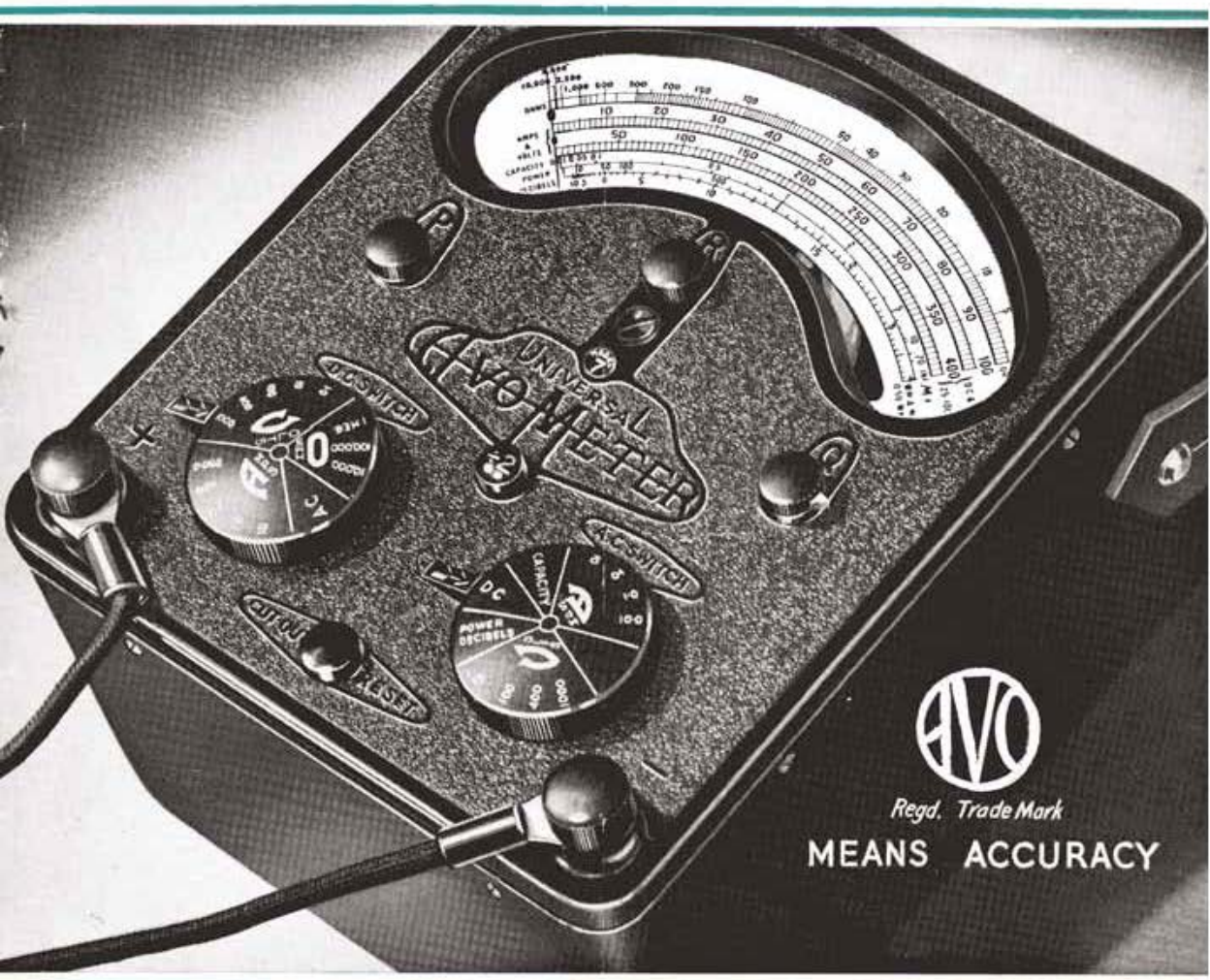
R·S·G·B VOLUME 21 · NO. 2 · COPYRIGHT · PRICE 1/6 AUGUST, 1945

BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN



- EVERY KILOCYCLE WILL COUNT
- COMMUNICATION RECEIVERS
- FRESHMAN'S GUIDE TO AMATEUR RADIO
- RELAYS IN STATION LAY-OUT

CLOSING DATE FOR SEPT. ISSUE IS AUG. 31ST. REPORTS SHOULD BE POSTED TO REACH D.R.'s & SCRIBES BY AUG. 27TH

AROUND THE DISTRICTS

Forthcoming Events

Aug. 18/19	Districts 7 and 13, 3 p.m. Field Day at Warlingham.	Sept. 2	District 12, 3 p.m., at G4GT, 19 Vernon Close, Watson's Walk, St. Albans. (Only turning off main London Road between the Peahen Hotel and the Capitol Cinema ; Bus 84.)
Aug. 19	District 4, 2.30 p.m., at BRS5605, 292 Gwendolen Road, Leicester.	Sept. 6	District 4, 7 p.m., at Peachey Street, Mansfield, Road, Nottingham (near Victoria Station).
Aug. 20	District 18, 7.30 p.m., at Imperial Hotel, Hull.	Sept. 8	District 7 (Reading), 6.30 p.m., at Palmer Hall, West Street. Constructional meeting.
Aug. 22	District 2, 8 p.m., at the " Dog and Partridge," Trippet Lane, Sheffield.	Sept. 9	District 15, 5.30 p.m., at BRS6275, 51 Rusthall Avenue, Bedford Park, Chiswick, W.4.
Aug. 22	District 15, 7 p.m., at " The Falcon," High Street, Uxbridge. Lecture, " The Manufacture of Quartz Crystals," by Mr. Birt, G3NR.	Sept. 16	District 10, 2.30 p.m., at GW8UH, 29 Ladysmith Road, Roath Park (off Penylan Hill), Cardiff.
Aug. 25	District 7 (Reading), 6.30 p.m., at Palmer Hall, West Street. Club room equipment discussion.	Sept. 17	District 18, 7.30 p.m., at Imperial Hotel, Hull.
Aug. 26	District 7, 2.30 p.m., at G2YL, Petersmead, Meadow Walk, Walton-on-the-Hill.	Sept. 18	District 15, 7.30 p.m., at R.A.F. Station, West Drayton, Middlesex.
Aug. 26	District 4, 6.30 p.m., at 2AOO, 78 Henry Road, West Bridgford. " Post-war Planning."	Sept. 18	Midland Amateur Radio Society, Annual General Meeting, 6.30 p.m., at Chamber of Commerce, New Street, Birmingham.
Aug. 26	District 15, Social Outing by coach to Speen. (See District Notes.)	Sept. 22	Provincial District Meeting, District 10, 3 p.m., at Park Hotel, Park Place, Cardiff. See separate announcement.
Aug. 29	Scotland " A " District, 7 p.m., in Room B, the Institute of Engineers and Shipbuilders, 39 Elmbank Crescent, Glasgow.	Sept. 25	District 7 (Reading), 6.30 p.m., at Palmer Hall, West Street. Display of equipment in competition for the Lewis Cup.
Sept. 2	Districts 7 and 13, 3 p.m., at Y.M.C.A., North End, West Croydon.		
Sept. 2	District 14 (Chingford Section), 3 p.m., at G2HR, 25 Clivedon Road, Highams Park, E.4. Train to Highams Park Station, or 35 Bus.		

A cordial invitation is extended to Society members to attend any of the above meetings.

DISTRICT 1 (North Western)

D.R. : H. W. Stacey (G6CX), " Sandleas," Eddisbury Road, West Kirby, Cheshire. Hoylake 337.

Ashton-under-Lyne.—At the July meeting G2MQ delivered an address on Frequency Measurement which was much appreciated by members present and a vote of thanks was recorded for his consideration and co-operation in attending the meeting along with 3PD. Matters concerning the forthcoming P.D.M. were also discussed. The next meeting will be held on September 16 at A.C.S. Educational Rooms, Stamford Street.

G5PX.

Liverpool.—Approximately 50 members attended the meeting on June 30—a record. Mr. R. Spears (G8AZ) delivered an excellent address on the elementary principles of television, which was followed by a demonstration of tank radio equipment arranged by Mr. Looney, who went to considerable trouble in getting a formidable array of equipment on the premises. Mr. E. Menzies (G5MQ) produced for inspection some equipment designed for V.H.F. Police Radio purposes. Owing to the absence in hospital of F./O. J. Davies (G2OA) the talk on station planning was left to the D.R. who advocated a unit type of construction for those primarily interested in experimental work. After payment of expenses, including a Press Notice of the meeting, the sum of £1 was remitted to H.Q. for the P.O.W. Fund.

2FHB.

Darwen.—At the July meeting which was well attended some time was devoted to Morse instruction using a valve oscillator and phones. Sgt. Warburton (2FCC) has written from S.E.A.C., L./Cpl. Simpson has been promoted full corporal. Congrats are offered to Mr. C. Blades (9917) on the arrival of a " junior op." The T.R. will be glad to hear from members with H.M. Forces ; address, 15 Earndale Road, Darwen, near Blackburn.

G8FI.

General.—Reports are scanty this month, no doubt because of holiday attractions. The P.D.M. which was to have been held in Manchester on September 9 has been postponed owing to the difficulties experienced in finding suitable accommodation with adequate catering arrangements, but it is anticipated that further efforts will bear fruit and make it possible to hold it in October or November, either in Manchester or Liverpool—please watch for a further announcement next month. It is felt that as this will be the first post-V.E. P.D.M. to be held in District 1 the arrangements should be really first-class.

G6CX.

DISTRICT 2 (North Eastern)

D.R. : C. A. Sharp (G6KU), 56 Moore Avenue, Wibsey, Bradford. Bdf. 10772. Scribe : H. Beadle (G8UO), 13 Chandos St., Keighley.

Bingley.—G6HF is converting his Tobe receiver into a 10-valve job.

Bradford.—It is regretted that more local support was not given to the recent showing of R.S.G.B. films which was enjoyed by all present. 6KU would like to hear from new members with a view to organising meetings. 3KF has recently built a 3-valve super. 3HA has been on seven days sick leave. A meeting will be held at the home of 3MQ (Mr. E. Dennison), 5 The Grove, Greengates, at 3 p.m., on August 26. All members welcome.

Doncaster.—193 hopes to revive the local radio society. 2BOJ and 8414 are active, the former after 12 months illness.

Halifax.—10020 says the de-luxe German signal keys are " humdingers." What has happened to the local group ?

Huddersfield.—A high fidelity recording and recordings of amateur contacts were demonstrated at the meeting held on June 24, at 5VD's home. Those present included 2BM, 3OY; 8CK, TF, VF, 9364 and 9782.

Leeds.—A T.R. is required, offers to 6KU please. 4349 (Transport Command, B.W.I.) is interested in photography. He sends regards to all members, particularly 6KU, 5VD and those around Cleckheaton and Heckmondwike. 4MC (R.A.F., Ceylon), says he is living a hermit's life. 5893 has built the midget receiver described in the September, 1944, BULLETIN and is delighted with the results.

Sheffield.—A successful sale of surplus gear was held at the July meeting. Welcome visitors were 2MA (Rotherham) and 193 and 8414 (Doncaster).

General.—Lt.-Col. Bisdee, VS7MB, Sand Hutton Hall, Sand Hutton, York, would be pleased to contact any G. he has worked over the air. 5834 had an interesting seven hours flight over Germany viewing bomb damage. A sincere welcome is extended to the 23 new members in the latest list ; they are asked to make themselves known to their T.R.

G8UO.

DISTRICT 3 (West Midlands)

D.R. : V. M. Desmond (G5VM), " The Chestnuts," Hanley Castle, Worcester. Scribe : E. J. Wilson (2FDR), 48 Westbourne Road, Olton, Birmingham.

Birmingham.—A meeting of M.A.R.S. was held on Tuesday, July 17, when a lecture and demonstration on a valve voltmeter for home construction was given by the President, Mr. C. Naylor Strong, F.R.C.S. Thirty members were present.

2FDR.

Evesham.—2563 is building an oscilloscope and 2FQP a battery all-wave receiver. 4736 is in Italy. 4144 is getting his automatic Morse sender into shape. Other members it is presumed are active and awaiting the return of licence facilities.

DISTRICT 4 (East Midlands)

Deputy D.R. : Albert E. Clipstone (G8DZ), 32 Tettenbury Road, Basford, Nottingham. Scribe : H. Ratcliffe (2AOO), 78 Henry Road, West Bridgford, Nottingham. (Phone 84150.)

Beeston.—In view of the falling off in attendance it was decided at a recent meeting to suspend the Morse classes until further notice. When there is sufficient demand they will be re-started.

BRS5514.

Derby.—There is not much news this month, although everybody who can, has applied for the re-issue of his licence, and is thinking about new gear. 7328 reports acquiring an R.M.E. 70 as the first step. 5568 (R.E.M.E.) home on leave is making a signal generator. G5RW is the proud possessor of a new " junior op."

(congrats). G2OU has a valve voltmeter on the stocks. We welcome G4CH, 2CRL and BRS9788. G2OU.

Leicester.—At the last meeting held at G2IX, part of the afternoon was spent in tracking down the elusive " db," later G4BI, paying a long awaited visit gave those present some insight on the production of panels and chassis for the home market. We congratulate Bill Vendy, G6VD, on his appointment as Station Engineer at R.A.F. Station, Grove, though his move means a big loss to the district. New faces will be welcomed at the midweek Morse classes. BRS5605.

Mansfield.—The D.D.R. has received a letter from G8NS, who has recently returned from B.L.A.; he hopes to be released in November, and looks forward to increased local activity.

Nottingham.—A good attendance was recorded at the July meeting held at 2FXY when the " Post-War Planning " series was continued. The construction of apparatus was the main topic. It was suggested by G6CW that letter budget groups be formed, and a receiver group has been started led by BRS5514. Other sections are being formed so that the whole field of activities will be covered.

An additional meeting will be held at 7.0 p.m. on the first Thursday in every month at Peachey Street, Mansfield Road, Nottingham. The first half hour is to be devoted to Morse instruction and this will be followed by discussions and demonstrations of equipment.

At a sale of apparatus auction by G8DZ a surprise parcel was put up and this went to G3QD. The prize turned out to be a large cucumber grown by 2FXY. We have to thank Mrs. 2FXY for the excellent snack that was put on at the meeting.

A welcome is extended to 2DCH, 9610, 9842, 9869, 9919.
G8DZ.

DISTRICT 5 (Western)

D.R.: R. A. Bartlett (G6RB), 31 King's Drive, Bishopston, Bristol. Bristol 46960.

Swindon.—G3HS, recently home on leave, says things are looking up in the area, and with 3HC and 2FZR did a round of visits. Among those visited were 5LO, 8VP, 8LV, 8PX and 3BR. He mentions hearing from 3JO and says that 2CQJ and 10225 are with him in Berlin. 8RW was left behind in Brussels.

Gloucester.—10126 asks for details of activity in the town.

Bristol.—A small party consisting of 6GN, 2BAR, 2FBV, 7961 and 6RB, visited the Exeter P.D.M. This opportunity of meeting old acquaintances seemed quite like old times. There will be no Bristol meeting during August. The D.R. has recently been visited by 4LW of Trowbridge, also by 2CVV, who, until recently, was stationed in the District.

