then the two blades and the stub.

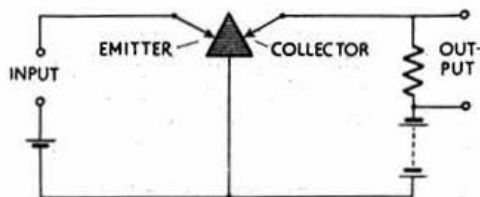


Fig. 2.

Typical germanium triode amplifier circuit.

The germanium triode is used in the type of circuit illustrated in Fig. 2. If a negative potential is applied to one of the blades (called the *collector*), then the current to it can be varied by altering the positive voltage applied to the other blade (called the *emitter*). The emitter current controls the collector current, its action being comparable with the grid of a thermionic valve, but it is a current-operated rather than a voltage-operated device.

Typical germanium triode characteristics are: input impedance 500 ohms; output impedance 30,000 ohms. Associated circuits have to be designed with these values in mind. Typical operating conditions in an amplifier are: collector:—1.5 mA. at -30 V.; emitter:—0.5 mA. at +0.25 V. With correct impedance matching, such an amplifier would give a power gain of 20-30 db. The safe limit of power output for a single germanium triode is at present about 20 mW., but oscillators may be made with outputs up to 100 mW., with an upper frequency limit of 10 Mc/s. due to transit-time effects.

Although no filament or heater power is required for germanium triodes, an H.T. supply is still necessary. They are not likely to replace existing thermionic valves in ordinary commercial radio and television applications at present, but will doubtless be used in specialised equipment where compactness and economy of power is essential—such as electronic computing machines, airborne and rocketborne radio and radar equipment, etc. They have the advantages of stability, long life and robustness.

Radio Panel Transfers

IN response to the query published last month, many members have advised Headquarters that panel transfers can be obtained from C. & K. Norvall (Printers), 5 Torrens Street, City Road, London, E.C.1. Two sheets are available, printed in silver lettering one-eighth of an inch high on a black background. Sheet No. 1 contains 100 labels for receivers (T.R.F. and superhet), transmitters (two and three stages), converters, adaptors, power packs and modulators. Sheet No. 2 contains more than 50 labels for test equipment, including the oscilloscope, beam switching unit, A.F. or R.F. signal generator, and crystal calibrated sub-standard frequency meter. Prices are 2/6 and 2/3 post paid respectively. A stamped-addressed envelope to the manufacturers will bring full details.

Members who wrote to Headquarters in answer to the enquiry are thanked for their interest.

Can You Help?

W. L. Nye (VK2XU), 163 Ramsay Road, Haberfield, New South Wales, Australia, with circuit data relating to the ex-R.A.F. wavemeter type W.1185?

R.S.G.B. BULLETIN, NOVEMBER, 1951.

THE HOLME MOSS TELEVISION STATION

By CHARLES A. SHARP (G6KU)

On Friday, October 12, 1951, the new B.B.C. Television Station at Holme Moss in the Pennines was officially opened by the Postmaster-General. In this article G6KU provides a concise close-up view of the equipment which—incorporating the most powerful vision transmitter in the world, with a peak-white power of 45 kilowatts—is an outstanding technical achievement and a tribute to British engineering.



The control desk for the vision and sound transmitters. The control room has windows overlooking the transmitter hall so that the engineer on duty can see the transmitters.

THE Holme Moss Television Station is situated 1,750 feet above sea-level, on top of the Pennines, in an exposed location. Up to eight feet of peat had to be removed in order to accommodate the substantial stone buildings and mast foundations. Heating is provided by warm air discharged from the transmitter cooling system, about 150 kW. being available for this purpose. The water supply for cooling and domestic purposes has to be specially pumped from a valley 800 ft. below the site.

The Mast

The mast, which is 750 ft. in height and weighs 140 tons, is located on a steel ball two inches in diameter, to allow angular movement in high winds. For the first 610 ft. the cross-section is triangular, this being followed by a circular section containing eight tiers of four slots for V.H.F. sound transmissions if required at a future date. The final section, 40 ft. high, houses eight vertical folded dipoles, arranged in two groups of four, one above the other.

The mast is supported by four sets of stays. It is designed to have an adequate safety factor under conditions producing a half-inch thickness of ice over the structure, with a wind velocity of 125 miles-per-hour at the mast head.

The Vision Transmitter

The peak-white power output of 45 kW. makes this the world's most powerful vision transmitter. The drive is derived from a crystal oscillator running at one-sixth of the carrier frequency (51.75 Mc/s.). There are two stages of frequency multiplication, followed by three stages of push-pull amplification into a cathode-follower, which drives the final push-pull linear wide-band amplifier. The transmitter is grid modulated in the final R.F. stages.

The Modulator

The modulator consists of a complicated pre-amplifier (which is duplicated against faulty

operation) feeding a sub-amplifier and a cathode follower, the latter being shunt-regulated. A black-level clamp unit controls the radiated black level of the transmission. The output impedance of the cathode-follower is only five ohms, to enable it to deal with the modulated R.F. stage grid current, which varies between zero and three amperes.

The Sound Transmitter

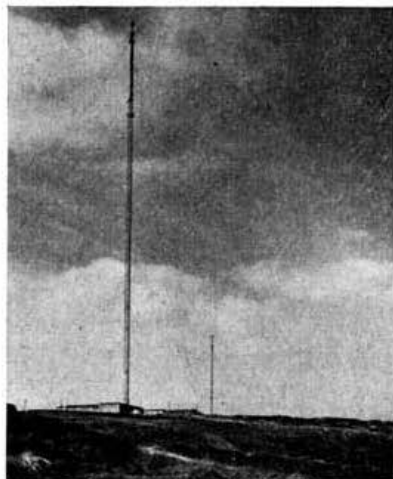
The oscillator and multiplier-amplifier stages are similar in design to those of the vision transmitter. The final stage (power 12 kW.) consists of a single earthed-grid air-cooled valve, which is Class "B" anode-modulated.

A bridge network combines the output of the sound and vision transmitters, preventing interaction between the two. The R.F. output is conveyed to the radiating elements at the mast head via 51-ohm coaxial feeder, through which warm air can be blown to prevent condensation.

Two lower-power stand-by transmitters and a reserve 150 feet mast and aerials are available in case of breakdown. With their associated control units and monitors they form a complete separate station, if required.

Control Equipment

A control desk, situated in the main building, overlooks the large sound and vision transmitters, enabling the complete control and monitoring of all voltages and currents to be carried out. Samples of the signal may be taken from any stage for display on a large tube. The safety interlocking system for all operating controls is checked by means of pilot lights on an indicating panel. Power supplies for the station are derived from an 11 kV. main, via appropriate transformers and rectifiers.



A general view of the station showing the main building in the foreground, the 750-ft. mast, and to the rear, the 150-ft. mast and standby aerial.

ANNUAL REPORT of the Council

THE Council takes pleasure in submitting to the membership a Report covering the activities of the Society during the year which ended on June 30, 1951. Reference will also be made to certain activities which continued after the year ended.

The R.S.G.B. Bulletin

The financial effects of the decision of the 1950 Council to place the printing of the Society's Journal in the hands of *South London Press Ltd.* are apparent from an examination of the audited accounts for the year. The net saving brought about by the transfer of business and enhanced revenue from advertising amounts to £1,429. A dispute in the printing industry during the summer and early autumn of 1950 led to delays in publication, but once this difficulty had been overcome production proceeded smoothly.

The improvement in the paper position, which made it possible for the Council during the spring of 1950 to invite competitive tenders for printing the BULLETIN, was maintained throughout the year under review, but in recent months the Society has been advised that restrictions may again be placed on the amount of paper used for technical publications.

Volume 26 contained 480 pages compared with 442 pages in Volume 25, 324 pages in Volume 24 and 256 pages in Volume 23. The first four issues in Volume 27 aggregated 184 pages.

The standard of technical contributions has again been well maintained. The Norman Keith Adams Prize for the outstanding contribution of the year has been awarded to Mr. R. H. Hammans (G2IG) for his article entitled "A Switched Wide-band Exciter." Other notable contributions were those by Mr. D. N. Corfield, D.L.C. (Hons), A.M.I.E.E. (G5CD), "A Crystal Controlled Exciter for the 70 cm. Band"; by Mr. A. G. Dunn (G3PL), "Filters for Speech Clipping"; by Mr. C. W. Cragg, Grad.I.E.E. (G2DHU), on "Pi-Coupling Networks" and "Push-Button Band Switching"; by Mr. R. L. Varney, A.M.I.E.E. (G5RV), on "A T.V.I.-Proof 50-watt Transmitter"; by Mr. N. H. Hyde, Assoc.Brit.I.R.E. (G2AIH), on "A 14 Mc/s. Single Side-Band Exciter"; and by Mr. B. H. Briggs, M.A. (G2FJD), on "Panoramic Reception."

The "Workshop Practice" series of articles was continued as were the topical features "The Month on the Air" and "Around the V.H.F.s." by Mr. A. O. Milne (G2MI) and Mr. W. H. Allen, M.B.E. (G2UJ), respectively.

Rules for, and results of, Society contests again occupied a good deal of space, as did the Résumés of the Proceedings at Meetings of the Council, lists of New Members and Reports from Groups and Affiliated Societies and Clubs.

Editorials drew attention to a wide variety of matters of topical interest.

Volume 26 contained more advertisers' announcements than any volume since before the war. During the year the responsibility for handling advertising in Society publications was transferred from *Parrs Advertising Ltd.* to *The National Publishing Co. Ltd.* The Council is pleased to record that Mr. Horace Freeman continues to act as the Society's Advertisement Manager—an appointment he has held since the BULLETIN was established in 1925.

The Council places on record its thanks to all who contributed to Volume 26 of the R.S.G.B. BULLETIN.

Membership

For the third year in succession a fall in membership has to be recorded. The comparable figures for the past few years are given in the following table:

Grade	Sept. 30 1947	Sept. 30 1948	June 30 1949	June 30 1950	June 30 1951
Home Corporate	12105	12336	11851	10936	10119
Overseas "	546	651	672	672	700
Life "	79	90	95	105	107
Honorary	8	8	8	7	7
Associates	1132	1354	1412	1303	1201
Totals	13870	14439	14038	13023	12134

Serious as are the losses recorded, the Council is aware that similar organisations throughout the world have experienced a marked falling-off in membership during the past few years. In the view of the Council the unsettled economic state of the country is the chief factor for the decline in membership. So long as the cost of living continues to increase, hobby-interest organisations will suffer.

Although the number of licences in force as at June, 1951 (7,677), showed a net increase of 190 compared with June 30, 1950 (7,487), it is known that some 500 licences were not renewed during the year—a further indication of economic difficulties.

Annual General Meeting

As a consequence of matters raised at the Annual General Meeting held in December, 1950, and action taken following that meeting by certain members, the new Council, on assuming office in January, 1951, decided that it would be desirable to issue a statement of policy. This was done and the Regional Representatives were invited to submit resolutions based on expressions of opinion voiced at local meetings. After these resolutions had been considered by the Council, the Regional Representatives were invited to attend a meeting in London. A full Report of the decisions reached at the meeting appeared in a subsequent issue of the BULLETIN.

The Council has already taken steps to implement certain of the resolutions passed at the meeting and others are being considered in connection with the revision of the Articles of Association.

Questionnaire

In order to assist the Council in its task of revising the Articles of Association and to test the feelings of members on major points of policy and administration, a questionnaire was sent to each member in March, 1951. Although only about a third of the members submitted returns, the subsequent analysis (details of which appeared in the May, 1951, BULLETIN) has proved of considerable value to the Council in its deliberations.

Articles of Association

Changes in the Society since the original Articles of Association were drawn up in 1926 have made it

clear that certain revisions are required. During the year steps were taken to prepare a first draft of the revision. It is anticipated that a final redraft will be presented to the membership during the early part of 1952.

Council Meetings and Attendances

From July to December, 1950, the Council met on seven occasions and were in session for a total period of 24 hours. From January to June, 1951, the Council met on eleven occasions and were in session for a total period of 46 hours.

In addition, Council members attended Official Regional Meetings, Committee Meetings and Regional Representatives Conferences.

The following is a list of attendances at Council Meetings for the period from July 1, 1950, to June 30, 1951:

Name	Possible Attendances	Actual Attendances
The President ... (Mr. W. A. Scarr)	18	16
Mr. W. H. Allen ...	18	17
Mr. A. P. G. Amos ...	18	13
Mr. F. Charman ...	18	16
Mr. L. Cooper ...	18	17
Mr. D. N. Corfield* ...	7	6
Mr. W. N. Craig ...	18	17
Mr. V. M. Desmond ...	18	7
Mr. C. H. L. Edwards ...	18	17
Mr. T. L. Herdman† ...	11	10
Mr. J. W. Matthews* ...	7	7
Mr. A. O. Milne ...	18	16
Mr. P. A. Thorogood ...	18	17
Mr. A. J. H. Watson ...	18	8
Mr. P. W. Winsford† ...	11	11

* Retired December 31, 1950.

† Took office January 1, 1951.

Representation

During the year covered by this Report, Official Regional Meetings were held in six centres. Details of the various meetings are given below:

Region	Venue	Approx. Attendance	Council Representatives present
1	Preston (Oct. 29, 1950)	150	The President, Mr. Edwards and the General Secretary.
2	Sheffield (May 20, 1951)	110	Messrs. Charman, Milne, Thorogood, the General Secretary and Miss Gadsden.
5	Cambridge (July 9, 1950)	330	The President, Messrs. Edwards and Thorogood and the General Secretary
9	Plymouth (Sep. 24, 1950)	95	The President, Mr. Charman, the General Secretary and Miss Gadsden
10	Rhigos (Apr. 22, 1951)	70	The President, Messrs. Craig, Edwards, Herdman, Milne and Winsford and the General Secretary
13	Edinburgh (Oct. 22, 1950)	90	The President, Mr. Craig and the General Secretary

Attendances in general were considerably higher than at the meetings held during the previous year. Since July, 1951, O.R.M.s have been held in Region 4 (Derby), Region 8 (Tunbridge Wells), Region 12 (Aberdeen) and Region 14 (Glasgow).

A number of well-attended county meetings took place during the year. Many of these meetings are now held annually and contribute greatly to the social aspect of the Society's activities in the counties concerned.

An average of 100 meetings arranged by town groups were held each month throughout the year. Lectures, demonstrations, film shows, technical and Morse instruction featured in the programmes of most town groups. Many groups have co-operated with other organisations in the running of local exhibitions.

The Council wishes to place on record its warm thanks to those who served as Regional, County, District, Town or Area Representatives during the year and to all others who contributed in any way to make the scheme of representation a success.

Amateur Radio Exhibition

The Fourth Amateur Radio Exhibition organised by the Society, held at the Royal Hotel, London, during November, 1950, was well supported by the radio industry and Government Departments. Attendances were on a par with those recorded in previous years.

The Exhibition was opened by Mr. Hugh Pocock, M.I.E.E. (Managing Editor of *Wireless World*), in the presence of a number of distinguished guests.

The Council records its thanks to all who helped to make the Exhibition a success.

Festival of Britain

The Society was privileged to play a prominent part in Festival of Britain activities. Following discussions between the Council and the Festival authorities, arrangements were made for an Amateur Radio station to be operated from the Land Travelling Exhibition. This Exhibition was set up in four main provincial centres, where it remained open in each centre for a period of three weeks. Throughout this period an Amateur Radio station was operated by teams of local amateurs. Although operating conditions were far from satisfactory, many hundreds of contacts were established from each site with stations at home and abroad.

The Council records its best thanks to Messrs. I. D. Auchterlonie (G6OM), C. A. Sharp (G6KU), V. M. Desmond (G5VM), and J. J. Curnow (G6CW), who accepted responsibility for the operation of the station when the Exhibition visited Manchester, Leeds, Birmingham and Nottingham respectively.

The Festival was also celebrated in cities, towns and villages throughout the British Isles and it was with pleasure that the Council learned of the many special Amateur Radio exhibitions and displays that were being arranged in this connection by local R.S.G.B. Groups and Affiliated Societies. As the result of these many and varied activities, members of the general public were afforded opportunities of witnessing practical demonstrations of Amateur Radio equipment. Accounts of these Festival activities appeared in the Society's journal.

The Council takes this opportunity of congratulating all members who assisted in the organisation of these special events.

Convention

The Festival of Britain Year Convention, held in London during June, 1951, was an unqualified success socially, but the support given by members living within easy reach of London was much below expectations, consequently a substantial loss was incurred.

The Council was glad to welcome as guests of the Society representatives from a number of overseas societies as well as amateurs from many parts of the British Isles and the British Commonwealth.

The Council records its best thanks to the Chairman of the Convention Committee (Mr. W. H. Matthews, G2CD) and to all who were associated

with him in the organisation of the first post-war Convention to be held in London.

Licence Matters

During the year the Council, through its G.P.O. Liaison Committee, negotiated the issue of Amateur Television licences. Because the frequencies originally assigned were considered to be too high for all practical purposes at the present stage of development, representatives of the Council sought, and were granted, an interview with H.M. Postmaster-General (Rt. Hon. Ness Edwards, M.P.) in order to state a case for the allocation of frequencies in the 70 cm. band. Members are now aware that, as the result of that interview, and following intensive investigations by Government Departments, to ascertain whether or not amateur television signals would interfere with other services using that band, the P.M.G. recently gave permission for a portion of the band to be made available for Amateur Television.

During the year the G.P.O. Liaison Committee continued to press for amateurs to be permitted to use Frequency Modulation in the 2 m. band and Pulse Modulation in the centimetre bands. Members will have noted that both of these facilities have now been granted.

The Committee has also continued to urge that qualified persons be allowed to operate amateur transmitting equipment on board ship and is at present negotiating for improved portable licence facilities.

The Council has been asked for its views on the draft of a new Amateur Television Licence. Discussions have also taken place with the G.P.O. on a wide variety of other matters associated with the issue of licences and the operation of amateur stations.

The good relations which have always existed between the G.P.O. and the R.S.G.B. were further strengthened when the Postmaster-General visited the Amateur Radio Exhibition in 1950.

The T.V.I. Problem

The Council has again taken steps to provide members with up-to-date technical information to assist them to solve their television interference problems. Several important articles on the subject of T.V.I. suppression appeared in the Society's journal and a new technical booklet—"Television Interference"—written by Mr. J. W. Mathews, Assoc.Brit.I.R.E., was published in June, 1951.

The Council drew the attention of the British Radio Equipment Manufacturers' Association to the number of complaints of interference arising on television receivers incorporating chassis produced by certain manufacturers. The Council pointed out that these chassis incorporate an I.F. amplifier of which the pass-band included the 14 Mc/s. amateur band. It was explained that the installation of such a receiver near to an amateur transmitter operating on frequencies in the 14 Mc/s. band, results in more or less severe break through. Discussions on this matter are continuing with the Technical Committee of B.R.E.M.A.

The problems associated with T.V.I. in fringe areas have been the subject of further discussions between the G.P.O. and the R.S.G.B. The Society, through its G.P.O. Liaison Committee, has expressed the view to the G.P.O. that it is unreasonable and unfair to expect radio amateurs, located in areas remote from a B.B.C. television station, to achieve a degree of harmonic suppression many times greater than is laid down for commercial stations by international agreement. Up to the

present, the G.P.O. has taken the line that a viewer must be protected no matter where he is located, provided a picture of entertainment value is capable of being received. The Society does not accept that view.

Radio Amateurs' Examination

When it became clear that the City and Guilds of London Institute could only hold one Radio Amateurs' Examination each year, the Society enquired whether the G.P.O. would be prepared to organise an additional examination on the understanding that the entry would justify the work involved.

The Society was later able to give certain assurances in that connection with the result that the G.P.O. decided to hold an examination in London during October, 1950. A total of 69 candidates sat for the examination and 40 were successful.

At the May, 1951, examination arranged by the City and Guilds of London Institute, 513 candidates were successful out of a total entry of 612. The high percentage of passes in both examinations was no doubt due in no small measure to the special courses of instruction provided commercially and at various technical institutes and colleges.

Slow Morse Transmissions

In order to assist those endeavouring to obtain an Amateur Wireless Licence, slow Morse transmissions were radiated daily on advertised frequencies in the 1.8 Mc/s. band. The organisation of this important service was again undertaken by Mr. C. H. L. Edwards, A.M.I.E.E. (G8TL).

