

R.S.G.B.



BULLETIN

April 1951

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Radio Society of Great Britain

Editor :

JOHN CLARRICOATS

Editorial Office :

NEW RUSKIN HOUSE,
LITTLE RUSSELL STREET,
LONDON, W.C.1

Telephone : Holborn 7373



Advertisement Manager :

HORACE FREEMAN

Advertising Office :

PARRS ADVERTISING LTD.,
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Contents

APRIL 1951

Editorial	365	In the Workshop	372	The International	
An Earthen-Grid Triode		The Propagation of Metre		Amateur Radio Union	380
Pre-Amplifier	366	Waves Beyond Optical		Amateur Radio and the	
A Crystal Filter for the		Range	374	Festival of Britain ...	382
R1155 Receiver	370	The Month on the Air	376	Two-Metre Contests 1951	384
Varnishes and Waxes for		Around the V.H.F.'s ...	378	Headquarters Calling ...	387
the Radio Amateur ...	371			Around the Regions	388

Forthcoming Events

REGION 1

Ashton-under-Lyne.—May 6, 3 p.m., New Jerusalem Schools.
Blackpool.—May 15, 7.30 p.m., Barclays Bank Chambers,
2 Birley Street, 2nd floor.
Bolton.—May 1, 8 p.m., Y.M.C.A.
Bury.—May 10, 7.30 p.m., Y.M.C.A.
Burnley.—May 2, 7.30 p.m., Mechanics' Institute, Manchester
Road.
Chester & District A.R.S.—Each Tuesday, 7.30 p.m., The
Tarran Hut, Y.M.C.A.
Darwen & Blackburn.—April 20, 7.30 p.m., Y.M.C.A., Lim-
brick, Blackburn.
Oldham.—Alternate Wednesdays, 7.30 p.m., Civic Centre,
Clegg Street.
Manchester.—May 7, 7.30 p.m., Reynolds Hall, School of
Technology, Sackville Street.
Preston.—April 27, May 11, 7.30 p.m., Three Tuns Hotel,
North Road.
Rochdale.—May 6, 3 p.m., Drill Hall, Baron Street.
Southport.—April 16, May 21, 8 p.m., 38a Forest Road.
Liverpool.—April 28, May 12, 2.30 p.m., The Mansion House,
Queens Drive, West Kirby.
Wirral.—April 25, May 9, 8 p.m., Y.M.C.A., Whetstone
Lane, Birkenhead.

REGION 2

Barnsley.—April 27, May 11, 7.30 p.m., King George Hotel,
Peel Street.
Bradford.—April 17, May 1, 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.—May 9, 7.30 p.m., Black Bull, Market Place.
Gateshead.—Thursdays, 7 p.m., Y.M.C.A., Sutherland Hall,
Durham Road.
Hull.—April 25, 7.30 p.m., R.E.M.E. Barracks, Walton St.
Leeds.—Fridays, 7.30 p.m., Swarthmore Educational Settle-
ment, Woodhouse Square.
Middlesbrough.—Thursdays, 7.30 p.m., All Saints' Hall,
Grange Road.
Newcastle-upon-Tyne.—April 30, 8 p.m., British Legion
Rooms, 1 Jesmond Road.
Rotherham.—Wednesdays, 7 p.m., Oddfellows' Hall, West-
gate.
Scarborough.—Thursdays, 7.30 p.m., L.N.E.R. Rifle Club,
West Parade Road.
Sheffield.—April 25, 8 p.m., Dog & Partridge, Trippett Lane;
May 9, 8 p.m., Albreda Works, Lydgate Lane.
Snaithwaite.—Fridays, 7.30 p.m., 3 Dartmouth Street.
Spenborough.—May 2, May 16, 7.30 p.m., Temperance Hall,
Cleckheaton.
Wakefield.—April 18, 7.30 p.m., Service House, Providence
Street.
York.—Wednesdays, 7.30 p.m., Community House, Falsgrave
Crescent

REGION 3

Birmingham (South).—May 6, 10.30 a.m., Stirchley Institute.
Coventry.—April 20, 7.30 p.m., Priory High School, Wheat-
ley Street.
Stourbridge (S. & D.A.R.S.).—May 1, 8 p.m., King Edward's
School.

REGION 4

Derby (D. & D.A.R.S.).—April 25, May 9, 7.30 p.m., Club
Room, Sub-Basement, Derby School of Arts & Crafts,
119 Green Lane.

Leicester (L.A.R.S.).—April 16, May 7, 7.30 p.m., Holly
Bush Hotel, Belgrave Gate.
Loughborough.—May 9, 7.30 p.m.
Mansfield (M. & D.A.R.S.).—May 6, 3 p.m., Swan Hotel.
Newark.—April 15, 29, May 13, 7 p.m., North Gate House,
North Gate.
Northampton (N.S.W.C.).—May 4, 7 p.m.; otherwise on
Fridays, 6 p.m., Club Room, 8 Duke Street.
Nottingham.—April 16, 30, May 14, 7.30 p.m., Lord Nelson
Hotel, Carlton Street.
Retford.—May 6, 3 p.m., Community Centre, Chapel Gate.
Spalding.—April 26, 7.30 p.m., 10 South Parade.
Worksop.—May 7, 7.30 p.m., King Edward Hotel.

REGION 5

Chelmsford.—May 1, 7.30 p.m., Smith's Radio Shop, 184
Moulsham Street.
Southend (S. & D.R.S.).—April 25, 7.45 p.m., G2BHA, 27
Park Road; April 27, Annual Social Event, Middleton
Hotel, tickets 3s. 6d.; May 11, Room 1, Municipal
College, Southend, "Problems of High Fidelity Repro-
duction," by Mr. J. A. Youngman (Goodmans).

REGION 6

High Wycombe.—April 24, 7.30 p.m., at Mr. N. Stacey,
"Green Lodge," Ridgeway.

REGION 7

Barnes & Richmond.—May 8, 7.30 p.m., 22 Lowther Road,
Barnes.
Brentwood.—April 27, May 11, 8 p.m., Drill Hall, Ongar
Road.
Chingford.—April 26, May 10, 8 p.m., A.T.C. H.Q., Pre-
toria Road.
Croydon (Surrey R.C.C.).—May 8, 7.30 p.m., "Blacksmith's
Arms," South End, Croydon.
Dulwich & New Cross.—May 7, "Kentish Drivers," Rye
Lane, S.E.15.
East Surrey R.C.—Barn Room, 8 Lesbourne Road, Reigate.
East London District.—April 22, 3 p.m., "Radio Control of
Models," Mr. G. Honnest-Redlich, Town Hall, Ilford.
Edgware (E. & D.R.S.).—Every Wednesday, 22 Goodwin
Avenue, Mill Hill.
Enfield.—May 20, 3 p.m., George Spicer School, Southbury
Road.
Finsbury Park.—April 17, 7.30 p.m., 164 Albion Road, Stoke
Newington, N.16.
Gravesend.—Every Wednesday, 7.30 p.m., 30 Darnley Road.
Guildford.—3 p.m., Royal Arms Hotel, North Street.
Hampstead.—1 Broadhurst Gardens, N.W.6.
Hays & Uxbridge.—April 6, 7.30 p.m., "The Vine,"
Uxbridge Road.
Hoddesdon.—May 3, 17, 8 p.m., The Salisbury Arms.
Holloway (G.R.S.).—Mondays, Wednesdays and Fridays,
7.30 p.m., Grafton School, Eburne Road, N.7 (one
minute from the "Nag's Head").
Kensington-Shepherds Bush.—8 p.m., 38 Royal Crescent,
London, W.11.
Lewisham (R.A.R.C.).—Wednesdays & Thursdays, 7 p.m.,
Childeric Road School, New Cross.
New Barnet.—May 12, 7.30 p.m., "Bunny's Restaurant,"
Station Road.
Norwood District.—April 28, 7.30 p.m., G2VB, 35 Granse-
cliffe Gardens, South Norwood. Bus 49, 68 and 68a
to All Saints' Church. A p.c. if attending.

(Continued on Page 389)

Great Clearance Offer OF BRAND NEW & PERFECT Cathode Ray Tubes & Valves

CATHODE RAY TUBES

CV No.	Civilian No.	Dia. in inches	Focus	Defn.	EHT	O.K. for T.V.	Price	Rail, Pkg. & Insur.
600	5CP1	5	E.S.	E.S.	2 kV.	Yes	25/-	2/6
1384	—	11.5	E.S.	E.S.	4 kV.	Expmtl.	40/-	10/-
1516	VCR516	9	Mag.	Mag.	5 kV.	No	40/-	10/-
1522	VCR522	1.75	E.S.	E.S.	800 V.	Yes	15/-	1/6
2880	EM14/1	3	E.S.	E.S.	800 V.	Yes	17/6	1/6
3776	—	5.25	E.S.	E.S.	4 kV.	Expmtl.	20/-	2/6

Acorn Valves: Type 956, 2/6 each, 20/- per dozen. Type 958A, 3/- each, 24/- per dozen.
Types 9004, 9005, 3/6 each.

VCR 517C C/R Tubes 6½" diam.: Green/Blue Screen. Excellent for T.V., 20/-. Base 2/6, carriage, packing and insurance 5/-.

In addition we offer the following tubes at the ridiculous price of 5/- each (preferably to callers only as packing, carriage and insurance amounts to 7/6). Types available, **ACR1, ACR2, ACR2X, ACR8, ACR1381.**

VCR 97 C/R Tubes. Have slight cut-off making them unsuitable for T.V. use, otherwise perfect, 10/- each. Base, 2/6, plus 5/- carriage, packing and insurance.

UHF Oscillators, Type RL18, 5/- each, 40/- per dozen.

Thyratrons, Type CV 1141, 6/6 each, 50/- per dozen. Type CV 22, 20/- each.

1-kilowatt Pentodes, Type 861, 20/- (callers only).

UHF Triodes, Type 7193, 1/6 each, 12/- per dozen.

Bayonet Base (Side Contact) Output Valves, Type EL50, 6.3 V., 5/- each.

Output Triodes, Type DET 5. An excellent replacement for PX25, 10/- each, 75/- per dozen.

25 watt Pentodes, Type PT 25H, 4 V. 400 V., 3/- each, 24/- per dozen.

Miniature Valves CV3830 (XH 1.5), 2/6 each, 20/- per dozen.

Transmitting and Special Purpose Valves. Special Offer. Types 8012, 830B, 878, 705A, 843, 1625, 1616, 4C27, 703A, EL266. Any of the above, 5/- each.

Type E1148, 1/6 each, 12/- per dozen.

Type CV52, 4/6 each.

Bayonet Base (Side Contact) Low Noise H.F. Pentode, CV1123 (EF8), (VR123), 6.3 V., 5/- each, 36/- per dozen.

T.R. Box, Type CV115, 5/- each. Magnetron, CV186, 10/- each.

ARP3 Valves, 13 V. 2AHF Pentodes, 3/- each, 24/- per dozen.

V/M Pentodes CV1124 (MSPEN), 4 V. 7-pin base, 5/- each, 36/- per dozen.

EHT Rectifiers, Type 2X2/879, 2/6 each, 20/- per dozen.

THE FOLLOWING CAN BE SUPPLIED AT 6/6 EACH

12J5, 77, 80, 84, 12SC7, 12SK7, 12C8, 12SK7, 12SH7, 38, 1A5GT, 1LC6, 1S4, 1T4, 3A4, 6AC5, 7E7, 7H7, 7Q7, 7R7, 1Q5, 5Y4G, 6B8, 6B8G, 6K6GT, 6K7G, 6K7GT, 6AB7, 6F6G, 6J7G, 6L7, 6SL7GT, 6N7GT, 6SQ7GT, 6SK7, 6SG7, 6U5, 6SS7, 6R7, 6SF5, 1C5GT, 1LD5, 1LN5, 1E7G, 37, 0Z4A, 713A, 3B7, 3D6, 717A, 1626, 6A7, 6B7, 6C5, 6J5, 6C8, 6C6, 6D6.

THE FOLLOWING CAN BE SUPPLIED AT 8/6 EACH.

25A6GT, 6Q7G, 5V4G, 1622.

SPECIAL OFFER—NOW AVAILABLE

C.R. Tubes, Type ACR13 (CV1385). A perfect replacement without alteration for the VCR97. Guaranteed free from "cut-off," price 35/-. Send 3d. for latest valve list of hundreds of types at lowest prices.

TERMS OF BUSINESS

Postage and Packing is free for orders over £2 in value unless otherwise stated. Under this amount, please include 1/- for orders up to 10/-, and 1/6 for orders over 10/-. C.O.D. orders cannot be sent under 20/-.

152-153 FLEET STREET, E.C.4. Phone: CENTral 2833—and at—207 EDGWARE RD., W.2. Phone: AMB 4033
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CURRENT COMMENT

BY YOUR WORDS—

THE ethics of making a contact over the air have been discussed in this and other Amateur Radio publications on numerous occasions but seldom more soundly than in the March issue of *Short Wave Magazine*, where Old Timer, L. H. Thomas, G6QB, focuses attention on some of the strange, and often selfish, customs that have grown up in recent years among certain sections of the DX fraternity. It is not our intention, here, to enlarge on his remarks, but rather to draw attention to another aspect of operating behaviour which, unless checked, may well lead us into deep waters. We refer to bad manners and the use of improper language on the air. Many of the remarks are made to sound big and to impress the "locals," rather than to cause offence, but occasionally words more suited to the fish market than to an amateur shack are uttered to the dismay and disgust of listeners, some of whom are young, impressionable short-wave enthusiasts. But perhaps the worst offender is the man who specialises in the *risque* story and puts over a joke in poor taste.

All who speak over an amateur station would do well to remember that they *speak in public*. By what they say and the manner of its saying both they and Amateur Radio in general will be judged. An amateur station is not just one end of a private telephone line, it is, for all practical purposes, a broadcasting station with myriads of potential listeners. Let us then, on all occasions, choose our words with care and speak with decorum.

PLAY-BACK RECORDINGS

A WORD of advice is due to those who make a practice of playing-back over the air recordings of amateur transmissions. It is one thing to make a recording of a transmission from a station with whom we are in contact and to play back the recording immediately in order to give the operator some idea of the quality and strength of his signals. It is quite another matter, however, to play back the recording—complete with call signs—on some later occasion when the station concerned is not on the air and without having secured the permission of the operator.

Is it to be wondered at that confusion is often caused when such practices persist? It would be a great pity if the G.P.O. introduced restrictions just because a few careless amateurs failed to watch their step.

A QSL PROBLEM

WHILST a tape recording may one day supersede the more normal form of QSL to which we are accustomed, the pasteboard card is still the accepted device most of us use to confirm a contact. For good and sound reasons it has for many years been the custom of the R.S.G.B. and most of the other I.A.R.U. Societies to allow non-members to collect their cards from the appropriate QSL bureau. Recently, however, one or two of the European Societies have been returning cards addressed to non-members of that particular Society. Whilst it is no business of ours to dictate the policy to be followed by other Societies in this matter we cannot help feeling that if the principle of refusing cards addressed to non-members is extended it may well lead to the establishment of unofficial QSL agencies throughout the world. In the meantime the R.S.G.B. will discuss the problem with the Societies concerned pointing out that the practice of accepting cards from non-members tends to bring in new members, rather than the reverse.

CONVENTION

THIS issue carries, as a loose leaf, an official order form listing the various functions and events which have been arranged to take place during the forthcoming National Convention.

From now until June will be a busy time for the Convention Committee but their work will be greatly simplified if those members who intend to support Convention will complete and return the order form promptly.

There is every indication that this Festival of Britain year Convention will be the biggest and brightest ever staged by the Society. Don't be one of those who will say afterwards, "I wish I had been there"!

**COMPLETE AND RETURN THAT
FORM NOW**

AN EARTHED-GRID TRIODE PRE-AMPLIFIER for the Two-Metre Band

SIGNAL frequency amplification, even at two metres, is not difficult to obtain with modern valves, but unless this additional gain is accompanied by a higher signal-to-noise ratio no advantage will be apparent in the weak signal performance of a receiver. Put another way, a receiver may produce a signal of S3 against a noise background of S2. If the R.F. amplification is increased the signal may be brought up to S5 but, unless the signal-to-noise ratio has been improved, the background will now be S4; so that the decisive one S point margin remains unaltered.

tice for a valve (*i.e.*, the input is fed to the grid, output taken from the anode, and the cathode held at zero potential for R.F.), the earthed-grid circuit reverses the roles of two of the electrodes to achieve the same end. The output is still taken from the anode but the grid is now the electrode at zero R.F. potential, and as such acts as a screen between the anode and cathode, which becomes the input electrode.

With a valve designed for this service there is no difficulty in obtaining stable amplification without neutralisation, and as the earthed-grid triode is naturally a wide-band device (due to the

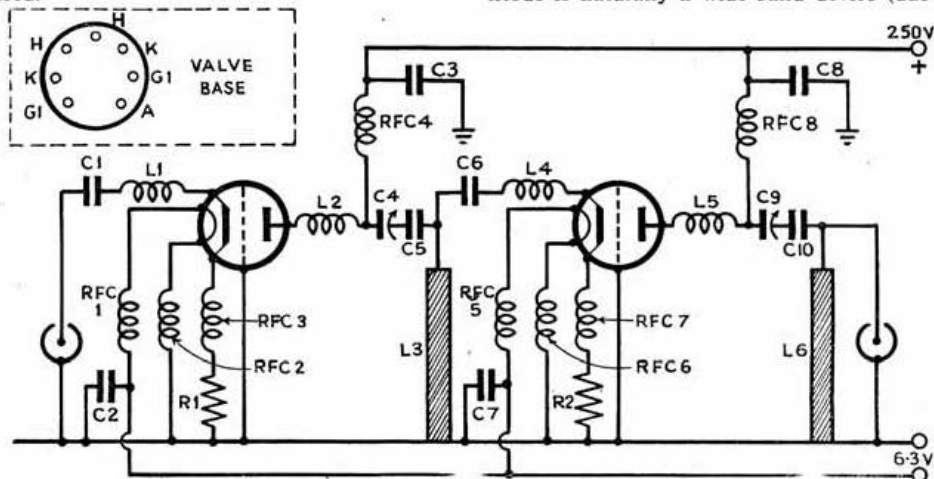


Fig. 1

The circuit diagram of the pre-amplifier. Inset is an under-chassis view of the connections to the Mullard EC91 valve.

C1, 5, 6, 10 200 μ F. T.C.C. Type CC43h.
C2, 3, 7, 8 500 μ F. T.C.C. "Micadisc."
C4, 9 3-30 μ F. Philips trimmers
L1 8 t. 20 S.W.G. $\frac{1}{2}$ in. diam. spacing one wire diam.
L2, 5 4 t. 14 S.W.G. silver plated $\frac{1}{2}$ in. diam. spacing one wire diam.

L4 4 t. 20 S.W.G. $\frac{1}{2}$ in. diam. spacing one wire diam.
L3, 6 See text and Fig. 5 (c)
R.F.C. See text and Fig. 5 (a)
R1, 2 150 ohm $\frac{1}{2}$ watt Erie.
V1, 2 EC91 Mullard.

The pre-amplifier described here has been designed not only to give substantial signal frequency gain, but also, at the same time, to effect an improvement in noise factor except in those few cases where the performance of the receiver is already well above average. Particularly is this amplifier recommended for use with receivers employing an R.F. pentode—inherently more noisy than a triode—in the first stage. A further advantage to be expected from its addition to an existing receiver is the almost certain elimination of I.F. break-through.