9932 of Cinderford would like to know of any other members near. G6RB.

DISTRICT 7 (Southern)

D.R.: W. E. Russell (G5WP), " Milestones," Mayford, Woking, Surrey. Woking 1589.

A District Meeting will be held at G2YL, " Petersmead," Meadow Walk, Walton-on-the-Hill, on Sunday, August 26, at 2.30 p.m. It is essential to give Miss Corry notice of your ability to attend either by postcard or by ringing Tadworth 3268.

Bournemouth.—Meetings were held on June 30 and July 28. The next will be on August 25, 3 p.m., at 45 Parkwood Road. VE4ASH and G2BB have been recent visitors here. Reg Lansley, 4KV, is now a major. 2HNO.

Croydon.—The first post-VE field-day (receiving only unfortunately) is being organised to give the newer members an introduction to our pre-war " fêtes champêtre." The venue will be at Warlingham and the event will commence on Saturday, August 18, at 3 p.m., finishing on Sunday 19th at about 5 p.m. Further details from G2DP (THO2849).

2FWA met VE1CW on Leatherhead Station whilst on his way to town. He spent some of his leave fishing with 5UL at Margate. 2RD is now at Klagenfurt, Austria, liking it better than Italy. 3FP called on the T.R. recently. He moved to Croydon after receiving a V1 at his old QRA. See " Forthcoming Events " for details of future meetings. G2DP.

Coulsdon.—Sgt. Montague, 2ANR, serving with the R.A.F./B.L.A., called on the T.R. whilst on leave. A very interesting letter has been received from 2BCI, who is a Radar Mech. with S.E.A.A.F. in Burma. He sends 73 to G4BW, 2ANR and 2ANS. Welcome to new members 9622 and 9756. BRS3003.

Southampton.—Meetings were held in June and July at the Mount Pleasant School. At one of these ex-G5MX, who is now in this locality, related his experiences of the early days on long-waves. The next meeting will be held at the same venue on Wednesday, August 15. G8QW.

Reading.—The June meeting was devoted to a discussion of the District 15 Plan which was presented by BRS4781 and a number of members from the High Wycombe area. This invasion from the adjoining District was most welcome. It was decided to support the plan and some of the BRS members were soon adopted by full licence holders. A proposal to obtain a room as a permanent workshop was carried and offers of apparatus by G4CY, G8MG, 2BYZ, 4781 and others were gratefully received. Among those present were G2RL, 4CY, 5TP, 6JK, 8KJ, 8MG, 2BHS, 2BTY, 2BYZ, 2DIO, 3656, 4573, 4781, 4782, 5555 and 7714. See " Forthcoming Events " for details of future meetings.

Guildford.—The July meeting again saw an attendance of over 30 to hear a most interesting talk by G2UM (who travelled from Basingstoke) on Operating Procedure. A lively discussion ensued only to be terminated by the appearance of tea. Our thanks are due again to G5RS for making the arrangements.
G5WP.

DISTRICT 10 (South Wales & Monmouthshire)

Acting D.R.: H. H. Phillips (GW4KQ), 80 Cottrell Road, Roath Park, Cardiff. Cardiff 4512 during business hours.

The D.R., whilst apologising for the absence of notes last month due to late arrival at H.Qs., would take this opportunity of announcing that a Provincial District Meeting (full details of which appear elsewhere in this issue) has been arranged to take place at Cardiff on Saturday, September 22, 1945. Owing to the limited accommodation available, it is *essential* that members wishing to attend forward reservations *immediately*, and in any event by not later than September 13, 1945, to facilitate the arrangement of suitable hotel accommodation. A cordial invitation to support is extended to Bristol and West of England members. A remittance to cover should be sent with reservation.

Cardiff.—Apart from post-war ideals, discussions at recent meetings were centred around the forthcoming Provincial District Meeting. A committee has been formed locally to promulgate arrangements and afford a welcome to visiting members.

Due to holidays, no meetings will be held during August, but a gathering of members will take place on Sunday, September 16, 1945, at 2.30 p.m., at the home of GW8UH, 29 Ladysmith Road (off Penylan Hill) Roath Park, Cardiff. Visiting members will be cordially welcomed.

Swansea.—At the time of closing for publication, no news is to hand regarding the proposed August meeting, but those interested are asked to communicate with Mr. W. Bowen (GW4CC), Thistle Dhu, Upper Killay, who has arrangements in hand for the event. The attendances at meetings since these notes last appeared have been fairly good and it is hoped that a representative gathering will be present at the P.D.M. in Cardiff.

In closing the notes for this issue, the writer would again request that immediate attention be given to the reservations for the Cardiff P.D.M., as accommodation cannot be guaranteed for those booking after the closing date given in the special announcement.
GW4KQ.

DISTRICT 11 (North Wales)

Deputy D.R.: C. Spillaine (BRS1060), 14 Queensway, Prestatyn, North Wales.

Prestatyn.—The writer, during a recent spell of leave from GI, had a busy time moving to a new home, but managed to meet some of the locals for a rag-chew at The Savoy Cafe on Sunday, July 8, G2GZ, 4444, 8152, 8268 and others being present. Discussions mostly centred around post-war licencing plans.

GW8WJ, home on leave after a long spell in the Middle East, has been contacted. He looks fit and well, and sends 73 to all local members. GW3CF still in the District is now on the road again, eking out his basic. Cfn. King, B.L.A., 5837, reports fit and well from a " non-frat " country.

Rhyl.—BRS5520 comes through with three letters this month, in which he reports that after a long search in India he succeeded in buying an 0–1 mA moving coil meter for the sum of £3. He is now constructing a multimeter.

Penrhyndeudraeth.—BRS8828 reports improvements to his engine-driven power unit. He is now running the house lighting off same. Also experimenting with class B unit on his receiver.

General.—ZL2RI, who reports from the Pacific area, sends 73 to all old friends. BRS1060.

DISTRICT 12 (London North and Herts)

Acting D.R.: P. R. Solder (G5FA), 35 Torrington Gardens, New Southgate, N.11. Enterprise 4347. District Scribe: C. R. Stevens (2DHF), 22 Bramford Court, Southgate, N.14. Palmers Green 0548.

Since the Dinner on June 30, the scribe has received no

SOUTH WALES VICTORY
PROVINCIAL DISTRICT MEETING
to be held on
SATURDAY, SEPTEMBER 22nd, 1945
at
PARK HOTEL, CARDIFF

commencing at 3 p.m. prompt. A Buffet Tea will be served at 5 p.m. INCLUSIVE CHARGE 2/6.

Reservations to Mr. H. H. Phillips (GW4KQ), 80, Cottrell Road, Roath, Cardiff by not later than September 13th, 1945

ALL MEMBERS CORDIALLY INVITED TO ATTEND

information as to the activities of members of the District except for a letter from Ft./Sgt. J. Harvey, 2CQJ, who is now in Berlin. He mentions that 3HS is with him and that the R.A.F. Berlin Amateur Society is going well. He has discovered among the ruins copies of *QST* from 1936–39 in excellent condition and other "Crafty Items." He also asks if anything has been heard of John Kyle, 6WL.

St. Albans.—There was a record attendance of 16 at the June meeting held at BRS3412, when it was agreed to establish a local fund by means of collections taken at meetings, to defray postage and incidental expenses. 7238 was appointed local Treasurer.

A most informative talk on Aerial Feeders was given by G8FJ, who made those present realise the importance of feeders, matching, standing waves, etc.

A discussion on G6WN's "Nine Points" followed, to which nearly all those present contributed, including 2ADL, a visitor from District 15, who was the originator of the scheme. The subject caused quite a heated argument between planners and anti-planners until an adjournment was made for a group photograph taken by 2CNC followed by tea for which thanks are due to 3412's parents and his young lady. Among those present was BRS3013, a repatriated P.O.W. whom we hope to see again.

G2CN and 8PM send greetings and 73 to 5UM in India.

Arrangements are now being made to hold more regular meetings during the coming season and offers of accommodation for either Sunday afternoons or Thursday evenings will be welcomed. The next meeting will be held at G4GT, who would appreciate a postcard from those attending. (See "Forthcoming Events.") 4GT asks for news of 2CY. The T.R. has been pleased to receive letters from 8LN, 5QF and 5UM (by air mail from India) and his visitors have included 2DOW, 4GT and Ft./Lt. Richardson, a former Canadian amateur who hopes to be on the air in St. Albans in due course. 2CNC was expecting an early return to the Channel Islands on urgent business. Mr. H. A. M. Clark, G6OT, has kindly offered to visit St. Albans later in the year to deliver a lecture on Amateur Radio for the benefit of the many new members; it is hoped to hire a suitable hall or room for the occasion.

District 12 meeting at St. Albans, Herts

DISTRICT 13 (London South)

Acting D.R.: S. E. Langley (G3ST), 19 Elm Gardens, Mitcham, Surrey.

The following members attended the July meeting at the Y.M.C.A., Croydon: G2DP, 2HP, 2JB, 2UA, 2UJ, 2VB, 3DF, 3ST, 3TG, 4DO, 6JO, 8RN, 2ANR, 2BFH, 2FFM, BRS1545, 3003, 4563, 4584, 8417, 6894, 9110, 4814, 8996, and 9287.

During tea, a lively discussion took place on post-war matters, and many useful ideas were brought forward.

The Morse class which precedes meetings, is to be made even more interesting, as a few fully-licenced members are to offer radio components as prizes to those who master 12 words per minute.

The proposed District 7 and 13 Field Day to be held during August or September at the old N.F.D. venue at Upper Warlingham has been further discussed. Those interested should get in touch with G2VB at 35 Grangecliffe Gardens, South Norwood Hill, who is in charge of the arrangements. BRS4324 will be present with his now practically completed radio fitted trailer, whilst G3ST will carry out tests with aerials supported by kites. (Please contact GW6AA, who is similarly interested.—Ed.) Bring your own ham and eggs, or laying hens!

G3ST.

DISTRICT 14 (Eastern)

Scribe: L. J. Fuller (G6LB), Business address (for correspondence until further notice) 85 High Street, Chelmsford. Tel.: Chelmsford 2079.

Chelmsford.—The Scribe, G6LB, announces that he will be returning to live in Chelmsford in the autumn, when he will have considerably more spare time to devote to District affairs than of late, and he thanks all members for their forebearance during a difficult past year.

Activity in Chelmsford is at a low level, but it is hoped to resume regular monthly meetings in September. The few remaining pre-war transmitting members are busy with plans for their new gear, and if all we hear about G8PB is true, the Witham ether is in for a very hectic time. G2KG, who is rejoining the Society after a long spell of overseas duty, reports the construction of a new receiver, using a regenerative R.F. stage. G3SI views the possibility of hundreds of stations on 7 Mc/s. using 150 watts, with some concern, but the Scribe feels that it could not make conditions any worse than in 1939. G2SA is also straining at the bit, with plans for a most ambitious and effective mast, which bids fair to make the Queen Mary's mainmast look like a beanpole.

Chingford.—The July meeting at G2XG was attended by 11 members, and an auction sale of gear realised £5 for the Far East P.O.W. Fund—a most magnificent effort for a small gathering. The Chingford area hope soon to appoint their own official T.R.

G6LB.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

D.R.: H. V. Wilkins (G6WN), 539 Oldfield Lane, Sudbury Hill, Greenford, Middlesex. Byron 3369.

The 23 members and visitors who were present at the July District meeting elected Mr. Filby (G4AQ) as District Treasurer. A discussion centred around microphone manners and Radio's conducting medium.

A coach trip to the pre-war N.F.D. site at Speen, will take place on August 26. Mr. J. Sutton (9746) is arranging the trip and the charge will be moderate. If you propose to attend, please write to him at 71 Yew Avenue, Yiewsley, Middlesex, by not later than August 19, and he will notify you of the pick-up point, etc. The ladies are, of course, invited. Those going by car or train should meet at The Plough, Speen at 3 p.m. Tea will be arranged for those who notify Mr. Sutton.

A Dinner and Dance has been arranged for October and full details will be published later.

Local meetings have been held in Harrow, Southall, and Feltham, with fair attendances. Apologies are offered to 5056 and G6RS for the omission of the Sunbury meeting from the July calendar of "Forthcoming Events."

Reports have been received from G4AR (who has returned to this country with his bride), 5JL, 4781, 5056, 7250 and two members who did not include their BRS numbers.

Mr. Clarke (9094), 124 Springwell Road, Heston, is prepared to take over the Twickenham area together with his own, but would like to hear from anyone who can suggest a venue for meetings.

G6WN.

DISTRICT 16 (South Eastern)

D.D.R.: W. A. Scarr, M.A. (G2WS), 8 Beckenham Grove, Shortlands, Bromley, Kent. Scribe: E. H. Trowell (2HKU), 27 Unity Street, Sheerness, Isle of Sheppey, Kent.

A sincere welcome is extended to the new members in the District and it is hoped that they will support local meetings.

Mr. J. Walton, 1092, would like to contact members in the Folkestone area.

Sussex.—G2PF, 5PF and 8RO visited H.Q. recently to meet 2879—their first "four-way" since 1938. 2PF has received a visit from 2MN, who would like to get together members of the West Sussex Short Wave and Television Club. 8RO is trying to arrange an early meeting. The latter has built an eight-valve receiver with band switching and would like news of 8QJ.

Maidstone.—The first war-time meeting of the Maidstone Amateur Radio Society took place at their clubrooms, 244 Upper Fant Road, when G3MR, 8UC, 2APC, BT1 were among those present. The next meeting is to be held on August 22, when it is hoped that local members will attend. Mr. P. E. Holder, 2 Florence Road, is acting as Secretary, and will supply full details.

Sidcup.—2DHV, now at Thirsk, Yorks., is looking for contacts.

Sheppey.—2VA, 3GW and 2HKU recently met. The latter enjoyed a visit from 3FP (Croydon) who also visited 2VA (now a Chief P.O.).

Will members interested in forming local clubs please write to the Scribe? When writing to the D.D.R., or the Scribe an S.A.E., should be enclosed if a reply is required.

2HKU.

DISTRICT 17 (Mid East)

D.R.: A. C. Simons (G5BD), Admiralty Road, Mablethorpe. Phone 69.

G6GH, looking very fit after his sojourn with the M.E.F., spent his leave in the D.R.'s home town. 8BQ (B.L.A.) is hoping to be released by the end of September. He has attended a meeting in Ghent. 5LL (C.M.F.) is having a spell in hospital. 2FT should find himself in good ham company at his new location—B.B.C., Midland Regional. 8SH (No. 1 A.A.S.) is making plans for his own post-war station, and is also assisting G5BD. Congrats to G2UK on his promotion to Major. 4657 bemoans the fact that his trade (R.M. Signals) does not appear to qualify him for the new licensing exemptions. 8094 would like the present QRA of G4IO, whom he met whilst in India.

G5BD.

DISTRICT 18 (East Yorkshire)

District Scribe: S. Davidson (G6SO), 10 Sydney Street, Scarborough.

G6SO regrets the absence of notes last month owing to pressure of business.