Morse Improvement Transmissions

For the benefit of members anxious to improve their Morse speed, special transmissions were radiated twice weekly from the station of Mr. S. Cook (G5XB), at 15, 20 and 25 words per minute.

Headquarters' Station

The Council regrets that it has not been found possible to maintain the Headquarters' station in regular operation. The station is at present housed at New Ruskin House, but this site is unsatisfactory for many reasons.

The Council hopes that it may soon be possible to set up the station in a more suitable location.

London Lecture Meetings

During the period from September, 1950, to April, 1951, papers were read on a number of important subjects. A list of the speakers and titles of papers follows:

September 29, 1950: F. Charman, B.E.M. (G6CJ), "Aerial Systems—Large or Small," with demonstrations.

October 27, 1950: H. J. Leak, M.Brit.I.R.E., "High Quality Reproduction."

November 17, 1950: F. Aughtie, D.Sc., M.Sc., A.M.I.E.E., A.M.I.Mech.E. (G6AT), "Electronic Computing."

January 26, 1951: D. N. Corfield, D.L.C. (Hons.), A.M.I.E.E. (G5CD), "Equipment for the 420 Mc/s. Band."

February 23, 1951: H. A. M. Clark, B.Sc. (Eng.), A.M.I.E.E. (G6OT), "Post-War Developments in Television."

March 30, 1951: R. H. Hamman (G2IG), "High Selectivity 'Phone Reception'."

April 27, 1951: A. O. Milne (G2MI), "Low-Power Portable Equipment."

The Council records its thanks to those who read papers and contributed to the subsequent discussions.

International Matters

Although it was agreed a year ago to spend up to £500 during the year ended June 30, 1951, in developing the work of the Region I I.A.R.U. Bureau, no appreciable expenditure was in fact incurred.

A Region I Committee was, however, set up under the Chairmanship of Mr. S. K. Lewer, B.Sc. (G6LJ), to co-ordinate the work of the Bureau. The Bureau Committee has exchanged correspondence on a variety of matters with officers of other European I.A.R.U. Societies and with the German Society (D.A.R.C.). Prior to the opening of the Extraordinary Administrative Radio Conference in Geneva a special letter was issued by the Bureau to each European Society stressing the importance of soliciting the support of their licensing authority at the Conference.

The Committee has also given advice to the European Societies in the matter of Contests and as the result of suggestions made by them a European V.H.F. Contest has recently been staged.

The Council wishes to emphasise once again that the European Societies look to the R.S.G.B. for guidance on licence matters and other matters of mutual interest.

Service Reserves

The Society was privileged in January, 1951, to make the first public announcement of the intention of the Air Ministry to inaugurate a Royal Air Force Voluntary Radio Service. It is understood that the response to the appeal for volunteers was very satisfactory. The Council regard it as unfortunate that a more comprehensive Reserve has not yet been set up by the Air Ministry to cater for those interested in communications, maintenance and radar.

During the year the Society was able to give publicity to the work of the Royal Naval Volunteer Wireless Reserve. This Reserve, first formed with the active co-operation of the R.S.G.B. in 1931, continues to recruit many of its members from the ranks of the radio amateur.

The Council greatly appreciates the interest which the Admiralty and Air Ministry have shown in recent R.S.G.B. Amateur Radio Exhibitions.

Technical Committee

Once again the Council pays tribute to the work of the Technical Committee, which, under the Chairmanship of Mr. H. A. M. Clark, B.Sc., M.I.E.E. (G6OT), has rendered yeoman service to the Council on a wide variety of technical matters and given valuable guidance to the editorial staff in connection with the BULLETIN.

Technical Publications

One new title—"Television Interference"—appeared during the year. This publication found a ready sale in all areas where the problem of T.V.I. is acute.

The Council authorised the preparation of a further new title—"Modulators and Modulation Equipment"—which is due to appear during 1952.

The Council regrets that it has not yet been found possible to proceed with the preparation of a new edition of *The Amateur Radio Handbook*. Preliminary investigations have, however, shown that the cost of producing a printing of 5,000 copies of a book which would compare favourably with the A.R.R.L. Handbook would not be much less than 20s. each. Under present conditions the Council does not feel justified in risking an expenditure of approximately £5,000 on a publication which, because of its high selling price, might not have a wide sale.

R.S.G.B. Amateur Radio Call Book

Although the first edition of the *R.S.G.B. Amateur Radio Call Book* did not appear until August, 1951, the Council wishes to record its thanks to Mr. John Tyndall (G2QI), whose offer to compile a British Call Book was gratefully accepted during the year under review. The good support given to this project by the membership has been most encouraging.

Contests Committee

A wide range of Contests, designed to cover many interests, was organised by the Contests Committee under the Chairmanship of Mr. W. N. Craig, B.Sc. (G6JJ).

National Field Day attracted an entry of 236 individual stations, representing 117 different Town Groups. For the first time the premier award was won by a Scottish Group—Falkirk—who finished with a margin of 37 points over Slough. East Molesey achieved third place. Chelmsford and Falkirk respectively led the "A" and "B" stations. Fine weather prevailed throughout the event.

The Annual B.E.R.U. Contest received a wider measure of support than in recent years, but the incidence of the dispute in the printing industry resulted in some overseas amateurs failing to receive the rules in time.

The decision of the Contests Committee to organise a series of Direction Finding Contests, culminating in a National Final, met with the warm approval of all who appreciate the importance and fascination of D/F work.

The Affiliated Societies' Contest was won by the Thames Valley Amateur Transmitters' Society (402 points) after a hard fight with the R.A.F. Amateur Radio Society (400 points).

A Low-Power Contest and two "Top Band" Contests attracted good support, as did a 144 Mc/s. Field Day and a 144 Mc/s. Contest. The special 420 Mc/s. tests held in June demonstrated marked technical advance.

The task of drawing-up the rules for and subsequently judging the contests, again threw a great deal of work on the members of the Contests Committee, who are most cordially thanked for their services.

QSL Bureau

In spite of continuing poor radio conditions, the R.S.G.B. QSL Bureau, under the direction of Mr. Arthur Milne (G2MI), again handled a very large number of cards. The Council records its thanks to all who contributed to the smooth running of the Bureau.

R.S.G.B. Operating Certificates

The number of claimants for the special operating certificates issued by the Society increased considerably during the year. The Empire DX Certificate—each one of which is produced by hand on vellum—has now been awarded to more than 60 members. Many expressions of appreciation have been received from recipients.

Affiliated Societies

During the year the Council was pleased to grant affiliation to 22 Societies and Clubs. The total number of Societies and Clubs now affiliated to the R.S.G.B. is 105, of which 81 are associated with fixed geographical areas, 11 with Government organisations, 9 with commercial concerns, and 4 with educational establishments.

Long Service Honoured

At the March meeting the Council conferred Honorary Membership on Past President Stanley Karl Lewer, B.Sc. (G6LJ), in recognition of his past

services to the Society. At the same meeting Henry Arthur Maish Clark, B.Sc. (Eng.), M.I.E.E. (G6OT), David Nisbet Corfield, D.L.C. (Hons.), A.M.I.E.E. (G5CD), and James William Mathews, Assoc.Brit.I.R.E. (G6LL), were elected Vice-Presidents in recognition of their outstanding services to the Society as Members of the Council and of the Technical Committee.

Headquarters

Once again the Council records with deep gratitude its thanks to the General Secretary (Mr. John Clarricoats) for his loyal and generous service throughout the year and for his expert advice and sound administration of the Society's affairs.

The Council would also express its sincere appreciation of the devoted services of the Assistant Secretary (Miss May Gadsden), who has now completed over 21 years' work in that capacity.

Thanks are also extended to the other members of the staff for the valuable assistance they gave to the General Secretary during the year.

The General Secretary was present at every meeting of the Council and at every Official Regional Meeting. He also attended a number of Society functions held in London and the Provinces and spoke at many meetings and gatherings of Affiliated Societies and Clubs. He was also present at the two Regional Representatives' Conferences held during the year.

Miss Gadsden also devoted much time outside her normal business hours to Society affairs and remained on duty throughout each session of the Council, frequently not arriving home until nearly midnight.

Conclusion

Members will appreciate that it is not possible within the compass of this Report to refer to all matters dealt with by the Council during the year.

For and on behalf of the Council,

W. A. SCARR
(President).

Society Trophies

SOCIETY Trophies have been awarded by the Council for the current year to the following:

Rotab: Mr. H. A. Bartlett, G5QA, for outstanding and consistent long distance work over a period of many years. (Mr. Bartlett has made more than 2,000 contacts with Mr. Parminter, ZL2OU.)

Wortley Talbot: Mr. D. N. Corfield, D.L.C. (Hons), A.M.I.E.E. Vice-President, R.S.G.B., G5CD, for outstanding experimental work on 420 Mc/s. and for many valuable contributions to the Society's Journal over a period of many years.

Courteney Price: Mr. R. H. Hammans, G2IG, for outstanding technical developments, particularly in connection with communication type receivers and switched wide-band exciters.

Founder's: Mr. J. P. P. Tyndall, G2QI, for his work in producing the R.S.G.B. Amateur Radio Call Book.

B.E.R.U. Senior Rose Bowl*: Mr. F. J. North, VP6CDI.

B.E.R.U. Junior Rose Bowl*: Mr. J. Van Wyk, ZS6QF.

B.E.R.U. Receiving Rose Bowl: Mr. B. Kendall, B.R.S.14261, and Mr. W. L. Ely, B.R.S.1535. (To be held for six months each.)

B.E.R.U. Senior Telephony Miniature: Mr. W. R. Joss, G2AJ.

Colonel Thomas Rose Bowl: Mr. W. R. Joss, G2AJ. Leading British Isles station in B.E.R.U. Contest.

N.F.D. Shield & Replica: Falkirk Group.

N.F.D. Shield Replica: Chelmsford "A."

1930 Committee: Mr. P. R. Gollidge, G3EDW. Winner of Low Power Contest.

Somerset: Mr. J. C. Foster, G2JF. Winner of 1st 1951 Top Band Contest.

Desmond: To be awarded to the winner of 2nd 1951 Top Band Contest.

Watts: Mr. S. F. Brown, G4LU, and Mr. J. Spragg, G3APY. In connection with 70 cm. tests. (To be held for six months each.)

Mitchell Milling: Mr. W. R. Joss, G2AJ. Winner of 2 Metre Contest.

1950 Council: Mr. G. T. Peck, B.R.S.15402. Winner of D/F Contest.

1951 Council: Mr. F. H. Watts, G5BM. Winner of 2 Metre Field Day.

Edgware: Thames Valley A.R.T.S. Winner of Affiliated Societies Contest.

Fergus: Mr. C. J. Spackman, G3GYQ, and Mr. P. J. Nash, G3EIX. Winners of Low Power Field Day. (To be held for six months each.)

Braaten: Mr. W. R. Joss, G2AJ. Leading English station in A.R.R.L. DX Contest.

Milne: Mr. J. Banner, GW3ZV. Leading U.K. station other than English in A.R.R.L. DX Contest.

Trophies and certificates will be presented at the Annual General Meeting on December 18th, 1951.

** Due to the risk involved in sending the silver Rose Bowls abroad, miniatures only will be forwarded to the winners. Their names will, however, be engraved on the respective Bowls.*

City and County of Bristol

THE Council, having decided that, for the purposes of representation, Bristol shall remain in Region 9, Corporate Members resident in that area are asked to note that the person who takes office on January 1, 1952, as Bristol T.R. will be responsible for R.S.G.B. activities within the boundaries of the City and County of Bristol and will, for administrative purposes, have a direct approach to the R.R. Later on, if circumstances warrant it, the Council will give consideration to the question of appointing a C.R. for the City and County of Bristol and T.R.s for specific parts of the Bristol area.

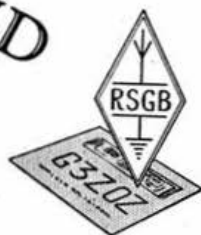
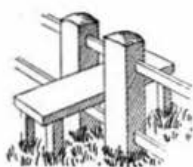
Radio Amateur's Handbook

ADVICE has been received from the A.R.R.L. that the 1951 edition of the *Radio Amateur's Handbook* is now out of print.

The A.R.R.L. regret that increased printing, paper and transportation costs force them to raise the overseas selling price of the 1952 edition to \$4.00 per copy. Orders for this edition are being accepted by Headquarters for delivery during January or February at the revised price of £1 10s. per copy post free.



THE HELPING HAND



TO AMATEUR RADIO

Part V. — Superheterodyne Receivers

The frequency changer or mixer valve is often a radio frequency pentode used in conjunction with a separate triode oscillator, the output of which may be applied to any electrode of the mixer. The point of injection must be decided by various design factors. Thus, if the local oscillation is applied to the mixer signal grid, radiation from the aerial will occur in the absence of a R.F. stage, while "pulling" between the oscillator and signal circuits may be serious. If, on the other hand, injection be made at the mixer anode, these defects will be reduced, but a larger oscillator output will be required, often possessing sufficient harmonic strength to generate whistles and other spurious signals at certain points in the tuning range.

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

Frequency Changer Faults

Some of the commoner defects which must be considered when designing a frequency changing stage are:

(1) *Interaction* or "pulling" between oscillator and signal circuits, due to excessive coupling, so that any alteration in the tuning of one circuit will tend to affect the tuning of the other. It becomes difficult to maintain the oscillator tuning at a fixed frequency separation from the mixer tuning. It should be noted that this trouble is quite distinct from the problem of arranging for the two circuits to "track" correctly, this depending on the correct adjustment of inductance and capacity in each circuit.

(2) *Radiation* by accidental or inherent coupling between the oscillator and the aerial, causing interference to neighbouring receivers.

(3) *Cross-modulation* of a received signal by a powerful unwanted transmission elsewhere in the band. This effect was troublesome when mixers were operated as detectors (the normal arrangement in early superhet receivers), but modern improvements in mixer design, coupled with operation over the straight portion of the grid voltage/anode current characteristic, have largely reduced this form of interference.

(4) *Background hiss* generated by the local oscillator, causing a decrease in signal-to-noise ratio.

(5) *Harmonics* in the output of the local oscillator, producing whistles and spurious signals due to unwanted beat frequencies.

(6) *Reduction of the oscillator output* when

A.V.C. voltage is applied to the signal section of multiple-grid frequency changers.

Types of Frequency Changer

The two valves (*i.e.*—pentode mixer and triode oscillator) are often assembled in one envelope, such a valve being called a *triode-pentode*. The insertion of an additional electrode to improve internal screening results in the *triode-hexode*—one of the most satisfactory frequency changers for short-wave operation (Fig. 1). Since the triode section is not in the direct path of the electrons as they travel from cathode to the anode of the hexode section, mutual conductance (*gm*) is relatively high, screening is good, and the application of A.V.C. voltage to the signal section does not greatly affect oscillator output.

Multiple-grid frequency changers—known as *hexodes*, *heptodes* and *octodes* (with six, seven and eight electrodes each respectively)—are widely used in broadcast receivers. While their performance is adequate on the medium and long wave-bands, screening between the oscillator and signal electrodes is, however, insufficient to avoid the troubles listed above, and in general their operation is inferior to that of the triode-hexode, or mixer and separate oscillator combination.

In receivers designed for optimum performance, the noise generated in the frequency-changing circuit may be reduced by using a triode as mixer instead of a multiple-grid valve, at the cost of lower stage gain. One source of valve noise is slight irregularity in electron flow, just as eddies in water flowing through a pipe give rise to random noise. As this effect is proportional to the valve's mutual conductance, it often happens that a valve which, on paper, has an impressive performance is often responsible for a disappointingly high level of background noise.

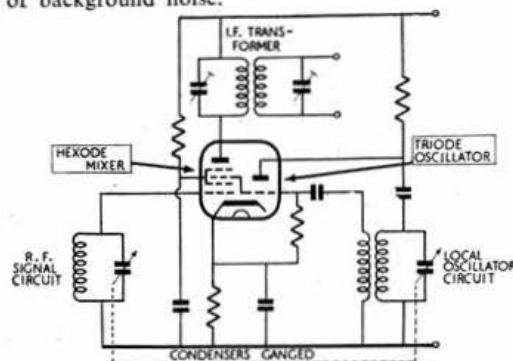


Fig. 1.

Basic circuit of a triode-hexode frequency changer

The Local Oscillator Stage

A triode valve is almost invariably used for the local oscillator. The oscillator tuning has to cover a frequency range differing from the signal circuits by the amount of the intermediate frequency. Thus, in a receiver tuning from 550 to 1500 kc/s., assuming an I.F. of 450 kc/s., the oscillator will tune from 1000 to 1950 kc/s. Except in some U.H.F. circuits, the oscillator always works on the higher frequency side of the incoming signal. Incidentally, it will be noted that the oscillator tunes through most of the 1.8 Mc/s. band, where a bunch of weak unmodulated carriers may sometimes be found which can be traced to broadcast receivers tuned to the local B.B.C. station!

The oscillator coil has fewer turns than those in the signal circuits, so that the altered ratio of inductance to capacitance necessitates special circuit arrangements in order to maintain the frequency difference of 450 kc/s. throughout the wave-band. When 110 kc/s. I.F.s were popular, the practice was to use specially shaped vanes in the oscillator section of the ganged tuning condenser, but with modern I.F.s around 450 kc/s. it is more usual to employ identical condenser sections, the necessary restriction in capacitance variation of the oscillator condenser being obtained by inserting in series with it a pre-set condenser termed a "padder." A different value of padder is required for each wave-band. Provided a suitable value of coil inductance is chosen, the padder can be adjusted so that the oscillator circuit tracks closely with the signal circuits, agreement being exact near both ends and midway through the tuning range, with slight error along other portions of the scale.

Oscillator stability is important, and is assisted by tuning the anode rather than the grid coil. Precautions must be taken to minimise frequency drift, which would entail retuning the receiver at intervals. Fortunately, materials such as ceramic have excellent dielectric properties with small coefficients of expansion, and these are commonly used. Compensation of drift may be obtained by connecting a small condenser in parallel with the oscillator coil (the trimmer setting being reduced, of course), with a temperature co-efficient equal and opposite to that resulting from other circuit components—the resultant drift with temperature then being negligible.

Double Conversion Superhets

In U.H.F. receivers, the reduction in gain resulting from I.F.s of 10 Mc/s. (or higher) may be obviated by the use of frequency changing in two steps. A first mixer converts the signal to 10 Mc/s., and after amplification at this frequency, the signal passes to a second mixer having an output around 450 kc/s. Detection and A.F. amplification follow, after the usual I.F. amplification. In practice, such an arrangement may comprise a U.H.F. converter feeding a normal communications receiver tuned to 10 Mc/s.

At frequencies higher than 100 Mc/s., it becomes difficult to obtain sufficient oscillator stability, and it may then be preferable to employ a crystal-controlled oscillator followed by one or more stages of harmonic multiplication. In such receivers, tuning is carried out in the I.F. section—which is readily achieved where a converter feeds a normal communications receiver.

Two stages of frequency changing may be found in receivers covering the usual short wave-bands, the object being to provide extreme selectivity rather than extra gain. The incoming signal is converted to 450 kc/s. (or sometimes 1600 kc/s.),

and after amplification is further converted to around 80 kc/s. At this low frequency, selectivity of the highest order is obtained. I.F.s lower than this figure are seldom employed owing to the difficulty of designing compact coils having a high "Q" in view of the large number of turns involved. On the other hand, conversion of the signal to an I.F. of 80 kc/s. in one step is not practicable owing to the excessive image response which would result, and the attendant difficulty of mixer-swamping due to the nearness of the oscillator output frequency to that of the signal.

Choice of Intermediate Frequency

The lower the frequency chosen for intermediate amplification, the lower will be the losses involved, with consequent improvement both in gain and selectivity. Present I.F.s (450-470 kc/s.) are chosen to provide a satisfactory compromise between the need for adequate gain per stage, and the necessity for ample separation between signal and image frequencies, this band of intermediate frequencies being relatively unused for transmitting (except by mobile services in coastal areas) so that danger of direct break through of interfering signals into the I.F. circuits is remote. In receivers designed mainly for operation above 12 Mc/s. image separation may still be insufficient, and an I.F. of 1600 kc/s. is often used (again in a region where few strong signals are likely to be encountered). Some loss of selectivity is involved, but this is not serious on bands above 20 Mc/s.