The Circuit

There are two ways in which a triode may be used as an R.F. amplifier: neutralised, or connected in an earthed or common-grid circuit. Both arrangements are designed to prevent undesirable feedback from output to input through the valve capacity, but whereas the first type of circuit follows what is regarded as normal prac-

low impedance input) it fits conveniently into the normal requirement of a 144-146 Mc/s. R.F. stage with tuning pre-set to the centre of the 2 Mc/s. wide band. Admittedly the rejection of second-channel signals is negligible, but with present-day frequency allocations on either side of the amateur band this is unimportant. Provided the I.F. of the receiver exceeds one megacycle no images of amateur signals will fall within the band.

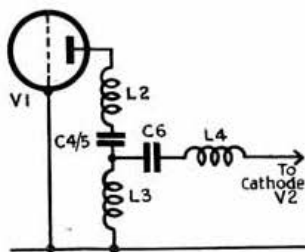


Fig. 2

Type of inter-valve coupling circuit employed.

* 32 Earls Road, Tunbridge Wells, Kent.

A number of amateurs used E.G.T. technique on the 58 Mc/s. band with some success, but the employment of similar circuitry on the higher frequencies generally led to disappointing results. The circuit now described, however, avoids many of the snags usually associated with E.G.T. amplifiers and is based on one developed during the war by *Mullard Electronic Products, Ltd.*, for radar receivers operating on approximately 200 Mc/s.

It will be seen on reference to Fig. 1 that series tuning is employed in the two anode circuits; the input to V2 and the output being developed across L3 and L6 respectively. The impedance to earth at these points is of the order of 80 ohms. For this reason the earthy end of each circuit consists of a piece of copper strip, the dimensions of which make it "look" like the desired impedance at the frequency concerned.

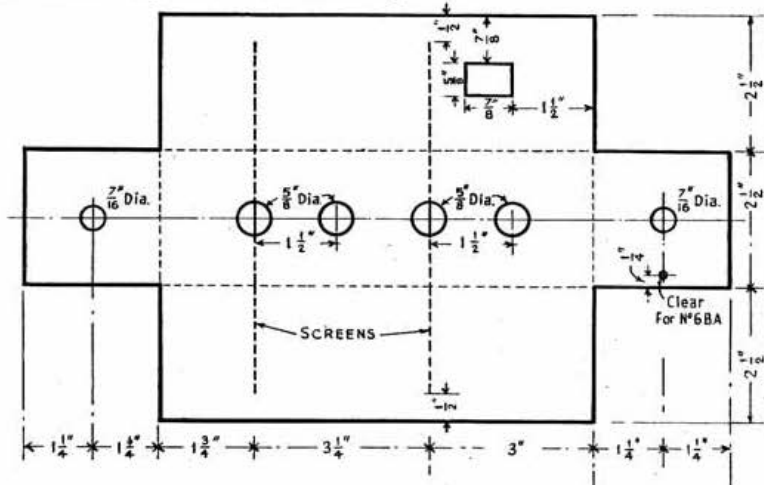
To make this arrangement more readily understandable, the equivalent circuit appears in Fig. 2, from which it will be seen that the input for

installations where the input impedance was of the order of 80 ohms, but if a diode noise generator is available this point can quickly be checked.

I.F. Break-through

Where a tunable converter is employed the I.F. may be chosen to avoid those frequencies on which strong stations operate, but there is always the possibility of static disturbances getting through the converter and raising the general noise level. In the case of the popular crystal-controlled converter the main receiver has to cover a tuning range of two megacycles, and it is consequently all the more difficult to guard against unwanted break-through. An important advantage to be gained from this pre-amplifier is the almost complete attenuation of unwanted signals at the I.F. from the receiver input. This is due to the copper strip sections of the tuned circuits acting as most effective short circuits at all lower frequencies.

Fig. 3.
Drilling diagram for the 16 S.W.G. aluminium chassis. The input end of the amplifier is at the right-hand side.



V2 is taken through the matching inductance L4 from a tapping on the anode tuned circuit of the previous stage. The tuning condenser C4 and blocking condenser C5 serve also as the coupling capacity between the two parts—L2 and L3—of the anode tuned circuit, and the gain will therefore depend to a certain extent upon their value. This, like all other component values in the amplifier, is by no means critical; provided that, when the circuit is in resonance, C4 is between 15 and 30 μ F, the performance will be satisfactory. A high L to C ratio at this point leads to a *lowering* of gain as does a decrease in the length of copper strip L3, but in both cases the noise factor remains unaffected over quite a wide range of values.

With the two *Mullard* EC91 valves specified the overall gain of the amplifier is considerable, and may be quite sufficient to overcome the inherent noise of a diode or triode mixer without further amplification. However, as this unit was intended primarily to precede an existing R.F. stage the pursuit of gain alone was not considered of major importance.

The noise factor of the amplifier is controlled to a large extent by the value of L1 which serves to match the feeder impedance to that of the cathode of V1. If on completion of the unit the noise factor is not satisfactory, adjustment of L1 is thus likely to be more rewarding than attention to any of the remaining coils or strips. The value shown has proved correct with several

Construction

The amplifier is built on a 16 S.W.G. aluminium chassis of the dimensions shown in Fig. 3 and provided with a shallow tray which closes the base and which is held in position with P.K. self-tapping screws. The two internal copper screens are therefore only 2 in. deep in order to clear the $\frac{1}{2}$ in. lips of this tray. For the original model, all metal work was carried out by *Messrs. E. J. Philpott's Metal Works, Ltd.*, of Chapman Street, Loughborough.

Owing to the somewhat restricted space beneath the chassis, assembly should proceed in a definite sequence for ease in making connections. The first components to be mounted are the two B7G valveholders, with pins 1 and 7 parallel to the transverse screens, followed by the two co-ax. sockets. L6, the output copper strip, is bolted to the end-plate of the chassis alongside the socket by means of a short 6 BA bolt and nut. Care must be taken to ensure good connection between the copper strips L3 and L6 and the chassis or copper screen, as a low impedance at these points is most important.

The heater and cathode R.F. chokes (R.F.C. 1, 2, 3, 5, 6 and 7) are next fixed to the chassis close to their respective valveholders, and the *Belling-Lee* 3-pin power socket fitted through the cut-out provided on the side of the chassis. C1, L1 and L4 should be wired in place at this stage, and connections made between the chokes and the

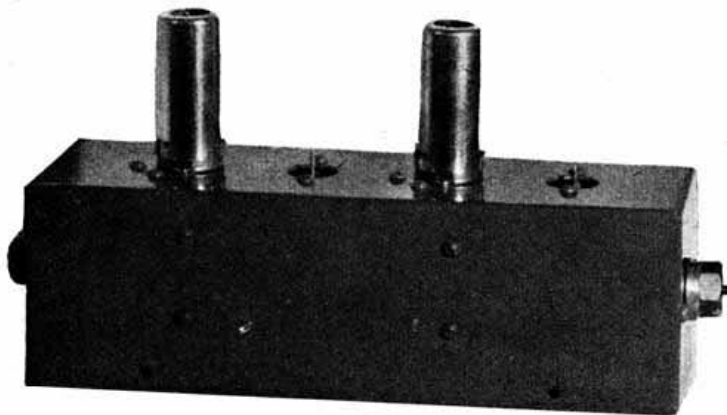
tags on the valveholders. Full details for constructing the R.F. chokes will be found in Fig. 5(a).

The T.C.C. "Micadisc" by-pass condensers are secured to the screens in the positions indicated in Fig. 4 by drilling $\frac{1}{8}$ in. holes, pressing the three small lugs over the edge of the hole, and soldering in place. Each "Micadisc" condenser serves as a feed-through for the heater or H.T. leads which pass through the screens. These leads—which constitute the entire wiring of the unit!—should be so disposed at the sides of the chassis as not

an attempt to solder these connections direct to the copper screens will almost certainly result in the heat melting the bases of the R.F. chokes.

The polystyrene "bridges" with the *Philips* trimmers already mounted are now screwed to the chassis, and the necessary connections made to the various blocking condensers. The two anode coils, L2 and L5, are soldered in position last of all.

It should be noted that when drilling or cutting the polystyrene it is *essential* to keep the twist-drill or hacksaw blade well lubricated to avoid



Side view of the 2-metre pre-amplifier.

to get in the way of components to be mounted later.

All earth connections, with the exception of L6 already mentioned, are made to the screens, and as much work as possible should be done on these before they are bolted in place. R.F.C.s 4 and 8 are also mounted on the screens so that connections between them and their respective anode coils and by-pass condensers are as short as possible. With the screens in position the remainder of the heater and cathode wiring may be completed, and wires run from a soldering tag on each screen just above the valveholders to the two GI tags and the small cylindrical screen on each holder. The use of a tag is advised here as

"binding." A thin oil, such as the popular "Three-in-One," will be found satisfactory for this purpose. The windings of the R.F. chokes and the pillars of the "bridges" are held in position with an application of "Denfix" polystyrene cement.

It is important to make sure, when connecting the *Philips* trimmers, that the end of each anode coil is taken to the soldering tag coming from the *body* of the trimmer, and not to the central pin; otherwise the screw exposed on top of the chassis carries H.T. voltage.

The use of T.C.C. "Micadisc" 500 μ F. by-pass condensers is advised partly to ensure as low inductance a path as possible for the heater and H.T. by-pass connections, and partly on account of their convenience in acting as "feed-throughs." They could, however, be replaced by T.C.C. silvered moulded mica condensers of similar capacity without serious loss of efficiency. All other fixed condensers should be the ceramic tube type CC43h as these were found to be definitely superior to other types tested.

The tubular valve screens are not essential in the interests of stability, but they improve the appearance of the amplifier and provide a ready method of ensuring that the valves remain firmly in their holders and are protected against accidental knocks.

Operation

After the wiring has been completed and tested, 6.3 volts for the heaters and 250 volts H.T. should be applied through the *Belling-Lee* type L1113 socket from any convenient power pack, and a check made with a voltmeter across each of the cathode bias resistors. A reading in the region of 1.5 volts indicates that the recommended current of 10 mA. is flowing through each valve.

A short length of 80-ohm co-axial cable should be used to connect the output socket of the pre-amplifier to the input of the receiver or converter. Then with an 80-ohm co-axial aerial

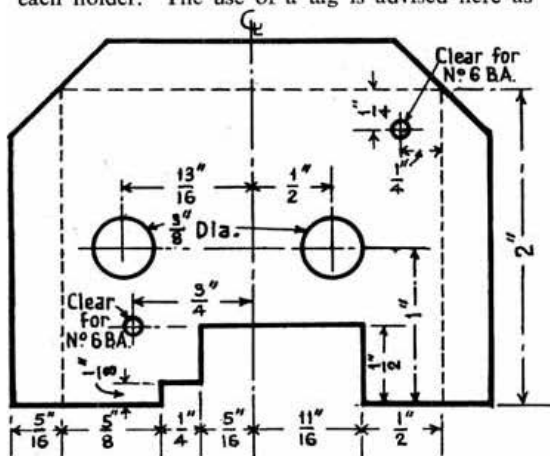


Fig. 4.

Fig. 7.

Details of the 22 S.W.G. copper screens, of which two are required, as seen from the *input* end of the amplifier. The flanges are bent *downwards* in this view, at the dotted lines. The folded width is such as to fit closely across the chassis. The 6 B.A. hole shown at the right hand top corner is required only in the second screen for mounting L3.

input connected, trimmers C4 and C9 should be varied in turn until the background noise is at its highest. It may be found that in order to obtain an even coverage of the whole of the two metre band this adjustment should be made at a frequency slightly to the low side of 145 Mc/s. It will be found that the two trimmers tune quite sharply, and they should both be nearly at their full capacity when at resonance; this may require some adjustment of the appropriate anode coil. When one or both of the trimmers are set at low capacity, instability may occur and the resulting increase in noise easily mistaken for resonance.

With the I.F. gain on the receiver set at its normal position, the background noise may appear to be intolerably high. This is to be expected with such greatly increased signal frequency amplification, and does not indicate that the pre-amplifier is noisy. The I.F. gain should be reduced until the background is at a low level, and a search made for weak signals to test the effectiveness of the unit. Unless the receiver itself is capable of giving exceptional performance what were previously weak signals should now appear much further out of the background and altogether more "solid."

The gain of the pre-amplifier is in the neighbourhood of 30 db. This may prove excessive if the converter already possesses considerable R.F. gain, and it has been found that the most satisfactory method of reducing gain is to decrease the length of L3 by one inch, thus making its overall length similar to L6. It has also been found inadvisable to employ a length of co-axial cable approximating to one-quarter wavelength between the pre-amplifier and the converter, as this may cause difficulties in tuning the converter or even cause instability.

In the original Mullard development work CV66 (RL37) type valves were employed. These have been tested by the author and gave excellent results in the circuit described. Modifications for their use include a larger chassis to accommodate the B9G valveholders, a slight reduction in the inductance of L2 and L5 by spreading the turns, and possibly a smaller number of turns in L1.

CV66s are out of production, but are still obtainable from various sources.

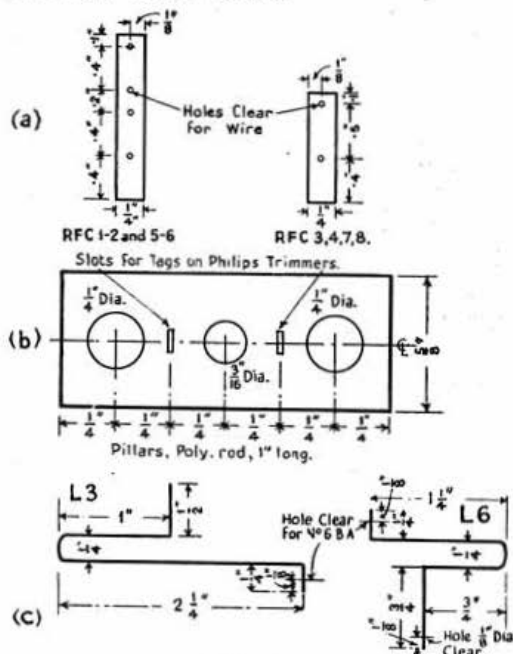


Fig. 5.

- All chokes are wound on $\frac{1}{4}$ in. diameter polystyrene rod with approximately 20 in. of wire. Nos. 1-2 and 5-6 have 24 S.W.G. enamelled wire close wound, the remainder 34 S.W.G. enamelled wire spaced to occupy the winding length. All are drilled and tapped 6 B.A. at their lower ends.
- Two polystyrene "bridges" are required to support the Philips trimmers. The platform is $\frac{3}{16}$ in. thick.
- Details of L3 and L6. The material is 16 S.W.G. copper strip $\frac{1}{4}$ in. wide.

Finally the writer would welcome comments and experiences from those who construct this piece of apparatus, and takes this opportunity of acknowledging his indebtedness to Mr. F. Barnard, G4FB, for his assistance in the early work on this amplifier.

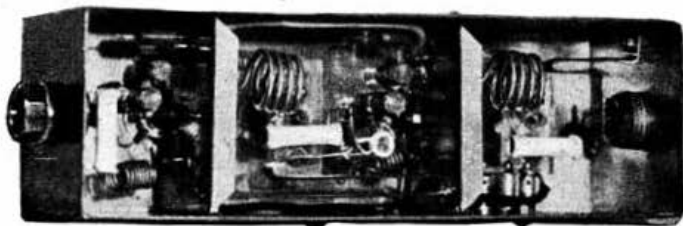


Fig. 6

Under chassis views showing disposition of main components. The bare wire running parallel to the long side of L3 is an earthing connection bonding the two screens.

A Crystal Filter for the R1155 Receiver

By G. B. HORSFALL (G3GKG)*

IN view of the congested state of the amateur I bands, especially the C.W. sections, a crystal filter is a desirable, if not an essential, feature for any communications receiver. The R1155—probably the most widely used of all “surplus” receivers—does not possess any such refinement and few amateurs seem to have given much thought to fitting one, although many less useful modifications are carried out almost as part of the instalment programme. Although the filter circuit shown in Fig. 1 is by no means original, it has been adapted to suit the particular requirements of the R1155, and gives a very worthwhile improvement in selectivity.

Modifications

It is unlikely that a suitable crystal for the non-standard I.F. of 560 kc/s. will be immediately available. However, 500 kc/s. crystals are in plentiful supply from such sources as the dinghy transmitter type T1333; these can be easily ground to approximately 560 kc/s. with the aid of fine carborundum powder. Crystal grinding technique is well known, and the newcomer will find that low-frequency crystals are easier to handle than high-frequency ones.

The second I.F. transformer requires modification and should be removed from the receiver for this purpose, careful note having been made of all connections to it. On removing the screening can, all the associated components will be found mounted on the paxolin panel. The secondary coil and former are removed together with the fixed trimming capacitor, and the 2 μ F. coupling capacitor. To form an I.F. transformer of more orthodox design, a Litz-wound coil of approximately double the inductance of the primary

should be mounted on the same former, spaced a fraction of an inch from the primary and sealed in place with a few spots of coil dope. A suitable inductance can usually be obtained from an old R.F. choke. Two 100 μ F. mica capacitors, C3 and C4, are fixed to the paxolin panel, all wiring completed inside the can, and the three output connections brought out to the tags at the bottom of the panel. The complete assembly is then remounted in the set.

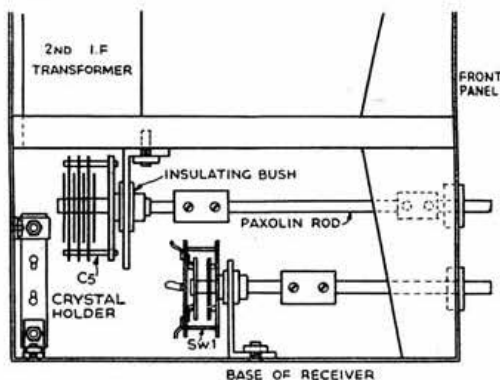


Fig. 2.
Suggested layout of main components.

The layout of the more important additional components is shown in Fig. 2. The crystal socket is mounted at the rear of the chassis directly below the second I.F. transformer on one of the supporting bands, which pass underneath the receiver chassis. By the side of the crystal is a bracket carrying C5, the 15 μ F. air-spaced phasing capacitor, which must be completely insulated from the chassis. A paxolin extension spindle, coupled to the capacitor by means of a flexible coupler, is brought out to a control on the front panel. The control switch, Sw. 1, is mounted just in front of the phasing capacitor, on a bracket fixed to the horizontal section of the supporting band. The extension spindle should be brought through a bush in the front panel using the mounting hole originally occupied by the B.F.O. switch, which is transferred to a position above the chassis. Incidentally, all screws used for mounting components on the supporting band should be countersunk to prevent difficulty in removing the set from its cabinet.

In order to keep the grid leads as short as possible the second I.F. amplifier valve is replaced by a 6AC7 which has all electrodes brought out to the base: this stage should then be rewired, cutting out the A.V.C. and using instead fixed cathode bias. Normal wiring precautions for an R.F. stage should be observed, i.e., all leads kept short and rigid, etc. All I.F. circuits are then realigned to peak at the resonant frequency of the crystal. The centre position of the switch, Sw. 1, gives an intermediate degree of selectivity which will be found useful for reading telephony signals through heavy interference.