Hull.—The meeting held on May 28 was attended by 15 members, and several topics were discussed including the

behaviour of the electric arc, and short wave receivers. Members inspected G4LH's home constructed moving coil pick-up; he promises to give a demonstration of his home recording gear shortly. Several of the " old gang " were present together with newer members.

At the June meeting, a lively discussion on aerials resulted in a general determination to read up some " gen " on the subject! The cause and remedy of second channel interference and other superhet topics were also discussed at some length. We were very pleased to welcome G2KM, who held a licence before 1914, and Dr. Smith, G5KD, both of whom are rejoining the Society.

Sgt. Duguid, BRS7271, was another welcome visitor. A total of 14 members and prospective members were present. The need for more frequent Morse practices has been expressed and arrangements are being made for weekly sessions. For dates of future meetings, see " Forthcoming Events."

G3PL.

Scarborough.—G6SO records visits from: 2DHV (Sidcup), 8823 (Derby), G3AH (Manchester), A. F. Veneer (London) and VE3AIU (Ontario), now on his way back home.

G6SO.

DISTRICT 19 (Northern)

D.R.: R. J. Bradley (G2FO), 36 Raby Road, Stockton-on-Tees.

Middlesbrough.—G3YK regrets the delay in forwarding photographs of the hamfest to those who ordered them, but this has been due to the photographer not having them ready on the promised day. For the benefit of those who have not ordered photographs, they are still available through the D.R. or 3YK. P.C. size 9d. and 6 in. × 8 in. 2s. 9d. post free.

G2FO.

Scotland

Scottish Records Officer: J. Hunter (GM6ZV), 51 Camphill Avenue, Glasgow, S.1. Langside 237.

" A " District.

District Officer: D. R. Macadie (GM6MD), 154 Kingsacre Road, Glasgow, S.4. Scribe: J. D. Gillies (2FZT), 3 Berridale Avenue, Glasgow, S.4. Merrylee 4060.

The 14 members who attended the July meeting were entertained by Mr. McDowall (GM3AR) with a talk on aerials and a description of the transitron oscillator for transmitting and receiving. Local members are rallying to the call to build up an active group in readiness for the return of Service members.

3FZT.

" B " District.—Another welcome letter is to hand from Sgm. A. G. Brown, who is still in the Middle East.

" C " District.

D.O.: Jas. Gouck (GM3NH), 4 School Drive, Downfield, Dundee.

The July meeting was supported by 13 members who listened with interest to a talk by Mr. R. P. Conway on the " Miller Effect." The mathematics of the subject were deeply gone into and everyone appreciated the manner in which Mr. Conway handled cumbersome equations with his usual abandon! Mr. A. Sherriffs has kindly offered to arrange for a party to visit the local power station. This function will probably take place on a Wednesday evening in September or October. Members who are interested should advise the D.O. on or before the next meeting, as it will be necessary to obtain an idea of the number forming the party.

GM3NH.

Headquarters Address

Numerous letters are still being sent to 53 Victoria Street, S.W.1, the pre-war address of the Society. An even larger number are sent to the General Secretary's private address at 16 Ashridge Gardens, Palmers Green, N.13. Appeals have consistently been made through this journal to members requesting them to use the correct address, but they appear to fall on deaf ears in certain quarters.

We again ask all members, especially those signing applications for membership to use the correct address, namely:

The Inc. Radio Society of Great Britain,
New Ruskin House,
28/30, Little Russell Street,
London, W.C.1.

The name of the Society should *always* be used when writing to Headquarters. It is not sufficient to address letters to the General Secretary as several firms are located in New Ruskin House.

Contacts Wanted

Mr. D. C. Shahani, **BERS579**, 8 Nrisinha Lodge, 177 Hornby Road, Bombay, will be pleased to contact members resident or serving in or around Bombay. Mr. Shahani is the Hon. Gen. Secretary of the Modern Youth Circle.

Philatelists Attention

Mr. Thos. de Putron, **G8MF**, 7 Commercial Arcade, Guernsey, C.I., will be pleased to send a first day cover bearing a copy of the ½d. Guernsey Arms occupation stamp to any interested member. Please enclose stamped and addressed envelope.

Can You Help?

F./O. J. H. Clarke, **2AAN**, Room 157, Crown Hotel, Harrogate, Yorks., has an SX 23 receiver which consists of the usual R.F. stage, two I.F.'s and crystal gate. The audio stage is capable of about 3 watts output. The selectivity switch has three positions with A.V.C. " on " and three without A.V.C. When tuned to, say, the London Regional Programme on medium wave and the S meter indicating S9+, the R.F. gain control has to be advanced fully to get about 2 watts maximum audio output. If the selectivity switch is then tuned to the A.V.C. " off " positions the receiver immediately " blocks " and the R.F. gain has to be tuned down to about half-way. The audio output is then much greater than with A.V.C. " on." On the H.F. bands, the same symptoms are noticed on loud signals, although everything appears correct on signals up to S6 and S7, when the audio output is probably greater than on the S9 signal.

The A.V.C. appears to work correctly as far as can be judged. The symptoms suggest that any loud signal immediately over-biases the H.F. stages and reduces gain drastically.

Can you suggest an explanation? If so please write direct to F./O. Clarke.

* * * *

Mr. D. F. Owen, **G2BC**, 18 Western Road, Flixton, Manchester, has a set of Bowyer-Lowe superhet transformers with plug-in oscillator, and is anxious to know if they can be used in the construction of a modern set. The transformers are air-cored and matched at 143 kc/s. They were manufactured in 1926.

Northern Radio Club

Mr. Alan Robson, 522 Denton Road, Newcastle-on-Tyne, 5, states that in future, meetings of the Northern Radio Club will be held every Wednesday from 6.30 to 9.30 p.m. at the new Club rooms, 16 Stratford Road, Heaton, Newcastle-on-Tyne. Further details regarding the activities of the Club can be obtained from Mr. Robson who is the Hon. Secretary.

Now We Know

We are indebted to G6LB and G8TL for sending the following:

" A radio engineer is a person who passes as an exacting expert on the basis of being able to turn out with prolific fortitude infinite series of incomprehensible formulas, calculated with micromatic precision from vague assumptions based on debatable figures taken from inconclusive experiments, carried out with instruments of problematical accuracy by persons of dubious reliability and questionable mentality."

Original source unknown.

* * * *

To avoid being drawn into a discussion a friend of Mr. Hopewell, G8LH, evaded the issue with the following:

" All I know about transmitters is that a piece of wire disappears into the sky—and at the bottom is an ammeter indicating a fantastic number of amps."

Morse Practice Offered

Mr. A. Bergol, **BRS5944**, 294 Brookvale Road, Erdington, Birmingham, 23, will be pleased to give free Morse lessons to any member who wishes to learn the code. All correspondence will be answered upon receipt of a stamped addressed envelope.

News from Europe

● M. Robert Piat, **F3XY**, Souppes (S. & M.), France, sends greetings to all old friends of the air and especially to G2FX, 3WD, 4HW, 5SD, 4LI, 6WX and 6YP. He would be glad to receive data on VR61 and VR92 valves.

● A. Weirauch, **OK1AW**, Mestec Kralove, No. 9 Czechoslovakia, sends greetings to his British friends, and hopes to meet them over the air again shortly.

● G6HF reports that Mr. Van der Toolen, **PA0NP**, pre-war Secretary of N.V.I.R., is fit and well and is believed to be still living in Santpoort.

● According to **PA0APX**, many Dutch amateurs were imprisoned by the Gestapo and two at least (PA0QQ and PA0MO) are dead. PA0APX was incarcerated in October, 1944.

● **OK1AW**, reports that Czecho-Slovakian amateurs are waiting for the return of their licences but as their stations were confiscated by the German police, much rebuilding must take place before they can get back on the air. The provisional address of the Czech Society (C.A.V.) is Praha II, Václavské Nám 3/IV p, Czechoslovakia. The acting Secretary is Ing. A. Schubert.

● **OK1AQ**, writes " at the contemporaneous time its allowed to us only the 3.5 Mc/s. band. Many of our members (old valiant Partizans) worked on secret unlicenced stations during the German occupation."

● H. M. E. Linse, **PA0UB**, reports fit and well after the liberation. He is now living at 's Gravendy-kwal 118, Rotterdam, and sends greetings to G5AR, 6FY, 6LL, 6UT, 2APS and other old friends.

Congrats

● To L.A.C. C. R. H. Broadhurst, **BRS8677**, on his recent marriage to Miss A. E. Smith. They are now living at 64 Bentley, Atherstone, Warwicks.

R.S.G.B. BULLETIN

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VOL. XXI **AUGUST, 1945** **No. 2**

EVERY KILOCYCLE WILL COUNT

SIX years ago we had a home membership of 3,000, half of whom were licenced operators of amateur transmitting stations. Not all were active, as the Society's Band Occupancy Checks showed, but it was an established fact that the average week-end station activity on 7 Mc/s.—our most popular band—was in the order of 1,000. Even with this number the band was heavily congested and at certain times the most skilled operator was hard-pressed to read signals without asking for repeats.

Now that our hopes for the early resumption of transmitting facilities are rising high, it is of paramount importance that we should give careful thought to the problem of interference and begin to lay plans for a solution of what may well become our greatest post-war problem and your own personal "Number One headache."

We should do well to remember that, notwithstanding the tremendous strides made since the last British amateur signal was transmitted, no technical development has occurred which permits a weak signal to be received, if its frequency is within a few cycles of that of a strong local station.

Crystal band-pass filters, double super-hets, "crystal gates" and similar aids to the improvement of selectivity have brought us far from the days of the 0-v-1, but however ingenious the device and however skilled the operator, the fact remains that no radio engineer has yet overcome the effects of overwhelming QRM.

This fact has a great bearing on the future of Amateur Radio and leads us to ask the pertinent question :—

"How much simultaneous activity can take place in one of the popular amateur bands before that band becomes—to use a Service term—'u.s.' ?"

Assuming that we are given permission to use the full pre-war 7 Mc/s. band, we shall have at our disposal a channel width of 300 kilocycles. In a similar 300 kc/s. slice of the spectrum assigned to other services approximately 42 single-channel double sideband telephony stations would be permitted to work with a 7 kc/s. separation, which figure the "powers-that-be" regard as the minimum for efficient operation. The number of stations would be increased to 60 if they used telegraphy. Before the war, as we have already stated, approximately 1,000 British Isles amateurs operated in the 7 Mc/s. band every Sunday. If they had spread themselves equally over the whole band—which assuredly they did not—there would have been an average of three stations operating on every kilocycle throughout the band. In other words we were forced by circumstances beyond our control to operate at a minimum density 17 *to* 21 *times greater* than other services. The actual density at the edges of the band was probably 50 times greater.

Consider now the state of affairs that may very well arise within the space of the next three years. By the end of that period the number of fully-licenced British Isles amateur stations will probably have increased to 5,000. It does not require a mathematician to see that if 5,000 amateurs took it into their heads to "invade" say 7 Mc/s. one Sunday the band would cease to possess any experimental value. The accumulative volume of noise (for it could be nothing else) would drown out even the most raucous "local."

The picture may appear black, but it is far better to face up to the position now than wait until we are back on the air.

There are probably several solutions to this particular problem, but the one that appeals to us most can be summed up in the words we used recently at the Nottingham P.D.M., "let us make proper use of every kilocycle in every amateur band."

As far as can be judged at present, British amateurs will be allotted the full Cairo bands. If this comes to pass we can but hope that activity will be much more equally divided over the bands than was the case before the war. We also hope that the fullest possible use will be made of our V.H.F. allocations. In pre-war days the centre of the 14 Mc/s. band was a "desert" in Europe because U.S. amateur telephony stations operated between 14,150 and 14,250 kc/s., whilst the 28 Mc/s. band, which incidentally was 2,000 kc/s. wide, was almost barren of signals from 29–30 Mc/s.

By virtue of a little careful planning we believe that it *will* be possible for as many as 5,000 British stations to operate with a fair degree of comfort. Can we count on your co-operation ?

* * * *

Since writing the above we have had an opportunity of studying the F.C.C. "Report of Proposed Allocations below 25 Mc/s." The following comments regarding Channel Widths have a considerable bearing on the subject discussed earlier.

> *"5 kc/s. channels are requested for telegraph service. The Commission is of the opinion that these channels can, within a period of five years, be reduced at least to a width of 2½ kc/s. Shortly after the war it is expected that a considerable amount of equipment will be installed to replace the apparatus at many foreign communications centres that has become obsolete or has been damaged by the war. Such new equipment should incorporate the latest developments which will facilitate operations on narrower channels. As a result shortly after the war practically all of the U.S. licencees and many of their foreign correspondents . . . should find it possible to operate on channels 2½ kc/s. or less, in width."*

J. C.

COMMUNICATION RECEIVERS*

MEASUREMENTS AND STANDARDS OF PERFORMANCE

By R. H. Hammans (G2IG) †

BEFORE the performance of a receiver may be judged, it is necessary that some yard-stick should exist. Frequently that yard-stick will be little more than the condensed experience of an individual observer by which he is able to judge whether a specimen receiver is good, bad, or indifferent compared with his own scale of values. It is necessary to reduce this personal opinion to facts and figures mainly in order to allow interchange of ideas and to avoid variations due to the human element.

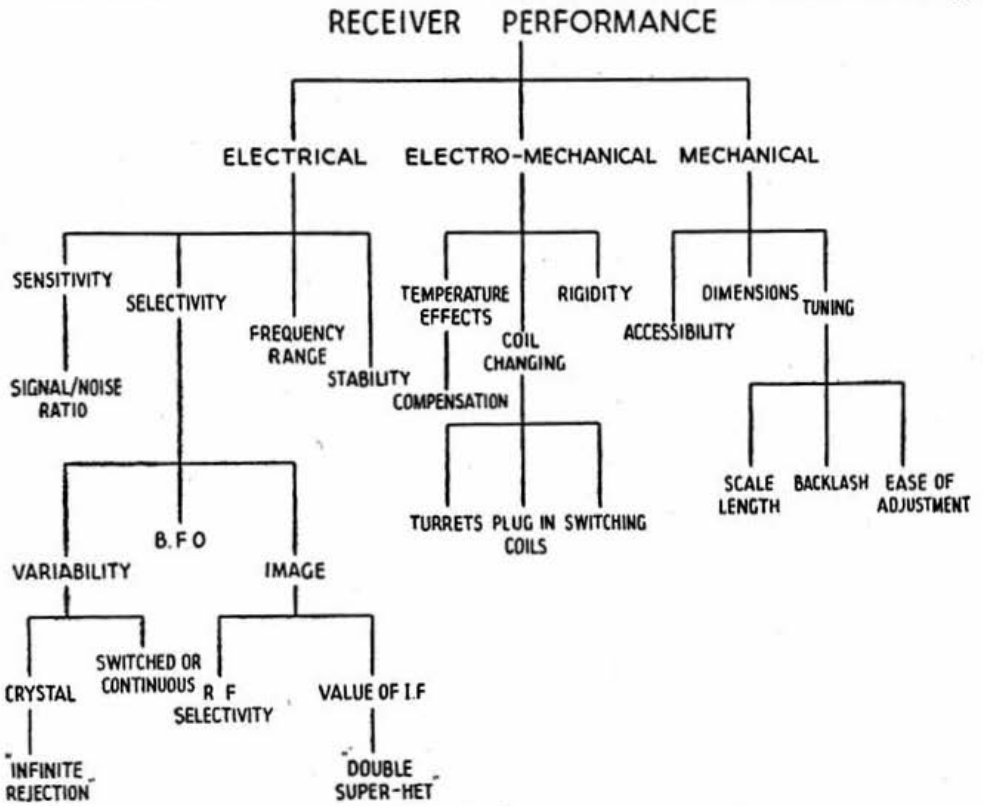


Fig. 1.
Family tree diagram illustrating relation of principal factors governing receiver performance.