When considering V.H.F. receivers, a further point arises. In a 144 Mc/s. receiver (assuming an I.F. of 450 kc/s.), the percentage frequency separation of the oscillator will be very small indeed. As the signal circuit tuning will be flat, the mixer may receive an excessive input from its own oscillator, so that it is desirable to use an even higher I.F. around 10 Mc/s. at the expense of selectivity and stage gain.

The above I.F.s refer to receivers for sound reproduction. Where a receiver has to feed a cathode-ray tube for a visual display, a wide bandwidth with fairly uniform gain throughout the pass-band is essential. Bandwidths in the order of several megacycles are common, and I.F.s may need to be as high as 50 Mc/s.—a value found in some radar equipment. In such receivers no attempt is made to obtain high gain per stage: frequency response is the more important requirement, and the coupling circuits are arranged—through deliberate damping, overcoupling, or "staggering"—to provide a reasonably flat-topped response curve over the pass-band of the I.F.s.

LONDON LECTURE MEETINGS, 1951/52

All meetings are held at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2. Buffet Tea from 5.30 p.m. Meetings commence at 6.30 p.m.

Friday, November 23, 1951: **D. N. Corfield, D.L.C.** (Hons.), **A.M.I.E.E. (GSCD)**

"TECHNICAL ASPECTS OF THE AMATEUR SOUND AND VISION LICENCES."

Tuesday, December 18, 1951: **Annual General Meeting.** Followed by, if time permits, a first showing of the 1950 I.A.R.U. Congress and 1951 R.S.G.B. Convention Films.

Friday, January 25, 1952: **Standard Telephones and Cables, Ltd.**

"OVERTONE MODE CRYSTALS."

Friday, February 29, 1952: **Mullard, Ltd.**

"MODERN VALVES FOR V.H.F. WORK."

Friday, March 28, 1952:

Subject to be announced.

R.S.G.B. FIFTH ANNUAL Amateur Radio EXHIBITION

AT THE

ROYAL HOTEL, WOBURN PLACE, LONDON, W.C.1

From

to

Wednesday, 28th November, 1951 Saturday, 1st December, 1951

THE EXHIBITION WILL BE OPENED AT 12 NOON ON
WEDNESDAY, 28th NOVEMBER, BY MR. CHARLES IAN ORR-EWING, O.B.E., M.P.



HOURS OF OPENING 11 a.m. to 9 p.m. DAILY

Admission
6d.



AIR MINISTRY

The Royal Air Force

A SELECTION of the wide range of radio equipment in use in the Royal Air Force is on view. Much of the equipment will be demonstrated. Examples are shown of overall performance test sets used for checking equipment carried in aircraft. In addition, quartz crystal reprocessing techniques of the Service, as well as frequency control, calibration and pulse measuring equipment, are demonstrated. Developments in resin-moulding techniques as applied to miniature radio components form a special section.

Of particular interest is a representative display of QSL cards from Amateur Radio stations operated by R.A.F. personnel. A large world map will show the origin of these cards.

AUTOMATIC COIL WINDER AND ELECTRICAL EQUIPMENT CO., LTD.

Winder House, Douglas Street, Westminster,
S.W.1

THIS Company, which has been manufacturing test equipment for more than a quarter of a century, are exhibiting the full range of AVO electrical and electronic instruments. The Model 8 AvoMeter (the most recent model) and the AVO Electronic Test-

meter are for the electronic engineer and the laboratory worker, while the range of multi-meters are for the plant electrician.

The requirements of the electronic, radio and television engineer are met by the AVO Valve Characteristic Meter, the Wide Range Signal Generator, the Universal Test Bridge, and other electronic instruments of advanced design, including the CT.38—a 100-range Electronic Multi-Meter.

Models of the Company's wide range of coil-winding machines are shown.

COSMOCORD, LTD.

Enfield, Middlesex

COSMOCORD, LTD., who specialise in the application of piezo-electric crystals to all forms of electro-mechanical instruments, are showing a comprehensive range of Acos pick-ups and microphones, including the following: G.P.20 pick-up—for both standard and long-playing records; G.P.10—for general purposes, output being more than two volts with a needle pressure of 35-40 grammes; G.P.25—a turnover cartridge with two styli for standard or long-playing records (available at present for manufacturers only); MIC 29 and MIC 30—a hand microphone with "press to talk" switch which is arranged to make or break an external circuit in addition to switching the microphone (with either type MIC 9 inset for

Valve book of the year!



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STAND No. 15

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY LONDON, W.C.2.

speech or MIC 14 inset for music); MIC 25—a new sound-cell microphone with a flat frequency response exceeding 15 kc/s.; MIC 22—a robust high-sensitivity microphone specifically designed for public address and home recording, and the MIC 16—a high output microphone with a level response to 10 kc/s. (for many years the standard microphone for sound level and noise measurement).

Hearing-aid components are on view. Specialised microphones, including probe types, the *Acos* artificial ear, and the S.I.I. pressure standard usable for frequencies above 100 kc/s., together with a variety of vibration pick-ups, are exhibited.

E.M.I. SALES AND SERVICE, LTD.

Hayes, Middlesex

THE complete range of high grade instruments produced especially for the Radio Amateur by E.M.I. is exhibited on this Stand, together with a variety of service equipment and sound recording apparatus; a selection of high quality components and loudspeakers; and a display of television receiving aërials.

The entire range of E.M.I. amateur equipment, which includes wavemeters and grid dip oscillators for H.F. and V.H.F. operation, field strength meters, etc. is shown. An exhibit of special interest is the *Fisk Solariscope*, an ingenious aid to all short wave enthusiasts.

Tape and disc recorders of the highest quality, together with high-fidelity ribbon microphones are exhibited. Tape recording is represented by the recently announced "*Emicorda*," a high fidelity domestic tape recording and replay machine, embodying many of the latest advances in magnetic recording technique. The E.M.I. portable disc recorder—for use with lacquer recording blanks—is also featured.

Many items of service equipment with special applications in the amateur field may be seen. These include an advanced-design oscilloscope, a V.H.F. signal-strength meter, a wide-range signal generator and other accessories.

EASIBIND, LTD.

84 Newman Street, London, W.1

THIS Company are featuring the *Easibinder*, a self-binding device invaluable for Amateur Radio enthusiasts. Designed for both permanent and temporary binding of technical journals, the *Easibinder* facilitates the formation of a reference library of current magazines with no danger of lost or soiled copies. Each issue can be inserted immediately it is received, without waiting for the complete volume to be published, giving the appearance of a perfectly bound book from the moment when the first issue is inserted. Magazines are easily inserted by means of steel wires supplied with the binders, and can be removed or replaced at any time.

Easibinders are specially made for almost all radio journals, including *Electronic Engineering*, *Wireless World*, *Short Wave Magazine* and the *R.S.G.B. Bulletin*. They are supplied with titles and years in gold lettering.

ENGLISH ELECTRIC CO., LTD.

Queens House, Kingsway, London, W.C.2

AMONG the exhibits featured on the *English Electric Company's* stand is the type T.901 metal cathode-ray tube, having an overall length of 17½ in. and a diameter of 16 in. Its advantages are: robust yet lightweight construction, near-flat high-quality glass screen permitting wide-angle viewing, and short overall length for convenience of component placement and cabinet design.

Examples of the Company's range of "C" core transformers suitable for power and audio frequency usage may be seen. Made from cold-rolled grain-oriented steel having high efficiency and low iron loss, they show a saving of weight and space, and combine ease of handling with mechanical strength. A range of accessories for use with the transformers is available.

An Insulation Tester is exhibited which provides, for the first time, continuously variable voltage up to 10 kV. D.C., and has the following features—non-lethal output adjustable from 500 to 10,000 volts; measurement up to 250,000 megohms; rejection of surface leakage currents; high accuracy on comparative tests, and aural indication of ionisation.

GENERAL ELECTRIC CO., LTD.

Magnet House, Kingsway, London, W.C.2

THIS Company are exhibiting components and complete equipments.

Components shown include a wide range of *Osram* receiving and low-power transmitting valves, and cathode-ray tubes for television. There is a selection from the many crystals made by the G.E.C. and a display of small panel-mounting indicating instruments. The "Selectest" multi-range test set is featured.

Germanium diodes are on show including a modern crystal receiver using this form of rectifier. Copies of the *Osram Valve Manual*, Part I are on sale.

Complete equipments exhibited comprise the BRT.400 communications receiver, a range of G.E.C. microphones suitable for amateur use, and token exhibits from the range of G.E.C. amplifiers.

ILIFFE & SONS, LTD.

Wireless World and Wireless Engineer

Dorset House, Stamford Street, London, S.E.1

THE journals and books shown on this stand are known among enthusiasts throughout the world. They include:—

Wireless World—Britain's leading technical magazine in the general field of radio, television and electronics. For 40 years it has provided a complete and accurate survey of current technique. Of topical interest is the *Wireless World* F.M. Receiver with a tuning range of 86.5-96 Mc/s., designed for simplicity of construction and alignment, and described in *Wireless World* by J. G. Spencer of the B.B.C. Research Department. Its main features are—a thermal-compensated oscillator, precision tuning check, and provision for A.M. reception.

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The Royal Air Force urgently needs a trained reserve it can count on in an emergency. And it is men and women like *you* who must form that reserve — people who are ready to give up a small part of their spare time to training: either to continuing to fly or to doing equally important jobs on the ground. Your close association with the Royal Air Force will bring you new experience and fresh companionship. Moreover, by volunteering now, you will be showing the world that you at least are ready to face up to whatever the future holds. Post the coupon below for full details.

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Please send particulars of part-time service with the R.A.F. (*Applicants from British Isles only.*)

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(*If ex-R.A.F. or W.A.A.F. please give rank, trade and number*)

★ *If you are between 14 and 17 — and keen — join the Air Training Corps* ★

Wireless Engineer—accepted by research engineers, designers and students as an international source of information for advanced workers. The editorial policy is to publish only original work, while the correspondence columns form a recognised debating ground.

Technical Books—On show will be a variety of up-to-date books selected from the comprehensive *Iliffe* range covering many aspects of radio and television.

PANDA RADIO

58 School Lane, Rochdale, Lancs.

PANDA RADIO are showing their new self-contained PR.120V table-top 150 watt transmitter, which incorporates the latest T.V.I. suppression technique and is built for maximum operating convenience and efficiency. A black wrinkle-finished cabinet, measuring 19in. x 17½in. x 12½in., houses the R.F. unit (incorporating a high stability V.F.O.), speech amplifier-modulator unit and a combined low and high voltage power unit. Band-switched operation on 3.5, 7, 14, 21 and 28 Mc/s., using band-pass filter circuits, permits both C.W. and amplitude modulated telephony transmission on each band with maximum ease. Normal P.A. input is 150 watts for C.W. and 120 watts for telephony. Provision is made for immediate power reduction for local working and a netting facility permits "quiet" QSY. Full safety precautions are employed and power circuits are individually fused. Adequate metering and control facilities ensure correct operation of the transmitter for maximum efficiency and minimum harmonic radiation at all times. Provision is made for the use of a crystal microphone and audio gain is adequate for 100 per cent. modulation at normal speech levels at a convenient speaking distance from the microphone. Break-in telegraphy may be worked on all bands.

The transmitter is designed to work into 50 or 100 ohm coaxial cable feeder either direct into a dipole or via a suitable tuning unit to any desired type of aerial.

A four section low pass filter, giving approximately 70 db. of harmonic suppression over the television bands and designed for use with the PR.120V is also shown.

E. J. PHILPOTT'S METALWORKS, LTD.

Chapman Street, Loughborough

THE Company are showing a comprehensive range of chassis, cabinets, rack and panel assemblies. Special designs to meet individual requirements can be "made to measure" at prices comparable to those of standard design.

The extension of the television service, and the problems introduced by T.V.I., has made an ever-increasing number of amateurs conscious of the advantages of complete screening and all-metal construction. In this connection it is of interest to note that the Company hope soon to be able to offer a copper-plated type of chassis and cabinet.

Of particular interest to the amateur with existing chassis-built gear are the prefabricated end-pieces which can be used to convert the

apparatus into sectional enclosed rack design. In general, the standard lines have been re-designed to provide even smarter equipment, and the scale of prices has been maintained without alteration for four years.

RADIO SOCIETY OF GREAT BRITAIN

New Ruskin House, Little Russell Street,
London, W.C.1

Headquarters Stand

A FULL range of R.S.G.B. technical publications is displayed including the *R.S.G.B. Amateur Radio Call Book* containing details of more than 6,000 British Isles call signs, and the new booklet *Television Interference*.

The new R.S.G.B. pennants are on sale together with car plaques, badges and brooches. Orders may be placed for subscriptions to *QST*, *CQ* and *Audio Engineering*, and for a wide range of other U.S. short-wave publications. Limited quantities of the 1951 edition of the *A.R.R.L. Handbook* and the latest edition of the *A.R.R.L. Antenna Handbook* are expected to be on sale.

The current issue of the *R.S.G.B. Bulletin* is shown. Prospective members may purchase this and four recent back issues at a specially reduced price.

Also displayed is a range of modern amateur-built equipment loaned by Members of the Technical Committee and other well-known amateurs.

Of topical interest is a 75 watt T.V.I. proof V.F.O. Controlled Transmitter designed by Mr. R. L. Varney, A.M.I.E.E. (G5RV). This transmitter is to be described in the December, 1951 issue of the *R.S.G.B. Bulletin*. Mr. Varney is also showing a 150 watt T.V.I. proof Power Amplifier employing an 832 valve.

Other items on show are: a sensitive Harmonic Indicator for detecting harmonics from an amateur transmitter in the various television channels; a Noise Generator for adjusting V.H.F. receivers and measuring their noise factor; a Frame Aerial for Marine Direction Finding using a single-turn loop with step-up transformer instead of the usual screened multi-turn loop; a 2-valve transmitter for 1.8 and 3.5 Mc/s. operation employing a Clapp oscillator; a 100 watt 144 Mc/s. Transmitter employing pipe-tuned circuits to reduce radiation of all frequencies outside the 144 Mc/s. band; a 420 Mc/s. Receiver built around the BC624 (sensitivity at 435 Mc/s. better than 1 microvolt absolute, 300 ohms balanced input); a straight Receiver for the new-comer to Amateur Radio covering 1.7, 3.5, 7, 14, 21 and 28 Mc/s., full band-spread; a Band-Switched Power Amplifier for use with Wide-Band Exciter.

Members of Headquarters staff are on duty to answer questions concerning the work of the Society.

RADIO SOCIETY OF GREAT BRITAIN

Amateur Constructors' Section

THIS section is devoted entirely to home-constructed apparatus, comprising a selection loaned by London and Provincial members. The display represents the type of equipment

PRODUCTS & SERVICE

Acos research and service is devoted to the practical application of piezo-electric phenomena to all forms of acoustic, ultrasonic and vibration problems, and the number of these piezo-electric applications is constantly being added to as *Acos* research widens.

R.S.G.B. EXHIBITION STAND 12



CRYSTAL PICK-UPS *Acos* microcell pick-ups, with easily interchangeable heads to suit either standard or long playing records, represent a major *Acos* contribution to high fidelity reproduction of both types of record, as witness the number of manufacturers who have standardised on *Acos* pick-ups.

TYPE G.P.20. This unique pick-up has provision for an interchangeable clip-on head, the **G.P.19 L.P.**, which converts it into an instrument for long playing records.

The famous **G.P.15** Microcell cartridge; alternative styli and an adjustment of needle pressure convert it into an instrument for long playing records.

Both G.P.20 and G.P.15 share these outstanding advantages:—

Output 5 to 20 times greater than any comparable magnetic type. No equaliser components required. Record wear virtually eliminated. No needle talk.

TYPE G.P.12. High fidelity model incorporating the G.P.11 cartridge with permanent sapphire stylus; excellent performance; output 1 volt at 1,000 c/s.; range 30 to 14,000 c/s.

TYPE G.P.10. General purpose model incorporating the **G.P.9** cartridge with the patented unbreakable crystal assembly; output 1.7 volts at 1,000 c/s.; range 70 to 8,000 c/s.

MAGNETIC PICK-UPS

TYPE G.P.6. Good performance with exceptionally robust construction; especially suitable for tropical climates; range 100 to 4,500 c/s.

TYPE G.P.7. Pick-up head for replacing the sound-box on acoustic gramophones; same characteristics as G.P.6.

HIGH FIDELITY MICROPHONES

For acoustic measurements, industrial noise measurements, disc recording technique, and P.A. systems, also ideal for the keen amateur.

TYPE MIC.16. Incorporates the well-known floating crystal sound-cell construction; flat response from 30 to 10,000 c/s.

TYPE MIC.22. Incorporates the Filtercel insert which is more sensitive than sound-cell type; substantially flat response from 40-6,000 c/s.

Both types available with a desk stand or with an adaptor for floor mounting which will also fulfil the requirements of a hand microphone.

COSMOCORD LTD., ENFIELD, MIDDLESEX

to be found in the modern Amateur Radio Station. For convenience of viewing, the equipment is grouped under various headings.

(1) *Transmitting and receiving equipment* below 30 Mc/s. of varying design, from a "fly power" single-valve transmitter to an elaborate "all band" rack assembly with remote control.

(2) *V.H.F., U.H.F. and microwave gear*, demonstrating both the simple approach and the more difficult plumbing methods used for these new and interesting bands. Ancillary equipment for the L.F. bands (including power packs, V.F.O.'s, automatic keys, modulators, etc.) is also shown.

(3) *Test gear*, including signal generators, valve tester, valve voltmeter, grid-dip oscillator, etc.

(4) *Historical equipment* dating back to the year before World War I.

(5) *Single-sideband equipment*, demonstrating the various methods adopted by amateurs in the British Isles. The display ranges from the simple type of crystal filter to the more ambitious three-element tuned phase-shift networks. There is also a phase-shift network ratio test set, and specimens of R.F. amplifiers used with this system.

Also displayed are various audio amplifiers and sundry equipment.

(6) *Model aerial display and demonstration.*

AMATEUR TELEVISION

A complete Amateur Television Transmitter, constructed by Messrs. J. R. Erskine B.R.S.12381 and R. Grubb G3FNL, will be in operation on 435 Mc/s. Transmissions, showing various patterns, will be monitored for display purposes.

SALFORD ELECTRICAL INSTRUMENTS, LTD.

Peel Works, Silk Street, Salford 3

THIS Company are showing a wide range of quartz crystal units, radio and television cores, selenium and copper-oxide rectifiers, and a quartz crystal activity test set.

The quartz crystal units can now be supplied for any frequency in the range from 400 c/s. to 16 Mc/s. for fundamental operation. A comprehensive range of evacuated units and a complete series of hermetically-sealed metal-cased types is available, ranging from the QC329 (similar to Air Ministry 10X pattern) to the QC500 and QC510, which are the smallest quartz crystal units on sale at present. Sample units for frequency sub-standards and transmitter crystals for the amateur bands will be displayed.

The G.E.C. Quartz Crystal Activity Test Set is designed to permit the equivalent parallel resistance to be measured directly at input circuit capacities of 20 $\mu\mu\text{F}$ or 50 $\mu\mu\text{F}$. The accuracy is better than 5 per cent. for crystals having frequencies in the range 3 to 10 Mc/s., and it can be used for crystals between 1 and 20 Mc/s. at slightly lower accuracy.

The radio and television cores on show are

those immediately available from stock, but other types are also obtainable on favourable delivery terms.

TELEVISION SOCIETY

*Hon. Secretary: G. Parr, M.I.E.E.,
68 Compton Road, London, N.21*

THE TELEVISION SOCIETY, whose interests are allied in many directions with those of the R.S.G.B., is represented at the Exhibition by the Assistant Secretary, Mrs. M. Allday, who will be pleased to answer questions on the Society's activities.

The experimental model of the *Viewmaster* television receiver, which is particularly suited to amateur experimenting, will be on view. Full details of the construction of this receiver are being published later in the year.

THE SHORT WAVE MAGAZINE, LTD.

55 Victoria Street, Westminster, London, S.W.1

PUBLICATIONS of *The Short Wave Magazine, Ltd.* shown on the stand include the latest reprint of the *DX Zone Map*, and copies of all available issues of *The Short Wave Listener* and *Television Review* and *The Short Wave Magazine* for the last five years.

Catering mainly for the interests of the S.W.L., *The Short Wave Listener* and *Television Review* has covered a great deal of ground since it first appeared in November, 1946, and is invaluable to the non-transmitting amateur. With it is associated the *British Short Wave League*, publishing its own *B.S.W.L. Review* for League Members.