After the filter had been aligned and was functioning correctly, a need arose for something better than the original slow-motion tuning drive.

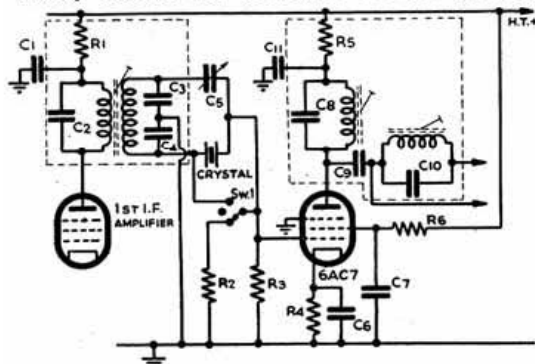


Fig. 1.
Crystal filter for the R1155.

Component Values:	
C1*, C6, C7*, C11*	0.1 μ F.
C2*, C10*	300 μ F.
C3, C4	100 μ F. mica.
C5	15 μ F. midget variable, air-spaced
C8*	600 μ F.
C9*	4 μ F.
R1*, R5*	2,200 ohms.
R2	150,000 ohms., $\frac{1}{2}$ -watt.
R3	2 megohms $\frac{1}{2}$ -watt
R4	330 ohms., $\frac{1}{2}$ -watt.
R6	56,000 ohms., $\frac{1}{2}$ -watt.
Sw1	Single pole, three-way, midget Yaxley.
Crystal	560 kc/s. (see text).

* Indicates components employed in the original circuit.

* Oaklands House, Stamford Road, Lees, nr. Oldham, Lancs.

(Continued on Page 373)

VARNISHES AND WAXES

for the Radio Amateur†

By JACK WOZENCROFT (GW3GIN)*

Coil varnishes, or "dopes," in use today consist almost entirely of solutions of thermoplastic resins in suitable organic solvents, together with a plasticiser. Polystyrene (distrene) is undoubtedly the most useful of these plastics for R.F. work, followed closely by perspex (methyl methacrylate).

Varnishes

A suitable varnish for R.F. coils can be made by dissolving scraps of polystyrene in one of the following organic solvents: ethylene dichloride, benzene or xylene, preferably the first mentioned. (N.B., one or two days should be allowed for complete solution.) The varnish should be made about the consistency of ordinary copal varnish, and, if too thick, thinned by adding more solvent. If this simple solution of polystyrene is used it will be found that on drying it has a tendency to crack or peel-away from the former. For this reason a very small amount of "plasticiser" has to be added to give the film a little elasticity. The simplest is ordinary castor oil added in the proportion of one drop to each ounce of varnish.

Perspex can be dissolved in ethylene dichloride or chloroform and is slowly soluble in acetone or amyl acetate. A solution of perspex is more in the nature of a jelly than a varnish and is rather difficult to handle. Its main use is as a cement. A drop of castor oil should be added as for polystyrene.

In all varnishes it is essential that no moisture be present and it should be ensured that the container in which they are made is absolutely dry.

Polyethylene (polythene, alkathene, telcothene) is another synthetic resin frequently encountered. The grade usually found is soft and flexible, somewhat like rubber, and its main use is in low-loss cable (co-ax. and ribbon feeders, etc.). It is insoluble in most solvents when cold, but will dissolve in hot benzene, carbon tetrachloride, or ethylene dichloride (above 60 deg. C.). The temperature should be raised by the external application of hot water; remember that not only is benzene highly inflammable but its vapour is explosive when mixed with air.

Cellulose nitrate (celluloid, xylonite), cellulose acetate, and ethyl-cellulose are similar but are not used much in R.F. work. The former is highly inflammable. All are soluble in acetone and amyl acetate to make a cement with useful mechanical properties.

Various varnishes have been used for "fixing nuts" in Service equipment. In U.S.A. equipment the varnishes are usually synthetic resins and the application of a drop of a mixture of ethylene dichloride and castor oil (about 5 per cent.) by means of a camel-hair brush usually softens the varnish sufficiently to allow the nut or bolt to be removed. The best plan is to dab the solution over a number of nuts or bolts, allow to stand for a few minutes and then apply another dab before removing each in turn. In British equipment the varnish applied appears to be usually of an oxydisable type, i.e., a varnish which when dry

leaves a film which is oxidised by the air to form an insoluble substance. About the only thing which will soften these sufficiently to permit removal is methylated spirit. It should be liberally applied and allowed to stand for a while.

Waxes

Waxes are often used on coils, transformers, etc., and these are mostly mixtures of the higher paraffins, often with resin (copaiba or synthetic) incorporated. A useful wax for impregnating transformers, L.F. chokes, etc., consists of about 5 per cent. of best quality (pale amber) resin mixed with equal parts of high and low melting paraffin wax. The three should be melted together in a large tin until thoroughly mixed. The component to be impregnated should be immersed in the wax at about 100 deg. C. and allowed to remain until the wax just begins to solidify. This will ensure that all air and moisture is driven out of the component and that it is thoroughly impregnated. This method can be used to reclaim old and leaky tubular paper condensers. The old wax can be scraped away from the ends, new wires soldered directly to the ends of the coils and the condensers suspended by the wire ends in the hot wax as above. Remove from the wax when it is about to solidify. When quite cool the condensers can be given a quick dip in just melted wax to thoroughly coat the outside.

The black pitch-like impregnation which often completely covers some ex-Service components can be removed by soaking overnight in several changes of ordinary burning paraffin. This is drastic treatment but often allows a mains transformer or L.F. choke to be salvaged and rewound.

Notes on Organic Solvents

Acetone, Amyl Acetate.—Highly inflammable. Quick drying.

Ethylene Dichloride.—Moderately non-inflammable but application of naked flame causes fairly rapid combustion. Should not be used in confined space. The vapour may be dangerous especially if inhaled through a lighted cigarette. Perfectly safe in a well ventilated room. Fairly slow drying.

Benzene.—Highly inflammable. Vapour is dangerous.

Chloroform.—Non-inflammable. Vapour is dangerous.

Ether.—Highly inflammable. Vapour anaesthetic. Highly explosive vapour when mixed with air and the flash point is low.

Carbon Tetrachloride.—Non-inflammable. Vapour can be dangerous (see as for Ethylene Dichloride).

The Missing R

MR. F. W. BENNISTER, G3COX, and Mr. A. S. Curry, M.A., F.R.A.S., F.C.S., G3DMQ, have drawn attention to the fact that Perspex is poly methyl methacrylate and not, as recorded last month, Poly-methylmethacrylate.

In connection with the Ten Minute Quiz published in the same issue, G3DMQ states that the term *SiO₂* is the chemical shorthand for one molecule of Silicon Dioxide as well as being the chemical term for Quartz (Crystals).

† Published originally in "CQ News Letter," a Region 10 (South Wales) publication.

* 50 Romilly Road, Canton, Cardiff.

In the Workshop

Recent articles in this series have dealt with the mechanics of multi-element arrays for normal short-wave communication purposes. The present article discusses some of the engineering problems that must be faced when designing suitable radiating systems for the V.H.F., U.H.F. and S.H.F. bands, with particular emphasis on the paraboloid reflector, which is widely used in modern U.H.F. technique.

WITH the transition from V.H.F. to U.H.F. (and even to S.H.F.), engineering problems become more formidable to those whose resources are limited as regards both workshop facilities and finance. The design of items such as paraboloid reflectors and wave-guide systems is an example of what amounts to an almost complete break-away from the conventional techniques of radio transmitters, receivers and radiating systems. At these frequencies plumbing takes the place of wiring, and the ruler or micrometer becomes the wavemeter. Paraboloid reflectors and lenses become essential features of the radiating system.

The transition is fascinating—the single wire and resonant twin-line feeder systems give way to the coaxial cable, which in turn gives way to the wave-guide. The wire aerial and the dipole are replaced by the end of a pipe, or by a tube with slots in it; and even the fantasy of a polystyrene aerial with a copper insulator becomes possible!

Because "pulse-technique" is at present prohibited in the amateur licence, it is essential to use, effectively, every milliwatt of radio-frequency energy. Consequently energy must be beamed in desired directions in the most efficient manner possible. Due to the difficulty of searching for signals from random directions, a continuously rotatable aerial system for transmission and reception is virtually a necessity.

The Paraboloid Reflector

A paraboloid reflector is applied to radio waves in the same way that a reflector on a car head-lamp is used to direct the light from the bulb into a sensibly parallel beam. The general shape of such a reflector is well known, and is derived from considerations of solid geometry. While a full mathematical treatment of the subject is outside the scope of this and subsequent articles, nevertheless, there are some empirical formulae (i.e. derived from practical experiment), which connect up the various features of the paraboloid in which we are interested.

The diameter D of a paraboloid with respect to the wavelength and the width of beam produced can be determined by means of the following identity:

$$D = \frac{70\lambda}{\text{Beam width}^\circ}$$

where λ = wavelengths in centimetres, and D = diameter in centimetres. A nominal value of 15° beam-width provides the following dimensions of paraboloids for the various V.H.F. and U.H.F. bands allocated to amateurs:

Band		Diameter	
(Mc/s)	λ (cm)	(cm)	(in)
420-460	70	325	128*
1215-1300	25	117	46
2300-2450	13	61	23.5
5650-5850	5	23.5	9.25
10,000-10,500	3	14	5.5

(* Not practicable)

It will be seen that if the beam-width is made greater, the diameter of the paraboloid decreases,

as also does the power gain. A compromise must therefore be made. A figure of 15° beam-width at half-amplitude seems a reasonable value for amateur working.

Power Gain

The gain of a paraboloid system can be calculated from the following empirical formula:

$$\text{Power gain} = \frac{4\pi A}{\lambda^2}$$

where A is the facial area of the paraboloid and λ the wavelength in the same units.

For example, a paraboloid 60 cm. in diameter—the size required for a 12.5 cm. transmission—would have a power gain of about 225, which appears to be a fantastically high figure. This assumes, of course, that radiation is constant over the whole face-area of the paraboloid, but in practice the effective area may be much less than the calculated value, and the figure of gain is reduced accordingly. A power gain value of

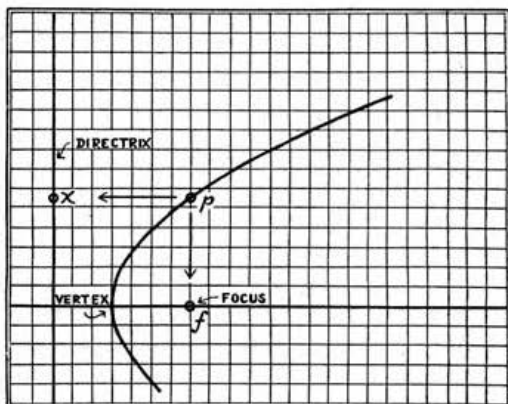


Fig. 1
The Parabola.—Equation to the curve is $y^2 = 4ax$. The point p moves so that the distance fp is always equal to the distance px .

about 60 per cent. of the calculated gain is normally available, and this factor reduces the figure quoted above to approximately 130—still a remarkably effective value as compared with other beaming devices.

This figure of gain is essentially a ratio, comparison being made with a theoretical aerial radiating equally in all directions in free space. Such an aerial is, of course, a practical impossibility, but serves as a useful datum, being accorded a value of unity. In the familiar aerial array used for V.H.F. work, directional power gain is obtained by the use of reflector and director elements. But in the higher V.H.F. and U.H.F. spectrum, the paraboloid reflector and its derivatives are the most effective beaming devices, and already play an essential part in the majority of centimetric techniques.

Summarising, the main advantages of the paraboloid reflector are:

- (1) High power gain.
- (2) Excellent directivity.
- (3) Accurate control of beam-width.

- (4) Use of one paraboloid for different frequencies.

Plotting a Parabola

The curve a projectile describes in vacuo is termed a parabola, and in the world of plane co-ordinate geometry this is defined as "the path taken by a point moving in one plane, so that its distance from a given point, called the *focus*, is the same as its distance from a line called the *directrix*." If this curve is rotated round its own axis, a paraboloid is obtained, which is the shape of the reflector being sought.

For those to whom plane co-ordinate geometry holds no terrors, the plotting of the curve of a parabola will be a simple matter. All the information required is given by the equation $y^2=4ax$, x and y being the co-ordinates and a the distance of the *focus* from the *vertex* or origin of the curve. Values of a and x are taken in convenient units of inches or centimetres, the square-root of the product in the equation giving the value of y in the same units.

Fig. 1 shows a paraboloid derived from this equation with the *vertex*, *directrix* and *focus* indicated.

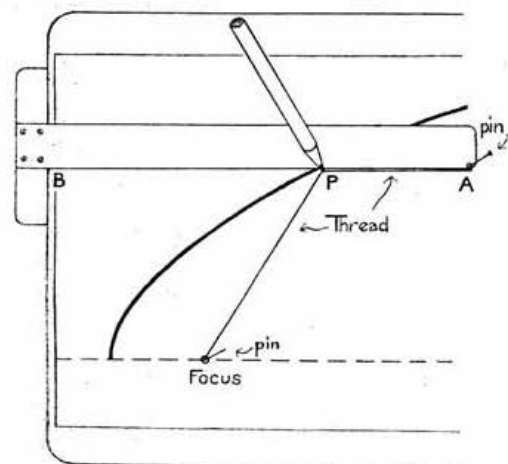


Fig. 2
Tracing a paraboloid section in the manner described in the text.

An alternative method of tracing a parabola, which involves no mathematical calculations, is illustrated in Fig. 2. The only equipment required is a drawing-board, paper, a length of thread, a T-square and some pins.

Having fixed the paper in position, place the T-square on the board, and insert a pin at the point A, as shown. Tie a thread to the pin, making the length of the thread AB. Now insert another pin in the drawing-board at a convenient point for the *focus*, and fasten the loose end of the thread to it.

With a sharp pencil take up the slack in the thread against the edge of the T-square, in the manner illustrated, then move the T-square up and down against the edge of the drawing-board, keeping the thread taut all the time by means of the pencil point. It will be found that with a little practice a perfect parabola can be traced without difficulty.

The next article will describe the construction of a paraboloid suitable for one of the V.H.F. or U.H.F. amateur bands.

London Members' Luncheon Club

THERE was an attendance of nineteen at the March meeting of the Club when Stanley Vanstone, G2AYC, taking the Chair for the first time, thanked Members for electing him to that office.

Specially welcome was Oscar Sandoz, VE1QZ, from Nova Scotia, who spoke briefly on V.H.F. matters. In his view the high standard of V.H.F. attainment in the U.K. is not given the publicity due to those who practice the art.

The Chairman then, on behalf of members of the Club, presented a leather handbag to Miss May Gadsden in recognition of her completing 21 years' service with the Society. Miss Gadsden made a suitable reply.

Annual Accounts for the year ended February 28, 1951, were submitted by the Hon. Treasurer and adopted. The meeting agreed to discontinue the existing annual subscription and to substitute a levy of 6d. per meeting.

With the coming of summer Club members hope to welcome many visitors from overseas and from the Provinces. Meetings are scheduled to take place on April 20, May 18, June 15, July 20, August 17. A telephone call to R.S.G.B. H.Q. or to the Hon. Secretary (Ruislip 2763) is all that is necessary. G2FUX

Danish Summer Camp

DENMARK'S Amateur Radio organisation—D.E.D.R.—announce that their summer camp will be held this year at Korsør. Attractions will include excursions, a hidden transmitter hunt, and the usual short-wave activities.

Although guests are invited to bring their own tents, a few rooms will be available by advance booking. Board prices are D.kr. 9.00 per day for adults and half price for children. The camp will be held from July 8 to 22.

Inquiries should be addressed to the Chief of Camp, Paul Heinemann, OZ4H, Vanløse-Copenhagen, 100 Vanløse Alle, Denmark.

B.E.R.U. 1951

THE 1951 B.E.R.U. contest was supported quite as well as last year, although conditions were markedly different. Operations have moved to lower frequencies, 28 Mc/s. being hardly open except for a few African contacts. It was good fun and like old times to find 7 Mc/s. full of ZL, VK, African, and Far East signals, and great battles were fought on this band—especially when a Russian contest turned up and we had to split the band in half!

From all directions came reports of very poor conditions for the 'phone section. In the first C.W. weekend there was Aurora in Canada and a curtain across the Atlantic. On the last weekend there was an improvement, and the Canadians were able to step out on 3.5 and 7 Mc/s.

G6CJ

CRYSTAL FILTER FOR R1155

(Continued from Page 370)

For this reason two of the vernier drives, as used on the popular RF26 and RF27 units, were fitted in a series combination to provide a reduction of either 40:1 or 1600:1 without backlash, which was the main objection to the original drive. Since the filter was fitted C.W. working has become much more pleasant and many enjoyable contacts have been made with stations which would otherwise have been completely unreadable.

THE PROPAGATION OF METRE WAVES BEYOND OPTICAL RANGE*

Introduction

THE original article was based upon long-term observations over various land and sea paths from the author's station at Clacton-on-Sea, Essex, and shows how a knowledge of easily recognised meteorological conditions associated with tropospheric propagation may be useful in the short-term prediction of radio conditions.

It is possible to calculate with a considerable degree of accuracy the field strength anywhere within optical range of the transmitter, given certain essential data. The present article relates to propagation outside line-of-sight working on frequencies between 30 and 200 Mc/s. As the current amateur V.H.F. allocations in this range lie between 144 and 146 Mc/s. the present synopsis will be confined almost entirely to the results to be expected in that region, and will therefore deal with the effects of tropospheric propagation, as the influence of the ionosphere may be ignored above 60 or 70 Mc/s.

Tropospheric propagation can be detected well below 30 Mc/s. and has similar characteristics, over the V.H.F. spectrum, to at least 500 Mc/s., and includes effects such as super-refraction, trapping, guiding and ducting.

The wave is guided round the curvature of the earth by refraction and/or reflection resulting from a slight decrease with height of the dielectric constant (K) of the lower atmosphere.

A relatively gradual decrease in K with height, results in a downward curvature of the ray track. A sharp drop, in addition to sharp refraction, produces reflection of those rays which arrive at the discontinuity at angles greater than the critical angle of incidence.

Changes of K with height are slight, at most a few hundred parts in a million, but are sufficient to produce the desired result.

Water vapour increases the dielectric constant of air, and changes are mostly dependent on the humidity of the lower atmosphere. K is inversely proportional to temperature and proportional to pressure, so that a decrease in pressure or an increase in temperature with height will cause downward bending. Normally both temperature and pressure decrease with height and so have a compensating effect. Rain and fog, being moisture in droplet form, have little effect at the frequencies under consideration, but invisible water vapour is important.

The amount of water vapour in the air increases with temperature, and at heights above, say, 2 km., where the air is cold, the moisture content is low. We are, therefore, concerned with the atmosphere from ground level to a height of 1.5 to 2 km.; not with heights exceeding 100 km. as in the case of ionospheric propagation.

As the steepest gradients or discontinuities occur at low altitudes, the height of the aerial becomes important and the optimum will vary with weather conditions.

Tropospheric propagation, being a function of the weather, and with weather systems rarely covering a radius exceeding 300 km., ranges exceeding 350 km. are very exceptional, and a

spacing of some 400 km. between stations should render them out of range and unlikely to cause interference one with another. This may be of little comfort to amateurs, but important to those setting-up television or V.H.F. point-to-point stations.