Progress in performance can continue only if the existing level of achievement is known. For instance, a research worker cannot produce spectacular improvements until he knows that they *are* spectacular. He might be aware that they are good, but other workers could have surpassed his results without his being aware of the fact. The converse might occur and unconscious of anything unusual the experimenter may risk depriving the community of his results through uncertainty of their value.

The consumer, too, is unable to select his purchase from advertised data unless he is conversant with some standards of performance. In the motoring world, most prospective car owners would know that a car capable of 80 m.p.h. at 50 miles to the gallon with seating accommodation for six and costing £150, would be something unusual, to say the least; but how many intending purchasers of a communication receiver would show the expected reaction to a quoted signal-to-noise ratio of 60db up to 100 Mc/s. with · 1μV input; or an adjacent channel selectivity of 20db at 3 kc/s. off tune?

It is perhaps unfortunate that a communication receiver has so many "departments" which may show good or bad performance. Many factors are interdependent so that efforts to obtain outstanding results from one inevitably cause restricted performance from another. For this reason it is essential that performance figures be quoted for all relevant features.

Fig. 1 is a "family tree" diagram intended to show the inter-related features which make up a communication receiver. Although each feature is shown as a distinct branch, certain of them are so dependent on others that they become complementary, that is to say, good performance from one creates indifferent results from another. Again, others are supplementary and affect each other so that good design of the one improves the other. As examples of the foregoing, complementary factors such as selectivity and quality of reproduction, and selectivity with ease of tuning, demonstrate the manner in which an improvement in one direction results in deterioration in another. Similarly, as examples of supplementary factors, oscillator stability permits the use of high selectivity, while high selectivity aids signal-to-noise ratio. These examples

* A paper read to the Society on December 30th, 1944.

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

illustrate the need for constant care in design; weighing advantage in this against disadvantage in that; seizing an opportunity to secure twofold improvement from a single operation.

DEFINITIONS

Selectivity

In broad non-technical terms, selectivity is the degree to which unwanted signals are rejected in favour of the wanted one. It is to some extent justifiable therefore to include under this heading such things as limiters. However, in order to simplify the question of definition it is established that the term as applied to a receiver means precisely the same as when a simple LC circuit alone is considered. A curve showing the current in an isolated parallel LC circuit at frequencies both sides of resonance has always the same symmetrical form although the " sharpness," or ratio of height to width (merely a matter of scale in a drawing), depends on the " goodness " of the components. Thus the selectivity could be quoted as the reduction in height for certain width; *i.e.* attenuation for certain band width.

Similarly, attenuation for " X " kc/s. off tune is a useful means of specifying selectivity. An inversion of the latter is commonly used in the measurement process. The amount by which the input signal has to be increased to maintain constant output, as its frequency is moved away from the resonant frequency of the circuit, is plotted against frequency change. An inverted curve of similar shape results. This process is preferable to the former in that it is simpler and more accurate measurements are possible.

Sensitivity

The absolute sensitivity of a receiver is, strictly, the input necessary to produce an output of a value which has been laid down as standard. It is in practice closely allied to overall gain. Receivers fall into two classes, one of the type whose gain is insufficient to allow internally-generated noise to approach the figure decided upon as a standard output, and the other of the type whose gain is sufficiently high to allow the noise output to approximate to the full standard output even although no signal is being received. Communication receivers fall in the latter category so that for the purposes of this paper it will be assumed that the gain of all communication receivers is sufficiently large to produce considerable noise output. In these circumstances the only factor which limits sensitivity is internally-generated noise. Consequently, in expressing sensitivity, the ratio of the signal component of the output to the noise component of the output is the useful figure, further amplification being merely a matter of power output.

Although no rigid standard exists for expressing such a ratio, it is becoming more and more usual to express the signal-to-noise sensitivity as " that number of μV input, modulated to 30 per cent. at a frequency of 400 c/s., which produce in the output a voltage ratio between the modulated and unmodulated conditions of 20db." It will be seen that this expression gives an accurate impression of the signal-to-noise ratio sensitivity for telephony reception. Probably a more accurate impression for telegraphy reception could be obtained by determining the input μV necessary to produce the same ratio of 20db in the case of an unmodulated input signal, the B.F.O. of the receiver being switched on and the signal applied and removed entirely to determine the ratio.

Image Ratio

Since most communication receivers are of the superheterodyne type, the phenomenon known as " second channel " or " image interference " is of importance in considering the performance. If the R.F. circuits were ideal, *i.e.* capable of infinite selectivity, no such phenomenon could occur, but in practice the selectivity of the R.F. tuned circuits is generally much inferior to that of the I.F. circuits and, as a consequence, their response to a signal separated from the wanted channel by an amount equal to twice the intermediate frequency is not negligible although in the ideal case such response would be zero. A method of expressing the ability of a receiver to reject second channel interference may be quoted as " the voltage ratio in db between the output due to a signal of a certain voltage at the wanted frequency to the output due to a similar signal on the unwanted channel."

Stability

There are various kinds of instability which are commonly encountered in the short-wave receiver, one of the most troublesome of which is caused by random changes of the local oscillator frequency. Apart from mechanical deficiencies, these random changes are, as a rule, due to variations in the supplies, and high tension voltage is the chief source. The degree to which changes of high tension supply affect the frequency of the oscillator is largely a matter of oscillator design, but the effect may be expressed in the form of a coefficient, quoting the percentage frequency change for a certain standard percentage change of high tension voltage. Perhaps more conveniently this may be written as the parts in a million frequency change for 10 per cent. change of high tension voltage.

Another form of instability connected with the local oscillator is due to the effect of temperature changes. Referring to Fig. 1, it will be seen that temperature effects are grouped under electro-mechanical features, since they are inherently due to changes in size or form of the materials used in the construction of the oscillator components, but since its manifestations are entirely electrical, temperature effects are probably more closely connected with " stability " than Fig. 1 shows. The method of expressing the effect of temperature changes on oscillator frequency is not so readily given, in the form of a coefficient, due to the great difficulty in determining the temperature change of the component which is the source of the instability. Perhaps some approach to an accurate coefficient could be obtained if the temperature rise inside the oscillator coil were measured and the coefficient quoted as the parts in a million change of frequency per degree Centigrade change of temperature.

Most of the other headings shown in Fig. 1 need no definition, but under the mechanical features the term " backlash " will be seen connected with tuning. The term is used to describe the mechanical play which inevitably exists in the transmission between the frequency control dial and the variable condenser. This mechanical inaccuracy takes the form of incorrect meshing of gears, flexing of mountings, torsion of shafts, etc. Backlash is experienced as an inaccuracy in resetting of the control dial when the approach is made to a given frequency from one direction and then the other. As the effect is purely mechanical it may be expressed in purely mechanical terms, that is to say, the difference in dial reading between clockwise and anticlockwise approach compared with the total length of the scale. Here again a coefficient may be employed—such as parts in ten thousand—indicating the error; *e.g.* geometrical degrees of backlash divided by the total rotation of the control shaft; usually 360° × the gear reduction ratio.

Further examination of Fig. 1 will show that for a receiver to have excellent performance in all the features shown is a remote possibility. In fact, in practice it is necessary that the receiver should be designed to have good performance in the features which will suit it

for the particular job for which it is required. In this way some of the factors shown will have greater importance in a receiver for one purpose than in another, whilst a receiver required for an entirely different function would have a completely different arrangement. However, if performance be quoted in all its practical aspects, the " consumer " may judge for himself the suitability of any given instrument to the purpose for which he intends to use it.

SUMMARY OF METHODS OF MEASUREMENTS

Apparatus Required

A standard signal generator.

Output meter of the square-law type.

Attenuator, preferably variable, but if fixed, the value of attenuation should be 20db.

Auxiliary equipment which greatly adds to the convenience of measurement consists of :—

A ganging oscillator of the frequency-modulated type, a cathode ray oscilloscope and a valve voltmeter of the peak type preferably adaptable for measurement of very high resistance D.C. voltages such as those encountered in A.V.C. circuits.

Measurement of Sensitivity

Absolute sensitivity, as previously defined, is quoted as " the input signal amplitude measured in μV, which is required to cause the receiver to produce an output at standard level." For this measurement the loudspeaker of the receiver should be removed and a resistance equal to the impedance of the loudspeaker substituted across the terminals. The receiver should then have all its gain controls set to maximum and a signal from the standard signal generator should be injected into the input terminals through a resistance equal to the input impedance of the receiver. The signal should be modulated with 400 c /s. tone to a depth of 30 per cent. and the frequency of the carrier should be set to the frequency at which it is desired that the sensitivity should be measured. The receiver should then be tuned accurately to this carrier, all incidental controls such as automatic frequency control, automatic volume control, B.F.O., noise limiting, etc., should be switched off where possible. The signal generator output attenuator is then adjusted to that value which produces an output power in the dummy output load of 250 milliwatts as measured by a square-law meter. The sensitivity is then said to be the number of μV delivered by the signal generator under these conditions.

Communication receivers operating under these circumstances, namely, with the gain controls all full on, will usually produce very much more noise than the standard audio output, even when no signal is present, consequently an entirely different method of measurement has to be substituted. Moreover, the standard output power of 250 milliwatts can be neglected since power output is entirely a function of audio amplification which is virtually limitless in modern technique. The limiting factor to gain is the noise generated by the receiver itself, and in a well-designed receiver the larger part of this noise originates in the first stage. It comprises noise of two sorts. Firstly, thermal agitation noise in the first tuned circuit (to which the aerial is coupled), and secondly, valve noise, usually referred to as " shot effect," and is due to random variations in the number of electrons in the cathode to anode path inside the valve. It will be assumed, therefore, that in a communication receiver this noise constitutes the major limitation to useful amplification. If a certain minimum ratio of signal-to-noise (say, 20db) be chosen and the input signal be adjusted from the lowest possible output of the standard signal generator until this ratio is achieved, then irrespective of power output a value of useful signal-to-noise sensitivity has been derived. As in the previous case the output voltage of the signal generator under these conditions is taken as the signal-to-noise sensitivity of the receiver. Conditions of measurement for this latter case are precisely similar to the conditions for absolute sensitivity measurements. Measurements for sensitivity should be made on every frequency band which the receiver is designed to cover, and at three points on each band, one at each extreme and one at the centre.

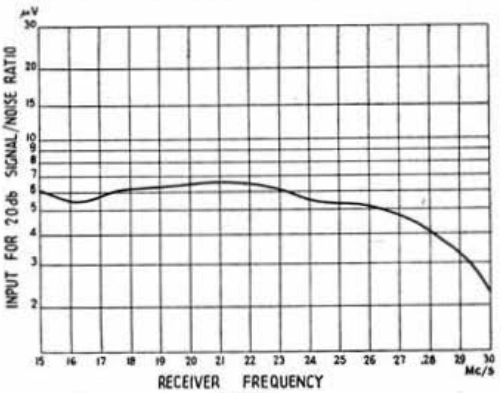


Fig. 2.
Typical curve of signal/noise sensitivity *versus* frequency.

Fig. 2 shows a typical sensitivity /frequency curve. Note the maximum signal-to-noise ratio at the H.F. extreme, due to accurate ganging at this point.

Selectivity

The standard signal-generator is applied to the receiver in the same way as for sensitivity measurements, except that if it is desired to measure the intermediate - frequency selectivity alone the signal - generator may be applied to the input of the I.F. amplifier, *via* the control-grid of the mixer, which should be isolated from the R.F. grid circuit. The signal-generator should be adjusted carefully so that the output from the receiver, when set to the frequency desired for the test, is at maximum. R.F. and I.F. gain controls should be set to maximum, consistent with avoiding overloading and the audio gain control set to produce a convenient level on the output meter. Now the signal-generator should be tuned away from the resonance point of the receiver by one kc /s. and the output increased until the output meter reads as before. A further adjustment of one kc /s. and a consequent increase in signal-generator output should be made, and so on until a succession of readings have been obtained enabling a curve to be drawn. Readings should be taken on both sides of resonance and should be closely spaced, such as at one kc /s. intervals or less, if the resonance curve of the receiver shows any abrupt changes. Great care must be observed in taking this measurement to see that no limiting or overloading occurs accidentally, and that A.V.C. is switched off. Where a variable selectivity control is provided a similar curve must be taken for representative positions of the variable control, and if the measurement is being made at R.F. one or two curves for different signal frequencies should be drawn to indicate to what extent R.F. selectivity influences the shape of the response curve.

A much more rapid and therefore more convenient method is that which employs a frequency-modulated ganging oscillator and cathode ray oscilloscope. In this method a visual trace of the selectivity curve is directly viewed on the screen of the cathode ray tube.

It is clear that with such a continuous picture of the curve available the effect of alterations in tuning of the various circuits in the receiver will be immediately discernible. The case of crystal filters presents a rather more complex problem ; here the shape of the selectivity curve frequently has a very narrow peak and an equally narrow trough adjacent to one another. The trough is the so called " infinite rejection trough " obtained by adjustment of the phase control. It is valuable to express the efficacy of the infinite rejection feature as " the smallest frequency deviation from maximum peak at which a 20db reduction in signal occurs on the side of the infinite rejection trough."

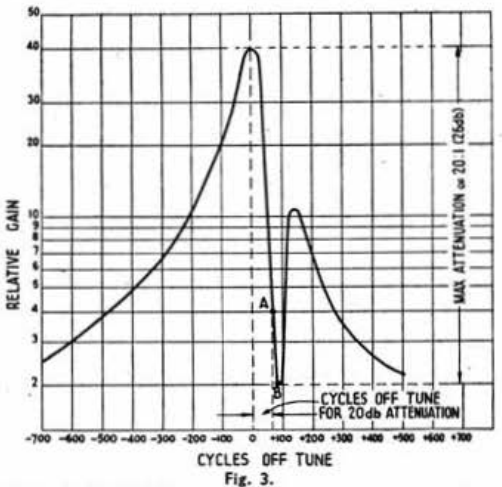


Fig. 3.
Typical crystal selectivity curve denoting measurements of rejection selectivity for 20db (point A) and maximum attenuation (point B).

(See point " A " Fig. 3.) A further specification could be included which gives a measure of the approach to real infinity to which the infinite rejection can be carried. This is desirable in view of the fact that certain crystal filters do not produce anything like infinite rejection owing to stray couplings allowing the signal to by-pass the crystal without suffering any very large attenuation in the process. (See point " B " Fig. 3.) Fig. 3 illustrates these two measurements.