The Short Wave Magazine caters for the experimenter, transmitting amateur and radio engineer, and now enjoys a world-wide circulation. Its regular news-feature articles have for years set a high standard in their respective spheres, and in addition each issue always contains a wide range of contributions of technical, constructional and experimental interest. In its style and format and in the scope of its contents *The Short Wave Magazine* meets the needs of all those who wish to keep in close touch with experimental radio and amateur transmission.

WODEN TRANSFORMER CO., LTD.

Moxley Road, Bilston, Staffs

A COMPLETE range of high-quality transformers and chokes designed for both amateur and professionally built communications, television and electronic equipment are displayed. Typical examples of potted compound-filled transformers are on show, together with hermetically-sealed "C"-core types.

The Company are also displaying a full range of smoothing chokes, filament and audio transformers, and transformers suitable for television equipment, together with multi-match modulation transformers. The latter have an audio rating of 30 to 250 watts, with reasonable cut-off characteristics below 200 cycles, making them particularly suitable for communication purposes.

Calling CQ!

Calling CQ!

- RADIO AMATEURS
- TECHNICAL MEN
- SHORT WAVE LISTENERS

JOIN THE ROYAL NAVAL VOLUNTEER WIRELESS RESERVE—THE FIRST POST-WAR RESERVE FOR AMATEURS — AND MAKE YOUR HOBBY EVEN MORE INTERESTING AND WORTHWHILE.

If you are between 17 and 45 the R.N.V.W.R. can offer you ● A G.P.O. Transmitting Licence granting you your own Naval Call-sign ● A Transmitter and Communication Receiver for use in your own home when qualified ● An Allowance for upkeep of your Transmitter whether private or from Naval issue. ● Trips during the summer to Continental ports, including France, Belgium, Holland, Scandinavia and Germany. ● Annual training visits to H.M. Ships of the Home Fleet with full Pay and Expenses. ● Sport and Social Activities. ● All travelling and training expenses paid from *your home* to R.N.V.W.R. Centres and Ships. ● Free issue of uniform and kit. ● Guaranteed entry into the Royal Navy if you are a potential National Serviceman not more than 17½ or have had deferment of call-up. ● Up to £9 Bounty per year plus Efficiency Grant up to a maximum of £3.

The R.N.V.W.R.
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Write for an attractive, fully illustrated brochure

“ABOUT THE ROYAL NAVAL VOLUNTEER
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Address

Send in your application to:

The Staff Communications Officer,
Admiral Commanding Reserves,
Queen Anne's Mansions,
London, S.W.1.

Cyrenaica

DUE to the efforts of the Society, together with urgent representations made by local members in the territory, we are glad to announce that MD1 and MC1 licences are now being issued. The former for Service and the latter for civilian personnel. One of the most pleasing features of the licence is that it allows of "Top Band" operation.

U.S.S.R.

It has now become clear that Russian amateurs have instructions not to make contact with stations in this country. No cards have been received from Box 88, Moscow, since early in May of this year. We do not pretend to know the reason for this strange behaviour. It seems to be just one more curious move on the part of those in control of Russian affairs, which can do no good to anyone. Those of us who looked forward to receiving cards from countries in the U.S.S.R. will be disappointed, and it would also appear that from now on the W.A.Z. certificate is impossible of attainment.

Notes and News

Conditions for the *CQ Magazine* contest during the weekend October 27-28 were on the whole good, with a useful 28 Mc/s. opening on the Sunday morning. In the evening there was a pronounced Aurora effect with even quite local signals subject to hollow-sounding flutter fade. A curious thing was that stations to the south took up a strong echo and flutter fade with the beam pointing north. The effect disappeared when the beam was rotated to point at these stations.

IHR reports that MID, to be heard quite often, is a pirate, and that the request to "QSL via IIR" is a piece of bare-faced impudence. The only active amateur in San Marino is 11AHR/M1. Bob

* 29 Kechill Gardens, Hayes, Bromley, Kent.



VS2DD (left) and VS2CR outside the Snake Temple at Penang.

Jardine, G6QX, raised 3A2AD with HB9MA on the key on 3.5 Mc/s. and again on 7 Mc/s. 3A2AG, with F7AT in control, gave 'phone and C.W. contacts to many stations during the "CQ" contest. 'QX, who has also raised VP8AP and 8W4AF (QSL via R.S.G.B.) says VU7FK is in Bahrain, awaiting cards from the printers. Bob's post-war score now stands at 150 in 38 zones.

ZL1AH heard GW3ZV on 1898 kc/s. from 1810-15 G.M.T. on September 30 peaking to 569. He was also heard again on October 1 at R4 S2/3 T9.

G5JL, a devotee of 7 Mc/s., offers a good selection in MD2JB (7028), VK3WL, VP8AP, ZS6PM, VO2L, 4X4DK, VP4CQ (7042), SU1GB (7029), VO6L (7028), KZ5KO (7028), HK5CR (7028), HK4DP (7043) and KP4QB (7030). He also reports that VE1EA is active on "Top Band."

G6XS lists ZS4EL (14095) at 1715, EA0AD (14080) at 1800, FQ8AE, who does not QSL (14080) at 1849, CR5AD (14064) at 1750, Y13HRQ (14022) at 1615 and EQ3B (14095) at 1735. When G2MI worked EQ3B recently (T1 note), the operator said "QSL via R.S.G.B.," but when G2MI explained that he was the QSL Manager, EQ3B promptly shut down. We may therefore draw our own conclusions! "QSL via R.S.G.B." is, we fear, a cloak of pseudo-respectability assumed by quite a few pirates.

G3EYN, who has had a spell of ill-health, needs only two more cards for his W.A.E. and another 30 for DX.C.C. (Speedy recovery, OM.) Alan Heath, B.R.S.17500, of Long Eaton, recommends KG6AAE around 1600 G.M.T. on 14 Mc/s. 'phone. AC3PT at 1530 and JA2MB at 1615 are also on 'phone. XZ2ST gives his address as Box 376, Rangoon. Incidentally Alan is in the R.A.F. hospital at Wolverhampton and has his receiver by his bed. He wants to express his appreciation of the kindness of G3GBQ and other local amateurs who have given him so much help and encouragement.

Cards sent via R.E.F. to F18RO have been returned, marked "Unknown." MD2PM, who is Lt. W. J. Norris, R. Sigs., 1 Inf. Div., Sig. Regt., M.E.L., F.I., passes thanks to the many Gs who acknowledge a beginner's "QRS," and who adjust their keying speeds accordingly. G4WK (Canterbury) has just returned from a visit to Germany, where he met DL's, 1JV, 1JX, 1LI, 1OI, 1MZ and 3GO. He speaks in glowing terms of the kindness and hospitality shown to him and comments on the beautifully made home-built gear he saw.

Bob Pybus is quite enthusiastic over 28 Mc/s. On October 5 he heard all continents in about 2½ hours. VK2AJQ, VK9GW, KG6AAC and KR6FJ were first in, then a good show of Africans with some Europeans about 1300 G.M.T., followed by KP4's, PY and W's later in the afternoon. Anyone needing a QSO with Paraguay is referred to ZP4BB, who speaks English and QSLs. TA2EFA is Lt.-Cmdr. Sturkey (W2EFA) in Ankara. Cards will be coming soon. ZS7C and ZS9G are both active on 28.

G8PB recently bagged VK6RU on 28. On 14 his best were DU1MB (14130) at 1525, for his first G, VU2JG and VP9HH. On 28 Mc/s. C.W. his log includes VP7NM, PY4AJD, KP4KD, PY6DU, LU3DD and PY2AQ.

From G2BSA and B.R.S.15846 we learn that VQ4RF, VQ3PBD and W5HBM plan to operate in Zanzibar for a week, beginning November 24. At least two calls will be on the air, probably VQ1RF and VQ1PBD, with both 'phone and C.W. on 10, 20, 40 and possibly 80.

ZE4JG mentions KG6USA, 1355 G.M.T., ZS7D at 1350 and CR9AF (14100) at 1450. His name, by the way, is Joao, not Joa.

Some good news comes from GD3UB—an order has been placed for 15,000 cards!! This winter Vic and his daughter will get down to the job of bringing the QSL position right up to date.

B.R.S.250 (Thornton Heath, Surrey) says VK1KJ (Heard Is.) is active on 14100 kc/s. around 1630 G.M.T. His name is Kevin. KM6AX (14080) has been heard at 0715, input 400 W.

B.R.S.15846 (Camberley) says HS1UN remains an excellent signal on 14150 C.W. All cards come direct air mail from U.N. H.Q. in Bangkok to R.S.G.B. VS7DB says G3EET—reported on his way to Singapore—never got that far; instead he is now waiting for a VS7 call and with the help of 'DB hopes soon to be on the air.

G2HKU (Sheerness) is at last in sight of getting A.C. mains. His recent DX includes FQ8AE, VK5DR (Cape de Couedie lighthouse on Kangaroo Is.), FK8AL, KG6ABE and HP1LA have been heard; the first two were contacted. On 7 Mc/s. VE, VK, YU and ZL have been worked.

DL2RO entered the low-power test and contacted 85 British stations with under 2 watts input to a V beam. During the tests, he also worked VE1JD. Other 3.5 Mc/s. contacts have been with EA0MI, FA8DA and 4X4RE. On 14 Mc/s., CR8EA, CR9AF, JA8OT, HS1UN, OX3GG, ZS3E and PK5AA are among the best. G3AMM received his card from VK1RD after only six months. The operator was VK5RD. He now has 126 confirmed. B.R.S.7594, of Yeovil, says MS4A is now back from a stay in Italy. The appeal for a card from ZB2A last month should have been for G3CMH, not GMH. His log for the month includes CR6CC (14205) at 1750, JA2MB (14185) at 1300, JA2MM (14257) at 0715, CP5EQ (28485) at 1818, MP4KAG (28285) at 1415, ZP4BB (28450) at 1750.

G6XS lists VS2CR (14100) at 1600, FQ8AE (14100) at 1715, CR7AS (14050) at 1700, CR7AF (14100) at 1700, LZ5LL (14080) at 1717 (looks rather improbable), FR7ZA (14025) at 1722 (who says his spot frequencies are 14022, 14116 and 14320), FK8AC (14012) at 0750, and ZA3XL (14090) at 0837 (QTH Box 83, Tirana). The spate of queer-sounding ZA's now active rivals the one-time excess of phoney Andorrans!

A1193 (Cambridge) remarks how carefully PY2CK and IT1THP make out their cards and wishes some of the others were as painstaking.

W2GT has heard ZD1AN and FQ8AK; these latter seem to be creeping up the alphabet quite quickly. FF8AG is ex-FQ3AT/FE8AB/F3AT. He says CR8A is on 14068 at weekends from 2100. W2SNZ has worked SV9RP.

In a long letter, HZ1HZ says that HZ1TA's QTH is now in Mecca. HZ1HZ cards have been sent out as QSLs for HZ1AF QSOs until cards are received from the printers. All contacts with HZ1HZ have now been QSL'd. A large batch which arrived with his letter brings them up to date.

B.E.R.S.195 says VR2CG worked OZ8SS recently at 1815 G.M.T. Most of the operators of

VR2A and B calls have now left Fiji. The same call is never re-issued. Eric's XU6F card came from Hong Kong, but the operator gives his QTH as Canton. G3HMZ is now VK3AMZ, but is not yet active. He has called on some of the VK3's and sends 73 to the N.W. Kent amateurs. B.E.R.S.195 now has 199 countries confirmed. He received a card recently from YI2AM, who is W3ACE.

Who's Who

VK1BS is on Macquarie Island and says VK1WO will be starting up fairly soon. The former is active about 0800 G.M.T. VK3XK is now VK9XK at Samarai Island, Papua, and is active at midday our time on 14 Mc/s. VK9MR is now back as VK3AMR.

AP2N (G4GB), H. Hardy, Palace Hotel, Karachi—the only active amateur in Pakistan—says that a CQ call brings a positive avalanche of replies. His other trouble in life is the fantastic price asked for radio gear. Something second-hand and broken costs more than the same item brand new in this country. 8W4AF, according to G6XS, can be reached c/o Master of Harbourage, Port of Mocha, Yemen. We are advised by the Nigerian P. & T. Dept. that all two-letter ZD2 calls are unlicensed.

Senor Jose Alvarea Alarcom, EA5DG, Apartado Postal 98, Cartagena, Spain, would like to correspond with a British amateur with a view to mutual improvement of the knowledge of each other's language. He is a pharmaceutical chemist by profession. If anyone would like to do so, please write to him direct.

ZD2FFB is Mr. F. F. Brewer, S.W.S.S. Posts and Telegraphs, Enuga, Nigeria, and will be active soon.

ZE4JG, brother of G3FKE (Bob Honey of ST2AM fame), who is due to return to England at the end of this month, will be pleased to give a ZE contact to anyone, up to that time, between 1900 and 2100 G.M.T. Please, not Saturdays—as this is reserved for G3FKE.

ZC4DT (ex-VT1AC/MP4KAA) says Cyprus is certainly a pleasant change after the barren wastes of the Persian Gulf! He has also some kind remarks to make about the R.S.G.B. QSL service, which are much appreciated.

From EK1RR and EK1CW comes the latest information on licences there. All amateurs in Tangier have now applied for the new licence which, it is said, will carry a CN2 call. It should be noted that EK cards are still acceptable by A.R.R.L. for D.X.C.C. EK1CW hopes soon to be on the "Top Band" when he can get the necessary bits and pieces. The new licence will probably be for 100 watts and will cost about £2.

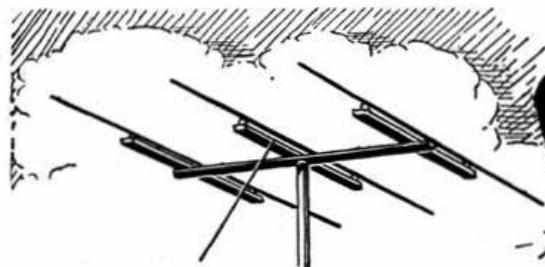
Channel Islands

Will members in the Channel Islands please note that their QSL Bureau sub-manager is now Mr. E. Bright, G3JW, Crockswell House, Exminster, Exeter, Devon? Many thanks to GC8NO for carrying the job so long, together with his many other duties.

Duke of Edinburgh Now Honorary Member of Brit.I.R.E.

HIS Royal Highness the Duke of Edinburgh, K.G., F.R.S., has honoured the British Institution of Radio Engineers by graciously accepting Honorary Membership.

The Duke's recent Presidential Address to the British Association indicated his wide interest in applied science. He accepted Fellowship of the Royal Society earlier this year, but the Institution is the first of the other learned societies to be so honoured.



AROUND THE V.H.F.'s

European 2 metre DX Record Broken.

First G/PA and G/ON Contacts on 70 cm.

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

TWO outstanding feats have recently been performed on the V.H.F.'s: firstly the European 2 m. DX record was broken, when G5YV (Leeds) contacted F8MG (Arcachon, Gironde), and secondly, G3DIV/A (Eastbourne, Sx.)—who only last month made the first 70 cm. QSO with France—added two more countries to his bag on that band by exchanging signals with PA0PN and ON4UV.

At 1845 G.M.T. on October 9, G5YV called CQ with his beam firing due west and heard F8MG replying to him with an RST 579 signal on 144.15 Mc/s., the strength remaining the same while the beam was swung through south to east. The French station reported his signals as RST 589. G5YV has since received confirmation of the contact from F8MG, who is situated 10 miles S.W. of Bordeaux, giving the distance as 635 miles. It appears that 'MG heard several G stations apart from G5YV, who was first received at 1630 G.M.T., but could only read G2FTS (near Hailsham, Sussex).

Immediately after this contact, and almost on the same frequency, G5YV heard weak signals from SM6QP (Gothenburg), but was unable to raise him before he faded out.

F8MG was logged at the writer's station—incidentally, by the XYL!—at 2100 G.M.T. on October 10 at RST 53/49. It would be interesting to learn whether he has been received in other parts of the U.K.

So far as the 70 cm. contacts are concerned, the distances are not so great as have been covered on several occasions between stations operating in this country, but to the radio amateur the lure of new countries is ever present, and we offer our warmest congratulations to all concerned.

On October 15, G3DIV/A found 2 m. conditions to be exceptionally good towards the east, and during a QSO with ON4UV (near Mons), at 180 miles, the latter suggested a test on the 70 cm. band. G3DIV/A changed over and was heard by ON4UV at RST 459 with fading to S2 at 2130 B.S.T. 'DIV's 70 cm. signals were also heard by PA0PN (Middelburg), 160 miles, who immediately went over to 70 cm. and established contact at 2150 B.S.T., giving a report of RST 579. The Dutch station was received at RST 578 on 434.8 Mc/s. while ON4UV, on 434.75 Mc/s., was RST 559 with some fading. Signals from PA0PN rapidly increased in strength, as did '3DIV's, until he was louder than a "local" at eight miles. On finishing the QSO with PA0PN at 2210 B.S.T. G3DIV/A was called by F8JR (Lille), 120 miles, who was RST 569 and gave the Eastbourne station 589. 'Phone contact was then made with ON4UV whose signal strength had, by that time, improved considerably.

On the following evening G2FKZ (London,

S.E.22), worked PA0PN, the latter's 'phone being heard at R5 S9 in Eastbourne. It is understood that G2DD (Stanmore) heard PA0PN on the 16th, but in the excitement he omitted to connect the aerial to his transmitter and by the time this had been remedied PA0PN was already in QSO with G2FKZ.

The receiver at G3DIV/A comprised a 12AT7 push-pull e.g.t. R.F. stage link coupled to a cavity-tuned CV 102 crystal diode mixer. The final stage of the transmitter was the popular 832 tripler and the aerial array an 8-element stack.

The Two Metre Band

The past month has, generally speaking, been exceptionally good for 2 m. work, and from all parts of the country come reports of the high state of activity which took advantage of the conditions. It would be impossible to quote all the excellent work which has been going on, although much of it would have made headline news only a year or so ago, so rapid has been the advance in V.H.F. technique. An attempt will be made, therefore, to give a general impression of what went on. To those contributors who are not specifically mentioned we extend our thanks for assisting with the general picture.

OZ2FR and OZ2IZ figure in many logs, and G3EHY's contact with the latter almost certainly is a present record for 2 m. 'phone working with a distance of 580 miles. Other 'phone contacts by this Somerset station include GM3BDA (325 miles) and G13QGB (270 miles).

An interesting example of aurora reflection took place on the evening of September 25. GM2DRD (Forfar) heard G3EHY at S6 and T2 when beaming northwards into the aurora. It is understood that GW5MQ heard G4HT (Ealing) apparently coming from a northerly direction, and a listener in Bournemouth overheard a QSO taking place between G4LX (Newcastle), and a station in Aberdeen. G4LX was also heard by G3DIV/A on the same evening, whereas he had never before heard any station in that direction more distant than G3COJ (Hull).

Good as September had been, October was at times even better. G6LI (Grimsby) found that the three weeks up to October 16, when a cold northerly airstream ended the series of bright, warm days and covered the majority of the country with fog, followed this pattern: signal strength rose sharply as the sun went down, with local stations up to 75 miles away coming in at very great strength. This build-up continued for an hour or so until most of southern England was audible with Midland stations at moderate strength. Then, from about 1900 B.S.T., a fade set in leaving certain areas still receivable at good to very good strengths. During that period, which could last for several hours, the DX came in in short bursts, and, in order to make contacts, short calls—and QSO's—were necessary.

* 32 Earls Road, Tunbridge Wells, Kent

At 2015 on October 8 OZ2FR and OZ2IZ suddenly appeared on the band in Grimsby at great strength on 'phone. On the 15th, during a foggy evening, G6LI worked G3FZL (London, S.E.22), at 1800, heard PA0AJA and PA0FC at 1930 and worked G6LL (Cuffley, Herts.) and PA0TG. On the next evening ON4BZ was the sole representative of his country on the band, and provided a tremendous signal. A certain number of PA0's were also audible. A CQ DX call to the north east brought back SM7BE (Lund, nr. Malmö) at S7 with an S8 report for 6LI. Stations were also heard calling SM6QP, but it is not clear whether this station was worked. OZ2IZ was S8 on 'phone at 2035 B.S.T.

It has been noticed by G6LI that on many occasions continental signals have passed over Lincolnshire without "touching down" there; this applies particularly to signals from Germany. G5BD, who is on the coast, often hears them some 20 minutes before they are audible at 6LI.