Radio Conditions and the Weather

Standard coverage, *i.e.*, without assistance from tropospheric propagation, is to be expected when there is a well mixed atmosphere with a rapid decrease of temperature with height accompanied by a slow fall in humidity, corresponding to cold, cyclonic or "frontal" weather.

For maximum extended range the requirements are high humidity at ground or low levels followed by a rapid drop with height or an increase of temperature with height (temperature inversion) which conditions should exist over a wide area. Generally, but not always, these two effects occur together. These atmospheric conditions may be specified as fine, warm, anti-cyclonic settled weather. For varieties of weather between these extremes it becomes more difficult to forecast the probable tropospheric radio conditions from a purely visual observation of the sky.

Unstable cold air, such as gives rise to cumulus or "heap type" clouds over sun-heated ground, provide poor conditions for "trapping," and generally follows in the wake of a depression. Often within a day or so the air tends to stabilise again.

The anti-cyclone, an area of high or very high pressure wherein the weather is generally fine and settled, winds very light, and clouds, if any, of a low, thin stratus type, provides the most marked super-refraction and trapping. Winter anti-cyclones provide rather more stratus cloud, and often fog, but in summer fine, clear weather is usual. Anti-cyclones cover larger areas than depressions and move much more slowly, and once formed often remain almost stationary for two or three days and on occasions as long as ten days or more. Hence under these conditions extended ranges by tropospheric trapping are reasonable for periods up to several days.

Foggy weather generally is an indication of good conditions for super-refraction as it indicates 100 per cent. relative humidity, and normally above the fog there is a clear sky and a sharp drop in the humidity.

In summer, or warm weather, tropospheric effects will be considerably more prevalent than in the colder winter months.

Diurnal Variations

Whilst on the average there tends to be greatest trapping possibilities from an hour or two after sunset with a peak in the early morning hours, the actual conditions are more often decided by the prevailing weather system than by the time of day.

After sunset, in stable weather, conditions are most suitable (over land) for the formation of temperature inversions, for as the ground cools the air in contact with it does likewise, while the air above remains at almost its daytime temperature, and with the heating effect of the sun removed there will be no turbulence such as tends to disturb stratified conditions in daytime.

Over sea or water very little diurnal variation

* A synopsis of an article by D. W. Heightman, G6DH, which appeared in the October, 1950, issue of the *Journal of the British Institution of Radio Engineers*, and published with the permission of the author and the President and Council of the Institution.

in surface temperature occurs, and the weather prevailing, and the sea temperature, decide the radio conditions and not the time of day—here again the anti-cyclone or smaller high pressure area gives most marked trapping. In the main, sea paths appear to provide about the same degree of reliability as land paths of similar length, but where the wave passes over, or runs along, a coastline certain localised effects are to be expected.

Depressions generally bring high winds, overcast, grey ragged clouds of considerable vertical development, and long periods of rain, and the lack of stratification of the atmosphere militates against good radio conditions. It has been noticed, however, that occasionally some short-lived reflections apparently occur from the warm front as it approaches ahead of the depression. This front is observable as a thin, high stratus sheet, gradually dropping in height. This condition soon ceases with the commencement of rain.

Results of Practical Tests

Following much work carried out by the author in 1938-39 in the 40 to 60 Mc/s. region, the results of which were published in the *Wireless World* in the latter year, and in the *R.S.G.B. BULLETIN* in 1947¹, a number of observations were undertaken in 1949 on the 145 Mc/s. band with the co-operation of a ship travelling up and down the North Sea. Transmissions from G6DH (Clacton-on-Sea) were checked for five minutes each hour by the operator on the ship as the latter progressed up the coast from the Thames to the Tyne or *vice versa*. Unfortunately it was not possible to arrange many complete "runs," but the records obtained showed that wide variations in the strength and range of the signal received on the ship occurred under varying weather conditions. The shore station radiated 20 watts of R.F. from a four-element Yagi beam 15 metres above ground, while a similar aerial system existed on the ship. The optical horizon for the conditions under which these tests were carried out was 56 km. (35 miles) approximately. Signal strengths to be expected on a "free-space" basis, as well as those due to attenuation in a standard atmosphere, were calculated, and generally the observed results lay between those limits. Under conditions of tropospheric propagation, signals exceeded by as much as 6 db. the free-space figures, while the range, for the same signal strength, was increased by four times. Unexplained increases occurred on three occasions from 40 to 50 miles.

Over land there has been evidence of skip effect under certain weather conditions. This skip, although not pronounced, appears to favour distances of the order of 150 to 200 km., and little or no signal is obtained from stations at intermediate distances of 70 to 140 km. Under such conditions it would appear that reflection at grazing incidence is occurring at an elevated discontinuity and super-refraction is absent or ineffective at intermediate distances.

Results Over Land and Sea Paths

Tests were carried out from November, 1948 to October, 1949 with ON4FG at Bornhem, near Antwerp, 205 km. distant, and F8OL at Meudon near Paris, both paths involving considerable distances over sea water. Two periods of ten minutes daily at 0745 and 1845 hours were devoted to the Belgian station, and one period at 1930

hours to F8OL. A power of 40 watts was radiated by ON4FG from a twelve-element array while F8OL employed 50 watts to a four-element Yagi. The receiving aerial at G6DH was a four-element Yagi at a height of 15 metres as used for the ship tests.

With both stations the records showed that maximum trapping occurred in the summer with a reduced number of openings during the cold mid-winter period, but it is interesting to note that signals from both stations reached quite high strengths late in November, but in the case of the longer Clacton-Paris path signals were only received under fine or anti-cyclonic weather conditions.

Fading

Fading, under the influence of tropospheric propagation, can often bring about a variation of as much as 20 db. in the received signal strength, and the periods of low strength are normally of longer duration than is the case with ionospheric propagation, sometimes amounting to several minutes, but rapid fading is occasionally observed.

It was noticed that the Paris television signal on 42 Mc/s. had to reach a certain level before F8OL became audible, and on two occasions only throughout the whole year was the 145 Mc/s. signal audible when the television was not.

Polarisation

For any particular set of conditions on a short-term basis either vertical or horizontal polarisation may be found to give maximum field strength, but on a long-term basis and generally speaking, there would appear to be no advantage one way or the other as regards range or freedom from fading. This observation confirms careful tests made over a lengthy period by certain American amateurs.

Taming the R1155

MR. R. STREET, B.R.S.12366, has been investigating the cause of "birdies" on the above receiver when it is tuned between 6-7.5 Mc/s. on Band II and between 1,100-1,300 kc/s. on Band III.

Most of the trouble has been traced to the dummy loop aerial not having been re-connected across the loop input wires after removal of the master switch and other modifications.

The dummy loop (C99 and L1) is at the extreme right-hand top of the coil box, viewed from the rear, and has two green leads coming out of the front of the box. These should be connected one each to the red/black pair or alternatively the red pair emerging from the D/F end of the box. Slight re-trimming of the tuned circuits on Bands II and III may be necessary.

Valve and Circuit Noise

RADIO Research Special Report No. 20 "Valve and Circuit Noise" (published by H.M.S.O. for D.S.I.R., price 9d.) surveys existing knowledge of the subject of valve and circuit noises in electronic equipment, and of outstanding problems in this field.

Noises originating in the valves and circuits of radio sets and other electronic equipment have become of greater importance as the sensitivity of receivers and instruments has increased.

The present publication, in addition to dealing with valve noise and thermal noise in electronic circuits, covers noise in photo-electric cells, semi-conductors, crystal rectifiers, gas discharges and magnetic field devices.

¹ "Five-Metre Propagation Characteristics," by D. W. Heighman and E. J. Williams, *R.S.G.B. BULLETIN*, Vol. 22, January, 1947.

THE MONTH ON THE AIR

By A. O. MILNE (G2MI)*

This Column

A WELL-KNOWN amateur recently called us to task because we inadvertently gave credit to someone else for a first contact which was made by him. We will refrain from comment except to say that this is *your* feature; you supply the information and we, to a great extent, have to take it on trust as accurate.

If you succeeded in working Raratonga at S9X on "Top-Band" 'phone more than a year ago, you must not complain if the man who did it last week gets the credit for being first! For some strange reason M.O.T.A. is said to be one of the most popular features in the BULLETIN. We cannot understand why this is so when only about 1% of 1% of you ever bother to send in news. True, things have been a little better of late, but they could be a lot better still, so what about it, chaps? Reports by the 23rd of the month please.



Bulawayo Members of the Radio Society of Southern Rhodesia recently organised a 7 Mc/s. D.F. Contest. The transmitter—set up at a gold mine nine miles from the town and operated by ZE2JS—was not located, but ZE3JL got within 1½ miles. Left to right, ZE4JA, ZE3JL, W. Eastley, ZE2KY (ex-G3DUR) and ZE3JV.

Single Side-band

G3CU expresses the view that the art of single side-band is attracting more and more interest. He quotes the case that on March 20 no fewer than seven S.S.B. stations were on 3720 kc/s., mostly working "break-in" and giving an excellent demonstration of high-speed duplex operation. Those taking part were G3FHL, G3FDG, G3CU, G3YW, SM5QV, OZ7T and OZ7BO. Other S.S.B. enthusiasts known to be active are G2CR and G3CWC. From what G3CU says, it seems that many amateurs do not know what a S.S.B. transmission sounds like and are often called many times by users of that system to no effect: If they do reply, they usually complain of the "shocking noise" on the frequency! Stations who experience this effect, after having called CQ, should suspect that S.S.B. is being used by the answering station and make the appropriate adjustments to their receiver.

The following procedure should be adopted: First "centre" the side-band on the I.F. channel; this is best done by using "sharp I.F." with the crystal on the first or second position, tuning for maximum signal; switch off the A.V.C.; turn up the audio gain to maximum; reduce the R.F. gain and set the B.F.O. to replace the missing carrier of the incoming signal. This requires careful adjustment, as the carrier has to be re-inserted with an

error of less than 50 c/s. for intelligibility and 20 c/s. for naturalness. If the B.F.O. is on the "wrong" side, the speech will be inverted. By the way, British and European stations all use the upper side-band.

G3CU is trying to compile a complete list of active S.S.C. stations. Those who use the system are asked to send information direct to H. F. Knott, 7 Red Post Hill, London, S.E.24.

"Top-Band" in ZL

We now have the full story of the "Top-Band" signals received by ZL1AH and reported last month. The receiver used was an HRO with a 415 ft. L-shaped aerial 80 ft./55 ft. in height. At 0637 G.M.T. "W1BB de G6GM" was copied (RST219, 1790 kc/s.). Five minutes later the following transmission was logged on 1812 kc/s. at RST549: "W/VE stns. QRT-QRU conds. worse w/ keep sked believe break through possible so tuning carefully CQ DX test CQ DX test de W1BB." A further CQ from W1BB was heard at 0650, followed at 0656 by a call from W9CVO to EK1AO (RST329, 1809 kc/s.). At 0700 W1BB was heard calling "CQ test" (RST539 QSB to 329).

Unfortunately, New Zealand amateurs are not licensed for the "Top-Band," nevertheless ZL1AH would like to arrange some cross-band tests for next September. Meanwhile we congratulate all concerned on a magnificent feat.

Notes and News

BR517915 mentions that two new stations, VS6V1 and VS6HR, are active in Hong Kong. G5FA has added VT1AC, VT1AF, PK5AA, KC6WC, VP4, VP5AL and CS3AA to his collection—the last three on 7 Mc/s. BERS195 reports three new stations on Heard Is., namely VK1NL (Nils), VK1KJ (Kevin) and VK1DC (Dave). Y13BZL put up a good show during B.E.R.U.

Y13ECU, who heard a G4 working EK1AO during the Top-Band contest, has been running tests on that band with G3PU, but apart from hearing him once, has had no other luck.

G2HKU of Sheerness recently qualified for a B.E.R.T.A. using a maximum input of 22 watts from D.C. mains or batteries, and wonders what is the lowest power that has ever been used to qualify for this award.

BR518017 has heard SM8VC (S.S. Nova Zembla, 14030 C.W., 1935 G.M.T.), VQ3AWL (14350, 1930 G.M.T.) and IT1BGE (14300). He has also heard ZS2MI and VK9XR being called on 7 Mc/s.

G3AID worked HE9LAA on 7045, who gave his QTH as Hugo Milte, Scharn 378, Liechtenstein. G3COH heard HP1JI/MM on an oil tanker giving his position as 500 miles N.W. of Cape Verde.

G6RH worked FR7ZA, Reunion Island (14023) and FP8AW (14015 kc/s.) on March 24 and 25 respectively. G3FHN has worked VP4TB and VP6CDI on 3.5 Mc/s. GW3DOF has 91 out of his 107 confirmed countries worked—a very fine effort. Some of his best QSOs on 14 Mc/s. have been with KG6GU and KG6HU at midday, AP2F and AP2N, 14090 at 1600 G.M.T.; CR5AD, 14060 at 1900; VP8AP, 14110 at 2000; JA2KW and JA2OM, midday on 14090; HC2JC, 14100 at 1930 (T7); CP5EK, KR6CA and MD2RG. Motto: If you want the best DX, go home for lunch!

* 29 Kechill Gardens, Hayes, Bromley, Kent.

Bob Pybus (Chorlton-cum-Hardy) says 28 Mc/s. opened up on March 21 with several W4's, KP4AR, KZ5PC, CE2AH, LU, PY, ZE and ZS coming in well. KZ5PC was S9+. On 3.5 Mc/s., during B.E.R.U., he heard VP6SD, VP6FO and VP7NH.

G6AB worked OH5NV at 1950 G.M.T. on Easter Day, on "Top-Band." Is this the first G-OH contact on that band? GW3ZV got across later. G6AB says there are plenty of UA, UB and OK signals to be heard.

Does anyone please know the present QTH of VS1DC? Alan Roocroft, BRS18980, of Liverpool offers the following on 14 Mc/s.: EA9BB, FF8AB, AC, AF, KV4AA, MD2RG, OQ5BQ, OX3SF, VP7NM, VP8AI and VP8AP. HI6EC was the best on 'phone. Alan is the Assistant Editor of the *Lancashire Radio Review*, an excellent local magazine produced each month for Lancashire amateurs.

BRS1711 (Topsham, near Exeter) has just recovered from an attack of 'flu and used his enforced leisure to good purpose. His long list of calls heard is headed by British Honduras. Some frequencies and times, please.

BRS7594 (Yeovil) has been copying HE1KE and TA3GVU on 3.5 Mc/s. Stations heard on 14 Mc/s. include: CR6AM, 14175 at 1815; CR6AQ, 14220 at 1830; EA0AC, 14350 at 1940; FP8AW on St. Pierre Miquelon, 14195 at 2200; VP5BF, 14160 at 2235 (QSL via VE3QB), all on 'phone. He has cards in from LU0DJD (who was operating in a car in Buenos Aires at the time of QSO), CR4AC, CR6AJ, KG6FZ and ZD6JL. He has 163 countries and 37 zones verified on 'phone. He gives the QTH of VR1F as c/o P.A.A., Canton Is., Phoenix Group; FQ8AE as Box 69, Fort Lamy, Chad, French Equatorial Africa, and says MD7WE's QTH in this country is Cpl. J. Howse, Cadre 10, W.T.S., Royal Signals, Garats Hay Camp, Loughborough, Leicestershire. Cpl. Howse has offered to answer any outstanding QSL's.

G3EFY (Exeter) has sampled all the DX bands and has worked ZL3OX at 0630 G.M.T., SP1JF, HA5BK and OH5OS/MM, near Gibraltar, all on 3.5 Mc/s. He also heard 3A2AC/Monaco on March 25 at 2100 G.M.T. Any details please? On 7 Mc/s. the bag included ZL3GQ, PY4AHG, 4X4BX, and LX1DW. VU2BC was heard at 2100 G.M.T. On 14 Mc/s. VT1AF and EK1RR were added for good measure.

Cyprus

"Tikky" Tyler, ZC4TF, sends up-to-date "gen" on the ZC4's. Those known to QSL are ZC4ND, PE, TF and XP. The other official calls are ZC4AB, BW and KN, but their cards have not yet come from the printers. ZC4HV will be QRT until July, but he QSL's. ZC4DC is the club call, but is off the air due to lack of gear. The present

holder of the call came across about 400 cards made out by his predecessor, whilst clearing out the shack. All these have now been distributed by Sgt. Jackson, who apologises for his predecessor's tardiness.

As previous holders of the call took the logs with them when they left, he cannot enter into any correspondence regarding missing QSL's. The official Bureau address is Box 451, Nicosia, Cyprus.

Saudi Arabia

Ken Ellis reports that HZ1TA is already on the air. The operator, H.R.H. Prince Talal, speaks several languages fluently, so should do well with his beams and BC610.

Another HZ soon to be on the air, is Lt.-Col. John Manifold, O.B.E., R.A.M.C., with a station at Jedda, probably HZ1XX. A further one is HZ1BA, belonging to Bassiouni Bey, who is a radio engineer and ex-member of the B.B.C. engineering staff.

Ken mentions the bad conditions during the first weekend of B.E.R.U.. The only station he could hear all night was VQ4RF, who was working VE's like shelling peas! Ken has received a QSL to confirm his 1.7 Mc/s. QSO with VE1EA, as well as one from EK1AO. G's and VK's come in on 7 Mc/s. from 1500 G.M.T., but the latter are rather weak. So far no contacts have been made. Ken has acknowledged all contacts made during B.E.R.U. Says ZM6AA is S9 for about 40 minutes each morning on 14 Mc/s.! On March 11, HZ1KE was heard at 0150 G.M.T. on 1.7 Mc/s. by G16YW at 559, but 'YW could not raise him.

Finally, what about this for a round-table QSO for nearly an hour? Stations involved, ZM6AA, ZL2BX, VR5GA, VK2BX, ZK2AA, VQ4RF, VT1AB and HZ1KE. If that does not make the mouth of every dyed-in-the-wool DX'er water, we don't know what will!

Low Power Field Day

HERE are a few more advance details of the new Low Power Field Day which will take place on Sunday, September 9.

The purpose of the Contest is to encourage the construction of ingenious lightweight portable equipment. The total weight of all equipment must not exceed 20 lb. including the following items: receiver, transmitter, power supply, batteries, headphones, key, frequency meter, aerial wire, insulators, earthing device, and spares... in fact, all radio and electrical apparatus and components taken to the site. The equipment must be entirely independent of the electrical system of any vehicle, and of any supply mains. Operation will be restricted to C.W. (A1) on the 3.5 and 7 Mc/s. bands.

Acknowledge that Contact with a Festival of Britain QSL— and advertise Britain

These cards are specially produced on art card with an illustration depicting the South Bank Festival area printed in orange and over-printed in black with your Call Sign and QTH. The reverse side is printed in one colour on the left with the usual wording, and there is a blank space on the right for you to address the card to your Contact. The card is produced with the co-operation of the Festival of Britain authorities, and in collaboration with the R.S.G.B. Convention Committee.

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AROUND THE V.H.F.'s

Report on Second 70 cm. Activity Period

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

THE second 70 cm. Activity Period (March 3-11) was supported by at least 27 stations—six more than last time. Conditions were by no means good, and nothing outstanding was reported. Details of the stations taking part together with their frequencies and stations heard and worked—where known—are given in the accompanying table.

In response to several requests a third Activity Period will take place from May 5-13. Suggested times of operation are set out below.