Second Channel or Image

As with sensitivity measurement, second channel ratio should be taken at three points on each tuning band and is measured in the following manner. The signal-generator is tuned to the frequency for the test and its output so adjusted that with receiver gain controls all at maximum there is no chance of limiting occurring. The frequency of the signal-generator is then set to a point twice the intermediate frequency away from its original position. In most cases this will be a change in a high frequency direction since it is usual that the local oscillator of the receiver is on the high frequency side of the wanted signal. The signal-generator should be tuned carefully when this point is reached so that once again a maximum is obtained on the output meter of the receiver. The signal generator output voltage is now increased by means of its calibrated attenuator until the output meter reading is the same as before. The signal generator output voltage change in decibels then represents the second channel or image ratio.

Establishment of Standards.

The British Standards Institution has prepared, with the co-operation of various interested bodies including R.S.G.B., a draft specification No. C.F. (EL)3653 for methods of testing and expressing performance of radio receivers. Unfortunately, its scope does not include communication receivers, but as the final specification has not yet been issued an opportunity still exists for introducing clauses specifically for this type of instrument. However, it is essential that any recommendations for additions or amendments should be the well considered decision of as large a number of interested parties as possible.

The Society is in a particularly favourable position to initiate such recommendations if the membership will advance views and suggestions. There has already been some interesting correspondence on the subject, and this paper is intended as a guide and stimulus to a definite conclusion in many of the nebulous facts and figures connected with communication receivers.

Bulletin Articles Wanted

The General Editor will be pleased to receive offers from members who are in the position to contribute articles on the following subjects :—

(*a*) The technical aspects of " break-in " describing stable-keyed crystal or variable frequency oscillators and controlling the following stages of an oscillator keyed transmitter.

(*b*) The prevention or suppression of key-clicks with special reference to keyed oscillator transmitters.

(*c*) Receiver muting for use with " break-in."

(*d*) The design and construction of monitors, modulation meters, and frequency meters.

(*e*) Test gear employing cathode ray tubes and associated equipment.

Members are asked to send, in the first instance, a synopsis of the projected article. " Hints to Contributors " will be forwarded to all prospective contributors.

A FRESHMAN'S GUIDE TO AMATEUR RADIO

By ARTHUR O. MILNE* (G2MI).

PART II

In this article, the second of a new series designed to assist the newcomer to Amateur Radio, a brief account is given of typical conditions experienced on each of the amateur bands in common use before the war. No attempt has been made to discuss technical or experimental aspects, as these will be considered in a further series of articles to be published later in the year.

LAST month we outlined the way in which the transmitting amateur obtained his licence. In this article it is proposed to follow him to the "shack" (radio room) and find out what happened when he made use of these hard-won facilities.

His first act would be to switch on his receiver, tune round the bands and note the general state of affairs; what signals were audible and whether things were right for "DX" (long distance) contacts. These details were summed up in the all-embracing term "Conditions" (sometimes contracted to "Condx.") a word which became more full of meaning and more indefinable, the longer one was an active Amateur.

In time one came to recognise the various symptoms at sight and to interpret their meaning so that it became possible to tell, almost at once, what to expect at any given time of day and season of the year.

Each band had its own peculiarities and potentialities. The discerning Amateur who was licensed to use most or all of them would soon know which band to employ for a given distance and time of day.

The general behaviour of the Amateur bands together with details of stations heard, were recorded month by month in this journal under the title "The Month on the Air"; but for the benefit of the newcomer, the following observations are a fair summary of what each band had to offer. (1)

1.7 Mc/s.

Although everyone thought and talked in terms of kilocycles per second, the bands were usually referred to in terms of wavelength. This was a legacy from the early days when kilocycles were a strange innovation and metres still "ruled the roost." Hence the 1·7 Mc/s. band was often referred to as "One sixty," as its approximate wavelength centre was 160 metres. Its devotees also called it "the top band."

Activity on "160" was largely confined to the weekends, owing to a general, but mistaken impression that there was more liability of interference with Broadcasting than on the other bands. Sunday morning was the favourite time and one could be certain of finding the same stations active week after week. Both telephony and telegraphy were used, but as the average limit for readable signals using the normal power allowed (10 watts) was about 100 miles during daylight, this band was "inhabited" mainly by little groups who contacted other stations in their own locality, but who seldom worked or heard stations further afield. At night, conditions opened-up for communication over most of the British Isles, although subject to severe atmospherics in the summertime. Occasionally during the hours of darkness there might be an odd European to add to the interest, but such signals were few and far between.

Towards periods of minimum sunspot activity (*e.g.* the winter of 1938–9) it was possible to bridge the Atlantic in the early hours of the morning in December and January, but in general 1·7 Mc/s. should be regarded as a domestic band, roughly confined to the immediate neighbourhood during daylight and to the British Isles at night.

As "One sixty" was shared with small boats and trawlers; whose so-called telephony transmissions (by reason of mis-operation and high-powered shouting into long-suffering carbon microphones) were usually quite unintelligible; the band provided its moments of excitement and exasperation. More than once the highly imaginative remarks of two trawler Captains whose gear had become entangled have been blamed upon the innocent Amateur users of the band!

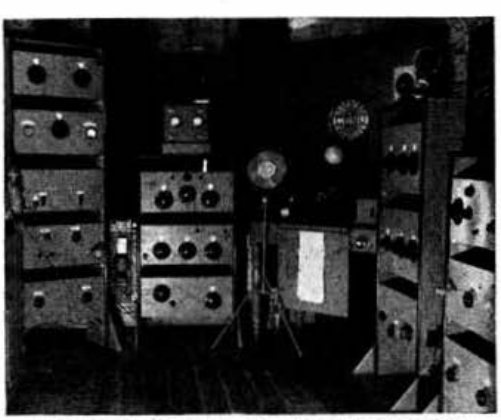
3.5 Mc/s.

The next band, in ascending order of frequency, is that between 3,500 kc/s. and 4,000 kc/s. universally referred to as "Eighty" owing to its location around the 80 metre wavelength.

This band was not fully available to British Amateurs due to the fact that it was shared with some of the Fighting Services. Facilities were granted only upon special application and even then activity was limited to the section 3,520 kc/s. to 3,730 kc/s. As with all the other bands, both telephony and telegraphy could be used, but in the United States, telephony was restricted to 3,900 to 4,000 kc/s.

3·5 Mc/s, for most of the year was, so to speak, 1·7 Mc/s. only more so! In other words, during daylight, it afforded good reliable communication up to about 200 miles. After dark, most of Europe could be contacted with ease. During periods of sunspot minima, it was good for fairly regular contacts with eastern parts of the U.S.A. and at dawn and dusk for contacts with the Antipodes.

On the whole, so far as Great Britain was concerned, 3·5 Mc/s. was used by the more experienced Amateurs, with the result that it was noted for good quality signals and a high standard of operating. Unfortunately, this did not hold good for some of the Continental signals also to be heard on the band.



G6NU, Gillingham, Kent. A neat and effective lay-out.

* 29 Kechill Gardens, Hayes, Bromley, Kent.

The winter period, during which long distance and world-wide contacts were possible, extended over two or three years with a well defined peak period. During most years East Coast U.S.A. contacts were possible in the early hours of the winter mornings, but could not be relied upon. During sunspot maxima, long distance contacts were very unusual at any time of the day or night.

7 Mc/s.

"Seven Megs."! What shall we say about "Forty"? Subject of the perennial controversy: "Should Forty Metre Phone be abolished?" Probably 80 per cent. of British Amateurs were active every week on this band. It was the universal training ground for the newcomer, a welter of strange noises on Sunday mornings and "playground" of most of Amateur Radio's black sheep; something to be heard to be believed!

Many British Amateurs licensed from 1936 up to the outbreak of war regarded this band as good only for European contacts at best and for domestic telephony over the area of Britain. The older hands, however, remember 7 Mc/s. as a DX band with Australians, Eastern Asiatics and Africans galore, New Zealand in the early mornings and Yanks all night. Time was, in 1930–33, when at dusk, from November to March, all European and local signals faded out. First came South and Central Africa around 6–7 p.m., then the Australians between 7 p.m. and 9 p.m., followed by Hong Kong and the Far East and India. Then a gap until 11 p.m. or so when the East Coast Americans became audible. From then until dawn, U.S.A. contacts were easy and as the sunlight appeared once more, came Australia and New Zealand until 9 a.m. By day, the band reverted to local working over most of Europe.

By 1935, conditions had so changed that DX on 40 was very rare, but just before the war, conditions similar to those experienced during 1930–1933 were beginning to reappear. By the time we get going once more, they will probably be over until the next peak period around 1953–4.

Forty metres was the abode of certain foreign Amateurs whose transmissions were notorious for their appalling quality and total disregard for other people's rights. So-called telephony from some of these people used to blot out large sections of the band. These emanations were referred to as "Spitch," a word which aptly describes the weird and wonderful noises which were radiated. It is to be hoped that any such signals which may reappear on the post-war air will be rigidly boycotted, in the general interest.

The 7 Mc/s. band, besides being the most densely occupied was probably the most abused. Operators of high power 'phone stations used their maximum input for effecting comparatively local contacts and much senseless chatter and over-modulation made life very difficult when "skip" was short. Perhaps with more of the Amateur spectrum available to a greater number of licencees, it may not be too much to hope that in the days to come, there will be a more general realisation of individual responsibility and a greater regard for the claims of others, to the benefit of all concerned.

14 Mc/s.

This band was the main, all-the-year-round stand-by of the DX man. "20 metres" could always be relied upon to produce something of interest. It had its moods, but never failed us for very long even at the most unfavourable periods of the solar cycle.

In the U.S.A. and Canada there existed a regional agreement whereby all telephony transmissions were confined to a band of frequencies between 14,150 kc/s. and 14,250 kc/s. This arbitrary splitting of the band was a rather mixed blessing because it resulted in the creation of, what was in effect, three separate bands. The rest of the world outside the North American area used both 14,000–14,150 kc/s. and 14,250–14,300 kc/s. for telephony and telegraphy. Any attempt to use the American telephony band would have been worse than useless! However, because of this American 'phone band, stations using the low frequency section of 14 Mc/s. did not call or work those using the high frequency end. No British telephony signal would ever have penetrated the local interference in the U.S.A. so in effect amateurs outside the North American continent were denied the use of 100 kc/s. of the band. On the other hand there was a considerable advantage in having the U.S. phones restricted to a section of the band. It is to be hoped, however, that when the Americans start up once more, they will see fit to move their telephony to one or other end of the main band to avoid the present rather unfortunate state of affairs.

The following rough survey of a typical day when conditions were good on 14 Mc/s. gives a fair idea of what might be expected.

From midnight to 3 or 4 a.m.; U.S.A., Canada and the West Indies with a general movement of reception from the middle west and west towards dawn. 7 a.m. to 8.30 a.m., Australia and New Zealand, California, the Pacific Islands and sometimes Middle West 'phones. The Australian signals often persisted throughout the morning, but it was mainly a question whether the Aussies went to bed or not!

The middle of the day was the quietest period with probably a few Europeans and East Coast U.S. stations audible, but by the middle of the afternoon came India, the Phillipines, China and Japan, with most of Africa around dusk. During the evening U.S.A. and Canada could be contacted and from about 10 p.m. to midnight came South and Central America. At some periods of the year South America was also good just before dawn.

There was no hard and fast rule about it, but the above can be taken as a rough guide.

20 metres was a "chancy" band for local contacts and although occasionally British Isles stations roared in with freak short skip conditions, they were liable to fade out with disconcerting rapidity. The only local work possible was within the area of the ground wave, a few miles only and this was discouraged in the interests of the other users of the band.

28 Mc/s.

"Ten" (ten metres) was, without doubt the most interesting and unpredictable band at our disposal. During sunspot minima it was useful for purely local and semi-optical range working, but during sunspot

Our President's Station (G6GR), as it was just before the war.

maximum periods, with the general movement of long skip conditions to the higher frequencies, would open up during the late summer for long distance working, round until the following Spring. As the solar cycle progressed, so the band opened later and closed earlier each year until, during a space of two or three years, 28 Mc/s. would be closed to DX altogether, except for occasional short duration freak conditions, lasting sometimes for less than an hour. 28 Mc/s. should be improving at the present time and if previous experience is to be repeated, the peak period will be reached about 1947–48.

The effect of the earth's rotation and the relationship between daylight and propagation was most marked ; Australian and Indian stations being audible during the morning, when conditions were good, followed by Russia, Finland and Roumania, Western Europe, the West Indies, Eastern U.S.A., and then as the afternoon progressed, stations further west in America became audible, each section of roughly 1,000 miles width being good for about an hour, closing with the Pacific coast, just before fade-out.

When conditions were not so good, the band would not open up until late in the afternoon and in this case the first signals to be heard would be American. Peak strengths for some long distance signals were sometimes amazingly good ; loud signals seemed to depend much more upon the state of the band than upon the power used at the transmitter, although good directional aerial systems were an advantage when conditions were not at their best.

The 28 Mc/s. band was noted both for the peculiar and the unexpected ! For example, one would hear a station, say 5,000 miles distant, coming in at a strength comparable with someone in the next street. In a few minutes the signals would fade away to complete inaudibility. Sometimes, an hour or more after the band had apparently closed down for the night, an isolated signal would suddenly appear at terrific strength, remain so for a few minutes and fade out just as suddenly. Occasionally such conditions held for a small area and we remember one such example when the band was filled with U.S.A. signals, all at tremendous volume, all situated in Modesto, California, working each other on a local hook-up, complaining of the lack of DX !

Like 14 Mc/s. the ten metre band was divided in the U.S.A. into c.w. and 'phone sections, telephony being banned from the first 500 kc/s. This division did not operate detrimentally to European users of the band, the amount of space available being so much greater than on the other bands. In fact the channel between 29,000 kc/s. and 30,000 kc/s. was not used as much as the lower part of the band, but things will probably be different when we restart our activities, when this little used territory at the " high-end " of 28 Mc/s. should be very useful.

Towards the end of the period of good conditions, *i.e.* when the sunspot minimum was approaching, the band would open up late in December and quite often one could hear only American stations in the far south, South Americans and South Africans which at times were extremely difficult to contact. It did not always follow that because a station was audible that he could hear you. All these vicissitudes, however, gave the band its special charm and interest. A considerable number of amateurs in fact confined their activities exclusively to ten metres.

56 Mc/s. and Beyond

56 Mc/s. or " Five," as it was usually called, was the lowest of the more specialised high frequency bands where ordinary gear did not work and where extraordinary gear often did, surprisingly well.

This band is within the field of experience of most of our Service membership who can very likely tell us more about it than we can tell them.

Suffice to say that signals were exchanged mainly over optical ranges and that long distance contacts were very exceptional.

One or two contacts took place between this country and Italy and several other Western European countries. At least one Scottish station has been heard in America, and one Australian has been heard in England. Several Americans have also been heard in this country, but the first two way contact across the Atlantic Ocean has yet to be made. (2)

Other V.H.F. bands around 112, 224 and 448 Mc/s. were also allocated for Amateur experiments, but it is not proposed to deal with them here as their peculiarities are well-known to most members who have been engaged on radio work during the war.

(to be continued.)