G3WW (March, Cambs.) appears to have worked most of the DX available, assisted by his new beam—now more than 60 ft. above ground—and improvements to his receiver. He worked, among others, on the 8th, F3DC, 8MX, 9MX, PA0AD, 'FB, OZ2FR and 2IZ, all round the S7/8 mark. Next day OZ2IZ was contacted again and said that OZ5AB and SM6QP were active. October 15/16 yielded many G signals as well as F9MX, ON4BZ, 4HC, OZ2FR, 2IZ, PA0AD, AJA, BAL, EO, FC, LDG and OWI.

F8XT (60 miles North of Bordeaux) reporting via G2RO on 7 Mc/s., heard a number of G stations on 2 m. during the evening of October 8. The figures following the call sign indicate the time of reception. G2WJ (2120), 3FIH (2143), 3GDR (2220/7), 5NF (2210/7), 5UF (2144) and 8IL (2120). F8XT intends to be radiating on 2 m. in the near future, but meanwhile will reply on approximately 3.6 Mc/s. to calls made to him on the 2 m. band. EI2W (Dublin) made the first EI/GC contact on October 8 by working GC2CNC (Jersey) on 'phone at 2209 G.M.T. He finds that his 12-element array, consisting of six half-wave dipoles backed by six reflectors and fed with 300 ohm line, gives the best results of any beam so far tested. EI2W worked GM3BDA, GM3DIQ, GM3EGW, GM3FOW and GM6WL, the latter employing an indoor aerial. His best GDX so far is with G2UJ.

Two Metres in Scotland

GM3EGW (Dunfermline) has been carrying out tests with G4LX (Newcastle), and although the latter station runs no more than 20 watts to an indoor Yagi beam, signals have been getting through regularly even when conditions have been poor. Considering that the path from Newcastle passes over some very difficult country from the V.H.F. point of view this experience just goes to show that 2 m. communication is far more reliable when put to the test than many think from casual operation on the band.

G3VM (Norwich) was worked by GM3EGW on September 21 at a range of over 300 miles, and GM2FHH (Aberdeen) worked G3BW (Whitehaven, Cumb.) on September 9. By beaming on the Aurora G4LX was contacted by 'FHH on the 25th, and it would appear that this was the QSO overheard by the listener in Bournemouth previously mentioned.

Comments

EI6A (Wicklow), 30 miles south of Dublin, hopes to be active on 2 m. shortly, and being on the right side of the Wicklow Mts. should be a good signal in this country. G3BK and 3WW each worked seven countries on October 8/9. The latter station made 132 contacts during the European V.H.F. Contest, but considered that the period of the test was too long. As an indication of present activity, G3EHY worked more than 100 different stations in the six weeks up to October 18. HB1IV was heard by ON4BZ calling CQ every 10 minutes during the contest, but apparently only worked two comparatively local DL's. GC2CNC was received by GI3QGB (Belfast) during the former's contact with EI2W.

PE1PL

This unusual Dutch call has been fairly prominent in the lists of calls heard recently. G2XA, during a recent visit to Holland, met PA0BK who is running this station at The Hague. The frequency is 144.0 Mc/s. and signals are radiated daily between 1230 and 1530 G.M.T. PA0BK would welcome skeds. with British stations willing to co-operate in a study of propagational conditions.

Aerial Direction and DX

An interesting point is raised by G3EHY regarding the apparent broadening of the horizontal directivity of beam aerials under certain conditions on 2 m. It has been noticed on several occasions when beaming east that stations in the Manchester and Birmingham areas have replied and it has been possible to work them with the beam anywhere between east and north. As mentioned elsewhere, G5YV experienced complete loss of directivity during his recent record-breaking QSO with F8MG. Similar effects, although not quite so pronounced, have been observed by the writer when working French stations, the signals having to come over a hill 4-mile away and some 100 ft. higher than the aerial. This has always been put down to the incoming ray, after refraction, striking the aerial at a near-vertical angle. Views and comments on this subject from other readers would be welcomed.

Two Metre F.M.

Taking advantage of the recent concession by the G.P.O., G8DM (Shrivenham, Wilts.) is now operating on 144.78 Mc/s. using N.B.F.M. The transmitter is crystal controlled, starting with a 1005.4 kc/s. crystal and employs a modified Armstrong system. The final is at present an 829B tripler producing some six watts of R.F. in the aerial. The station has only been in operation for a short time but already some very favourable reports have been received.

The 70 cm. Band

The skeds. between GW2ADZ, G4LU (nr. Oswestry), G2FKZ and G3FZL (both in South-East London), are now running quite consistently, signals being sometimes better than on 2 m. over the 165/170 mile path.

In order to combat the difficulty of searching a wide band of frequencies on 70 cm. with the possibility of missing weak signals, G8DM suggests that stations should operate between 433.5 and 436.5 Mc/s., a range in harmonic relationship with the new 2 m. F.M. band of 144.5 to 145.5 Mc/s. This, he points out, would ease the problem of efficient converter design as well as making the finding of stations easier.

Amateur Radio and the Festival of Britain

Nine Thousand at Ilford—Royal Visitor at Woolwich

Ilford Arts and Crafts Exhibition

AMATEUR Radio was well to the fore at the Ilford Arts and Crafts Exhibition held recently at Ilford Town Hall as part of the Borough's Festival of Britain celebrations. The Radio stand—which featured an amateur station—was organised by the Ilford R.S.G.B. Group and the Ilford Radio Society, who did everything possible to make the 9,000 visitors to the Exhibition more conscious of the amateur movement.

Approaching the Town Hall, it was impossible to miss the special towers erected on the roof of the building. These carried the station aerials, and the mystic letters R.S.G.B. and, being illuminated at night and nearly 130 ft. above the ground, they could be seen for great distances.

In order to popularise the Exhibition, a mobile transmitting unit—operating under the call G8TL/P—toured the locality, maintaining telephony contact from fixed sites with the main station. This unit comprised a luxurious caravan in which was installed a portable transmitter and receiver. Public address equipment was also used to good effect.

In the entrance hall a complete Field Day station was erected. Inside, prominently displayed on the large stage was the main stand, in the centre of which was installed the transmitting station G3CVN/A, operating on 180, 20 and 2 metres. On either side of the transmitting booth were arranged exhibits made by local members. Transmitting equipment on show included an all-band 150-watt transmitter, two V.H.F. units for transmitting and receiving on 144 and 420 Mc/s. (centre), and no less than three "Top Band" transmitters of various vintages (right).

A special feature of the Ilford Radio Society Exhibit was Mr. Largen's unique collection of valves, many of great historic interest. There were also shown many other historic items including licences issued prior to World War I.

In common with many other similar exhibitions, the problem of QRM loomed high, and this was not helped by the fact that the only available supplies were D.C., necessitating the use of converting equipment. By erecting a coaxial aerial

feeder for the AR88 receiver, it eventually became possible to work some of the local stations who willingly co-operated to make the Exhibition outstandingly successful. To those who called in vain, the organisers can only plead that, due to circumstances beyond their control, only S9 signals could be worked.

In conclusion, recognition is made to *British Insulated Callenders Construction Co., Ltd.*, for the loan of the aerial towers; *Brady's Motors* for the loan of the caravan and car; members of the 4th Goodmayes Senior Scout Troop who erected the masts and generally assisted on the stand; "Lofty," who piloted the caravan so willingly in his leisure time, and—finally—those who gave of their time and energy in erecting, operating and dismantling the stand.

The Woolwich Festival Exhibition

AN Amateur Radio station was last month honoured by a visit from Her Royal Highness Princess Margaret. The occasion was the opening of the Woolwich Festival Civic Week and Exhibition at the Town Hall, where a radio stand, featuring an amateur station operating under the call signs G3EIW/A and G3FRB/A was organised by the Woolwich group of the R.S.G.B. The Princess was graciously pleased to take an interest in the exhibits on the stand, and in the work of the R.S.G.B. as a whole.

The transmitter, built by G3FRB, was that used at the "B" station during N.F.D. and comprised a Clapp V.F.O., followed by two buffer stages driving an 813 with an input of 120 watts, modulated by a pair of 830B's. The aerial for the transmitter was a 66 ft. Zepp, stretched across the main road; and for the receiver—a 132 ft. long wire with a remotely controlled tuning unit situated on the roof. Separate transmitters were used for "Top Band" and two-metre operation. Unfortunately, owing to the consistently high level of electrical interference, activity was confined to 40 and 160 metres, but in spite of many difficulties, a satisfactory influx of QSL cards from all parts of the British Isles was maintained.

A "roving microphone" in the capable hands of



ILFORD FESTIVAL EXHIBITION

A corner of the highly successful exhibit staged by the Ilford R.S.G.B. Group and the Ilford and District Radio Society at the Ilford Festival of Britain Arts and Crafts Exhibition. The Exhibition was opened by the Mayor of Ilford on September 22, 1951

G8LN proved to be a popular feature of the show. Other items of great interest were a small electrical computer built by Mr. Davis (B.R.S.41), a 1910 vintage Marconi spark transmitter and a "fly power" transmitter and receiver which would fit comfortably in the palm of the hand, constructed by G3HRC.

The organisers would like to thank the many amateurs and short wave listeners who returned QSL cards by first post, enabling a brave show to be made on the front of the stand, and also those who did so much to make the Exhibition a success—G3EIW, G3FRB, G3GEV, G3HRC, G3DON, G8LN, and Messrs. W. Halls, J. Parker, R. Baker and R. Mundon.



Close-up view of the Amateur Radio Station G3CNV/A, at the Ilford Exhibition, showing, left to right, G3CNV, Miss M. Roberts, G2BRN, and G3BTM (operating).

London Lecture Meeting

ABOUT 50 members were present at the inaugural meeting of the autumn-winter session held at the Institution of Electrical Engineers on Friday, October 26, to hear a lecture on Amateur Television by Messrs. J. R. Erskine, B.R.S.12381 and R. Grubb, G3FNL.

The Chair was taken by Mr. D. N. Corfield, D.L.C.(Hons.), A.M.I.E.E., G5CD (Vice President) who had the support of Messrs. A. O. Milne, G2MI, L. Cooper, G5LC, T. L. Herdman, B.A., G6HD, W. H. Allen, M.B.E., G2UJ (members of the Council) and Messrs. J. W. Mathews, G6LL and H. V. Wilkins, G6WN (Vice Presidents).

A vote of thanks to the lecturers was ably proposed by Mr. Douglas Walters, G5CV.

East London District Meeting

TWO hundred people, including members of the East London District of the R.S.G.B. and the Ilford and District Radio Society, met on September 23 in the Lambourne Room, Ilford Town Hall, to hear Captain P. P. Eckersley speak on "Two Emma Tocs and All That." The occasion was the opening meeting of the East London District new winter season.

Captain Eckersley, at one time Chief Engineer of the B.B.C. and the voice behind 2LO, reminisced entertainingly about the days when he fulfilled the combined functions of pianist, entertainer, and technician. During his talk he made an appeal for freedom of radio as a parallel to freedom of the press, maintaining that broadcasting stations should become "newspapers of the air," providing a wider range of programme service.

It's Topical

A NEW form of piracy—namely, the interception of police messages on short wave radio by over-zealous newspapermen anxious to obtain early news of the latest crimes—was the subject of a recent article in *World Press News*. The practice is not extensive, but its importance can be judged by the fact that the Post Office has taken the matter up with the Newspaper Proprietors Association—the point being that the unauthorised interception and publication of such messages is illegal under the Wireless Telegraphy Act. The official view is that it is not a matter of Amateur Radio listeners with a keen news sense picking up the news and selling the story; it is a matter of newspapers listening themselves—a dangerous practice that might eventually undermine public confidence in special short-wave intercommunications if privacy is lost.

Latest YL to take out a call is Verna E. Stent, of Staines, Middlesex—now **G3HUH**. Verna became interested in Amateur Radio about three years ago, through listening to 40 m. signals on a domestic receiver. She took a postal course in radio, and plucked up enough courage to join the Hounslow and District Radio Society—thus becoming the only YL member. She has constructed a number of receivers, including a crystal set which gave enough output to work a loud-speaker! The station at G3HUH, which is not yet complete, comprises a transmitter under construction (6V6 oscillator and 6L6 P.A. for 80 m.), two receivers (a BC454 and a Japanese model), and a 68 ft. centre-fed aerial. She considers Amateur Radio as something of a busman's holiday, as during the day she is continually speaking to people via a microphone—at a telephone exchange!

A seasonable suggestion is made by **Centre Tap**, writing in his regular column in *Radio Constructor*, who thinks that the **R.S.G.B. Call Book** will make a very acceptable Christmas present for overseas amateurs. Provided a corner of the envelope is cut away to reveal the contents, book postal rates are available, the cost being relatively small. Hundreds of amateurs all over the world exchange small gifts at Christmas, and a Call Book is a useful and inexpensive addition to that December shopping list!

The apparatus used in recent experiments to determine the true **speed of light** is now on show at the Institution of Electrical Engineers, London, W.C.2. The exhibit consists of a cavity resonator in which a radio wave is reflected backwards and forwards between the two ends. When the time of travel equals the time interval between successive waves, they build up to an electrical resonance which can be detected with high precision. The apparatus can be operated by visitors, using an oscilloscope as a monitor. The equipment will remain on view until November 30.

Listeners and viewers who complain to the G.P.O. of **interference** to their reception will in future be given a pamphlet which tells them how they can make a few simple tests to ascertain whether the trouble is due to a faulty receiver, or an inefficient aerial and earth system. If the interference is found to be of external origin, then a form at the end of the pamphlet may be completed to enlist the aid of the G.P.O. It has been found that many complaints of interference are due to receiver, aerial, or installation faults, and it is hoped that the new pamphlet will appreciably reduce the number of calls made on the **Interference Investigation Service**.

Around the Regions

Meetings at Plymouth, Tunbridge Wells and Derby

The South-Western Hamfest

In perfect weather, more than eighty members from Region 9 gathered together at the Continental Hotel, Plymouth, on Sunday, October 7, for the South-Western Hamfest. Headquarters was represented by the General Secretary (Mr. John Clarricoats) and the Assistant Secretary (Miss May Gadsden). Other guests included the R.R. (Mr. H. Bartlett, G5QA), and the C.R. for Devon (Mr. G. Wheatcroft, G3HMY).

A display of equipment, including a home-built wire-recorder, claimed the attention and interest of

B.E.A. generating station and the Plymouth B.B.C. transmitter and studios. Tea was followed by a technical quiz for a silver cup presented last year by the R.R. The quiz was won by a team from Torquay. The final events on the day's programme were the draw (surely everyone, including the twelve ladies present, must have won at least one prize!); a general quiz; and the long-awaited talk and demonstration by Mr. Harold Jones (G5ZT/T) on his home-built closed circuit television equipment.

Thanks are due to Messrs. Bartlett and Wheat-



The South-Western Hamfest, held at the Continental Hotel, Exeter, on Sunday, October 7, was attended by more than 80 members and their ladies. In this group photograph can be seen in the front row: G2GK (T.R., Torquay), May Gadsden (Assistant Secretary), G5QA (Region 9 Representative), G6CL (General Secretary), G3TX (T.R., Plymouth), G3HMY (C.R., Devon) and G3GOX.

the visitors—as also did the display of prizes provided for the draw. Lunch was served in the pleasant surroundings of the Ballroom, during which Mr. Wheatcroft offered a number of informal toasts. Responding to a formal toast to the Society proposed by Mr. Bartlett, the General Secretary spoke of the present trends and future prospects of Amateur Radio.

After the official photograph had been taken, the party split into two groups for visits to the local

croft for their help in organising the event, to Mr. Jones for the work involved in rebuilding his TV gear in time for demonstration at the meeting, to the Committee and all who attended for their co-operation and support, and to the following manufacturers who donated such excellent prizes: Mullard Ltd., Westinghouse Brake and Signal Co., G.E.C. Ltd., T.C.C., Standard Telephones and Cables Ltd., British N.S.F., Multicore Solders, and the Erie Resistor Co Ltd. J.E.

The South Eastern (Region 8) Official Regional Meeting was held in Tunbridge Wells, Kent, on Sunday, September 30. The R.R. (G3DJD) is seated next to the President in the front row. Others in the group include G2UJ, 4DC, 4KD, 5LC (representing Council), G6CL, G5BS and G6NU.



Tunbridge Wells O.R.M.

THE attendance at the Region 8 O.R.M. held on September 30, 1951, was disappointingly small having regard to the large number of members living in the vicinity of the venue. Only seventeen members and four ladies were present to greet the six members of Council and the General Secretary. However, those who did turn up were able to enjoy a very pleasant day with ample good spirits and a friendly feeling reminiscent of many pre-war meetings.

The lunch was good and the party was enlivened by the efforts of Mr. P. W. Winsford, G4DC, who acted as unofficial toast master, ably backed up by the President (Mr. W. A. Scarr). After lunch, photographs were taken in the grounds and members then assembled for the business meeting, which lasted until 5 p.m. Many matters of interest were discussed and it was possible to clear up one or two doubts in the minds of some members. Among those who spoke were the President,



Examining the Amateur Television equipment demonstrated by Harold Jones (G5ZT) at the Devon Hamfest, are (left to right), G3TX, Miss Gadsden, G6CL, G5QA, G3HMY, G2CK and G5ZT.



The East Midlands (Region 4) Official Regional Meeting was held in Derby on Sunday, October 14. In the front row, extreme left: G2DTQ (acting R.R.), sixth from left, Miss May Gadsden, followed by the President (Mr. W. A. Scarr, G2WS), G5LC, G6CL and G2UJ.

Messrs. Cooper, Winsford, Herdman, Thoregood, and Clarricoats, each of whom dealt with various aspects of the Society's affairs.

After tea a raffle was ably conducted by Mr. W. Nutton, G6NU, and the meeting was concluded by an amusing talk by Mr. C. S. (Pim) Bradley, G5BS, on his early experiences of radio. His remarks brought nostalgic memories to some of the old-timers, and were of great interest to some of the younger and less experienced members. He concluded with some forthright comments on present-day Amateur Radio and on matters that affect the hobby. The meeting closed at 7 p.m. R.J.D.

Derby O.R.M.

THE first O.R.M. held in Region 4 since 1949 took place at the Grandstand Hotel, Derby, on Sunday, October 14, 1951, when 54 members and their ladies attended to greet the Headquarters

delegation, consisting of the President (Mr. W. A. Scarr, G2WS), Messrs. L. Cooper, G5LC, and W. H. Allen, G2UJ, representing Council, the General Secretary (Mr. John Clarricoats G6CL) and Miss May Gadsden.

The hour before lunch afforded many opportunities to meet old friends and make new ones. There was also time to inspect the station set up by the R.N.V.(W.)R. and the display of specialised metal-work for the amateur arranged by Mr. L. J. Philpott, G4BI. Official photographs were taken during this period.

After lunch, the party was officially welcomed by Mr. Arthur Goode, the C.R. for Nottinghamshire, acting as R.R. during the illness of Dr. E. S. K. Vance. During the business meeting, presided over by Mr. Scarr, members of the Headquarters' party spoke on various aspects of the Society's activities. A general discussion followed. The meeting closed with a vote of thanks to the Derby members responsible for organising the event, to which the Derby T.R., Mr. Charles Drinkwater, replied briefly.

After tea, Mr. J. Spragg, G3APY, lectured on transmitter and receiver design for 70 cm operation, and demonstrated his latest equipment. The meeting was brought to a close by the drawing of the usual "swindle," those not successful at winning a prize being presented with an insulated screwdriver or a "High 'Q' Litz-wound inductance" as consolation. C.D.



Old timers at the Derby O.R.M. Left to right: G8QZ, 2DLJ, 2WS, 4CO, 6CL, 6CW, 5LC, 6MN

VIVE QRP!

Low Power Contest a Great Success

TWO thousand QRP contacts in twenty-three hours! Such was the achievement of the thirty-seven stations who, with a combined peak input power of just over fifty watts, entered for the 1951 Low Power Contest on October 6-7. Should anyone still be inclined to doubt the communications-value of these fly-power contacts it is worth recording that the Contest Committee found a standard of accuracy in the log-entries that compares most favourably with those of higher power events.