THIRD 70 cm. ACTIVITY PERIOD

Operating Periods

May 5	...	...	...	15.00-16.00
				19.00-20.00
May 6 and 13	...	...	...	10.00-12.00
				22.30-23.30
May 7, 8 and 11	...	...	...	19.00-20.00
May 9 and 10	...	...	...	22.00-23.00
May 12	...	...	...	15.00-16.00
				22.30-23.30

B.S.T. throughout

It has been suggested that the individual periods should be extended, but as the tests are in no sense competitive, it is thought that any extension would tend to spread the activity too thinly, bearing in mind the comparatively small number of stations at present operating. This would spoil the objects of the tests, namely to get stations on the band at definite times and thus to insure, as far as possible, that contacts may be available for those wishing to carry out experimental work on their apparatus.

A point which is becoming of increasing importance in 70 cm. work, and which will crop up again when even higher frequency bands are more widely used, is that of searching for weak signals.

Frequencies in general use fall between 432 and 438 Mc/s.—in harmonic relationship to 144-146 Mc/s.—but even so a band 6 Mc/s. wide takes a lot of searching, particularly when the beam in use has a narrow response. G2FKZ would like to see the activity periods bearing a relation to aerial direction, e.g., all southern stations beam north from 10 to 12 o'clock. This scheme has possibilities, and sounds attractive, but depends entirely upon good co-operation and a stout refusal to answer loud calls from other directions. This would require more than a little strong-mindedness when the band appears dead for DX. The idea, however, has obvious advantages when tropospheric conditions appear favourable for long distance contacts, and as these conditions are more likely to appertain during the summer months, it might be tried out during the fourth Activity Period which is scheduled for July. The views of 70 cm.

operators would be welcome on this point, but meanwhile it is suggested that, in recognition of the efforts of G3EHY—up till now unsuccessful—to establish 70 cm. contact between Banwell, Somerset, and the London area, all available London stations should call him from 19.00 to 19.10 B.S.T. on May 5 next and listen for his reply during the ensuing 10 minutes.

Views and Comments

"No signals were received quite so well as during the last activity week in spite of definite improvements to the converter"—G2DD. "A few weak signals, presumably 'phone, would have been readable on C.W."—G5CD. "Most stations were S9, including G5TP at 38 miles, and no fading was experienced. I was impressed by the usefulness of the three lobes of the aerial (2-metre 6-element Yagi) which made searching so much easier"—G8KZ. "Sorry results were negative, but it has all been very interesting, and only by having these organised activity periods regularly shall we get anywhere on a frequency like this"—G3EHY. "... to be perfectly honest, activity week makes very little difference to the stations one normally hears or can work"—G2FKZ. "I thoroughly enjoyed myself, particularly on the first Sunday, when I heard no less than 14 stations"—G2CIW.

Readers will be sorry to learn that G2CIW will shortly cease to operate on the V.H.F.'s as he is going abroad. From then on he will be fighting the QRM on the lower frequencies!

Apparatus in Use

The majority of stations employed triplers as the final stage in their transmitters, the 832 being most popular. G5CD had two Mullard QQV06-40's as tripler and P.A. with an input of 25 watts, while G2WS had one of these valves, with 22 watts input, arranged as a tripler. Two type 105 units (tripler and P.A.) with CV82 and CV53 and 5 watts input formed the output stages of the transmitter at G2DD. G5PY also employed two 105 units, both with CV53's. These were driven from his 144 Mc/s. transmitter and both CV53's were anode modulated. Reports indicated that the percentage of modulation was uncommonly high. The excellent signal reported by several stations from G8KZ had its origin in an 832A with 22 watts input (280 volts at 80 mA.) and 3 mA. grid current. Peter does not say whether the uncomplaining 832A was "blown" or not!

All stations employed crystal mixers with the exception of G5CD, who used a 12AT7 double-triode. G2QY favoured a push-pull crystal mixer. 6J6's would appear to be normal practice for the R.F. oscillator at most stations.

Conditions

G3EHY operated during all the test periods and his report included data on 144 Mc/s. conditions at the time, together with notes of the weather conditions, temperature and barometric

* 32 Earls Road, Tunbridge Wells, Kent.

pressure. March 4, which was noted as a good day by several operators, was good for 150 miles on the lower frequency, and showed some signs of auroral reflection in the evening. The temperature varied between 38 and 40 degs., but the pressure was around 29.7 in. The lowest temperature and pressure occurred on the last Sunday and coincided with a very good path to the north for two-metre signals but was poor to the south-east.

Reports and comments on the third Activity Period will be welcome, and it is requested that they be sent as soon after May 13 as convenient.

Other 70 cm. News

G8KZ is operating most evenings on 436.05 Mc/s. between 19.00 and 20.00 and again between 22.30 and midnight B.S.T. The daily test transmissions from G3EHY on 435.75 Mc/s. from 18.40 to 18.50 B.S.T. continue but this station is now radiating a further call at 20.00 daily. All transmissions are aimed at the London area and reports would be welcomed. G2DD has now made upwards of 226 contacts on the band. G4AP is active every Thursday from 20.00 to 22.00 on 435.27 Mc/s. and is anxious to make contacts. His receiver includes a 955 acorn triode oscillator with silver-plated lines operating at fundamental frequency which proves to be quite stable and far more efficient than harmonic injection.

The Two Metre Band

Conditions generally have been far from good, and well below those experienced at this time last year. From the beginning of January to March 20 G6LI (Grimsby), who operates regularly between 18.00 and 22.00, heard and worked—in January—G2FO, FZX, 3DMU, FXG, VM, 6LL, 8GL, (February) G8GL. (March) G2FO, XV, 3DMK, 4DC and GW5MQ. The latter station, located in Flint, was heard at RST569, and was also heard by G2UJ at S4/5 during the late evening of March 4. G6LI wishes to remind some of the southern stations that two metre activity also takes place in the north of England, and mentions several occasions when he has been hearing stations 200 miles away working 25 to 50 miles and saying that the band was dead!

G3BW (Whitehaven, Cumberland) was heard by G3EHY at 232 miles quite consistently during the first three days of March, and was later worked—on the 10th—at good strength. On March 4 at 20.30 G.M.T. 'EHY heard S9 signals from G3BKW (Oxford) with his beam pointing north, and on establishing contact was given a similar report. On turning the beam to the correct direction for Oxford, signals dropped practically to inaudibility at both ends. This sounds like a good

example of auroral reflection, but whether the characteristic "auroral quality" was in evidence was not mentioned. March 10 was another good evening, but the 15th appeared to have been the best so far this year. G3EHY worked a number of northern stations on 'phone and heard a GM3 replying to one of his CQ calls. Unfortunately fading prevented the full call being read.

G3WW (March, Cambs.) has been active to some purpose, and sends a fine list of stations worked between February 12 and March 13. This seems to indicate that the band has been by no

means as dead as some would have us believe. As many of the stations mentioned in his list are comparative newcomers to the band, locations are given as an assistance in searching:

G2AIQ (Cambridge), ATK (Birmingham), DUS (Stotfold, Beds.), FQP (Ramsey, Hunts.), FTS (Hailsham, Sx.), HCG (Northampton), UQ (Whittlesey), XC (Portsmouth), XV (Cambridge), 3ABA (Coventry), AKU (St. Ives, Hunts.), BK (March), CGQ (Luton), CXD (Staffs.), DIV/A (Eastbourne), DUP (Northampton), EHQ (Peterborough), EHY, EMJ (Derby), ENS (Leicester), FMI (Cheshire), FNW (Leicester), GGJ and 4MW (Cambridge), SDS (Surrey), RW (Derbyshire), UD (Kings Lynn), 6AG (Bexley, Kent), CW (Nottingham), NB (Aylesbury), YU (Coventry), 8MZ (Birmingham), SY (Cambs.), GW2ADZ (Mont.), 5MQ (Flint). Stations heard but not worked included G2RI, 3GHS, 4HT, NB and 5UF.

Two Metres in Germany

G2WS, during his recent business trip to Germany, visited Hanover where DL2MW (ex-G8MW) is doing what he can to stimulate activity on the two metre band. Several stations are working and contacts have been made with Denmark.

A Welcome Visitor

The call VE1QZ figured prominently in V.H.F. logs during the famous 50 Mc/s. DX season in 1946-7. Recently the writer and others had the pleasure of meeting the owner, Oscar Sandoz, of Dartmouth, N.S., who was visiting this country on business. Oscar took the opportunity of calling upon some of those whom he contacted on 50 Mc/s., including G5PY, who worked him three times on that frequency and who, on this occasion, was able to give VE1QZ his first experience of 70 cm. operation in this country.

* * *

Please send reports for publication in the May BULLETIN by April 23.

SECOND 70 CM. ACTIVITY PERIOD

Ref. No.	Call and Situation	Freq.	Stations	
			Heard	Worked
1	G2CIW Romford, Essex		4, 5, 17, 18, 27	2, 3, 7, 9, 13, 15, 16, 19, 23, 26
2	G2DD Stanmore		13, 14, 21	1, 3, 4, 7, 10, 15, 16, 17, 18, 19
3	G2FKZ London, S.E.22		10, 13, 17, 18, 22, 27	1, 2, 3, 4, 5, 6, 7, 11, 15, 16, 19, 21, 23, 26
4	G2QY Pinner	435.10	7, 19, 20, 21	1, 2, 3, 10, 13, 15
5	G2WJ Dunmow, Essex	435.78	13	1, 3, 25
6	G2WS Beckenham			3, 22
7	G3BOB Hayes, Kent			
8	G3EHY Banwell, Som.	435.75	Nil	Nil
9	G3EHW London, S.E.18			
10	G3FP Croydon			
11	G3PZL London, S.E.22			
12	G4AP Swindon, Wilts.	435.27	Nil	25
13	G4CG Wimbledon	435.20	2, 3, 18, 19, 22, 26, 27	1, 4, 7, 10, 15, 16, 17, 23
14	G4KD Edgware			
15	G5CD London, N.W.11		16, 21	1, 2, 3, 4, 7, 13, 17, 19, 20, 26
16	G5CR Hayes, Kent		7, 10, 17, 19, 20	1, 3, 13, 22, 23
17	G5DT Crayford, Kent			
18	G5KH London, S.W.15			
19	G5PY London, S.W.12	435.40	10, 17, 18, 27	1, 2, 3, 13, 15, 21, 26
20	G5RD Stoke Row, Oxon.			
21	G5TP Beckenham			
22	G6HD Dartford, Kent	435.30	15, 26	1, 3, 5, 7, 9, 13, 16, 17
23	G6PG			
24	G6YP London, S.E.5		5	12
25	G8DM/A Nr. Swindon	436.05	13, 15, 18, 20, 23	1, 2, 3, 7, 17, 19, 27, 21
26	G8KZ London, W.10			
27	G8SM East Molesey, Sy.			

— Indicates no report received.

THE INTERNATIONAL AMATEUR RADIO UNION

By S. K. LEWER, B.Sc. (G6LJ)

It is vitally important that members should understand the purposes and aims of the I.A.R.U. This account of its work comes from the pen of a distinguished Past President and recently elected Honorary Member who was present when the Union was formed in 1925. Twenty-five years later—at the second Paris Congress—he occupied the chair of the Administrative Committee. In 1947 Mr. Lewer represented the I.A.R.U. and the R.S.G.B. at the Atlantic City International Telecommunications Conference.

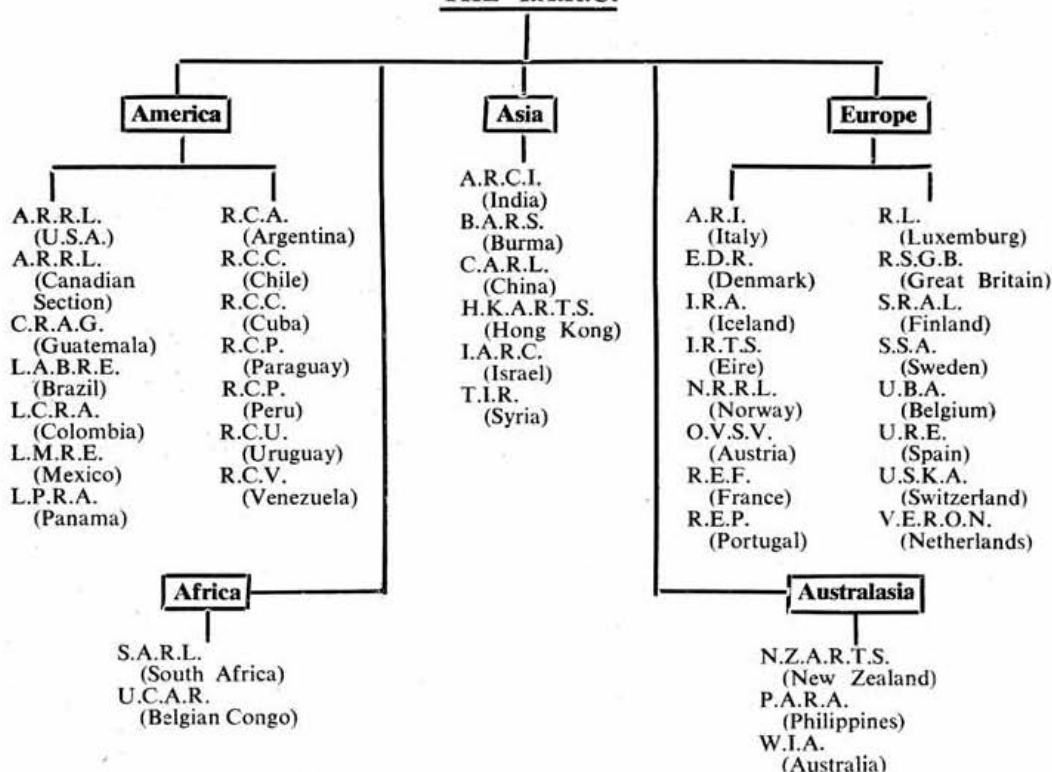
TWENTY-FIVE years ago the I.A.R.U. was formed to co-ordinate the affairs and to safeguard the interests of Amateur Radio which had newly acquired a truly international character as a result of the discovery of short-wave DX. The I.A.R.U. has continued to serve this function ever since, and at the 25th Anniversary Congress held in Paris last May the need for it was even more deeply appreciated.

The I.A.R.U. is an organisation without funds. It is a union of Societies, one of which is appointed as the Headquarters Society. Since the formation in 1925, the A.R.R.L. has served as the Headquarters Society and still serves. The officers

I.A.R.U. Calendar: this is produced at the expense of the Headquarters Society. The A.R.R.L. has also generously allowed part of *QST* to be used for I.A.R.U. purposes, and in fact *QST* is the official organ of the I.A.R.U.

The publicity which has been given to the affairs of the I.A.R.U. has been regrettably meagre. This is no criticism of the A.R.R.L. as the Headquarters Society. The fault lies in the organisation of the Union as a body without funds. A tribute should be paid to the A.R.R.L. and to the other Societies which have contributed to the growth and the activities of the I.A.R.U. without being able to draw on any Union funds.

THE I.A.R.U.



of the I.A.R.U. are appointed from the officers of the Headquarters Society: its President is Mr. George W. Bailey, W2KH, and its secretary is Mr. Arthur L. Budlong, W1BUD (respectively President and Secretary of the A.R.R.L.).

Twice yearly the Headquarters Society distributes to the Member Societies a document known as the

Member Societies

Any national non-commercial Amateur Radio society whose influence substantially covers its national territory can be elected to membership of the I.A.R.U., but only one society in each country or colony can be admitted. The election

is conducted by a postal vote through the medium of the Calendar.

The individual amateurs who are members of such national societies are therefore part of the I.A.R.U. organisation, and indirectly they have the opportunity and the power to determine its activities.

At the present time the I.A.R.U. comprises 41 Member Societies. This membership confers an important status on the Member Society, not only in the world of Amateur Radio but also in relation to the respective national authorities. The fact that a society makes itself aware of and participates in the world-wide affairs of Amateur Radio gives that society additional strength in its negotiations with governmental departments, especially where questions of international character arise.

Functions

The objects of the I.A.R.U. as formally laid down in the Constitution are as follows:

The promotion and co-ordination of two-way Amateur Radio communication.

The effecting of co-operative agreements between the national Amateur Radio societies on matters of common welfare.

The advancement of the radio art.

The representation of two-way Amateur Radio communication interests at International Telecommunications Conferences.

The encouragement of international fraternalism.

The promotion of such additional activities as may be allied thereto.

One of these additional activities is the co-ordination of QSL bureaux throughout the world: another is the issuing of the well-known W.A.C. (Worked All Continents) Certificates, which incidentally are issued entirely at the expense of the Headquarters Society.

Meetings

The I.A.R.U. does not hold regular meetings. The Congress held in Paris last May, and reported upon in the August, 1950, BULLETIN, was the first official meeting since the formation of the I.A.R.U. in 1925. One of the recommendations agreed at that Congress called for another meeting to be held within three years in order that the I.A.R.U. might keep a closer watch on the changing problems of Amateur Radio and be adequately prepared to deal with them.

The cost of holding international conferences is high, even when there are relatively few delegates. Travelling expenses are obviously disproportionately heavy for the societies whose headquarters are in remote parts of the world. Stenography and translation expenses are also substantial. The total cost per delegate may be high, but when the cost is related to the vast numbers of individual amateurs who benefit directly or indirectly from the work of the conferences it is seen to be remarkably small.

The Need for International Co-operation

The world-wide character of Amateur Radio clearly calls for international co-ordination on several matters. For instance, the organisation of international contests, the interchange of cards by QSL bureaux, the drafting of codes of practice and the establishment of a band plan to avoid conflict between telegraphy and telephony operation and between local and DX operation are obviously matters which can best be dealt with by

mutual agreement between the various national societies.

The frequency bands which are available for amateur use are decided by international agreement between governmental administrations, but at the conferences which determine these frequency bands it is vitally important to provide effective representation of amateur interests. This is far better achieved on an international basis than on a national basis—a policy that was confirmed at the recent I.A.R.U. Congress in Paris. The international governmental conferences are held every few years* to review the rules and regulations and to amend them in the light of the changing circumstances of world-wide telecommunication. In the preparatory period which precedes such conferences, the closest liaison should exist between each national amateur society and its governmental administration. In this country the R.S.G.B. has, from the earliest years of its existence, been in close contact with the G.P.O. But, through lack of experience or for other reasons, in many and perhaps most other countries a corresponding desirable liaison does not exist. International co-operation between national societies can do much to foster a closer understanding with the authorities and thus strengthen the position of the amateur at future Telecommunications Conferences.

The contribution of Amateur Radio to scientific study, especially of propagation and V.H.F. technique is well appreciated in certain quarters, although nowadays it unfortunately receives little public acknowledgment. To ensure the most effective results, a full exchange of ideas and information amongst the amateur societies is essential.

All these aspects of international amateur co-operation are covered by the constitution of the I.A.R.U. The voice generally expressed at the recent Paris Congress called for an expansion and a strengthening of such activities.

The Future of the I.A.R.U.

The I.A.R.U. is now beginning its second quarter-century. Its obligations are incomparably more pressing now than at its formation. Since 1925 the number of amateurs in the world has increased enormously and it is still growing. Countries where Amateur Radio was unheard of in 1925 now have flourishing national societies with large and active memberships. The amount of apparatus and equipment owned and operated by amateurs have similarly grown and their technical knowledge and skill are continually increasing.