1. *The Propagation of Radio Waves.* Briggs, R.S.G.B. Bulletin, Vol. 20, Nos. 7–11.
2. *The 56 Mc/s. Band.* Monthly Commentary, T. & R Bulletin, Vols. 13–15.

RELAYS IN STATION LAY-OUT

PART II

By P. W. J. GAMMON (G3VB)

THE previous article dealt with the general station layout. To achieve the operating conditions previously outlined, some examples of typical chassis units on the operator's position will now be given together with details of a relay system.

Relay Wiring

A standard wiring system for each relay coil should be adopted. The writer proposes to connect each coil to the positive relay supply terminal, earthing the negative. The relay can then be operated by merely

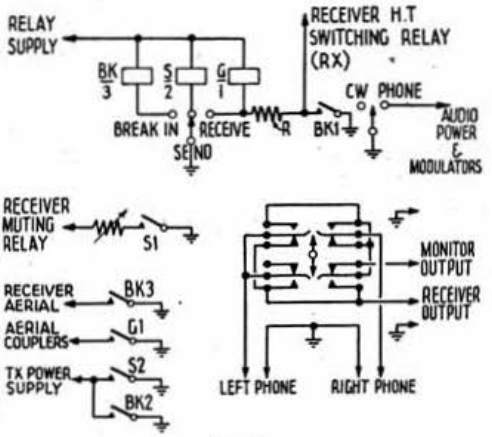


Fig. 2.
Suggested circuit of relay control panel.

applying an earth, giving the advantage that rotary switch bushes can be earthed at the panel mounting.

Control Panel

Fig. 2 shows a suitable circuit arrangement. The two chief controls are Break-in/Send/Receive, and 'Phone/C.W. Further refinements are a split-'phones switch for monitoring and a margin current adjustment to ensure snappy operation of the receiver muting relay when the transmitter is keyed. The circuit shows a telephone type switch used to select between receiver or monitor.

The operation is as follows :—

In the "Receive" position relays "G" and "RX" are operated. "G," contact operates a further relay in the aerial coupler to apply the transmitting aerial to the receiver link line. "RX" relay, in the receiver power pack, applies H.T. to the receiver.

In the "Send" position, relay "S" is operated. "S_1" contacts apply a marginal current to the muting relay while "S_2" contacts operate further relays in the power supplies to apply H.T. to the required stages of the transmitter.

In the "Break-in" position, relay "BK" is operated. "BK_1" contacts operate "RX" relay, the resistor R preventing the operation of "G" relay, since a separate aerial is used for reception. "BK_3" contacts operate a relay to switch-in the separate receiving aerial, while "BK_2" contacts operate power supply relays.

With the switch in the "'Phone" position, relays are operated to apply H.T. to the audio amplifier and modulator, and to remove a short circuit from the modulation transformer secondary.

V.F.O. and R.F. Driver

Fig. 3 shows a circuit arrangement utilising 6L6 or 807 types as doublers. For clarity the 7, 14 and 28 Mc/s. circuits have been omitted. The functioning of the R.F. portion of the circuit is normal. Fixed bias should be "cut-off" value or slightly less, additional working bias being obtained by the flow of grid current through the resistors R_1, R_2.

The five position single pole band switch operates relays "A," "B," etc. Contacts "A_1" "B_1" apply drive to the link outputs for the band selected while

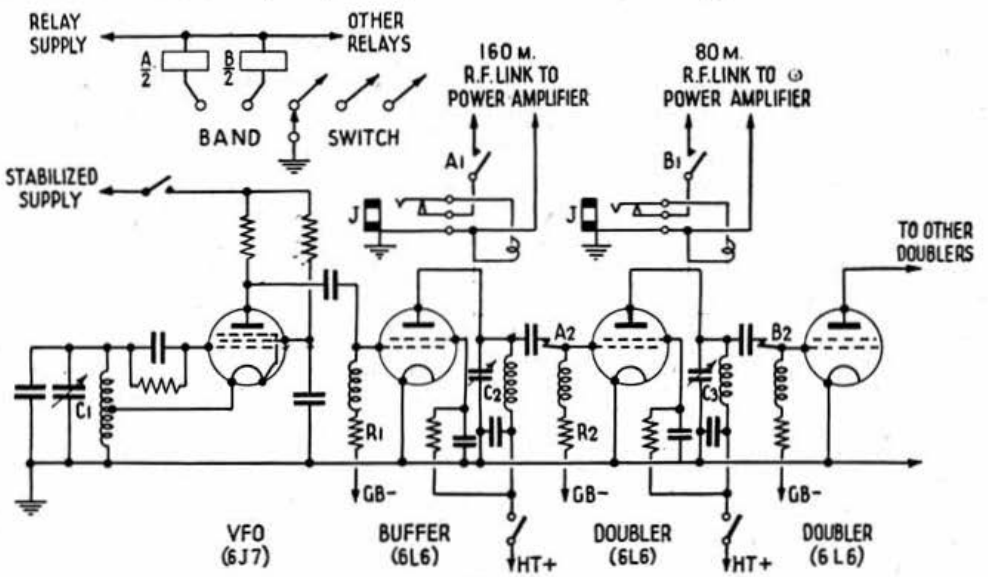


Fig. 3.
Circuit of relay controlled V.F.O. and R.F. driver.

"A_2," "B_2", cut the drive from succeeding stages, which are then held at a low anode current by the fixed bias. The band switch contacts are also extended to the transmitter rack, where they operate relays to bring in the particular power amplifier for the band selected.

parallel, are prevented from operating by the unoperated corresponding "V_3" contacts.

On the "'Phone" position an earth is extended to operate relay "M". Contact "M_1" removes a short circuit from the secondary of the modulation transformer. Contact "M_2," in a similar manner to "V_3,"

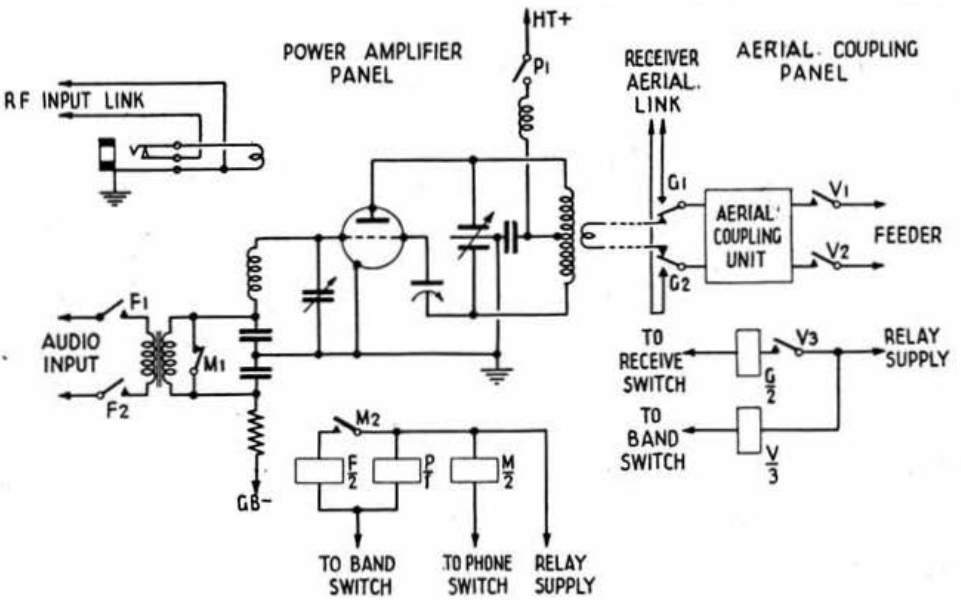


Fig. 4.
Relay arrangements of a single-ended grid modulated P.A.

Keying can be effected in the cathode or screen of the buffer, the V.F.O. running continuously to give greater stability. The jacks "J" provide an alternative output on the panel, and are mechanically coupled to the relays "A," "B", to cut drive when the plug is inserted.

Condensers C_1, C_2, C_3 etc. are ganged and controlled by a frequency calibrated dial.

Other Equipment

The audio amplifier, in the writer's case, is to utilise volume compression and push-pull triode or tetrode output. If voice-operated break-in is contemplated an audio feed to operate the relay must be provided, and a suitable place from which to take it would be the compression amplifier.

A keyed lead must be provided to operate the receiver muting relay. The latter should be a slugged type with "slow-to-release" characteristics, and can then be adjusted to hold at the usual keying speed. Voice relay contacts and auto-send contacts should be connected in shunt with the key.

The remaining units on the operator's position are conventional and need no discussion.

Power Amplifiers

Fig. 4 shows a typical grid modulated single-ended power amplifier and aerial coupler. With the band switch in the position for this P.A., an earth is extended to operate relay "V." Contacts "V_1" and "V_2" connect the feeder. If a single wire feeder is used, only one contact will, of course, be required. "V_3" contact prepares a circuit for the operation of relay "G" which changes over the aerial link from the P.A. to the receiver. "G" relays in other aerial couplers not selected by the band switch, though in

prepares a circuit for the operation of relay "F." The latter is operated by the band switch and it applies A.F. drive through contacts "F_1" and "F_2" to the modulation transformer. An attenuator may be needed at this point to suit the audio level to the requirements of the stage. Relay "P," also operated by the band switch, applies H.T. to the stage.

The R.F. drive is brought in *via* a panel jack to allow the P.A. to be driven from an alternative drive source if desired.

Fig. 5 shows a higher powered push-pull plate-modulated amplifier, with associated modulator. Relay operation is the same, with the addition of contact "F_3" to apply H.T. to the modulator. Panel switches are fitted in shunt with "P_1" and "F_3" as an alternative means of control.

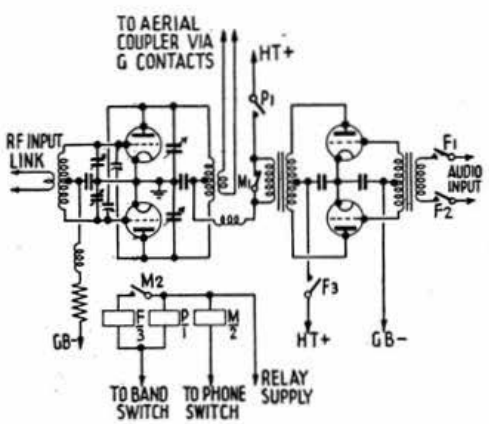


Fig. 5.
Suggested circuit of relay controlled push-pull plate modulated P.A

Power Supplies

Fig. 6 shows a typical power pack for audio or R.F. The H.T. transformer is switched by a thermal relay (T.H.), operated from an auxiliary winding on the rectifier filament transformer. Relays " S " and " Q " are operated by the " send " and " 'phone " switches respectively. Relay " Q " will only be required in

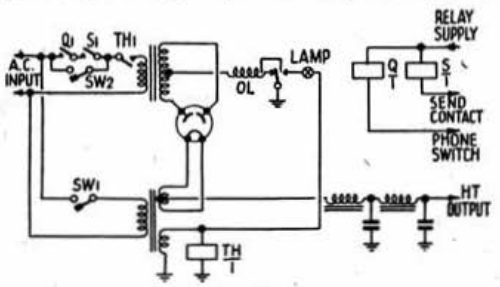


Fig. 6.
Typical power supply showing switching arrangements.

audio or modulator supplies. The switch SW_1 provides manual switching of the rectifier heater. SW_2 switches the H.T. manually as an alternative to relay switching. An overload relay (O.L.) can be fitted as an extra refinement, or a suitable rating of fuse can be used.

Mains Distribution

Fig. 7 shows a possible arrangement of mains distribution and contactor circuit. The contactor (MC) is held by rectified mains over its own contacts " MC_1 " and MC_2 " as shown. In the event of a mains failure followed by a rapid restoration of power the power rectifiers would be protected even though the thermal relays had not cooled sufficiently to break contact. The contactor would release, and resetting by hand would be necessary.

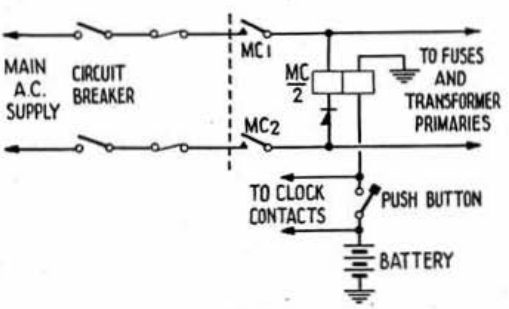


Fig. 7.
Mains distribution.

A further refinement is the addition of a battery-operated coil as shown, allowing the entire station to be started with a push-button, when manual switches have been previously set. Further, the station could be put on the air by clock contacts, a useful facility for the lone amateur taking field strength measurements, or adjusting aerials.

Conclusion

The complete layout as outlined may seem somewhat ambitious, but it is flexible enough to allow a start from small beginnings provided that racks are installed in the first instance. For example, one all-band P.A. and aerial coupler could be used, the drive being patched-in from the required output frequency. The band switching facility would, of course, be lost. If all-band operation is not contemplated the drive links and P.A. for the bands not used can be dispensed with. Any type of P.A. or modulation, differing with the band if desired, can be fitted into the relay scheme. An endeavour should be made to have each chassis unit manually, as well as relay, switched to facilitate testing.

JUNE WEDDING

Wing-Commander Cecil Page, G6PA., of Ospringe, Faversham, Kent, formerly Experimental Section Manager of the Society, was married at the English Church in Algiers last June to Miss Helen Clark, of the American Consulate.

G6PA is one of the Senior Wing Commanders at M.A.A.F. Rear.

A WEEK-END IN THE SOUTH-WEST

THE first P.D.M. of the South-West since before the war was held in Exeter at the Rougemont Hotel on July 22. Although the attendance of 30 was less than half the record which marked the previous meeting in 1938, there is obviously no lack of enthusiasm in the District, judging from the wide area from which members came in and from the high level of QRM during the rag-chewing session.

The success of the meeting was unquestionably due to the untiring efforts of the T.R. for Exeter, Herb Bartlett, G5QA, not only in preparation for the meeting but before and after. It was he who, amongst other things, saved the reputation of the South-West by the magical production of cider when all sources of supply seemed to have failed!

Further interest was added by the arrival of a visiting party from District 5, headed by the D.R., Arthur Bartlett, G6RB.

Headquarters was represented by the President, Mr. E. L. Gardiner, G6GR, the General Secretary, Mr. John Clarricoats, G6CL, the Vice-President, Mr. S. K. Lewer, G6LJ, and the Honorary Secretary, Mr. H. A. M. Clark, G6OT.

After lunch and the photograph, Mr. W. B. Sydenham, G5SY, the D.R., opened the meeting and invited the President to take the chair. Mr. Gardiner spoke of the remarkable growth in the membership of the Society and touched on several matters of general interest, after which he asked G6CL to give his review of the amateur position.

Clarry's Hour

"Clarry's Hour," which lasted for his customary 70 minutes, gave the members a picture of the immediate and the more distant future. He outlined the situation with regard to licences, call signs, the post-war marketing of amateur requirements, the proposed examination for new licences and the exemption in respect of Service trades, the self-discipline to be recommended for British amateurs and the general adoption of such principles as break-in. He promised a larger BULLETIN as soon as the paper situation improved and invited prospective writers to send in their contributions without delay.