To qualify for the maximum scoring rate, more than half of the stations operated for at least part of the time with inputs of 500 milliwatts or less. Indeed G6ZN, winner of the 1947, '49 and '50 events, made use of this year's contest to provide an outstanding example of real "QRPP." With 36 volts on the anode of a PM202 Hartley oscillator, his input never exceeded 72 mW, and for much of the time was only 27 mW! Yet in a restricted operating period, he made 45 contacts in 30 counties, his incoming signal strength reports averaging S 4.6.

Leading Stations

This year the victor—by a clear margin of over 100 points—is Mr. P. R. Golledge, G3EDW of Rayleigh, Essex, who is seldom far down the list but who has never before managed to secure a leading position. His 101 contacts, 91 of them made with less than 500 mW., were with stations in 37 counties, giving him a total of 2285 points. The equipment at G3EDW comprised: transmitter, EF50 Clapp oscillator, 6SH7 frequency doubler and 6AG7 power amplifier; receiver, R107; aerial, 134 ft. top, 35 ft. high, fed at 44 ft. from one end with 90 ft. of 300-ohm twin feeder.

While '3EDW snatched a four-hour rest break, Mr. W. I. G. Reid, G3CPA of Hampton, Middlesex, kept plugging away throughout the night. His perseverance brought him into second place, closely followed by two regular competitors: G6GM of Holsworthy, Devon, and G2AVC of Hanworth, Middlesex. G6GM, incidentally, found the contest an enjoyable, though somewhat tiring, way of celebrating his 67th birthday. Grand show old-timer!

Equipment at these stations included:

G3CPA: transmitter, 1T4 M.O.—3A4 P.A.; receiver, BC342 plus Q5-er; aerial, $\frac{1}{2}$ -wave, centre-fed.

G6GM: transmitter, VT501 E.C.O.; receiver, HRO; aerial, $\frac{1}{2}$ -wave, centre-fed.

G2AVC: transmitter, 6F12 Clapp oscillator—TT11 P.A.; receiver, 640; aerial, 75 ft., end-fed.

Comments

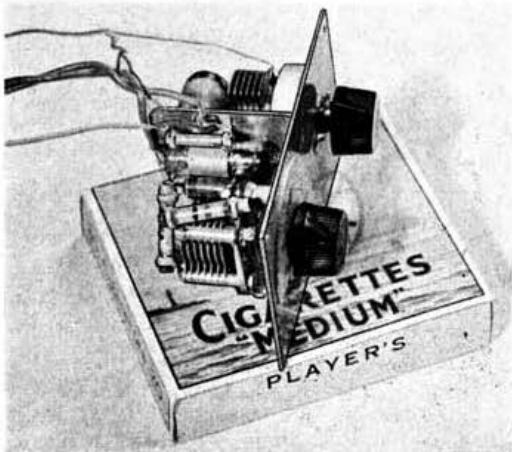
With QRP, few operators can hope to attain a high rate of contacts (five per hour is very good going), but DL2RO and GC2CNC both succeeded in registering 12 contacts in a one-hour period and several other entrants topped double figures. The outstanding signals from DL2RO—yet another addition to the many call signs which have been held by old-timer G2DC—were in part due to his Vee aerial. Next year he hopes to get down to $\frac{1}{2}$ -watt and should then provide a formidable challenge to the G entrants despite the fade out of all U.K. signals between 1000 and 1600 G.M.T. GC2CNC is not favoured by his location, nor by being "rock bound." He was also much troubled

Final Positions

Place	Call Sign	Power (watts)	Con-tacts	Counties	Points
1	G3EDW	0.5-2	101	37	2285
2	G3CPA	0.49	91	36	2160
3	G6GM	0.5	90	35	2150
4	G2AVC	0.5	91	32	2140
5	G5MP	0.5	82	31	1950
6	G3CGD/P	0.25-0.29	72	33	1810
7	GW3EFZ	0.5	71	34	1760
8	G3CKF	0.5-0.8	75	33	1810
9	G4NS	0.4	63	35	1610
10	G4IB	0.45	65	27	1570
11	GC2CNC	0.4	48	27	1230
12	G5LQ	0.5	49	24	1220
13	G6ZN	0.027-0.072	45	30	1200
14	G6HD	0.43	47	23	1170
15	G5JL	0.42	42	22	1060
16	G2FGD	0.5	41	24	1060
17	G14NU	0.45-1.8	47	32	1045
18	G6YR	0.5	35	22	920
19	G2HNF	1.0	60	29	890
20	G8DL	0.75	58	27	850
21	G3HRK	0.9	53	29	820
22	DL2RO	1.8-2.6	84	35	765
23	G6WR	0.5-2	62	33	755
24	G2YK	2	75	35	725
25	G2AOL	0.47	23	15	610
26	G3BGP	0.35-2.8	62	29	600
27	G4XC	1-3	67	31	541
28	G5JX	1.9	45	29	515
29	G3GMK	1	31	16	470
30	G4QD	3	46	32	458
31	GW3GXL	2-5	43	27	437
32	G6GH	0.9	22	14	360
33	G5ND	4.8	55	29	345
34	G6JJ	5	48	28	328
35	G8FA	3.5	30	18	240
36	G6AH	0.6-0.9	8	7	150
37	G3HTI	2.7	11	8	113

by being called by Continental stations wanting a GC on 3.5 Mc/s. and did well to gain 11th place.

It is not often that the entrant who occupies the lowest rung of the results-ladder can be singled out for special mention; but G3HTI surely deserves a word of praise as he was only licensed on September 20 and was using an 0-v-0 receiver. Two other straight receivers, a 1-v-1 at G3CGD/P and an 0-v-1 at GW3EFZ helped to gain their owners 6th and 7th places. It should be added that straight receivers without



[Photo by G2FK

This midget one-valve E.C.O. transmitter gave G8DL, Christchurch, Hants, 58 contacts during the 1951 QRP Contest. Using a sub-miniature R.F. pentode, it runs at 0.75 W., and measures 3" x 2" x 1½".

an R.F. stage can—and do—radiate considerable interference when used for C.W. reception; indeed most of them generate considerably more R.F. power than, for instance, the transmitter at G6ZN. Quite rightly, G3ANQ took us to task for not stressing this point last year.

Another newcomer, G3HRK, assembled his transmitter at the very last moment, but succeeded in finishing in the top half of the table. G3CGD who has extremely limited aerial space at his home QTH—a severe handicap for 3.5 Mc/s. QRP—was operating during the contest from a caravan on top of an 800 ft. hill. He mentions how valuable QRP can be for acquiring information on wave propagation since aerial patterns tend to be much less distorted by random reflections and radiation from feeders.

For those who like to study the current trends in low power transmitter design, an analysis of the equipment used by the leading 20 stations in the 1951, 1950 and 1949 events is given below:

Circuit Arrangements	1951	1950	1949
Single-stage (M.O.)	4	8	3
Single-stage (C.O.)	1	2	3
Two-stage (M.O.)	6	5	11
Multi-stage (M.O.)	7	4	3
Multi-stage (C.O.)	2	1	-

But it is not altogether necessary to build a special transmitter for QRP provided you have enough faith in the efficiency of the normal QRO rig. G6HD, for example, adheres strictly to the rules, yet runs a pair of 807s at under the $\frac{1}{2}$ -watt!

D/F Contest National Final

FINE weather favoured the National Final of the R.S.G.B. Direction Finding Field Days held at Romford, Essex, on September 30, 1951. The event was organised by the Romford and District Amateur Radio Society, fourteen teams taking part. The transmitter and crew—operator G3CRR (Alan Glazier) together with a Contests Committee member as official observer—were hidden beneath a large old tree surrounded by brambles, bracken, holly and artificial camouflage, and remained in position from 1245 until 1630 B.S.T. Elaborate precautions had been taken—anti-sling solution being top priority!

The dipole aerial was made from No. 40 gauge copper wire—as were a number of decoy wires;

Contests Diary

1951

December 1-2 } All European DX
December 8-9 }

1952

January 12-13 Affiliated Societies
January 26-27 "Top Band" (1.8 Mc/s.)
March 29-30 B.E.R.U. (Telegraphy)
April 5-6 B.E.R.U. (Telephony)
May 10-11 144 Mc/s. Field Day
June 7-8 National Field Day
June 22 420 Mc/s. Tests
July 6 European V.H.F.
September 7 Low Power Field Day
September 21 Second 144 Mc/s. Field Day
October 4-5 Low Power
November 8-9 "Top Band" (1.8 Mc/s.)

those contestants who forsook D/F for sleuthing soon became disillusioned! The commencing signals at 1400 were well received by all competitors, and the first sounds of approaching voices were heard at the transmitter site at 1435. From then on, transmissions had to be carried out almost in whispers so that competitors should not hear any direct sounds.

The arrival of G. Peck at 1451 and S. Phillips at 1453 was followed by a lapse of twenty minutes before the third competitor arrived. The station was found on one occasion by a member of the party: had this been the first arrival, it would have meant disqualification for the operator. At times competitors were within two yards of the transmitter, even when it was transmitting, and so well was it hidden that the bough upon which the crew were resting their heads shifted as people walked by.

At the conclusion, when only four competitors were unplaced, the trek to Great Warley took place, where 59 competitors and friends sat down to tea. After the presentation of prizes and short speeches, the company dispersed to their homes in various parts of the country. Thanks are due to the organisers—G3BNI, G3DNL and G3CRR—for the smooth running of the event.

Results

Pn.	Name	Town	Time of Arrival
1	G. Peck	High Wycombe	14.51
2	S. Phillips	Birmingham	14.53
3	J. Frings	Westcliff-on-Sea	15.12
4	J. Salter	High Wycombe	15.15
5	C. Young	Birmingham	15.16
6	J. Finch	High Wycombe	15.28
7	R. Hautley	Peterborough	16.19
8	R. Seabrook	Prittlewell	16.20
9	R. Whitley	Peterborough	16.23
10	P. Jude	Reading	16.25

Unplaced: C. Smart (Birmingham 23), L. Griffiths (Birmingham 23), N. Simmonds (Stourbridge), and J. Watson (Burgess Hill, Sussex).

Newnes Technical Books

A new pocket-size catalogue of technical books published by George Newnes Ltd., Tower House, Southampton Street, Strand, London, W.C.2, is now available free on application. The books listed cover all aspects of radio, television and radar, each title being followed by a brief description of the contents. The catalogue forms a useful guide to technical works of reference currently obtainable.



The presentation of the Cullen Trophy by Arthur Dyer (G6VV, South-East London D.R.), to P. F. Jolson (G3HLF), representing the Gravesend R.S.G.B. Group, followed a recent dinner organised by the Gravesend Amateur Radio Society. The Guest of Honour was the Deputy-Mayor of Gravesend (Councillor W. Wyatt). The Cullen Trophy is awarded annually to the highest scoring Region 7 "A" Station during N.F.D.

Slow Morse Transmissions

THE following slow Morse transmissions, sponsored by the Society, are intended to assist those who aspire to obtain an amateur transmitting licence. More volunteers are still required for parts of the British Isles not already covered and to allow a temporary respite to those who have given their services for several years.

G.M.T.	Call	kc/s.	Town
Sundays			
10.00	G6MH	1990	Southend-on-Sea
10.00	G5XB	1950	Reading
10.30	G3G10	1915	Guildford
11.00	G2FXA	1900	Stockton-on-Tees
21.00	G2FIX	1812	Nr. Salisbury
22.15	G3AEZ	1847	Dorking
Mondays			
19.00	G3NC	1825	Swindon
19.30	G3AIX	1760	Birmingham
20.00	G2AJU	1900	Stutton, Ipswich
20.00	G3DSR	1750	Derby
21.00	G3BLN	1900	Bournemouth
21.00	G3BHS	1820	Eastleigh, Hants
22.00	G3AEZ	1847	Dorking
22.00	G3G10	1915	Guildford
22.00	G3EJF	1810	Bury, Lancs
	G3GCZ		
	G3DZU		
	G2AYG		
22.15	G8TL	1896	Ilford
Tuesdays			
18.00	G2FXA	1900	Stockton-on-Tees
19.00	G5XB	1905	Reading
21.00	G3EFA	1855	Southport
22.00	G3ELG	1772	Rotherham
22.00	G5G10	1915	Guildford
22.00	G2BND	1890	Dalston, E.
Wednesdays			
14.00	G3ADZ	1910	Southsea
19.00	G3ADZ	1900	Southsea
20.00	G2NY	1850	Preston
22.00	G3DLC	1800	Grays, Essex
22.00	G3G10	1915	Guildford
Thursdays			
18.00	G2FXA	1900	Stockton-on-Tees
19.00	G3NC	1825	Swindon
19.30	G3BUJ	1990	Southend-on-Sea
20.00	G3FVH	1920	Hull, Yorks
21.30	G6DL	1760	Birmingham
22.00	G3AEZ	1847	Dorking
22.00	G3G10	1915	Guildford
22.30	G3OB	1803	Manchester
Fridays			
14.00	G3ADZ	1900	Southsea
19.00	G3BLN	1900	Bournemouth
20.00	G5AM	1900	Witnesham, Ipswich
20.00	G2AMV	1870	Wirral
21.00	G3BHS	1820	Eastleigh, Hants
22.00	G3G10	1915	Guildford
Saturdays			
14.00	G3ADZ	1910	Southsea
22.00	G3G10	1915	Guildford
23.00	G2FXA	1900	Stockton-on-Tees

* Each station will operate in turn.

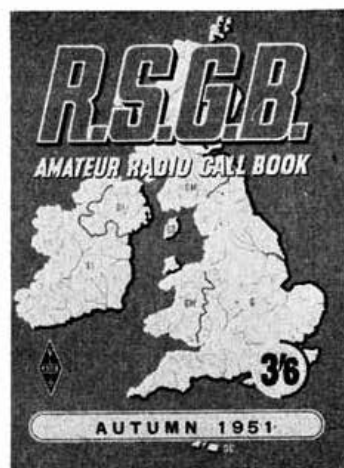
Stations listed who find themselves unable to continue transmissions should immediately notify the organiser, Mr. C. H. Lamborn Edwards, A.M.I.E.E. (G8TL), 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

Absorption Wavemeter

IN answer to queries from readers, the value of the tuning condenser used in the absorption wavemeter described on page 153 of the October issue is 100 μ F. The manufacturer is unknown as it is a war-surplus item.

R.S.G.B. BULLETIN, NOVEMBER, 1951.

An Amateur Radio Best Seller



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WORTH ITS WEIGHT IN GOLD!

REPRESENTATION 1952

THE following Corporate Members have been duly nominated to serve as Regional, Town and Area Representatives. Except where an election is due to take place, the person nominated has been elected and will take office as from January 1, 1952.

Regional Representatives

Region	Name, Call Sign and Address
1	B. O'BRIEN (G2AMV), 26 Coombe Road, Irby, Heswall, Cheshire. *G. WEBSTER (G5GK), School House, Simonstone, Nr. Burnley, Lancs.
2	*C. A. SHARP (G6KU), 56 Moore Avenue, Wibsey, Bradford, Yorkshire.
3	J. TIMBRELL (G6OI), Englefield House, White Hill, Kinner, Nr. Stourbridge, Worcestershire. J. N. WALKER (G5JU), 333 Rednal Road, West Heath, Birmingham 31.
4	*J. J. CURNOW (G6CW), The Yews, Mapperley Plains, Nottingham. DR. E. S. G. K. VANCE (G8SA), "Sycamores," Huthwaite, Nr. Mansfield, Notts.
5	*R. F. G. THURLOW (G3WW), North House, Wimblesington, Nr. March, Cambridgeshire.
6	H. G. HUNT (G3ECV), 9 Salerno Road, Southampton, Hampshire. *F. A. JEFFERIES (G8PX), 1 Lovelace Road, Oxford.
7	*W. H. MATTHEWS (G2CD), 7 Beddington Road, Seven Kings, Essex.
8	*R. J. DONALD (G3DJD), 2 Canfield Road, Brighton 7, Sussex.
9	*H. A. BARTLETT (G5QA), "Lendore," Birchy Barton Hill, Exeter, Devonshire.
10	No nomination.
11	*F. G. SOUTHWORTH (GW2CCU), "Samlesbury," Bagillt Road, Holywell, Flintshire, N. Wales.
12	*J. DOUGLAS (GM2CAS), 43 Abbotswell Drive, Bridge of Dee, Aberdeen, Scotland.
13	*W. BAKER (G3AFL), 4 Devon Terrace, Berwick on Tweed.
14	*D. MACADIE (GM6MD), 154 Kingsacre Road, Glasgow S.4.
15	S. H. FOSTER (GI3GAL), 31 Belmont Road, Belfast, N. Ireland.

* Nominated by the Council.

Town or Area Representatives

Region	Town or Area	Name, Call Sign (or B.R.S.) and Address
1	CHESHIRE Chester	H. MORRIS (G3ATZ), 24 Kingsley Road, Boughton Heath.
	CUMBERLAND West Cumberland	J. COLEBROOK (G3BJD), 33 Hollins Close, Mirehouse, Whitehaven.
	LANCASHIRE—EAST Darwen and Blackburn	J. SIMPSON (G4JS), 1 March Terrace, Darwen.
	LANCASHIRE—WEST Blackpool	I. C. LAMB (G6LD), 7 Mossom Lane, Norbreck.
	Liverpool	D. M. BOLTON (G3DVB), 45 Terence Road, Liverpool 16.
	Preston	H. A. WOODS (G2AXH), 13 Merrick Avenue, Farrington Park.
	Southport and Formby	F. H. P. CAWSON (G2ART), 113 Waterloo Road, Southport.
	Warrington and District	N. ATKINS (G3EXG), 12 Thelwall Lane, Latchford.
2	DURHAM Darlington	P. LUCAS (G3BQJ), 32 Brougham Street.
	West Hartlepool	L. FODEN (G3CHJ), 207 Park Road.

Region	Town or Area	Name, Call Sign (or B.R.S.) and Address
2 contd.	NORTHUMBERLAND Stocksfield, Corbridge, Hexham and Haltwhistle	J. G. WARDHAUGH (G4LA), 20 Hallgates, Hexham.
	YORKSHIRE—EAST York	G. F. NOTTINGHAM (G3DTA) off 51 Carr Lane, Acomb.
	YORKSHIRE—WEST Bradford	A. W. WALMSLEY (G3ADQ), 6 Hilton Road, Legrams Lane.
	Pontefract	W. FARRAR (G3ESP), Stanton, Hemsworth Road, Ackworth.
3	HERFORDSHIRE Hereford	P. B. BUCHAN (B.R.S.18819), 123 Hinton Road.
	WARWICKSHIRE Birmingham—South	D. HOWELL (G2DOF), 222 Shenley Fields Road, Selly Oak.
	Coventry	J. R. TUCK (G6TD), 121 Grayswood Ave., Coventry.
	Kenilworth, Leamington and Warwick	R. WEBB (G6XY), 233 Warwick Road, Kenilworth.
	WORCESTERSHIRE Malvern	F. E. WINGFIELD (G2AO), St. Margaret's, Imperial Rd.
	Stourbridge	W. A. HIGGINS (G8GF), 28 Kingsley Road, Kingswinford, Nr. Brierley Hill.
4	DERBYSHIRE Derby	F. C. WARD (G2CVV), 5 Uplands Avenue, Littleover.
	LEICESTERSHIRE Loughborough	G. MASON (G3CKF), 8 Herrick Road.
	LINCOLNSHIRE Boston	B. J. KILLICK (G3GPQ), 75 Willoughby Road.
	Grimby and Cleethorpes	F. R. PETERSEN (G3ELZ), 58 Peaksfield Avenue, Grimby.
	NORTHANTS Peterborough	H. BONE (G3EHQ), 104 Montagu Road.
5	NORFOLK Great Yarmouth	P. HARRISON (G3CFK), 63 Southtown Road, Great Yarmouth.
	SUFFOLK Ipswich	A. E. CULLINGTON (G3HEZ), 1 Spring Road.
6	BUCKINGHAMSHIRE Bletchley	L. WILFRED LIMB (G2DTD), 107 Newton Road, Old Bletchley.
	GLOUCESTERSHIRE Cheltenham	JOHN J. YEEND (G3CGD), 30 St. Luke's Road.
	Gloucester	E. A. PERKINS (G3MA), 40 Calton Road.
	Stroud	B. L. HORTON (G3CBH), Prescott, Haven Avenue, Bridgend, Stonehouse.
	HAMPSHIRE Christchurch	J. SINGLETON (B.R.S.9196), 51 Walcott Avenue.
	Petersfield and District	R. T. DEALEY (G6DT), Woodville, Drillhall Road, Horn-dean.
	Portsmouth	J. S. K. STEPHENS (G8WC), 65 Ebery Grove, Copnor.
	Southampton	F. A. L. RUSSELL (G3BHS), 11 Chestnut Avenue, Eastleigh.
	WILTSHIRE West Wilts Area	E. A. PARSONS (G2PS), 12 Station Road, Westbury.
7	LONDON—NORTH Barnet, Boreham Wood and N.20 Enfield (including N.9, N.18, N.15 and N.17 postal districts)	R. WALKER (G6QD), 7 Potters Lane, New Barnet.
	Finbury Park (N.1, 4, 5, 7, 16 & 19 postal districts)	H. MCFARLANE (G8SK), 15 Rotherfield Road.
	Hoddesdon	R. C. HARRIS (G2BAB), 9 Queen's Drive, N.4.
	Southgate (N.8, 11, 13, 14, 21, 22)	H. A. W. JONES (G4HJ), 99 Standstead Road.
		S. FELDMAN (G3GBN), 10 Oak Way, N.14.