Simultaneously with the growth of Amateur Radio, there have been tremendous expansions of other radio services such as broadcasting, television, aeronautical and navigational systems, and their collected demands for operating frequencies are much too heavy to be met by a universally satisfactory allocation scheme. So strong are the interests of these other services that the amateur would soon become extinct if he did not energetically make his voice heard above the incessant clamour. This is the over-riding task of the I.A.R.U. now and in the years to come. It is for the amateurs themselves, acting through their Societies, to make the I.A.R.U. strong enough and effective enough to safeguard their interests in the face of growing opposition and competition.

*Atlantic City, 1947; Cairo, 1938; Madrid, 1932; Washington, 1927.

Amateur Radio and the Festival of Britain

Amateur Radio Station GB3FB

THE Industrial Division of the Council of Industrial Design announce that the following apparatus and equipment will be in use at, or used in connection with, the Amateur Radio Station GB3FB, at the Land Travelling Exhibition.

Description	Supplied by
Low Power High Stability Variable Frequency Oscillator.	Labgear Ltd.
Stabilised Power Supply Unit, Series 1120.	All-Power Trans-formers Ltd.
Rotary dual 20/10 metre aerial array, remote control, mounted on steel tower.	Panda Radio Co.
Selsyn cable.	Telegraph Construction & Maintenance Co., Ltd.
Co-axial Feeder Cable	Telegraph Construction & Maintenance Co., Ltd.
100 - watt Transmitter, completely switched, full amateur coverage, crystal-controlled with aerial matching network.	Teleradio (1943) Ltd.
Communications Receiver, Model Q5/10X.	Q-Max (Electronics) Ltd.
Communications Receiver, Model 750 "Eddystone."	Stratton & Co., Ltd.
"Avo" 25 range high sensitivity test meter, with automatic overload protection.	Automatic Coil Winder & Electrical Equipment Co., Ltd.
Metrovick miniature oscilloscope, type 244, a small high performance oscilloscope with all the essential features of a normal size instrument.	Metropolitan-Vickers Electrical Co., Ltd.
Signal generator, Model E.	Advance Components Ltd.
"Solon" electric soldering irons.	W. T. Henley's Telegraph Works Co., Ltd.
Electric soldering iron (Solderpencil) for use in awkward places and on miniature equipment.	E. K. Cole Ltd.
"Ersin" Multicore Solder.	Multicore Solders Ltd.
Morse Key.	Walter's Electrical Manufacturing Co. Ltd.
Great Circle Map, Azimuthal Projection.	Webbs' Radio.
Sectric Wall Clock.	Smith's English Clocks Ltd.
Ribbon Microphone and Table Stand.	Reslosound Ltd.
Loudspeaker in cabinet, "Baby Baffle" 660.	Richard Allan Radio Ltd.
Loudspeaker "Stentorian."	Whiteley Electrical Radio Co. Ltd.
Log Books and QSL Cards.	R. Martin & Co. Ltd.
Swivel Chair.	Leabank Chairs Ltd.

"Our Way of Life Exhibition"

UNDER the auspices of the Bristol Council of Social Service an exhibition, with the descriptive title "Our Way of Life," is to be held on the Memorial Ground, Bristol, from July 7 to 21, 1951, in connection with local Festival of Britain activities.

The Bristol R.S.G.B. Group is to co-operate in this important West County function by operating an Amateur Radio station under the call-sign G6YA/A from the exhibition site. The station will use two transmitters, a 10-watt job for the 1.8 Mc/s. band and a 150-watt job (employing a pair of HK254's modulated with a pair of 811's) for 3.5, 7, 14 and 28 Mc/s. A tape recorder will be built in. The receiving side will be taken care of with a Marconi Electra and two home-built receivers of quite outstanding merits built by two B.R.S. members.

It is expected that 420 Mc/s. transmissions will also be radiated from the exhibition site.

Members who work G6YA/A are asked to QSL promptly, so that their card may be displayed. A specially designed card supplied by the Corporation of the City of Bristol will be used to confirm contacts.

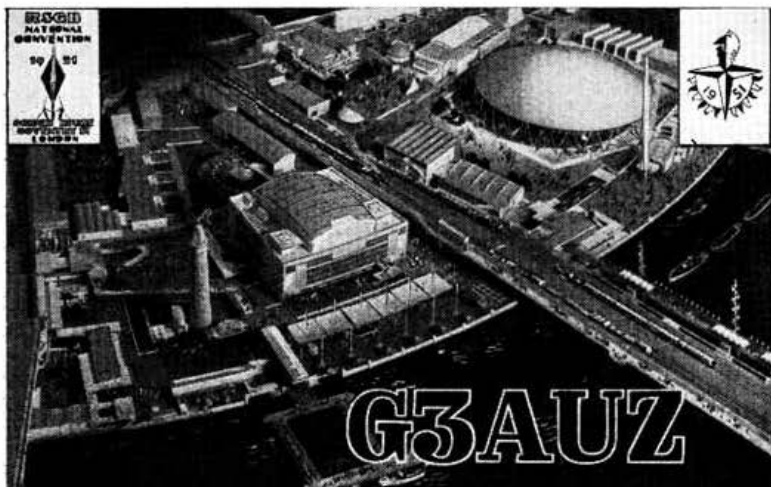
Welsh Industries Fair

A Collins T.C.S.12 transmitter and receiver will be presented to the constructor of the best item of home-built Amateur Radio equipment exhibited at the Welsh Industries Fair, to be held during the period July 4 to 14.

The competition is open to all Region 10 R.S.G.B. members, and entries will be judged at the June meeting of the Cardiff group. Intending competitors who are unable to attend should seek the co-operation of the Cardiff T.R.

The latest date for notification of entry is May 1. Full details may be obtained from the Region 10 R.R. (Mr. F. Hamer, GW8BW, 7 Neath Road Bungalows, Rhigos, Glam.), or from the Cardiff T.R. (Mr. G. F. Wilson, 120 Cardiff Road, Llandaff, Glam.).

The Cardiff T.R. will also welcome offers of suitable equipment for exhibiting from members who do not wish to compete.



Festival of Britain QSL

Here is an example of the special Festival of Britain souvenir QSL card, designed and printed by E. R. Martin, G6MN, and produced in collaboration with the R.S.G.B. Convention Committee. The illustration depicts the South Bank site, and embodies the Festival of Britain and R.S.G.B. National Convention emblems. The card is printed in orange and can be overprinted in black, with a call sign or B.R.S. number. The cards are offered at the attractive price of 25/- for 250, post free.

South Park, Darlington

The Darlington R.S.G.B. Group is to operate an Amateur Radio station from South Park, Darlington (site for local Festival of Britain activities) during the period from June 10 to July 10. The call-sign G3FYI will be used and the station will operate on all bands from 9 a.m. to 9 p.m. for the first nine days, and thereafter from 6 p.m. to 9 p.m. The main transmitter will run at 150 watts; *Eddystone* 640 and 750 receivers will be employed for reception.

The organisation of the station is in the hands of a Festival Committee comprising the T.R. (Mr. P. F. Lucas, G3BQJ), and Messrs. R. Jackson, G2CKN, and R. Sharp, G3EQH.

AMATEUR RADIO AT THE LAND TRAVEL EXHIBITION

The dates when the Land Travelling Exhibition Station will be in operation are as follows:—

May 5—26: Manchester (City Hall, Deansgate)

June 23—July 14: Leeds (Woodhouse Moor).

August 4—25: Birmingham (Bingley Hall, King Alfred's Place)

Sept. 15—Oct. 6: Nottingham (Broad Marsh).

Call Sign GB3FB

Festival Coat-of-Arms

QSL cards bearing the coat-of-arms of Uxbridge are to be used to confirm contacts with the Uxbridge and Hayes R.S.G.B. Group amateur station at the Uxbridge Festival of Britain Industrial Exhibition. This privilege has been granted by the local authority strictly for the purpose stated and for a limited period.

British I.R.E. Festival Convention

THE British Institution of Radio Engineers are to hold a Festival of Britain Convention during the summer. More than seventy papers will be read, covering almost the whole field of radio and electronic engineering. Residential facilities will be available at Connaught Hall, Southampton, and King's College, Cambridge.

I.E.E. Convention on Television

THE Council of the Institution of Electrical Engineers announce that a Convention entitled "The British Contribution to Television" will be held during the spring of 1952.

The programme will include the reading of and discussions on a number of papers, supported by demonstrations, together with visits to appropriate organisations. Further details will be announced when the programme has taken a more definite form.

VK/ZL Contest, 1950

THE Contests and Awards manager of N.Z.A.R.T. announces that the following are the British Isles results of the 1950 VK/ZL Contest:

C.W. — England: *G2AJ 1219, *G6XN 835, G3COJ 755, G8DA 196, G6AH 105, G3GPC 84.

Scotland: *GM3EST 15.

Wales: *GW3ZV 944, GW3FSP 520.

*Phone.—England: *G6XN 451.

Wales: *GW8BW 318, GW3FSP 140.

* Certificates have been posted to those marked with an asterisk.

Slow Morse Transmissions

DUE to increasing pressure of private business, G3ARU of Wanstead, London, who for the past four years has regularly transmitted a practice on Thursday evenings, has been compelled to give up. His past services have been most warmly appreciated.

Further offers, especially from members in the London area, are urgently required, in order that the present service may be maintained and augmented. Offers should be addressed to the Hon. Organiser, Mr. C. H. L. Edwards, A.M.I.E.E. (G8TL), 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

B.S.T.	Call	kc/s.	Town
Sundays			
10.00	G6MH	1990	Southend-on-Sea
10.00	G5XB	1950	Reading
10.00	G3AEZ	1847	Dorking
11.00	G3ADZ	1900	Southsea
11.00	GM3AVA	1860	Falkirk
12.00	G3CWW	1730	Hendon, N.W.4
21.00	G2FIX	1812	Nr. Salisbury
22.00	G2FXA	1900	Stockton-on-Tees
Mondays			
13.00	G3AXN	1870	Southend-on-Sea
19.00	G3NC	1825	Swindon
19.30	G3AIX	1760	Birmingham
19.30	G3GYW	1922	Westcliff-on-Sea
20.00	G2AJU	1900	Stutton, Ipswich
20.00	G3DSR	1750	Derby
21.00	G3ESP	1850	Wakefield, Yorks
21.00	G3BLN	1900	Bournemouth
21.00	G3BHS	1820	Eastleigh, Hants
22.00	GM4MF	1860	Falkirk
22.00	G3AEZ	1847	Dorking
22.15	G8TL	1896	Ilford
Tuesdays			
13.00	G3AXN	1870	Southend-on-Sea
19.00	G5XB	1905	Reading
19.30	G2CPL	1900	Lowestoft
21.00	G3DMP	1850	Wakefield, Yorks
21.00	G3EFA	1855	Southport
22.00	G3ELG	1772	Rotherham
22.00	G2FXA	1900	Stockton-on-Tees
22.30	G6JB	1820	Salcombe, Devon
Wednesdays			
18.45	G3COL	1990	Leigh-on-Sea
19.00	G3ADZ	1900	Southsea
20.00	G2NY	1850	Preston
22.00	G3DLC	1800	Grays, Essex
22.00	GM4JQ	1860	Falkirk
Thursdays			
18.00	G3AXN	1870	Southend-on-Sea
19.00	G3NC	1825	Swindon
19.30	G3BUJ	1990	Southend-on-Sea
20.00	G3FVH	1920	Hull, Yorks
20.00	G3NT	1805	Northallerton
21.00	G2AQN	1850	Ossett, Yorks
21.30	G6DL	1760	Birmingham
22.00	G2FXA	1900	Stockton-on-Tees
22.00	G3AEZ	1847	Dorking
22.30	G3OB	1803	Manchester
Fridays			
13.00	G3AXN	1870	Southend-on-Sea
14.00	G3ADZ	1900	Southsea
19.00	G3BLN	1900	Bournemouth
19.30	G2CPL	1900	Lowestoft
20.00	G2AJU	1900	Stutton, Ipswich
20.00	G2AMV	1870	Wirral
21.00	G3RB	1850	Ossett, Yorks
21.00	G3BHS	1820	Eastleigh, Hants
22.30	G6JB	1820	Salcombe, Devon
Saturdays			
22.00	GM3OM	1860	Falkirk
23.00	G2FXA	1900	Stockton-on-Tees

OTHER AMATEURS ARE ASKED TO AVOID CAUSING INTERFERENCE TO THESE TRANSMISSIONS

OPEN EVENT MAY 19 - 20 : FIELD DAY JULY 8

384

NEW REGIONAL BOUNDARIES PROPOSED

At the Regional Representatives' Conference held in London last October, several representatives expressed the view that certain regional boundaries should be changed.

The Membership and Representation Committee subsequently considered the matter at length and in January last submitted their proposals to the Council. Broadly speaking, these sought to meet the views expressed by the representatives of Regions 8 and 9 that their Regions were too large.

The proposals of the Committee were accepted by the Council who sent them forward to the Regional and County Representatives concerned for their views. The viewpoints expressed have been carefully considered by the Committee who have recommended to the Council that the counties listed below shall constitute the various Regions:

Region 5 (Eastern)

- Bedfordshire (from Region 6)
- Cambridgeshire
- *Essex
- *Hertfordshire (from Region 6)
- Huntingdonshire
- Norfolk
- Suffolk

Region 6 (South Central)

- Berkshire (from Region 8)
- *Buckinghamshire
- Gloucestershire (excluding the Bristol area) (from Region 9)
- Oxfordshire
- †Wiltshire (from Region 9)

Region 8 (South Eastern)

- Hampshire (including the Poole area of Dorsetshire)

- *Kent
- Sussex

Region 9 (South Western)

- Bristol
- Cornwall
- Devon
- †Dorset (excluding the Poole area)
- Somerset

Before introducing the changes, however, the Council will consider any serious objections that may be raised by representative groups of members in the regions concerned, provided such objections are received by the General Secretary not later than May 31, 1951. If no serious objections are raised the changes will take effect as from July 1, 1951.

* Outside Region 7 (London).

† Members resident in Wiltshire are invited to express a preference for that county to remain in Region 9 or to be transferred to Region 6.

‡ Members resident in the Poole area of Dorsetshire are invited to express a preference to remain in Region 9 or to be transferred to Region 8.

R.R.s to Meet the Council

A CONFERENCE between the Regional Representatives and the Council will take place in London during the weekend of April 28-29.

The Conference will give consideration to propositions submitted by the R.R.s and to the views expressed by those members who completed and returned the questionnaire issued last month.

Correction

MR. H. A. M. CLARK, G6OT, who was recently elected a Vice-President of the Society, has drawn attention to the fact that his second name is Arthur and not Archibald as stated in the announcement published in our last issue. We regret the error.

OFFICIAL REGIONAL MEETINGS, 1951

THE following is a list of O.R.M.s. to be held during 1951, together with the names of the persons appointed to represent the Council at the various meetings:

Date	Region	Venue	Official Delegation
April 22	10	Hirwaun	The President, Messrs. W. N. Craig, C. H. L. Edwards, T. L. Herdman, A. O. Milne, P. W. Winsford, and the General Secretary.
May 20	2	Sheffield	Messrs. F. Charman, C. H. L. Edwards, A. O. Milne, P. A. Thorogood, the General Secretary, and Miss Gadsden.
Sept.	8	Tunbridge Wells	The President, Messrs. W. H. Allen, A. P. G. Amos, T. L. Herdman, P. A. Thorogood, P. W. Winsford, and the General Secretary.
Sept. 16 Sept. 17	14 12	Glasgow Aberdeen	Messrs. L. Cooper, W. N. Craig, T. L. Herdman, A. O. Milne and the General Secretary.
Oct. 14	4	Derby	The President, Messrs. W. H. Allen, L. Cooper, V. M. Desmond, the General Secretary, and Miss Gadsden.

It is anticipated that an O.R.M. will be held in Region 6—possibly Reading—during the Autumn. In that event the official delegation will comprise the President, Messrs. W. H. Allen, A. P. G. Amos, L. Cooper, F. Charman, W. N. Craig, T. L. Herdman, P. W. Winsford and the General Secretary.

The Council has agreed that the Society shall, when called upon, pay for the hire of the meeting room at any O.R.M. up to a maximum of £5.

New Assistant Editor Appointed

A WARM welcome is extended to Mr. D. McIlwain of Leyton, London, who has joined the staff at Headquarters as Assistant Editor. During the last war, Mr. McIlwain was a Signals Officer in the Royal Air Force and at one period was in charge of the Long Range High Speed Morse links with Canada and Australia.

Although not at present a transmitting amateur, Mr. McIlwain has a specialised knowledge of R/T and W/T procedure and can copy the code at more than average speed. In recent years, he has successfully engaged in free-lance journalism in radio and television.

Metropolitan Radio Club of Los Angeles

WHEN the Metropolitan Radio Club of Los Angeles disbanded recently the members decided to forward the balance of their funds (amounting to 51 dollars) to the A.R.R.L. with a request that the money should be used to provide copies of the *Radio Amateurs' Handbook* for British Isles amateurs. This kindly gesture is most warmly appreciated by the Council who, in accepting the offer, have decided that the books (24 in number) shall be awarded as free prizes at the forthcoming Convention Dinner.

DIRECTION FINDING FIELD DAYS

At a meeting of Town Group and Affiliated Society representatives held at the Royal Hotel, Woburn Place, London, on March 11, plans for this year's D/F Field Days were fully discussed. With the approval of the Council, the Contests Committee has agreed on the programme shown below.

It should be pointed out that members of the R.S.G.B. and of Affiliated Societies can take part in one or more of the qualifying events. All events will be held under identical rules, and details of assembly point, call sign, map and tea reservation, etc., can be obtained from the organisers as shown below. Where possible they will also be published in the BULLETIN.

The rules are similar to previous years, with the exception that "sealed envelopes" will no longer be used. Teas will be arranged near the starting point so that the location can be previously announced.

Programme of Qualifying Events

Date	District	Organiser
May 20	High Wycombe	G. T. Peck, c/o Ernest Turner, Electrical Instruments, Ltd., Chiltern Works, Totteridge Ave., High Wycombe, Bucks.
June 10	Birmingham	Slade Radio Society, C. Smart, 110 Woolmore Rd., Erdington, Birmingham 23.
July 1	Peterborough	L. Critchley (T.R.), 36 Waterloo Rd., Peterborough.
July 15	Rugby	P. N. Prior, B.T.H. Recreation Club, Rugby.
August 26	Southend-on-Sea	Southend Radio Society, J. H. Barrance, 49 Swanage Rd., Southend-on-Sea, Essex.

National Final

The National Final will be held in the Romford area on September 30.

Qualifying Field Day—May 20, 1951

Organiser.	Mr. G. T. Peck, c/o Ernest Turner Electrical Instruments, Ltd., Chiltern Works, Totteridge Ave., High Wycombe, Bucks.
Call Sign.	G4NT/P.
Frequency.	1883 kc/s.
Assembly Point.	Tyler's Green (opposite Red Lion Inn), Penn. 3 miles N.W. of Beaconsfield. National Grid ref: 41/906936.
Map.	Ordnance Survey, New Popular Edition, 1in. to mile. Sheet 159.
Assembly Time.	1330 B.S.T.

Intending entrants must notify Mr. Peck of their intention to compete not later than May 14, stating the total number in the party who will require tea.