The pre-war habit of sending QSL cards through the Society's channels was something which, in his opinion, could well be discarded. At the time the war intervened, many tens of thousands of cards were handled every week by the staff at Headquarters. The resumption on a post-war scale, reckoned as being comparable with the vastly increased membership, would be an impossible task unless the staff and the accommodation were considerably extended.

The important question of the fuller representation of the Provinces on Council was being considered, although little could be done while so many members of the Society were still abroad and therefore out of touch. A revision of the district areas may be found desirable and possibly a return to the old principle of county representation. But experience has shown that the greatest difficulty lies in finding members in the Provinces who are able to attend meetings in London throughout the year.

Technical interests were looked after by the Experimental section before the war, and in view of the growth of the Society this will have to be reconsidered, perhaps to the extent of employing a qualified technical man.

Mr. Clarricoats invited questions and suggestions on the subject of contests, but perhaps it was the preoccupation of the members with the problems of getting on the air again which masked the interest in this one-time provocative subject, for nobody had anything to say.

Several members asked questions, however, on other matters and these were answered by the President and the Secretary.

Tribute to H.Q. Staff

Before the meeting adjourned for tea, Mr. Lewer paid a tribute to the Secretary and to Miss Gadsden for their loyalty and staunchness in carrying on through the flying-bomb and rocket period. Not once had the publication of THE BULLETIN been delayed or the business of the Society interrupted.

Mr. Lewer also spoke of the unnecessary additional burden placed upon the Editor when members submit articles which are not set out in the preferred manner. As the size of THE BULLETIN increases, this point will become even more important. Prospective authors can

Nottingham P.D.M., June 23, 1945.
Mr. E. L. Gardiner, G6GR (President), handing the National Field Day Trophy won in 1939 by District 4 to Mr. A. E. Clipstone, G8DZ, (Deputy D.R.). Mr. John Clarricoats, G6CL (Gen. Secretary), and Mr. H. A. M. Clark, G6OT (Hon. Secretary), are to the right of the President and Mr. John Curnow, G6CW, to the left of Mr. Clipstone.

obtain from Headquarters a leaflet which gives all the advice and information required.

Technical Development

Mr. Clark completed the survey of the amateur's position by referring to the changes which were likely to take place in constructional technique. He pointed out that the new frequency ranges which have been opened up as a result of war-time developments and which may become available for amateur use are going to call for a large measure of plumbing and lathe work. The adjustment of these VHF tuned circuits will require some form of metal-working machine as compared with the old-style pliers, screwdriver and soldering-iron technique.

The formal part of the meeting was concluded by a speech from the D.R., who expressed his hearty thanks to Mr. Bartlett for his energetic assistance as organiser.

During tea, many old friendships were renewed and future plans were discussed, after which the members dispersed, some to the luxuries of Torquay, others to the desolation of Dartmoor and the wilds of Tiverton. The representatives from Headquarters, who had paid a lightning visit to Rev. A. B. Trewin, G2AT, at Exminster and to Dawlish just before the meeting, found the attractions of the Devonshire coast almost irresistible. But when they reluctantly returned to London the next morning they would have had no difficulty in evading even the most efficient anti-radio Gestapo. Nobody would have suspected a party of four men, even if they had something of the wild look of the radio-amateur in their eyes and muttered strange things about DX-channels and wide-band amplifiers, of having anything to do with radio when their luggage included such innocent devices as beehives, an empty fruit basket and kippers !

C. CIDER.

District 19. Hamfest held on June 23, 1945, in Middlesbrough. *Front row:* G8IF, 5QU, 8CL, Mr. Hall (G.P.O. Engineer), G3YK, 3JN (ex SUIAF), 2FO (D.R.), 5XT, 3BS, 3IV, Sgt. Ruse.
(Photo by Permission "Evening Gazette," Middlesbrough.)

KHAKI and BLUE

● Ft./Lt. Howard Brabrook, **G5ZD**, was on the air last month when he broadcast over the A.E.S. network a programme of gramophone records of his own choice. G5ZD, who is at H.Q., 205 Group R.A.F., C.M.F., expects to return home in October.

● Sgt. J. McNab, **2CQI** (Malta Command Signals) sends his regards to ex-Batchelors G2RD, 8CK, 8JI, 8PP, GM8MQ and 2FWX. He is looking forward to contacts with other members stationed in Malta.

● Cpl. P. Nicoll, R.A.F., **G5ZN**, who is now stationed in the south after his return from India would be glad to contact members in Shoreham, Hove and Brighton. His temporary address is c/o 47 Greenways Crescent, Shoreham-by-Sea, Sussex.

● L.A.C. E. A. G. Beales, **BRS5133**, who is at No. 7 B.S.U., R.A.F., S.E.A.A.F., reports that successful meetings have been arranged on the unit under the Chairmanship of Sq./Ldr. Laurie Ridgway, G2RI. The following members have attended regularly : BRS5162, 5211, 5795, 6753 and 7100. Discussions have covered a wide range of subjects including aerial system, photo cells, frequency modulation, and radio altimeters.

● F./O. R. Q. Marris, **2BZQ**, Officers Mess, R.A.F. Station, Thorney Island, Emsworth, Hants, would be glad to hear from G6GH, 2BQC and other " Early Birds."

Congrats

● To P.O. E. G. Cocks, H.S.D., **BRS7412**, whose wife presented him with a daughter on May 24, 1945.

● To Capt. G. G. Gibbs, R.A., **BRS7049**, of Welwyn, Herts, on his recent marriage. Capt. Gibbs is now at A.A. School, Clifton, Karachi, 6, India.

● To Ft./Sgt. J. R. Dathan, **BRS4412**, who was Mentioned in Despatches for gallant and distinguished services in N.W. Europe.

R.A.F. Fitting Parties

Ft./Sgt. S. T. Hall, G3BR, R.A.F. Station, West Drayton, Middlesex, reports that the response to his request, published in the July issue, has been excellent and that already nearly 150 members have written to confirm they have served with R.A.F. fitting parties. As it is impossible for him to answer personally all the letters received, he asks that those concerned should accept this as an acknowledgment.

Members when writing to G3BR should quote their call sign or BRS number.

Forces Broadcasting Service, Middle East.
The Headquarters Technical Maintenance Unit, comprises Major Ken Ellis, SU5KW (*centre*), S./Sgt. Warham, BRS7176, Sgt. Marshall, SU1TM, L.A.C. Buckland, SU1DB, and Cpl. Knight, 2DFL.

Letters to the Editor

Impedance Matching

DEAR SIR,—Mr. MacKay's article in the July issue on the subject of impedance matching will undoubtedly be a great help to newcomers to electric circuit theory. I feel, however, that an added note may help to avoid a certain confusion which often puzzles beginners.

The statement that maximum output power is obtained when the load impedance equals the generator impedance is known as *Thévenin's Theorem*. In receiving circuits we nearly always want maximum output, and impedances are, therefore, " matched " on this basis. The fact that half the output is lost in getting the maximum is an unfortunate necessity.

In generating power, we are more often concerned with *maximum efficiency*, and in this case there is no such matching of impedances. It is thus necessary to distinguish between generators and power converters. For example, a power station delivering 100,000 kilowatts to an electric supply main would not be expected to dissipate an equal amount in its alternators !

The efficiency is equal to the load resistance divided by the total of load and generator resistances. It is, therefore, expedient to keep the generator resistance to the smallest possible fraction of the load. A well-designed generator is usually not capable of dissipating the power it would lose on a Thévenin match. It delivers but a fraction of the maximum theoretical output but at high efficiency.

In a " Class A." or " Linear " amplifier the maximum output is obtained by matching. In a " Class C." amplifier delivering power to an aerial, matters are very different. Firstly the matching theorem applies only to " linear " circuits, that is, circuits where the impedances are constant for all values of current. The internal resistance of a Class C. amplifier is anything but linear and bears no simple relation to the static anode resistance. Secondly, the amplifier is designed to consume H.T. power and convert it to R.F. output, at high efficiency. 75 per cent. efficiency can often be achieved, so that a valve capable of dissipating 25 watts, consumes 100 watts of H.T. power and delivers 75 watts to the aerial.

In the paragraph headed " Aerials " Mr. MacKay does not appear to appreciate this point, or the way in which the dynamic impedance of the tank circuit enters into the power conversion. If the tank circuit were matched to the valve, and the aerial then matched into the combination, the valve would consume 50 per cent. of the power output, and the aerial would get half of the remainder, *i.e.* one quarter of the total.

The valve operation calls for a certain load resistance. The tank circuit is used firstly to " tune-out " valve capacity, which would otherwise shunt the load, and secondly it is used as a transformer to step up the aerial or line impedance to equal the required valve load. The dynamic impedance of the tank circuit is merely an unfortunate resistance in shunt with the load, and must be considered as part of the load. By using good components the dynamic resistance can be made very high, so as to consume very little of the output power. The aerial coupling would be adjusted. For example, suppose the dynamic resistance were 100,000 ohms and the valve required a 1,000 ohm load. The aerial coupling would be adjusted until it introduced a loss in the tank circuit equivalent to a 1,000 ohm shunt resistance, and the tank circuit itself would then waste only 1 per cent. of the power delivered by the valve.

Yours faithfully,
F. CHARMAN (G6CJ).

The Post-War Amateur Market

DEAR SIR,—The various points made by G3PL in the July issue are undoubtedly correct, but I think it only fair to point out that in 1939, Tungsram in conjunction with Webbs Radio were marketing a first grade British-made 6L6G valve, with ceramic base for 7s. 6d.

At that time B.V.A. makes of 6L6G's cost about twice that figure.

Now that the majority of British valve manufacturers are members of the B.V.A., and, if that body does really wish to capture the British Amateur Market, I suggest the time is ripe for an agreement between B.V.A. and R.S.G.B. whereby *Licenced Amateurs* can buy any type or make of B.V.A. valve at special low prices. These valves to be *only* obtainable from recognised amateur dealers, who in turn could be supplied direct from the manufacturers thereby cutting distribution costs.

Council have done an excellent job in informing British manufacturers of our probable post-war needs, and provided they co-operate fully, by producing the right goods at the right price, there is no doubt the British amateurs will support them 100 per cent.

Yours faithfully,
T. H. STREETER (G5CM).

DEAR SIR,—I have read with interest your article and the correspondence on the post-war amateur radio market, and feel that my company is in an excellent position to be of assistance to your members in the supply of power transformers and chokes.

The only way in which these components could be supplied at competitive prices is by standardisation, and in this direction R.S.G.B. members would render a very useful service if they would write to me setting out typical electrical specifications for these components. We should then be willing to manufacture for stock the most popular components which could be supplied direct to members on a " Cash with Order " basis.

As manufacturers we are both anxious and willing to co-operate with your members if they will let us know their needs.

Yours faithfully,
J. P. COLEMAN, A.M.I.E.E.,
Director.

Gresham Transformers, Limited,
Hampton Hill, Middlesex.

More About Valves

DEAR SIR,—I am sorry to see from Mr. Dunn's letter in the July issue that he seems to have misunderstood my remarks about valves, or perhaps I was not clear enough. I agree that in many cases American components were available here earlier than British-made products, and I do not feel it is my place to defend this ; apparently in the early days some of our manufacturers did need the spur of competition. In " mitigation," however, I do feel it reasonable to point out that there is a terrific difference in the demand in the two countries, and Mr. Dunn will, I am sure, realise that incentive to produce is governed to a very great extent by the demand.

One other aspect of the matter is that in very many cases, not only with components but with receivers, a lot of the American merchandise which was imported to this country before the war was, in fact, obsolescent in its own market ; and although it was highly acceptable here, as being different, and maybe in advance of some of our own products, it was not produced especially for our market, but "flogged" at job prices in the U.S.A., for export, so that often the prices here bore no relationship to the actual value, and new goods could never have been produced here to compete in price.

As to British valve prices, before Mr. Dunn decides to condemn whoever is responsible, I sincerely hope he will " include me out." In my endeavours in the early days to make radio goods available to amateurs as cheaply as possible, I experienced several painful and costly High Court actions for selling BVA valves at less than their fixed prices ! The discrepancy between the retail prices of valves sold singly, and bulk contract prices of valves ordered in (probably) hundreds of thousands may possibly be as great as Mr. Dunn suggests, and of this I have no knowledge. That there is a difference must be obvious. I have asked the Secretary of the British Radio Valve Manufacturers' Association to drop a line on this subject.

The most unfortunate misunderstanding of my remarks, however, is on the relative efficiency of British and American types. Of course it would be silly to suggest that a British-made 6L6-G is better than an American 6L6-G, and I never had anything like this in mind. What I meant was this: when an amateur comes into the shop with a list of components and valves which, from the component values, etc., has obviously been taken from an old American publication, there does seem little justification for embarking, in 1945, on the use of, say, a type 78 R.F. Pentode when a very little adaptation would enable him to take advantage of, say, an EF39. I do not think there is any question of the superiority of this type, for instance, and it is only one of dozens.

In conclusion, I should be sorry if Mr. Dunn, or anyone else, has the impression that I hold with the use of British-made goods to the exclusion of imported, if there is any advantage in imported goods. I have in the past travelled all over the Continent, and to America, finding new goods which will appeal to amateurs (often on novelty, though frequently on merit) and hope to be able soon to do so again.

Yours faithfully,
R. H. COSKY.

Are You a Prelto ?

DEAR SIR,—With the prospect of a rapid and unprecedented increase in the number of radio amateurs there seems to be a definite need for a new name to supersede " amateur " or " ham."

The term " Amateur " originated more than a quarter of a century ago and was used in the sense of an amateur transmitter or amateur broadcaster, which bears little resemblance to the present-day radio experimenter.

One tends to think of an " amateur " as a dabbler or tinkerer, while the term " ham " is one which I could never bring myself to use.

My suggestion is : Private Radio Experimenter, Licenced To Operate, the initial letters forming the word " Prelto."

The expression is complete, explicit, and dignified, and the abbreviation not entirely strange by comparison with such words as Shaef, Seac and Pluto. Further, Prelto is easy to pronounce and is not liable to mispronunciation in different parts of the country or in other countries. As far as I can ascertain the word has no existing meaning in any European language.

Will you give the suggestion your consideration and perhaps a trial in THE BULLETIN to test the reaction of the average " prelto " towards the adoption of a new title?

Yours faithfully,
W. B. BROWN (G6QY),
Lieut. R.N.V.R.

HEADQUARTERS CALLING

COUNCIL 1945

President:
ERNEST LETT GARDINER, B.Sc., G6GR.

Executive Vice-President: S. K. Lewer, B.Sc., G6LJ.
Honorary Secretary: H. A. M. Clark, B.Sc., G6OT.
Honorary Treasurer: A. J. H. Watson, F.S.A.A., G2YD.
Honorary Editor: Arthur O. Milne, G2MI.
Immediate Past President: A. D. Gay, G6NF.

* *

Members: F. Charman, G6CJ, D. N. Corfield, D.L.C.(Hons.), G5CD, Lt. Col. K. Morton Evans, O.B.E., GW5KJ, F. Hoare, G2DP, E. H. Laister, BRS3386, S. E. Langley, G3ST, W. E. Russell, G5WP.