Region	Town or Area	Name, Call Sign (or B.R.S.) and Address
7 <i>contd.</i>	Welwyn Garden City	J. HUM (G5UM), "Wyldes," Bulls Green, Nr. Knebworth.
	LONDON—SOUTH Coudsdon	L. C. B. BLANCHARD (B.R.S. 3003), 122 St. Andrew's Road.
	Guildford and Woking	G. K. ALLEN (G3HST), 18 Selsdon Road, New Haw.
	Gravesend and District	P. F. JOHNSON (G3HLF), 13 Brandon Street.
	Norwood and District	W. D. GILMOUR (G2VB), 35 Grangecliffe Gardens, S.E.25.
	LONDON—SOUTH-EAST Bexley, Bexleyheath, Welling & Crayford	D. W. WOODERSON (G3HKX), 39 Woolwich Road, Bexleyheath.
	LONDON—SOUTH-WEST Sutton and Cheam	R. I. CLEWS (G3GDK), 1 Hurstcourt Road, Sutton.
	LONDON—EAST Chingford	A. V. GREENWOOD (G3DCQ), 8A Sunnysdene Avenue, Higham's Park, E.4.
	East Ham	W. H. HAYES (G3CJQ), 180 Latham Road, E.6.
	Ilford	F. F. RUTH (G2BRH), 579 High Road.
	Grays	C. MUNDAY (B.R.S.15584), 68 Chestnut Avenue.
	LONDON—WEST Ealing	R. E. G. CAWS (G3BRL), 34 Greystoke Lodge, Hanger Lane, W.5.
	Hayes (Middx) ..	V. E. W. WHITAKER (G3HRG), 6 Warley Avenue.
	Hendon (N.W.4, 7 and 9), Edgware	D. A. FINDLAY (G3BZG), 126 Whitechurch Lane, Edgware.
	Kensington and Shepherds Bush	W. G. H. ROBINSON (G3EZM), 38 Royal Crescent, W.11.
8	Slough (Bucks) ..	R. RIVERS YOUNG (G3BTP), 16 Elmhurst Road, Langley.
	Uxbridge	F. RUTTER (G2FMF), 237 Windsor Avenue, Hillingdon.
	SUSSEX Brighton and District	R. J. HARVIE (G2DRP), 66 Larkfield Way, Withdean.
	9 CORNWALL Bristol	R. T. POETON (G3CTN), 37 West Broadway, Henleaze.
	Falmouth	A. L. ROGERS (G2FQD), 6 Woodhouse Terrace.
	North Cornwall ..	J. E. BOWDEN (G2AYQ), Albany House, Goonown, St. Agnes.
	West Cornwall ..	R. V. ALLBRIGHT (G2JL), 12 North Parade, Penzance.
	DEVONSHIRE Exeter	T. W. A. SMITH (G3EFY), 98 Ladysmith Road.
	North Devon ..	W. MILLS (G2FHW), Prospect House, Pitt, Appledore, Nr. Bideford.
	10 GLAMORGANSHIRE Neath, Port Talbot and District	D. E. DAVIES (GW3FSP), Sunhyridge, Castle Street, Skewen.
	12 Banff	A. JOHNSTON (GM3GCH), 16 Whinhill Terrace.
	Dundee	A. MILLAR (B.R.S.6731), 71 Byron Crescent.
	Aberdeen	L. HARDIE (GM2FHH), 91 Inchbrae Drive, Garthdee.
	Forfar	W. ROBERTSON (GM6RI), The Schoolhouse, Tannadice.
	13 Edinburgh ..	A. DEWAR (B.R.S.18777), 37 Calder Circle, Edinburgh 11.
		D. SAMSON (GM3EQY), 56 Elm Row, Edinburgh 7.
	Falkirk	F. C. ROBERTSON (GM3GIV), Mount Carron.
	15 Belfast	R. BARR (GI5UR), 4 Dunkeld Gardens.

Ballots

It will be necessary to conduct a Ballot in the following Regions:—

Region 1	N. O'Brien (G2AMV), G. Webster (G6GK).
Region 3	J. Timbrell (G6OI), J. N. Walker (G5JU).
Region 4	J. J. Curnow (G6CW), Dr. E. S. G. K. Vance (G8SA).
Region 6	H. G. Hunt (G3ECV), F. A. Jefferies (G8PX).

It will also be necessary to conduct a Ballot in the following Town:—

Region 13, Edinburgh	A. Dewar (B.R.S.18777), D. Samson (GM3EQY).
----------------------------	---

Voting

Corporate Members resident in the Regions or Towns concerned are invited to record their vote in favour of one of the above candidates and to forward same on a postcard addressed to the General Secretary, New Ruskin House, Little Russell Street, London, W.C.1, to arrive not later than November 30, 1951.

Prescribed Form of Voting Card

Election of Representatives 1952/3.

I being a fully paid-up
Corporate Member of the Society, wish to record my vote
in favour of Mr.
as Representative for
Signed
Call Sign or B.R.S.
Address

VOTES FOR REPRESENTATIVES
MUST **NOT** BE INCLUDED IN
COUNCIL BALLOT ENVELOPES.
CLOSING DATE FOR VOTING
CARDS IN CONNECTION WITH
THE ELECTION OF REPRESENTA-
TIVES FRIDAY, NOV. 30, 1951.

Radio Direction Finding

DURING the war much progress was made in Germany in radio direction finding. For example, there were devised some novel arrangements to improve the accuracy of both direction and position finding. Radio Research Special Report No. 21, just published, contains translations of nine papers written by German technical experts in this field of radio. Seven of the papers were presented originally at an official German conference on navigational aids and allied problems held at Landsberg in 1944 and two are later contributions. The Report should be of considerable interest to contemporary scientific and technical workers on this subject.

The papers are published under the name of the original author and the translations were provided by the Admiralty.

The Report is published for the D.S.I.R. by H.M.S.O., price 3s. 6d. (90 cents U.S.A.), by post 3s. 8d.

HEADQUARTERS CALLING

COUNCIL, 1951

President :

WILLIAM A. SCARR, M.A., G2WS.

Executive Vice-President : F. Charman, B.E.M., G6CJ.

Hon. Treasurer : A. J. H. Watson, F.S.A.A., G2YD.

Hon. Secretary : L. Cooper, G5LC.

Hon. Editor : Arthur O. Milne, G2MI.

Immediate Past President : V. M. Desmond, G5VM.

Members : W. H. Allen, M.B.E., G2UJ, A. P. G. Amos, G3AGM, W. N. Craig, B.Sc., G6JJ, C. H. L. Edwards, A.M.I.E.E., G8TL, T. L. Herdman, B.A., A.M.I.R.E., G6HD, P. A. Thorogood, G4KD, P. W. Winsford, G4DC.

General Secretary : John Clarricoats, G6CL.

September Council Meetings

Résumé of the Minutes of the Proceedings at the Meeting of the Council of the Incorporated Radio Society of Great Britain held at New Ruskin House, Little Russell Street, London, W.C.1, on Thursday, September 20, 1951.

Present.—The President (Mr. W. A. Scarr) in the Chair, Messrs. W. H. Allen, A. P. G. Amos, F. Charman, L. Cooper, W. N. Craig, V. M. Desmond, C. H. L. Edwards, T. L. Herdman, A. O. Milne, P. A. Thorogood, A. J. H. Watson, P. W. Winsford and John Clarricoats (General Secretary).

I.A.R.U. Calendar.

Apropos "I.A.R.U. News" (page 119 September, 1951, BULLETIN) it was reported that Mr. John Huntton (Assistant Secretary, A.R.R.L.) had written to advise the Society that for the past two years the Board of the League has declined to make proposals relating to Band Planning. Mr. Huntton agreed it was an oversight that the League did not explain in the June I.A.R.U. Calendar its reason for not voting on Proposal 73.

Audited Accounts:

The Hon. Treasurer presented, and explained at length, the Audited Accounts for the year ended June 30, 1951.

The Council resolved:—

- to accept and adopt the Audited Accounts as submitted and to authorise the same to be printed for presentation to the membership.
- to record the thanks of the Council to Mr. A. J. H. Watson for the highly efficient manner in which he had again handled the Society's Accounts.

Nominations for the 1952 Council.

Nominations were made for the 1952 Council in accordance with the list published in the October issue of the BULLETIN.

Amateur Radio Exhibition.

A full discussion of Exhibition arrangements took place, with the Exhibition Manager (Mr. H. Freeman) present.

During the discussion it was stated that the revenue from stand lettings would probably be considerably less than in recent years and that as a consequence a financial loss might be incurred.

The Council resolved:—

- as a service to members to proceed with plans for the Fifth R.S.G.B. Amateur Radio Exhibition.
- to make a charge of 6d. for admission.
- not to reproduce a separate catalogue.
- to provide facilities for the display of items of home-constructed equipment.
- to set up an Ad Hoc Committee to organise the Amateur Constructors' Section.
- to proceed with plans for holding a luncheon on the opening day.

Membership.

The Council resolved:—

- to elect 58 Corporate Members and 23 Associates.
- to grant Corporate Membership to 4 Associates who had applied for transfer.
- to grant Life Membership to Mr. M. W. Swinbank.

Application for Affiliation.

Resolved, subject to the receipt of a satisfactory report from the London R.R., to grant affiliation to the South West Essex Radio Club.

Representation.

Members of Council and the Secretary reported upon the successful O.R.M.s. held recently in Glasgow and Aberdeen.

V.E.R.O.N. 35th Anniversary.

The President reported that the meeting held in Zeist to commemorate the 35th Anniversary of Amateur Radio in the Netherlands was well supported and highly successful. (An account of the Meeting appeared in the October issue of the BULLETIN.—Ed.)

British Amateur Television Club Badge.

A letter was submitted from the Hon. Secretary of the British Amateur Television Club (Mr. M. Barlow) in reply to one sent by the President concerning the similarity between the R.S.G.B. and B.A.T.C. badges. The Council noted the explanations given by Mr. M. Barlow.

General Secretary's Service on Committees of the Council.

Apropos of Recommendation C adopted at the Regional Representatives' Conference held in April, 1951, it was reported that the Society's legal advisers had again been asked to give advice on the question of the General Secretary's appointment to serve on Committees of the Council with voting power.

The Society's legal advisers wrote stating that the Council had been in order in appointing the General Secretary as a Member of Committees of the Council with power to vote. The letter also pointed out that the limitation of the appointment, as set out in Clause 4 of the Society's Memorandum of Association, is that no Member of the Council or Governing Body shall be appointed to any salaried office of the Society. A Member serving on a Committee is not appointed to a salaried office.

Resolved to receive the letter.

Applications for Affiliation.

Consideration was given to the following Resolution submitted by the London R.R. (Mr. W. H. Matthews) at the request of the London D.R.s:—

- That when a body applies for affiliation to the R.S.G.B. it should be asked to give reasons for such application.
- That a requirement of affiliation shall be that two-thirds of the members of that body shall be fully paid-up members of the R.S.G.B. at that time.
- That they shall accept the T.R. for the area (in the case of the non-existence of a T.R. they should nominate one) as the liaison with the R.S.G.B.

Resolved to advise Mr. Matthews that the matters referred to in the resolution would be considered when the appropriate Articles of Association are examined by the Council.

General Purposes Committee.

Pursuant to notice given by a Member, it was moved, seconded and

Resolved that the General Purposes Committee be disbanded.

Region 8 O.R.M.

An agenda of business for consideration at the forthcoming Tunbridge Wells O.R.M. was submitted by the R.R. (Mr. R. J. Donald).

Hampshire County Meeting.

An agenda of business for consideration at the forthcoming meeting to be held in Southampton was submitted by the C.R. (Mr. L. J. Fitzgerald).

Letter from Petersfield A.R.

A letter was submitted from the Area Representative for Petersfield and District (Mr. R. Dealey), in which he drew attention to the fact that, in the *Résumé of the Minutes of the January, 1951, Council Meeting*, an item under the heading "R.S.G.B. Scheme of Representation" referred to the fact that this scheme does not recognise the offices of Chairman, Secretary and Treasurer presumably in local groups.

In the September issue of the BULLETIN (Page 107, Col. 1) a reference is made to a Council Member (Mr. P. W. Winsford) being Chairman of the New Cross and Dulwich group of the R.S.G.B. Mr. Dealey inquired whether the publication of this statement, coupled with the fact that Mr. Winsford is a Member of the 1951 Council, indicates that the office of Chairman (and other offices possibly) in local groups is now recognised by the Council. Mr. Dealey stated that his inquiry should not be taken as indicating that he is in favour of such recognition. He is not.

Resolved to inform the Petersfield A.R. that the Council, whilst not recognising in the Scheme of Representation the offices of Chairman, Hon. Secretary, Hon. Treasurer, etc., cannot prevent such officers being appointed unofficially by local groups.

Amateur Wireless Stations on Ships.

A letter dated September 15, 1951, was submitted from the Director of Overseas Telecommunications of the G.P.O. setting out the terms and conditions under which the Postmaster-General is prepared to issue a special licence to those holders of the Amateur Wireless Station Licence who wish to operate an Amateur Wireless Station on board ship.

It was agreed that the members of the G.P.O. Liaison Committee should examine the proposals in detail and submit their views to the G.P.O.

National Field Day.

Correspondence was submitted from the Bristol T.R. and West Cumberland C.R. regarding N.F.D. matters.

The Chairman of the Contests Committee read a letter which he had written to the Bristol T.R. The correspondence from the West Cumberland C.R. would be considered by the Contests Committee.

Adjournment.

Due to the lateness of the hour it was resolved:—

- that this meeting shall stand adjourned until 6 p.m., Wednesday, September 26, 1951.
- that the Special Meeting of the Council already arranged for that day shall commence immediately the business of this meeting is concluded.

The Council rose at 9.45 p.m.

The Council reassembled at 6 p.m. on September 26, 1951, when the following were present:—

The President (Mr. W. A. Scarr), Messrs. F. Charman, L. Cooper, W. N. Craig, C. H. L. Edwards, T. L. Herdman, P. A. Thorogood, P. W. Winsford and John Clarricoats (General Secretary).

Amateur Radio Exhibition.

Approval was given to a list of persons to whom the Council would extend an invitation to be present at the opening of the Exhibition and informal luncheon.

Hampshire & Dorset Meetings.

The delegates of the Council who were in attendance at the Hampshire and Dorset meetings held on September 23, 1951, reported on the proceedings.

Technical Committee.

The Minutes of a meeting of the Committee held on September 6 were approved and the Recommendations (A and B) contained therein adopted. The recommendations related to the Bevan Swift Prize Fund and the Norman Keith Adams Prize Winner. (Both matters were reported upon in the October issue of the BULLETIN.—Ed.)

Contests Committee.

A report covering a series of meetings of the Contests Committee was submitted and approved.

Phil Thorogood Trophy.

Mr. P. A. Thorogood informed the Council that he wished to present to the Society a suitable trophy for award in connection with European V.H.F. Contests. The President, on behalf of the Council, thanked Mr. Thorogood for his kind offer.

The Council rose at 8.20 p.m.

Résumé of the Proceedings at a Special Meeting of the Council held on Wednesday, September 26, 1951, at 8.30 p.m.

Present.—The President (Mr. W. A. Scarr) in the Chair, Messrs. F. Charman, L. Cooper, W. N. Craig, C. H. L. Edwards, T. L. Herdman, P. A. Thorogood, P. W. Winsford and John Clarricoats (General Secretary).

Purpose of Meeting.

The President explained that the purpose of the Meeting was to give further consideration to the revision of the Articles of Association.

The Council then proceeded to examine a draft revision of the Articles. Articles 21 to 28 were dealt with.

It was agreed to hold a further Special Meeting of the Council on Saturday, October 27, to continue the examination of the Articles.

The Council rose at 9.45 p.m.

R.S.G.B. BULLETIN, NOVEMBER, 1951.

Representation

The following is an alteration to the list published in the February, 1950, issue of the R.S.G.B. BULLETIN:—

County Representative.

Hampshire:

R. Bassett, B.R.S.16075, 42 Norham Avenue, Southampton.

Vacancies.

County Representatives.

Messrs. L. J. Fisher, G4MK, and A. Evans, GW4MZ, have resigned as Representatives for the Counties of Leicestershire and Carnarvonshire and Anglesey respectively.

Nominations for their successors should be made in the manner described in the September, 1949, issue of the BULLETIN, and sent to reach the General Secretary by November 30, 1951.

Town Representatives.

Messrs. W. Darbey, G6ZA, and P. F. Clarke, G3CQL, have resigned as Representatives for the towns of Rotherham and Southend-on-Sea respectively.

Nominations for their successors should be made in the manner prescribed in the September, 1951, issue of the BULLETIN.

"Guide to Broadcasting Stations"

In the review of this publication on page 175 of the October issue the name of the publishers was inadvertently omitted. "Guide to Broadcasting Stations" is published by *Wireless World*, Dorset House, Stamford Street, London, S.E.1, price 2/2 by post.

FORTHCOMING EVENTS

(Continued from Page 189)

Southgate.—December 13, 7.30 p.m., Geography Room, Arnos Secondary Modern School, Wilmer Way, N.13.

Sutton & Cheam.—November 6, December 4, 18, 7.20 p.m., Sutton Adult School, Benhill Avenue.

Slough.—December 20, 7.45 p.m., "The Golden Eagle," High Street.

St. Albans.—November 21, December 5, 19, Ottershaw, Upton Avenue.

Welwyn.—December 4, 8 p.m., Council Chambers.

REGION 8

Brighton.—B.D.R.C.: Tuesdays, 7.30 p.m., Eagle Inn, Gloucester Road; E.B.S.W.C.: Thursdays, 7.30 p.m., 27 Warren Avenue, Woodingdean.

Chatham (M.A.T.R.S.).—Mondays, 7.30 p.m., Co-operative Hall, Luton Road.

Gillingham (G.T.S.).—Alternate Tuesdays, 7.30 p.m., Midway Technical Institute.

Petersfield.—December 13, 7.30 p.m., Heroes' Hotel, Waterlooville.

Portsmouth (P.D.R.C.).—Tuesdays, 7.30 p.m., Royal Marines' Signals Club, Eastney Barracks.

Reading (R.R.S.).—November 24, Abbey Gateway.

Southampton.—December 1, 7.30 p.m., 22 Anglesea Road, Shirley.

REGION 9

Bath.—November 19, 7 p.m., 12 Pierrepont Street.

Bristol.—November 16, December 14, Carwardine's Restaurant, Baldwin Street, Bristol 1.

Exeter.—December 7; 7 p.m., Y.M.C.A., 41 St. David's Hill.

Gloucester.—Alternate Thursdays, 7.30 p.m., Spread Eagle Hotel, Market Parade.

North Devon.—December 6, 7.30 p.m., Rose of Torridge Cafe, The Quay, Bideford.

Penzance.—December 6, Railway Hotel.

Plymouth.—November 17, December 15, 7 p.m., Tothill Community Centre, Tothill Park, Knighton Road, St. Jude's.

Stroud.—Wednesdays, 7.30 p.m., Subscription Rooms, Railway Hotel.

Torquay.—December 15, 7.30 p.m., Y.M.C.A., Castle Road.

Weston-super-Mare.—December 4, 7.30 p.m., Y.M.C.A.

West Cornwall (W.C.R.C.).—November 15, December 6, Fifteen Balls, Penryn.