Rules

1. Events will be open to members of the R.S.G.B. and of Affiliated Societies, and will be held on Sunday afternoons, commencing at 1400 B.S.T. and concluding at 1630 B.S.T.

2. Transmissions will take place in the 1.8 Mc/s. band, with not more than 10 watts input, and power will remain constant throughout the test. Identification signals will be given in Morse for the first two minutes of the first transmission, followed by three minutes telephony. Transmissions shall be audible at the start and competitors will be permitted to leave at the end of the five-minute period detailed above.

3. Transmission times:—

1400 to 1402	Morse
1402 to 1405	telephony
1415 to 1419	do
1430 to 1433	do
1445 to 1447	do

Subsequent transmissions, which will be speech modulated, will take place at irregular intervals, but with a minimum continuous transmission of two minutes, and a maximum silent period of 15 minutes at the discretion of the organiser.

4. The hidden station will be located within 10 miles of the starting point, at least 50 yards from any inhabited building, and directly accessible to the competitor without entering, crossing, or trespassing upon property in private occupation or passing through a gateway. Organisers will specify an Ordnance Survey Map, New Popular Edition, scale 1in. to the mile, covering both the starting point and the transmitter location.

5. Each competitor must sign-on at the starting point on both the starter's sheet and an entry form. This entry form will contain a copy of the rules, and the winner of the event will be the entrant whose entry form is first accepted by the operator of the transmitter. Only the competitor may actually locate the transmitter. Any member of a party arriving at a transmitter prior to the competitor, or found searching the vicinity, will entail disqualification of the party. Competitors arriving at the transmitter shall disperse under the direction of the operator.

6. Only one receiver tuned to the 1.8 Mc/s. band shall be carried by any party during the test, and the competitor, at the time of his arrival at the hidden transmitter, must have his receiving apparatus with him and, if required, demonstrate that it is in working order.

7. Two independent R.S.G.B. observers will be present, one at the start, and the other at the hidden transmitter, for each of the qualifying events, and at the National Final. In the case of dispute, their judgment shall be taken as final.

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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.

February Council Meeting

Résumé of the Minutes of the Proceedings at the Meeting of the Council of the Incorporated Radio Society of Great Britain at New Ruskin House, Little Russell Street, London, W.C.1, on Tuesday, February 13, 1951, at 6 p.m.

Present.—The Executive Vice-President (Mr. F. Charman), in the Chair, Messrs. W. H. Allen, A. P. G. Amos, 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. A. Winsford, and John Clarricoats (General Secretary).

An apology for absence was submitted from the President (Mr. W. A. Scarr), who was abroad.

Annual General Meeting Matters.

Correspondence was submitted and considered from a number of R.S.G.B. Representatives and groups, and from several affiliated societies.

It was reported that a Statement of Policy (drawn up at a special meeting of the Council held on February 2, 1951) had been issued to all R.S.G.B. Representatives and, for information, to all affiliated societies.

A questionnaire, based on information supplied by members of the Council, was approved for circulation to the membership in the March issue of the BULLETIN. It was agreed to await the results of the questionnaire before giving further consideration to a suggestion put forward by Mr. Winsford that the Council should convene a Special General Meeting.

It was agreed to convene a Conference in London between the Council and the Regional Representatives during the weekend April 28-29, 1951. It was agreed to invite the Regional Representatives to submit motions for consideration at the Conference and then, if deemed desirable, to the membership for consideration at a Special General Meeting.

Membership.

Resolved (a) to approve:—

57 applications for Corporate Membership

8 applications for Associateship

2 applications for Junior Associateship;

(b) to grant Corporate Membership to five Associates who had applied for transfer.

Applications for Affiliation.

Resolved to grant affiliation to:—

Kenilworth Radio and Television Society

Royston and District Radio Club.

Representation.

Resolved, on the recommendation of the Region 10 Representative, to appoint Mr. G. R. Silverthorne, GW2BG, as County Representative for Monmouthshire.

Festival of Britain.

The Council placed on record their thanks to Mr. V. M. Desmond for agreeing to accept responsibility for the Amateur Radio Station when the Land Travel Exhibition visits Birmingham.

Political Propaganda.

Mr. Milne agreed to prepare a statement for publication dealing with the general question of political propaganda on QSL cards. [The statement appeared in the March issue.—Ed.]

General Purposes Committee.

The following terms of reference for the Committee were approved:—

"As directed by the Council from time to time, to prepare long or short term plans: to consider ways and means for improving the services available to members; to study

plans for maintaining the membership; to study and report upon the organisation of the Society; to consider suggestions designed to emphasise the educational aspects of the Society's work; to conduct periodic surveys of the membership and to deal with such other matters as may be delegated to the Committee by the Council."

Amateur Radio Exhibition.

It was reported that accommodation had been reserved at the Royal Hotel for the period November 26-December 1, 1951, for the purpose of holding the Fifth Annual R.S.G.B. Amateur Radio Exhibition.

London Membership.

It was reported that the total number of Corporate Members of the Society living within 25 miles of Charing Cross, as at February 1, 1951, was 2,385.

Region 8 Representative.

No nomination having been received within the advertised time for the vacant office of Region 8 Representative it was resolved to appoint Mr. R. J. Donald, G3DJJ, of Brighton, as Acting Representative for Region 8 and to reconsider the appointment when the new regional boundaries are about to be introduced in approximately three months' time.

Region 10.

Consideration was given to a request from the newly elected South Wales Regional Representative (Mr. F. Hamer) that the Council should permit an O.R.M. to be held at Hirwaun, near Aberdare, during April.

Resolved to advise Mr. Hamer that the Council do not consider Hirwaun is a suitable venue for a South Wales O.R.M., neither do they consider it desirable to hold an O.R.M. on commercial premises.

It was agreed to suggest to Mr. Hamer that the O.R.M. should be held in Cardiff, Porthcawl or Swansea.

[Subsequently, Mr. Hamer advised the Council that the O.R.M. would not be held on commercial premises. The Council thereupon resolved to grant permission for the Region 10 meeting to be held in Rhigos.—Ed.]

Region 11.

It was reported that certain members in North Wales had expressed a wish that no O.R.M. be held in their Region during 1951. The information was noted.

Finance.

Resolved to accept and adopt the Cash Account for the month ended January 31, 1951, as submitted by the Honorary Treasurer.

Novice Class Licence.

Consideration was given to a suggestion put forward by a B.R.S. member that the Society should request the G.P.O. to issue a Novice Class Licence.

Resolved to take no action on the suggestion and to advise the member concerned that, in the opinion of the Council, the amateur bands are already congested.

Convention.

It was agreed to convene a Special Meeting of the Council to consider the arrangements for the forthcoming National Convention.

Council Activities.

The view was expressed that the membership should be informed of the very great deal of voluntary work which many members of the Council are at present undertaking.

The meeting terminated at 10.20 p.m.

National Convention, 1951.

A Special Meeting of the Council took place at Headquarters on Friday, March 2, 1951, at 6 p.m., when matters relating to the forthcoming National Convention were discussed.

Present.—The Executive Vice-President (Mr. F. Charman), in the Chair, Messrs. W. H. Allen, L. Cooper, C. H. L. Edwards, T. L. Herdman, A. O. Milne, P. A. Thorogood, P. W. Winsford and John Clarricoats (General Secretary).

Messrs. D. C. Jardine, F. G. Lambeth, J. Hunter and W. H. Matthews (Non-Council Members of the Convention Committee) were present by invitation.

The meeting discussed, *inter alia*, the Financial Aspects of the Convention, Publicity Arrangements, and the Programme of Events.

The meeting terminated at 8.40 p.m.

Silent Key

It is with deep regret we record the death of Mr. N. B. Yates, GW2HBK (father of Mr. R. B. Yates, B.R.S.11118 and Mr. A. G. Yates, B.R.S.16789), of Waenlawr, Caernarvon, North Wales, after a long illness. Mr. Yates, senior, was well known to regular workers on 7 Mc/s. and to many members living in Wales. Heartfelt sympathies are extended to his family and close friends.

AROUND THE REGIONS

Brighton & District Radio Club

A programme of lectures and demonstrations, as well as visits to Southwick Power Station and Brighton Telephone Exchange, have been arranged. Meetings are held on Tuesday evenings at the Eagle Inn, Gloucester Road, Brighton. The Hon. Secretary is R. T. Parsons, 14 Carlyle Avenue, Brighton 7.

Bristol

Harry Gratton, G6GN, described the operation of his stabilised power supply at the March meeting held at Cawardine's Cafe.

At the meeting on April 20, G3EHY will speak about 2-metre equipment. The G5FS Trophy Competition will be judged next month and a visit to the B.B.C. Welsh Region transmitter is planned for May or June.

City of Belfast Y.M.C.A. Radio Club

An Amateur Radio Exhibition—the first organised by the Club—is to be held on April 27 and 28 in the Minor Hall, Y.M.C.A. building. The purpose of the Exhibition is to provide the public with an opportunity of learning more about Amateur Radio. The Club station G16YM will be in operation from the Exhibition.

SOUTH WALES OFFICIAL REGIONAL MEETING

CROSSFORD HOSTEL, RHIGOS
(Near Aberdare, on main Cardiff-Swansea Road)

SUNDAY, APRIL 22nd, 1951.

PROGRAMME

Lunch - - - - - 1 p.m.

Opening of Radio Exhibition by Rt. Hon. Ness Edwards, M.P. (H.M. Postmaster-General), supported by Mr. Carlyn Thomas, M.P., 2 p.m.

Business Meeting - - - - - 3.15 p.m.

Tea - - - - - 5 p.m.

Tickets: Lunch and High Tea, 13/6; High Tea only, 6/-, from R.R. (F. Hamer, GW8BW, 7 Heath Road, Rhigos); J. Wilson, 120 Llandaff Road, Cardiff; D. Davies, Sunnyside, Castle Street, Skewen; R. Silverthorn, George Road, Abergavenny, by not later than April 20, 1951.

Coventry Amateur Radio Society

At the meeting held on February 12, a sound and colour film dealing with the manufacture of laminated plastics for radio and electrical purposes was shown by G2BFT. On February 26, G3RF delivered a lecture demonstration on Super Modulation. On March 12, Club members and others witnessed a demonstration arranged by the International Amateur Model Constructors' Society. The ingenuity shown in the adaptation of single-valve low-power transmitters and small receivers and the degree of control obtained over the moving models greatly impressed the large audience.

Darlington & District Amateur Radio Society

The Society, which co-operates with the local R.S.G.B. group, has acquired excellent lecture room and workshop facilities at 129 Woodlands Road, Darlington, at which address new members are assured of a warm welcome.

The programme of activities includes lectures, Morse instruction classes, assistance during N.F.D. and participation in local F.O.B. celebrations. Call-sign is G3FYI.

Dunfermline Radio Society

Having acquired a clubroom at Abbot's House, Maygate, the Society now intends to expand its activities. Regular meetings will be held on the last Thursday in each month, but it is hoped that the clubroom will be open one or two nights each week. Enthusiastic support from local amateurs and others interested in radio will be needed to make a success of this new venture and visitors or intending members will be welcome at any time. Details from the Hon. Secretary, D. R. Leah, GM3FGH, 14 Hillwood Terrace, Rosyth.

R.A.F. Locking, Amateur Radio Society

From F/Sgt. J. F. Wort we learn that a branch of the Royal Air Force Amateur Radio Society is now flourishing at Locking, Somerset. During the B.E.R.U. Contest two previous Junior winners, VSICW and ZBIQ, operated the Society station G3AIR, but found it was not so easy with a G call. During N.F.D., G3AIR/P will pair up with the Weston-super-Mare station G8GB/P.

Southend and District Radio Society

On March 16, Mr. H. Andrews, of Dulliber Condenser Co., lectured on "Radio Interference Suppression." The lecture, which was illustrated with a number of lantern slides, acted as a booster to the Society's campaign for the suppression of car ignition interference. The Annual Social will be held

at the Middleton Hotel on April 27. On May 11, Mr. Youngmark, of Goodmans, will lecture on "Problems of High Fidelity Reproduction."

South Manchester Radio Club

The Club announces that two cups will be available for an annual DX competition. The first, presented by G3BFM, will be awarded to the winner of the transmitting contest, and the other, presented by the Club, to the winner of the receiving contest. The contest will take place on Sunday, April 22, 1951, from 09.00 to 17.00 B.S.T. Entry forms will be issued on application to the Secretary, N. I. Wilkes, 57 Longley Lane, Northenden, Manchester.

Stoke-on-Trent Amateur Radio Society

The operation and maintenance of the Society's transmitter and receiver has occupied a good deal of time at recent meetings. A lecture by G3EHM on voltage stabilisation and regulation was well received, as was a description and demonstration of a commercial tape-recorder. G3MIV is congratulated on obtaining his licence.

The Society meets weekly at 8 p.m. on Thursdays at the rear of Cottage Inn, Oakhill, Stoke-on-Trent. The Hon. Secretary is J. R. Brindley, B.Sc., G3DML, 45 Rosendale Avenue, Chesterton, Newcastle, Staffs.

Thames Valley A.R.T.S.

Highlight of the lecture on "Tape Recording," given by Mr. W. Webber, to the well-attended March meeting, was a full-length recording of the Thames Valley "Top-band" network made a day or two earlier. Mr. G. Barratt, G8IP, is to discuss "Operating Procedure" at the May meeting.

Wirral Amateur Radio Society

The same high standard of workmanship as had been seen on previous occasions was in evidence when the Annual Constructional Contest was judged recently, and J. Hopkins, G3EXT, declared the winner.

The Society meets on Wednesday evenings in the Y.M.C.A., Wheatstone Lane, Birkenhead, at 7.30 p.m. The first D/F contest of the season is due to take place on May 20. Non-members who wish to participate in this and other activities of the Society should contact the Hon. Secretary, A. H. Watts, G3FXC, 38 Sandymount Drive, Wallasey.

The W.A.R.S. News Letter is available to members and non-members of the Wirral Society on payment of a small charge.

Wrekin Amateur Radio Society

The Club meets on Monday evenings (8 p.m.) in the Y.M.C.A. Canteen, Wellington. In addition, a local net is in operation on 1,820 kc/s. on Sunday mornings from 11.30 B.S.T. and on Mondays and Fridays from 19.00 B.S.T. Local interest appears to be divided between 420 Mc/s. and single-sideband operation. The Hon. Secretary is J. C. Tranter, G3BQQ, 78 New Street, Wellington, Shropshire.

International Radio and Electronics Exhibition of India

AN International Radio and Electronics Exhibition, organised by the Radio and Electronics Society of India, is to be held in Bombay during February, 1952. Intended to emphasise the tremendous potentialities of modern electronic equipment and techniques, the Exhibition will include a demonstration of television.

A delegation representing the Exhibition organisers is at present visiting Britain to study B.I.F. and Festival exhibits.

NORTH-EASTERN OFFICIAL REGIONAL MEETING

SUNDAY, MAY 20th, 1951

BRITISH RESTAURANT, SHEFFIELD
(NEAR CITY HALL)

Assemble	1.30 p.m.
Meeting	2.30 p.m.
High Tea	4.30 p.m.
Informal Meeting	5.30 p.m.

Tickets, 6/- each, from R.R. (C. A. Sharp, G6KU), 56 Moore Avenue, Wibsey, Bradford, or C.R. (J. P. Featherstone, B.R.S. 16,417), 208 Psalter Lane, Ecclestone, Sheffield, by not later than May 15th, 1951. Remittances to be made payable to the R.R.

REPRESENTATION

Additions or Amendments

The following are additions or amendments to the list published in the February, 1950, issue of the R.S.G.B. BULLETIN.

Town Representatives

Region 8 Kent—Maidstone.

*C. S. Bradley, G5BS, Half Yoke Farm, East Farleigh, Maidstone.

Region 9 Somerset—Bath.

E. C. Palmer, G3FVC, 4 Chestnut Grove, Englishcombe Park, Bath.

Somerset—Weston-super-Mare.

*W. C. Holley, G5TN, Waverley, Worlebury Hill Road.

Region 11 Caernarvonshire—Llandudno.

J. P. O'Brien, GW2BCH, Fron Hevlog, Bryn Derw Road, Nr. Llandudno Junction.

Region 12 Aberdeenshire—Aberdeen.

L. Hardie, GM2FHH, 91 Inchbrae Drive.

* New appointment.

Vacancies

Messrs. G. K. Syme, GM3EFH, and P. Lambert, G3CYX, have now resigned as T.R.s. for Kirkcaldy (Fife-shire) and the Cray Valley, respectively.

W/Cmdr. W. E. Dunn, G2LR, has resigned as C.R. for Lincolnshire.

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

Change of Address

Region 8: Address of Isle of Wight T.R.. H. J. Buckett, G3ARL, is now 37a Fitzroy Street, Sandown.

London Lecture Meeting

MORE than 70 members were present at the Institution of Electrical Engineers on Friday, March 30, when Mr. R. H. Hammans (G2IG) lectured on "High Selectivity 'Phone Reception." A theoretical exposition of the performance of crystal band-pass filters in relation to interference was followed by a convincing demonstration with a receiver having a crystal pass-band of 2.5 kc/s., and incorporating a system of side-band selector switching. Mr. A. O. Milne (G2MI) assisted by providing a 'phone signal from a portable transmitter.

A general discussion followed, during which many points of interest were raised by G2FKZ, 2MI, 3BLP, 3EKE, 3FOR, 3GKN, 6LL, 6WN and BR57509. Later Mr. M. Hedgeland, M.B.E. (G2DBA), voiced the thanks of the meeting to the lecturer.

The Chair was taken by Mr. W. N. Craig, B.Sc. (G6JJ).

FORTHCOMING EVENTS

(Continued from Page 363)

St. Albans.—May 9, 8 p.m., "The Beehive," London Road.
Slough.—May 17, 7.45 p.m. The Golden Eagle Hotel, High St.
Sutton & Cheam.—May 1, 15, Sutton Adult School, Benhill Avenue.

Welwyn.—May 1, 8 p.m., Council Chambers.

Woolwich & Plumstead.—8 p.m., The Bull Tavern, Vincent Road, S.E.18.

REGION 8

Brighton (B.D.R.C.).—Tuesdays, 7.30 p.m., Eagle Inn, Gloucester Road.

Brighton (E.B.S.W.C.).—Tuesdays, 8 p.m., 27 Warren Ave., Woodingdean.

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

Eastbourne.—May 4, 7.30 p.m., Christchurch Club Rooms, Harover Road.

Gillingham (G.T.S.).—Alternate Tuesdays, 7.30 p.m., Medway Technical College.

Petersfield.—April 19, 7.30 p.m., "Woodville," Drill Hall Road, Hordean.

Portsmouth.—Tuesdays, 7.30 p.m., Royal Marines' Signal Club, Eastney Barracks.

Southampton.—May 5, 7.30 p.m., 22 Anglesea Road, Shirley.

REGION 9

Bath.—April 16, 7 p.m., 12 Pierrepont Street.

Bristol.—April 20, 7 p.m., Smoke Room, Carwardine's Restaurant, Baldwin Street, Bristol 1.

Exeter.—May 4, 7.30 p.m., 98 Ladysmith Road.

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

North Devon.—May 3, 7.30 p.m., Rose of Torridge Cafe, The Quay, Bideford.

Plymouth.—April 20, 7 p.m., Tothill Community Centre, Tothill Park, Knighton Road, St. Jude's.

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

Torquay.—April 21, 7.30 p.m., Y.M.C.A., Castle Road.

West Cornwall (W.C.R.C.).—April 19, May 3, "Fifteen Balls," Penryn.

Weston-super-Mare.—May 1, 7.30 p.m., Y.M.C.A.

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

REGION 10

Cardiff.—May 14, 7.30 p.m., "The British Volunteer," The Hayes.

REGION 14

Falkirk.—April 27, 7.30 p.m., Temperance Cafe, High Street.

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(AMBYTHENE BRAND)

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

Parts are fully interchangeable and readily assembled, dismantled or modified to suit individual and changing requirements.

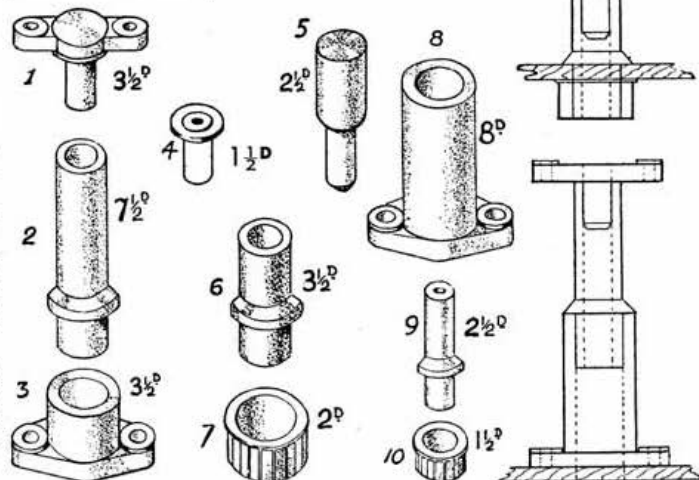
With ten Standard Units some three dozen useful components can be assembled, ranging from a 3½" wall-mounting Stand-off using 2, 5 and 8 to a ¾" Feed-through using 9 and 10.

Low cost—the price of the two examples quoted above is 1s. 6d. and 4d. respectively.

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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P.V.C. versus Polystyrene

DEAR SIR,—I should like to reply to the letter from Mr. Griffin (G6FJ) in your January, 1951, issue.

Mr. Griffin is, of course, theoretically correct in his statement regarding the relative properties of Polystyrene, Perspex, and P.V.C. insulation, but surely he is "straining at a gnat"! The practical efficiency of the link coils used in the T.V.I.-proof 50-watt transmitter is what matters and is, I think, adequate. Since we know that ideally we should use air-spaced self-supporting plug-in coils, made of silver-plated copper conductor, for the P.A. tank circuit in order to achieve maximum efficiency, but, in fact, we compromise by using a coil turret, of the type described in the July, 1950, BULLETIN article, for maximum operating convenience with reasonably good efficiency, the use of conveniently available P.V.C. covered wire for the link coils seems to me to be justified.

Mr. Griffin has apparently overlooked the fact that, since the link coil is essentially a low impedance circuit (nominally 75 to 100 ohms), the shunt resistance effect, even using a wire covering of poor power factor, is high enough to be completely negligible in this application.

The equivalent shunt resistance, R_s , of the link coil is

$$R_s = \frac{1}{\omega C P}$$

Where $\omega = 2\pi f$

C = shunt capacity of link coil

P = Power factor of link coil insulation.

Thus at 1 Mc/s., taking $C = 2 \mu\text{F}$. and $P = 0.06$;

$$R_s = \frac{1}{2\pi \times 10^6 \times 2 \times 10^{-6} \times 0.06} = 1.3 \text{ Megohms.}$$

The effect of 1.3 Megohms in shunt with 75 ohms will, of course, be quite negligible.

Although power factor figures for P.V.C. at 10 to 30 Mc/s. are not given by Mr. Griffin, those published by the *Federal Telephone and Radio Corporation* in their "Reference data for Radio Engineers" are as follows:

Frequency c/s.	Dielectric Constant	Power Factor
60	3.2	.012
10 ⁶	2.9	.016
10 ⁸	2.9	.008

Thus, it will be seen that even at very much higher frequencies than 1 Mc/s. the shunt resistance effect of the P.V.C. link coils will be quite unimportant.

However, in order to prove the point, I have carried out an experimental comparison between P.V.C. and Telcothene-covered link coils, using the transmitter on 14 Mc/s. The results are tabulated below.

Test	Link coil	P.A.		Feeder Current Amps.	Ratio I1/I2	db gain
		Ig	Ik			
1	P.V.C.	2.0	95	0.30	—	—
2	Telcothene	2.0	95	0.307	1.02	0.2

Thus, assuming the feeder current reading difference was real and not due to experimental error, it will be seen that the additional circuit loss due to the use of P.V.C. link is a mere fraction of a decibel.

Yours faithfully,

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

Chelmsford, Essex.

More About V.F.O.s

DEAR SIR,—I should like to comment on the V.F.O. Unit described by Alan Dunn (G3PL) in your January, 1951, issue.

Mr. Dunn rightly claims that the circuit is a modified Clapp oscillator; it is, in fact, a Colpitts oscillator—no more, no less (!). (See Figs. 1a and b.) In a Colpitts circuit the anode (screen in the '3PL arrangement) and grid are at high R.F. potential. The original Colpitts—developed from the Hartley in the days of soft triodes—was frequently used

in single valve transmitters, coupled direct to an aerial. The circuit afforded better frequency stability and control under variable load conditions than the Hartley.

The Clapp development—something quite different—was brought about by modern communication requirements for a highly stable V.F.O. which would excite buffer and amplifier stages with crystal-like qualities and provide a low impedance output.

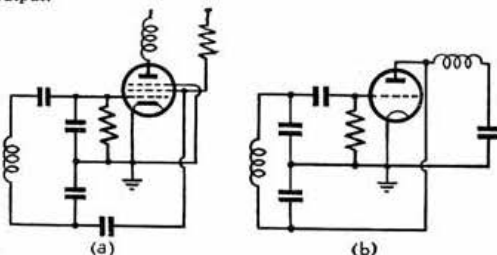


Fig. 1.

(a) The circuit described by G3PL as a modified Clapp oscillator. (b) The Colpitts circuit.

The subtle differences between the Clapp and Colpitts circuits are as follows:—

Clapp Circuit.

- (1) R.F. voltages developed between grid and earth.
- (2) Lower voltages required, resulting in less strain on the components.
- (3) Low impedance output across cathode and earth, having small effect on the frequency-determining circuits.
- (4) High impedance output from the anode, well isolated from the tuned circuits.

Colpitts Circuit.

- (1) High R.F. voltages developed between anode and grid.
- (2) High voltages required, resulting in the need to use best quality components.
- (3) Output from grid or anode, resulting in external coupling to frequency-determining circuits, affecting stability.

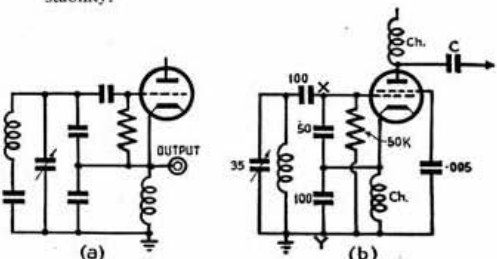


Fig. 2.

(a) The Clapp circuit. (b) The Crystal or Master Oscillator circuit.

The disadvantages of using a series capacitor in a Clapp V.F.O. (as described by G3PL in his original article) have not been made clear, since it is stated only that "C series" should be of the same order as "C stray"—both of which vary with frequency.

The method employed by Mr. Dunn, in his compact 7 Mc/s. V.F.O. unit, to vary frequency, must necessarily affect the feed-back voltages, causing a variable output from the oscillator—a practice to be deprecated, no matter how small the variation may be.

The lack of reference to Clapp-styled oscillators for use at frequencies above 3.5 Mc/s. and for exciting amplifiers at the fundamental would suggest an appeal to readers for circuits and other information.

The writer has used a modified form of Colpitts—known as a COMO (Crystal or Master Oscillator)—for exciting a low-power transmitter on 1.7, 3.5 and 7 Mc/s. using V.F.O. and P.A. and working at the fundamental frequency throughout. It is also known that at least two amateurs are using a V.F.O. of similar design on 28 Mc/s., using co-axial cable for the frequency-determining circuits. The substitution of a crystal (across points X and Y, Fig. 2b) for the tuned circuit makes the arrangement readily adaptable for crystal as well as for V.F.O. operation. Output in this instance is taken from the anode through the capacitor C to the P.A. grid. The oscillator and P.A. cathode circuits are keyed to permit break-in operation. An important point to bear in mind, if a T9 note is required, is that the grid leak of the COMO must be returned to earth and not to cathode.

It appears to the writer that the COMO circuit has "got something," but let us be quite sure we know which circuit we are using and give it its proper name.

Yours faithfully,

D. DEACON, Lieut. (L), R.N. (G3BCM).

London, S.E.25.

(1) Admiralty Handbook of Wireless Telegraphy, Vol. 11, Section K, Fig. 7.

NEW BOOKS

TECHNICAL INSTRUCTION FOR MARINE RADIO OFFICERS. By H. M. Dowsett, M.I.E.E., F.Inst.P., and L. E. Q. Walker, A.R.C.S. 9th Edition. Page size $8\frac{1}{2} \times 5\frac{1}{2}$; 699 pages, with 700 illustrations and 31 fold-out sheets. Published by Iliffe & Sons Ltd. 60/- (postage 9d.).

With the publication of this edition, the "Handbook of Technical Instruction for Wireless Telegraphists" (known to old-timers as "Hawkhead-Dowsett's") has had its title amended to "Technical Instruction for Marine Radio Officers" in recognition of the fact that over the course of years the duties of the marine officer have been progressively supplemented.

The original object of the book, namely, to provide simple instruction in general radio principles and practice for those who operate marine wireless equipment remains unaffected. The ground work covered provides a complete theoretical course for the P.M.G.'s certificate—the syllabus for which, together with a specimen paper, is now included as an appendix.

The current edition has been revised on an ambitious scale. Chapters have been added on the C.R.O., U.H.F. generators and radar recognition systems. Descriptions are included of new communication apparatus placed in service during and since the war. There are nearly 200 new illustrations and the type matter has been reset.

SHORT WAVE WIRELESS COMMUNICATION (INCLUDING ULTRA SHORT WAVES). By A. W. Ladner, A.M.I.C.E., and C. R. Stoner, B.Sc. (Eng.), M.I.E.E., M.I.R.E. 5th Edition. Page size $8\frac{1}{2} \times 5\frac{1}{2}$; 717 pages, with 417 illustrations. Published by Chapman & Hall. 50/- (postage 9d.).

In presenting the 5th edition of this well-known book, the authors have continued the tradition of producing a treatise dealing with the general principles of Short and Ultra-Short Wave Wireless Communication. About 75 new diagrams have been prepared and three chapters (History, Push-pull and Diathermy) have been deleted and replaced by chapters dealing with Sound and Vision Intelligence, Waveguides and Wireless Telegraph Circuits.

For long years "Ladner & Stoner" has held an honoured place in Amateur Radio circles. The long-awaited 5th edition will no doubt receive as warm a welcome as any of its predecessors.

WIRELESS SERVICING MANUAL. By W. T. Cocking, M.I.E.E. 8th Edition. Page size $7 \times 4\frac{1}{2}$; 296 pages with 121 diagrams and 16 photographs. Published by Iliffe & Sons Ltd. 12/6 (postage 5d.).

This book deals extensively with the location and cure of the innumerable faults which can develop in broadcast receivers and associated equipment. Radio amateurs as well as professional will find it invaluable in solving many of the problems that arise in experimental and constructional work.

The present edition has been revised and brought fully up to date; in particular the chapter on television receiver defects has been completely rewritten. There is now a special chapter devoted to servicing with the C.R.O.

THE "PRACTICAL TELEVISION" RECEIVER. Page size $9\frac{1}{2} \times 7\frac{1}{2}$; 36 pages with 30 diagrams and photographs. Published by George Newnes Ltd. 3/6.

Stage-by-stage instructions for building a highly efficient 18-valve television receiver, tested and produced in the "Practical Television" Laboratories. Instructions are also included for adapting the design to the Sutton Coldfield transmissions.

RADIO LABORATORY HANDBOOK. By M. G. Scroggie, B.Sc. M.I.E.E. 5th Edition. Page size $7 \times 4\frac{1}{2}$; 430 pages with 173 diagrams and 44 photographs. Published by Iliffe & Sons Ltd. 15/- (postage 5d.).

This well-known and popular text book describes the methods available for carrying out tests and measurements, using either commercial or improvised equipment. The present edition has been revised and new material added—in particular the more recent developments in valve oscillator design.

THE WILLIAMSON AMPLIFIER. By D. T. N. Williamson. Page size $9\frac{1}{2} \times 7\frac{1}{2}$; 36 pages and 31 illustrations. Published by Iliffe & Sons Ltd. 3/6 (postage 2d.).

This booklet contains a collection of articles on the Design of a High-Quality 15-watt Amplifier which appeared some time ago in "Wireless World."

The Williamson amplifier has gained world-wide recognition among quality-reproduction enthusiasts for its remarkably low harmonic and inter-modulation distortion. The response curve is flat within 1 db. up to 10 kc/s. and phase shift is negligible over the range 10 kc/s.-20 kc/s.

The various issues of "Wireless World" in which the amplifier was originally described, have long been out of print; in this booklet all information published since 1947 on the amplifier has been collected and edited for easy reference.

TELEVISION RECEIVING EQUIPMENT. By W. T. Cocking, M.I.E.E. 3rd Edition. Page size $8\frac{1}{2} \times 5\frac{1}{2}$; 375 pages plus a 20-page advertisement section. Profusely illustrated. Published by Iliffe & Sons Ltd. 18/- (postage 5d.).

This edition of a book which has for some time been accepted as an authentic guide to British television practice, has been thoroughly revised and brought into line with the very latest developments. New chapters deal with Deflector Coils and Selectivity. The book has been reset and now appears in a new format.

BOOK REVIEWS

ELECTRONIC VALVES. BOOK I—FUNDAMENTALS OF RADIO-VALVE TECHNIQUE. By J. Deketh, translated by F. F. Garratt. 5.5 pages. Philips Technical Library, distributed by Cleaver Hume Press Ltd., London. Price 25/-.

This book—translated from the Dutch—is the first of a series dealing with valve technique and is a production of the Philips Laboratories. The early chapters clearly describe the fundamental principles of valves without resorting to complicated mathematics. A further chapter covers the construction of conventional receiving valves; no special types, however, are included, nor are any valves mentioned using the 9-p.n. Noval base. The descriptions and photographs are solely of assemblies of Philips manufacture, but since the methods employed are very similar throughout the world little is lost as a result. Further chapters describe the performance of valves in circuits and contain a wealth of useful practical information.

For those not well acquainted with glass working it would have been desirable to mention, in Chapter VII, that, in the construction of the valve pinch, the lead wires should have a coefficient of expansion approximately matching that of the glass; this fact is indeed mentioned later in reference to pressed glass bases and their pins. The claim that valves with pressed glass bases do not suffer from capacitance changes whilst warming up is not entirely accurate, since it ignores the larger changes caused by electrode expansion, a very important consideration at V.H.F.

The description of dynamic transconductance in Chapter XII is a little confusing, and appears to suggest that the dynamic mutual conductance of a valve can be higher than the static figure; this is not true and is so proved on the next page. In the section on optimum loads (Chapter XVII) it is a pity that the more general practice of quoting loud-speaker impedances at 400 cycles has not been adopted; the 800 or 1,000 cycles figures given follow telephone rather than radio practice.

The translation is very good and the number of errors, on this score, is remarkably small. This book can be recommended to any amateur who wishes to enlarge his technical knowledge or who is considering the radio industry as a profession. D. N. C.

VOLTAGE STABILISERS. By F. A. Benson, M.Eng., A.M.I.E.E., M.I.R.E. Published by Electronic Engineering. 125 pages. 12/6 net.

The advantages of voltage stabilisation in certain circuits are becoming more well known, and most amateurs use one form or another somewhere in their stations.

This little book provides a useful means of reference to the various types of stabilisation now in use, and gives details of systems ranging from Magnetic Saturation and Glow Discharge Tubes to Valve Stabilisers. There is also a chapter on the lesser known and more specialised systems. A very comprehensive list of references is given and the book is adequately indexed.

It can be confidently recommended to those amateurs who wish to further their knowledge of voltage stabilisation, and take advantage of its merits. J.W.M.

World Radio Handbook for Listeners

The 4th Edition of this book, published from Denmark in the English language, is a comprehensive and detailed symposium of European medium-wave and world-wide short-wave broadcast services. Full information is given on call-signs, frequencies, times of operation, types of interval signal and whether or not a station sends QSL cards. Well illustrated, the book comprises 112 pages of carefully arranged data. The British agents are *Surridge, Dawson & Co. Ltd.*, 101 Southwark Street, London, S.E.1. A.O.M.

News of G6UB

Old friends of Mr. S. W. J. Butters, G6UB, and in particular those who were associated with him in the old S.L.D.T.S. days, will be sorry to learn that he was recently bereaved by the loss of his wife who had been ill for more than two years. G6UB hopes shortly to be on the air again and to renew contact with old acquaintances who may have wondered what had happened to him.

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The following have been elected to membership:—

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* Denotes transferred from Associate Grade.

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Sussex Town and Area Representatives

Members resident in Bexhill, Crowborough, Hastings and St. Leonards, Horsham and Lewes are invited to nominate persons to serve either as Town or Area Representatives. Nominations should be submitted in the form prescribed in the September, 1949, issue of the BULLETIN (Page 83).

G2AK

This Month's Bargains

G2AK

U.H.f. Receivers, Type 1481 (66-86 Mc/s.): Same as R1132, except for frequency range. R.F. mixer Osc. (Voltage stabilised), 3 I.F. stages, 2nd Det., B.F.O., etc. 11 valves in all. Brand new in transit case, £3 19s 6d., plus 7/6 carriage.

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.

HEAVY DUTY POTS: 2,000 and 500 ohms only. Toroidal type by P. X. Fox, worth 15/—, Our Price 3/6 each.

AR88D SPARE CRYSTALS: 455 kc/s. 15/— each.

AR88 MATCHING SPEAKERS: Black crackle case, 2.5 ohm. Price £3 15s.

AEROVOX 2μF. 1,000 V. Oil-Filled Conds., 2/6 each or 10 for £1.

VIBRATOR PACKS: 6 V. input, output 180 V. 40 mA., fully smoothed. 19/6, postage 1/6.

Carriage paid on all orders over £1 except where stated. Please include small amount for orders under £1.

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T.U. UNITS: All brand new with cases, T.U. 10 and 26. 10/— each, plus carriage 3/6.

TEST METER: 7 ranges as follows: 1.5 V., 3 V., 150 V., 6 mA., 5,000 ohms, 25,000 ohms, 2 1/2" dia. scale M.C. meter. Rotary selector switch. Black bakelite case, 6" x 4 1/2" x 4 1/2", fitted with removable lid, also provision for internal batteries. Ranges can be extended very easily. Bargain price, 25/—, plus 1/6 post.

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 8 1/2" x 11". First-class paper and bound with heavy cover. Price 17/6, post free.

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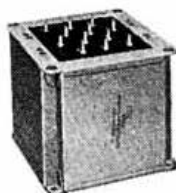
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