Yeovil.—Wednesdays, 7.30 p.m., Grove House, Preston Rd.

REGION 10

Cardiff.—December 10, 7.30 p.m., "The British Volunteer," The Hayes.

REGION 13

Edinburgh (L.R.S.).—November 29, thence fortnightly, 7.30 p.m., Edinburgh Chamber of Commerce, 25 Charlotte Square. Newcomers welcomed.

REGION 14

Falkirk.—November 30, December 14, 7.30 p.m., "The Temperance Cafe."

Glasgow.—November 28, 7.30 p.m., 39 Elmbank Crescent.

REGIONAL AND CLUB NEWS

Barnet and District Radio Club

At a Special General Meeting held recently the following officers were elected: Chairman, P. M. Elton, G3GOZ; Hon. Secretary, D. Cliff, 1 Manor Road, Boreham Wood, Herts. Contest, Station and Publicity Managers were also elected. The club meets at 8 p.m. on Wednesdays at "Hopedene," The Avenue, Barnet, Herts. The club station, call G3FFA, is now active on "Top Band."

Brighton and District Radio Club

Increased membership and bigger attendances at the weekly club meetings are welcome features of the winter season. Highlights for the near future include: *Taylor Electrical Instruments* (November 27), *Pye Tele-Comm. Equipment* (December 4), and "Home-constructed Tape Recorder" (December 11).

Bury St. Edmunds & District Amateur Radio Club

This new club replaces the old West Suffolk Amateur Radio Society which closed down last month. Suitable accommodation for meetings is being arranged and a club station is planned. Country members are particularly invited to attend and apply for membership. The Secretary is C. A. King, 44 Bishops Road, Bury St. Edmunds, Suffolk.

Cambridge University Wireless Society

Recent activities include a lecture on "Directive Aerial Systems," by F. Charman, G6CJ, and a visit to *Pye Ltd.* for a demonstration of colour television. Talks and discussions planned for future meetings are: "Radio Astronomy" (November 19), "Electronic Musical Instruments" (November 26), and "Radio Techniques in Meteorology" (December 3). The Secretary is M. P. Hogkins, F4, Trinity Hall, Cambridge.

Cheltenham Amateur Radio Society and R.S.G.B. Group

"Converting the BC453 into a 2 Metre Receiver" was the subject of a talk by F. Watts, G5BM, at a recent meeting. Morse classes are being well supported, and plans are in hand for the wiring of tables with separate keys and phones with a view to more efficient tuition. Meetings are held at 7.45 p.m. on Fridays at St. Mark's Community Centre, Brooklyn Road, Cheltenham.

Coventry

In the T.R. elections the Coventry Group have renominated J. R. Tuck, G6TD, the retiring T.R.

During October, local members visited the Kenilworth Radio and Television Club, the South Birmingham R.S.G.B. Group and the Derby (Region 4) O.R.M. The winter programme will start on November 24 with a lecture by L. Kennard, G3ABA.

Coventry Amateur Radio Society

Meetings continue to be held on alternate Mondays at the Y.W.C.A., Queen's Road, commencing at 7.30 p.m. The Annual Dinner will be held on February 29. Details are being finalised for the annual M.A.R.S.-C.A.R.S. Contest.

Darlington Dinner and Dance

The Darlington and District Amateur Radio Society will hold their Annual Dinner and Dance at the "Gretna Wedding Inn," Aycliffe, on Wednesday, December 19, 1951.

Tickets, 9s. each, are obtainable from the Secretary, D. Graham, 21 Hamsterly Street, or the T.R., P. Lucas, 32 Brougham Street.

Dorking and District Radio Society

Last month the Society operated a station—call G3CZU/A—at a Model Engineering and Amateur Radio Exhibition held at Dorking Halls. A "Top Band" Contest will be held on November 18, and a lecture given by P. Bond on November 20. The Secretary is J. Greenwell, 7 Sondes Place Drive, Dorking.

East Surrey Radio Club

"F.M. Circuits" and "Amateur Radio Stations in Australasia" were the subjects of recent talks given by G. A. Bird (G4ZU) and Tommy Price (the Club's patron) respectively. The Annual Dinner will take place on November 17. The Club would be glad to hear from anyone who knows of a room to let in the Redhill-Reigate area suitable for permanent premises; meanwhile, meetings are held at the Barn Room, Lesbourne Road, Reigate.

Edinburgh Amateur Radio Club

At the A.G.M. the following officers were elected: President, D. A. E. Samson, GM3EQY; Hon. Secretary, C. L. Patrick; Treasurer, J. Gorrie, GM3DVX. On November 21 GM3FUU will talk on "Something New in Radio." The Club meets at 7.30 p.m. on Wednesdays in Unity House, 4 Hillside Crescent, Edinburgh.

Gloucester and District Amateur Radio Club

Meetings are held fortnightly (the next being on November 22) at the Spread Eagle Hotel, Gloucester, with *Mullard* film strip lectures at alternate meetings. The Secretary is C. F. Cole, St. Martins, 113 Stroud Road, Gloucester.

Leeds Amateur Radio Club

The first of a series of six television lectures was given last month by Mr. Hammond of the *English Electric Co., Ltd.* A lecture demonstration by G3CML on "A Simple 160 metre Transmitter and Receiver" is planned for November 21 with a view to establishing a weekly "Top Band" Club net. The Secretary is W. Hawkrigge, 7 Langdale Gardens, Leeds, 6.

Leicester Radio Society

More than 60 members recently enjoyed two sound-film shows in the club room at Holly Bush Hotel, Begrave Gate, Leicester. Preparations are in hand for the New Year dinner and dance on January 11, 1952. Details of membership and future programme may be obtained from the Hon. Secretary, A. L. Milnthorpe, 3 Winstor Drive, Thurmaston, Nr. Leicester.

Midland Amateur Radio Society

At the October meeting a lecture on "Home Made Gadgets for the Shack" was given by B. H. T. Oliver, G3DJQ. Members are reminded to bring along a piece of home-built equipment to the November meeting to compete for the G6XJ Cup.



HOLIDAY IN HOLLAND

A party of 29 British amateurs and their wives recently paid a visit to Amsterdam as guests of Dutch amateurs. Visits were made to the Hilversum studios, the broadcast and television transmitters at Lopik, and to *Philips Valve Factory* at Eindhoven (pictured above), where, incidentally, each member of the party was presented with a QQE/0640 V.H.F. transmitting valve. The trip was organised by Harold Andrews (G5DV).

Newbury and District Amateur Radio Society and R.S.G.B. Group

The formation of a Newbury R.S.G.B. Group took place preceding a meeting of the Society in September. At the recent A.G.M. the following officers were elected: Chairman, J. Olive (G3HQO); Secretary, A. W. Grimsdale (G3CJU); Treasurer, G. Ball. Meetings will take place on the last Friday each month at the Railway Hotel, 1 Greenham Road, Newbury. The Group meeting will be at 7.30 p.m. to discuss purely R.S.G.B. matters, and the combined meeting will commence at 7.45 p.m.

A film show, comprising documentary films illustrating the applications of ship-to-shore radio and marine radar, is planned for November 30.

North-East Amateur Transmitting Society

The new Secretary is L. Bergna, 121 Addycombe Terrace, Newcastle-on-Tyne, 6.

Pontefract Area Transmitting Group

This Group having been formed from the former Pontefract and District Amateur Radio Club, the accent in future will be on matters of transmitting interest. A "Top Band" net on 1990 kc/s. is active on Sundays at 1100 G.M.T. Further information is available from W. Farrar, G3ESP, "Stanton," Hemsworth Road, Ackworth, Pontefract.

Royal Air Force Amateur Radio Society

Since its formation in April, 1938, the Society has had its Headquarters at R.A.F., Cranwell, but on October 1, 1951, due to some reorganisation of R.A.F. Technical Training Establishments, the Headquarters was transferred to No. 1 Radio School, R.A.F., Locking, Weston-super-Mare. Arrangements are in hand for the transfer of the Headquarters Station (call G8FC) to Locking. Until the next annual general election for committee—due to take place in January, 1952—the affairs of the Society will be managed by an interim committee elected locally from members at R.A.F. Locking.

Sheffield Amateur Radio Club

Members are asked to note that the December meeting will be held on the 19th. The annual dinner will take place on January 16, 1952, at the Sheffield and Ecclesall Co-op. Restaurant. Tickets are 7s. 6d. each. Applications (with remittance) should reach the Secretary (E. Walker, 11a Welwyn Close, Sheffield 12) not later than December 19.

Southend and District Radio Society

At a very successful meeting held last month in the Girls' High School, Boston Avenue, Mr. Emyln Jones, B.Sc., A.M.I.E.E., with a team of experts from the *Mullard Research Laboratories*, gave a lecture demonstration on "Projected Television." More than 250 persons were present.

An exhibition of technical components was followed by a film-strip lecture on the projection principle, after which the B.B.C. special programme featuring the opening of the Holme Moss transmitter was clearly projected on to a classroom screen and also displayed on a domestic receiver for comparison.

Later in the month Mr. W. A. Smith lectured on "Synchronising Pulse Separation." A pen and pencil was presented to G3AXN, prior to his departure on an Antarctic expedition. The Secretary is J. H. Barrance, M.B.E., F.I.L., "Trenba," 49 Swanage Road, Southend-on-Sea, Essex.

Sunderland Radio and Television Society

At a special meeting held recently it was agreed that the name of the Society be changed to the above form. The following new officers have been elected: Chairman, T. Garrard; Hon. Secretary, C. A. Chester. Meetings are held fortnightly at 8 p.m. on Wednesdays at 16 North Bridge St.

Thames Valley Amateur Radio Transmitters' Society

The Society's annual Field Day Contest for the "Cooper Cup" was won by K. Rogers, G3AIU, of Epsom, assisted by F. Hicks-Arnold, G6MB. On Saturday, December 8, the Society will hold its annual Ladies' Festival at the Carnarvon Castle Hotel, Hampton Court. Interested readers are invited to contact the Secretary (K. Rogers, 21 Links Road, Epsom) for details.

Torbay Amateur Radio Society

For the second year running members of the Society provided the team that won the South-Western Hamfest "Quiz Cup." At a recent meeting the *Mullard* film strip "Cathode-Ray Tubes and Valves" was shown and lectured on by the Secretary, W. A. Launder, B.Sc. (Eng.). A talk, "Principles of Television," will take place on November 17. Visitors are welcomed at the Y.M.C.A., Castle Road, Torquay.

Warrington and District Radio Society

The "G.R. Trophy" will be presented to the winner of the recent "Top Band" contest (in which eight neighbouring societies competed) at the Annual Dinner and Social to be held at the Fir Grove Hotel, Latchford, on November 30. The Headquarters of the Society are now at the King's Head Hotel, Warrington, and meetings are held at 7.30 p.m. on the first and third Tuesdays in each month. The Hon. Secretary is S. Wood, G3EZX, 51 Henshall Avenue, Latchford, Warrington.

Filmstrips for Groups and Clubs

Mullard Filmstrips: Three new titles have recently been added to the series of Mullard 35 mm. Educational Filmstrips. These are: **No. 9—History, Development and Principles of the Cathode-Ray Tube (in colour);** **No. 10—Construction and Manufacture of Television Picture Tubes (in black and white);** and **No. 13—The Story of Radio (in black and white).** Each filmstrip carries between 30 and 40 illustrations. A printed booklet of lecture notes, which can be either read verbatim or used as the basis of a talk, is also supplied.

For a single showing, the filmstrips may be obtained on loan free of charge by applying to **Technical Publications Department, Mullard Ltd., Century House, London, W.C.1.**

* * *

The Editor will be pleased to receive additional items for inclusion in this feature.

Around the Trade

It is surprising how easily trimming tools and small accessories such as feeler gauges and B.A. spanners can get lost, even in the best regulated workshop or shack. Most radio amateurs and radio-television engineers and servicemen have at some time or other experienced that frustrated feeling when hunting frantically for an end or side trimmer amidst a pile of assorted tools, components and junk in the middle of a difficult alignment. The Master Trimmer Kit,



The Master Trimmer Kit measures only $4\frac{1}{2} \times 4 \times 1$ inch deep, and fits easily into the pocket.

manufactured by J. & S. Newman, Ltd., offers one solution to the problem. In a neat, pocket-size, black crackle-finish metal box are securely clipped the following useful items: one end trimmer, side trimmer, Yaxley switch contact adjuster, low capacity trimmer, screwdriver, a set of feeler gauges, six box spanners (from 1 to 8 B.A.), and a set of four spanners (from 0 to 8 B.A.).

The kit is obtainable at 25/6 post free from the manufacturers at 100 Hampstead Road, London, N.W.1.

G2AK

This Month's Bargains

G2AK

COMPLETE NOISE LIMITERS: Wired on a small sub-chassis with 6H6 type valve, boxed, with circuit and instructions. Only 5/-. post free.

TRANSMITTING TUBES: Type 807, 10/- each; 813, new and boxed, £3 10s. each; 723A/B Klystron, £3 each; 866A, 17/6 each. Few only.

HEAVY DUTY L.F. CHOKES, Fully Potted: 30 H. 100 mA, 150 ohms (weight 14lb.), Price 13/6. 20 H. 126 mA, 100 ohms (weight 14lb.), Price 15/6. 30 H. 150 mA, 150 ohms (weight 18lb.), Price 17/6. All carriage paid. Eire 5/- extra.

20 H. 120 mA, unshrouded chokes, new goods. Price 15/9. Packing and postage, 1/6.

HEAVY DUTY POTS: 500 ohms only. Toroidal type by P. X. Fox, worth 15/-. Our Price 3/6 each.

MORSE PRACTICE SETS, with double-action buzzer, output for phones, excellent key. Requires only 4½ V. battery. As new, 7/6, postage and packing 1/-.

THROAT MIKES: Dual unit, 4/- each. Postage 6d.

TWIN FEEDER: 300 ohm Heavy Twin Ribbon Feeder 5d. per yard. Standard K25 300 ohm. Twin Ribbon Feeder 9d. per yard. K24, 150 ohm 9d. per yard. Co-ax. Cable, ½" dia, 70 ohm 8d. per yard; ¾" dia, 1/3 per yard. Post on above feeder and cable 1/6. any length.

HEAVY DUTY 10 W. push-pull output transformers, 15-1, 22-1 and 45-1, 15/9. Packing and postage, 1/6.

TANNOY POWER MIKES: Few only, 7/6 each. Post 1/-.

AMERICAN Single Button Carbon Breast Mikes with aluminium diaphragm. Beautiful job. Only 5/- each. Packing and postage, 1/-.

R.F. CHOKES: Pie wound, 2.5 mH., 100 mA., receiver type, 9d. each, or 7/6 per doz.; 250 mA., transmitter type, 1/- each, 10/- per doz.

STATION LOG BOOKS: 200 pages, printed one side only. Size 8½" x 11". First-class paper and bound with heavy cover. Price 17/6, post free.

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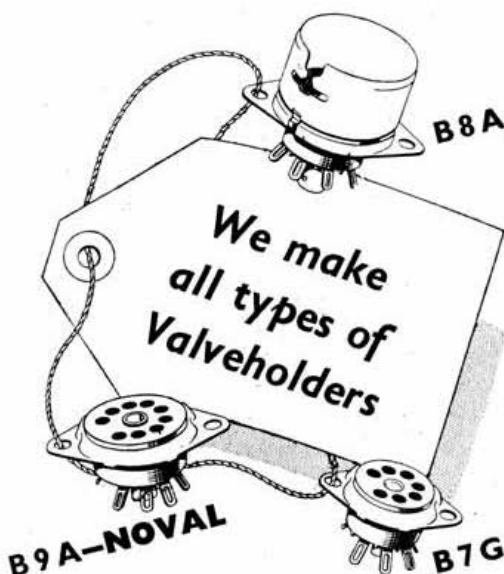
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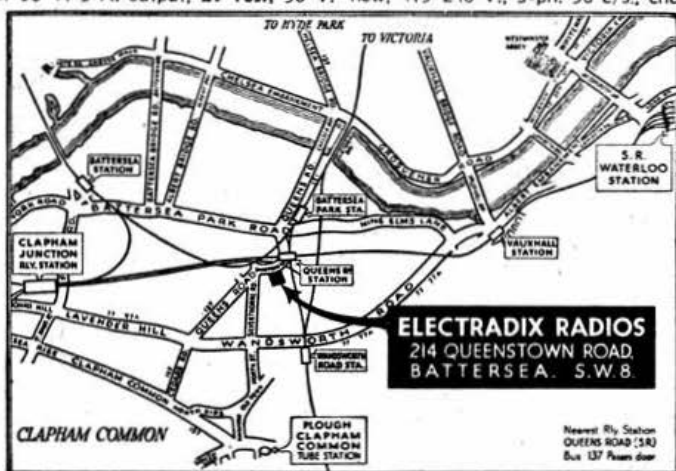
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(Continued on Page 240)

EXCHANGE & MART SECTION

(Continued from Page 239)

NEW and unused RG1/240A (2), £1; RK28A (2), 30s.; VT62 (2), 12s. 6d.; GU50 (4), 7s. 6d.; Det. 19 (2), 8s. 6d.; TV05 (12), 7s. 6d.; 2A2A, 10s.; 2A3 (4), 7s. 6d.; all prices each valve. 1 A. 250 V. circuit breaker, 6s. Utility Vernier dial, 3s. 6d. 100 mA. 2 1/2" projecting meter (new), 4s. 6d. Transformer 200/250 A.C. secs., 310 V.-175 mA., 4,000 V.-1.1 mA., 6.3V.-4A., 4V.-22A. and three 4V. 1-2A. windings, 17s. 6d. Box of large and small fixed variable condensers, resistors, chokes, R.F. chokes, Jones plugs, dials, etc., 10s. the lot. Heavy G.P.O. key, 3s. 6d. Wanted, 5R4GY.—G6CB, 7 Caxton Road, Wimbeldon, S.W.19. (15)

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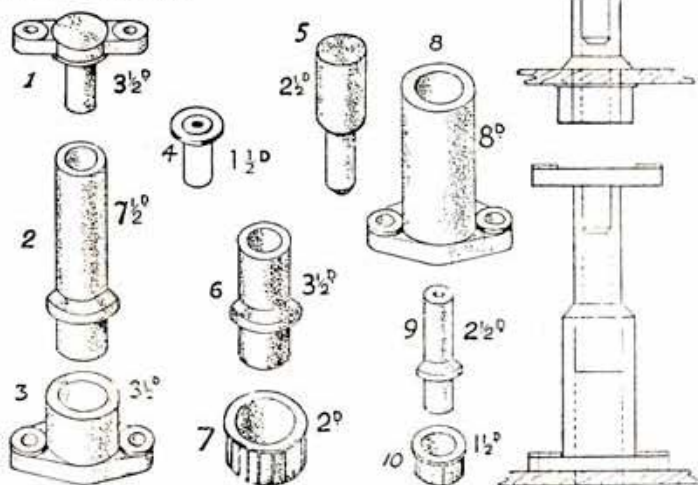
A series of moulded parts enabling users to build up a series of Stand-offs, Feed-throughs, etc.

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With ten Standard Units some three dozen useful components can be assembled, ranging from a $3\frac{1}{2}$ " wall-mounting Stand-off using 2, 5 and 8 to a $\frac{3}{4}$ " Feed-through using 9 and 10.

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Excellent H.F. Insulation. Unbreakable. Colour identification.



Sample Kits of 19 representative parts 5s. post free.

Assembled sets loaned for demonstration at Branch Meetings, etc.

Enquiries for individual fabrications and Trade mouldings for Radio and T.V. welcomed. Further particulars and Price Lists forwarded on request.

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PROGRESS REPORT

on the

PR-120-V



Since the PR-120-V was announced, the prototype has been subjected continuously to the most stringent and exacting tests. We are pleased to say that the results have been very satisfactory. As the design of the PR-120-V is the result of three years' intensive study on the problems of T.V.I. by one of the country's best known highly qualified radio engineers, we were expecting something really good. We were not disappointed, neither will you be.

There are, however, certain delays in deliveries of some components. We do still think that we will maintain our production schedule to commence deliveries December next.

We shall be exhibiting this remarkable piece of equipment at the forthcoming R.S.G.B. Amateur Radio Exhibition, Stand No. 9.

PANDA RADIO CO., 58 School Lane, Rochdale

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WORKS: 16-18 Heywood Road, Castleton, Nr. Rochdale.

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