G.P.O. Liaison Officer: A. E. Watts, G6UN.
General Secretary: John Clarricoats, G6CL.

June Council Meeting

Resume of the Minutes of a Meeting of the Council of the Inc. Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Monday, June 19, at 6 p.m.

Present.—Messrs. E. L. Gardiner (President), S. K. Lewer, A. D. Gay, A. E. Watts, A. O. Milne, A. J. H. Watson, H. A. M. Clark, F. Charman, D. N. Corfield, K. M. Evans, E. H. Laister, S. E. Langley, W. E. Russell and J. Clarricoats (General Secretary).

Apology for Absence.—The General Secretary presented an apology for the absence of Mr. F. G. Hoare.

1. It was unanimously resolved to elect 256 Corporate Members (199 proposed by Corporate Members, 57 supported by references), 28 Associates, 10 Junior Associates and 8 Foreign Corporate Members. Four Junior Associates were transferred to Corporate Membership.

2. The Monthly Balance Sheet and Statement of Account were presented and adopted.

3. It was unanimously resolved that in view of the cessation of hostilities in Europe active collecting for the R.S.G.B. Prisoners of War Fund shall cease as from July 15, 1945.

It was agreed to despatch parcels to two members who had recently been released from Japanese prison camps.

4. It was reported that arrangements had been made to publish "District Notes" as a loose leaf supplement to THE BULLETIN, commencing with the July, 1945, issue.

5. Letters of greeting were read from representatives of R.B. (Belgium), R.E.F. (France) and N.R.R.L. (Norway).

6. Capt. J. W. Mathews, G6LL, and Mr. R. H. Hammans, G2IG, were invited to serve with the members of the Technical Publications Advisory Committee as adjudicators for the Norman Keith Adams Prize for the year 1944–45.

7. In connection with the post-war amateur market it was reported that 170 copies of the list of components issued by Council had been circulated to manufacturers. It was also reported that Major G. McLean Wilford, G2WD, had provided the Society with much valuable additional information which would be conveyed to the Radio Component Manufacturers Federation.

8. Various matters relating to the re-issue of licences were discussed at length.

9. A copy of the Federal Communications Commission (U.S.A.) V.H.F. plan was tabled. It was agreed to request the G.P.O. to support the plan, insofar as it affects amateur assignments above 25 Mc/s. The plan provides for 8 amateur bands *viz.*: 28–29·7 Mc/s., 44–48 Mc/s. (or 56–60 Mc/s.), (or 50–54 Mc/s.), 144–148 Mc/s., 222–225 Mc/s., 420–450 Mc/s., 1145–1245 Mc/s., 2300–2450 Mc/s., 5250–5650 Mc/s., 10,000–10,500 Mc/s., 21,000–22,000 Mc/s. with shared rights above 30,000 Mc/s.

10. It was agreed to obtain legal advice on matters connected with Copyright.

The meeting closed at 10 p.m.

Important Notice
Statements of Account

Headquarters request members to exercise great care when returning subscription accounts. During recent weeks several statements have been returned with the name and address of the member completely cut off, thus providing no clue to his or her identity. Headquarters have retained the original envelopes together with the remittances sent, but no receipts have yet been given.

If those responsible for wasting the time of our already heavily overworked staff in the manner indicated, do not write to Headquarters promptly, their names will automatically be removed from records.

Bulletin Honoraria

The Council has much pleasure in announcing that honoraria have been awarded to the following members for their contributions to Volume XX of THE R.S.G.B. BULLETIN.

Mr. B. H. Briggs, 2FJD, "The Propagation of Radio Waves."
Mr. C. W. Cragg, 2HDU, "Audio Frequency Oscillators."
Mr. H. W. Miles, G2NK, "Servicing Communication Receivers."
Mr. S. C. Dunn, BRS6348, "Square Waves and Others."
Mr. P. F. Cundy, G2MQ, "Single Valve Frequency Divider," and "Pre-fabricated Lattice Mast."
Mr. R. H. Hammans, G2IG, "The L.C. Circuit."
Mr. A. R. Yates, G3LB, "A Sound Reinforcement Amplifier."
Mr. E. Beckwith, BRS3430, "A Fabricated Aerial Mast."
Mr. F. J. Forbes, 2BFC, "Experimental R.C. Box."
Mr. G. H. Schuler, 2BMU, "Electronic Reproducer."
Mr. T. J. Norton, G4KZ, "Fully Automatic Key."
Mr. R. F. O'Connor, BRS4348, "Photo-Cell Tone Generator."
Mr. W. H. Walker, 2DXS, "H.T. Supply from Audio Transformers."
Mr. R. T. Jenks, 2DYZ, "Versatile Component Analyser."
Mr. W. G. Johnson, 2BJY, "Diode Detection and A.V.C."
Mr. L. A. Saunders, BRS5917, "Audio Amplifier."

Life Membership

At any time after election to the Society, a member may, subject to the approval of the Council, commute all future annual subscriptions by a payment of ten guineas which shall entitle him to all privileges and rights of ordinary membership for the remainder of his life.

Applications for Life Membership should be addressed to the General Secretary.

Bankers Orders

Members who make use of the Bankers Order arrangement for paying their annual subscription are reminded that the actual order should be sent direct to Headquarters after completion, and not to a bank. Considerable inconvenience has been caused through deviation from the correct procedure, which is carefully explained in the Subscription Account notice issued by the Society.

R.S.G.B. Prisoners of War Fund

DONATIONS.—The General Secretary acknowledges with thanks, on behalf of Council, the receipt of donations from: Catterick Mtgs., per 5724, £1 10s.; H. Arnfield, £1; District 1 (Liverpool), per 2FHB, £1; F. Boad, G8IF, 14s. 6d.; C. E. Jefferies, 5s.; E. A. Lever, 2CVD, 10s. 6d.; District 14 Junk Sale (per J. E. Johnson, G2HR) £5; P. H. Smith, 2FWV, 10s.; Catterick Mtgs., per 5724, 7s. 6d.; D. McInnes, BRS96, 5s.; A. V. Grant, 6886, 5s.; J. S. Ellis, 6787, 5s.; A. A. Goldie, BERS182, 7s. 6d.; F. L. Hawthorne, ZL1GX, 10s.; R. McGowan, 6839, 5s.; Anon, 5s.; District 13, per G3ST, 8s. 6d.

Total Receipts to date £1,640 13s. 11d. Total expenditure to date £921 0s. 9d.; Balances in hand as at July 30th, 1945: European Fund £349 13s. 2d. Far East Fund £370.

ALL BACK.—Mr. C. H. L. Edwards, G8TL, reports that all members who were known to be prisoners of war in Germany have now returned safely except W./O. Barry, whose death was recorded last month.

FAR EAST.—Mr. Edwards would be grateful for any information concerning members held prisoner by the Japanese. The official list prepared by the Society shows that 12 members are in Jap prison camps.

Cigarettes and tobacco have been sent to Ft./Lt. O. Dykes, 2ALJ and a silver cigarette case suitably inscribed is to be sent to Major J. Drudge-Coates, VU2FO. Both of these members were released earlier in the year from Rangoon.

American Publications

The Society is in a position to accept orders for the following publications which are ordered individually from America:

"QST" (Official monthly publication of The American Radio Relay League). By subscription, per annum	17s. 6d.
"The Radio Amateur's Handbook" (A.R.R.L.) 1945 Edition	10s. 6d.
"The Radio Amateur's Handbook"—Special Defence Edition (A.R.R.L.)	8s. 6d.
"The Antenna Handbook" (A.R.R.L.)	4s. 0d.
"A Course in Radio Fundamentals" (A.R.R.L.)	3s. 6d.
"The Radio Handbook" (Editors and Engineers) 1943 Edition	12s. 0d.
"Radio" (Monthly publication of Radio Magazines Inc.). By subscription, per annum	21s. 0d.
"CQ" (Monthly publication of Radio Magazines Inc.) by subscription, per annum	17s. 6d.

Orders must be accompanied by a remittance made payable to the Society and rates and prices are subject to alteration without previous notice. Delivery can be expected in about 12 weeks from date of order. Service Addresses must not be used. Single copies of text books only may be ordered.

Members who change their address during the currency of a subscription to *QST*, *CQ*, or *Radio* should advise the publishers *direct*.

EXCHANGE AND MART SECTION

MEMBERS' private advertisements 2d. per word, minimum charge 3s. Maximum words accepted, 100. TRADE advertisements 6d. per word, minimum charge 9s. Maximum words accepted, 50. An additional charge of 1s. 6d. is made for use of Box Numbers. TERMS : Cash with order. All copy and payments to be sent direct to Advertisement Managers, Parrs Advertising Ltd., 121 Kingsway, London, W.C.2, by the 25th of the month for following month's issue.

ALL KINDS OF PRINT, especially QSL Cards.—Send your inquiries to G6MN, Castlemount, Worksop.

ABUNDANT supplies available for amateurs. All new goods. Electrolytics, resistors, condensers, coils, I.F.'s, speakers 2 in. to 12 in. Filament, mains, O/P transformers, 1 ma meters, Yaxley switches, Mullard bridges and oscilloscopes, 10,000 English and American tubes, including many hard to get. State your wants. S.A.E., I ship C.O.D.—BRS7370, BERNARDS RADIO CO., 67 High Street, Chatham. Phone 2927.

A 1941 Model NC100XA National communication receiver for sale, with matching speaker, and in perfect order, 10 tubes with P.P. output give high fidelity B.C. and extreme sensitivity on high frequency bands from 30Mc. to 550kc. Latest type National crystal filter with phasing and selectivity controls ; also fitted with noise limiter stage for static and ignition QRM.—G2XY, 110 Stainburn Crescent, Leeds, 7.

AMATEUR selling up ! — A good opportunity to get some scarce components. Some brand new acorns and 9000's, electrolytics and meters. Send for lists " V " for valves, " M " for meters and " G " for other gear. First come first served.—S.A.E. to GRAVES, Hillcrest, Chalvington Road, Chandlersford, Eastleigh, Hants.

AMATEUR equipment designed and built to specification ; transmitters, speech amplifiers, modulators, etc. All types of valves in stock. Personal attention to all inquiries.—G8WL, 26 Waverley Road, Kenilworth. Phone 77 5.

A FINE CHOICE.—RME.69 communication receiver with matched speaker, offers ! Hallicrafters Sky Champion communication receiver, 8 valves, offers. Universal A.C./D.C. communication receiver, 7 valves, A.V.C., B.F.O., 11 to 200 metres, takes speaker or phones, £30. Eddystone " All-World 4," battery operation, Colonial model with full set of coils, £20. 5-valve superhet, 3 wavebands, table model, extension for P.U., in fine walnut case, nearest offer to 29 gns.—Box 665, PARRS, 121 Kingsway, London, W.C.2.

BE SURE and write for our mail order list " T.R." Steel racks, chassis, condensers, coils, chokes, etc. Complete trimmer tool kit, box spanners, screw drivers (12 tools and 2 extension handles) in carrying wallet, 30s. 2½d. stamp for list " T.R."—WAVEBAND RADIO LTD., 63 Jermyn Street, London, S.W.1.

BRS5689 again !—Three pairs 'phones, 2,000 ohms, with sponge rubber earpads as used by Services, 12s. 6d. pair. 200 *Wireless World's*, 1938–1945, 6d. each. 150 BULLS, 1940–1945, 3d. each. All O.K. Pye all-wave dipole aerial complete and unused, with Pyrex glass insulators, transformers and cables, etc., 30s. 22 range Universal Avominor with plugs, leads, etc., good condition, £8. 100 yards single screened cable, suitable mikes, P.U.'s, grid leads, etc., 6d. yard. Tuning condensers, ball bearing, brass, 2 G.E.C., ·0005 with knobs and s.m. drive, 10s. each. Two ·0005 brass, no s.m. but knobs, 5s. each. S.A.E. for replies please.—BRS5689, 24 Rossie Island Road, Montrose, Angus.

CATHODE Ray Oscilloscope. Complete with X and Y amplifiers and time base in panelled steel cabinet (14 × 10 × 12). All necessary switching and usual controls, latest 2½ in. Cossor tube and GDT4B relay, £25 (cost of components) or near offer.—G3SV, Pyrgo Park, Havering, Romford, Essex.

COMMUNICATION Receiver required. Must have crystal gate and be in working order.—Write particulars to ZB1A, CUNNINGHAM, 232 Leigh Road, Chandlers Ford, Hants.

CAN someone help please ?—I need a modulation transformer, either Thordarson 11M77 or U.T.C. VM4 ; also a good class communication receiver.—Details to G2XV, 89 Perne Road, Cambridge.

EXCHANGE Television gear for good communications receiver. Sale 10 watt P.A., nearest £17.—MORRIS, 34 Birch Avenue, Romiley, Cheshire.

EXCHANGE new 955 acorn triodes for multirange meter or large scale milliameter.—BRS6375, 25 Estridge Way, Tonbridge, Kent.

FOR SALE.—Marconi record changing radiogram, 4 tuned stages.—Details from L. LOTT, G6PT, Y.M.C.A., Burnham-on-Sea.

FOR SALE.—U.T.C. Varimatch type VM1, also class B driver transformer for 6A6 valves. Many valves, cabinets, etc. Callers preferred.—G3NM, 82 Knockbreda Road, Belfast.

FOR SALE.—B.T.H. A.C./D.C. Gram-motor and turntable (T./table slightly soiled) complete with mains resistor, £4. Runbaken midget grinder/polisher, 230/250v, A.C./D.C., new, £5 15s. Heybeard Model D.150 A.C. mains eliminator ; output 150v, 15/50mA ; tappings, S.G. (var.) Det and Power, £2. Two Westinghouse H.T.8. metal rectifiers, 8s. each. Ferranti S.V.4.B. mains transformer, 15s. Ferranti B.1 choke, 12s. 6d. Ferranti A.F.6 L.F. trans., £1. Ferranti O.P.M.1 output, 12s. 6d. Ferranti O.P.M.5 output, 12s. 6d. Ferranti A.F.4 L.F., 9s. Varley D.P.4 output, 12s. 6d. Varley D.P.14 output, 12s. 6d. Varley Nicore 11 L.F., 5s. 6d. R. L. Hyperm class B. D.Y.37, 10s.—C. WEIR, 5 Wellington Road, Manchester, 8.

METERS !—New 2½ in. M.C. Flush-5, 30, 50, 100, 250 mills., 38s. 6d. Also see previous adverts.—STUCKS RADIO, North Street, Sudbury, Suffolk.

MONOMARK service.—Permanent London address. Letters redirected. Confidential. 5s. p.a. Royal patronage. Key tag 9d.—Write BM/MONO7A, W.C.1.

NATIONAL H.R.O. Senior model, 7 coils, power pack, rack and panel mtg. ; recently serviced by Webbs', perfect condition. Offers invited.—2CZH, 140 Seymour Avenue, Morden, Surrey.

NATIONAL H.R.O. Senior.—Latest pre-utility model, absolutely spotless and perfect, very little used, complete with power supply and special calibration chart, £85. General Radio absorption wavemeter, 15–240 metres, framed charts, indicator light, in carrying case, £6. Turner (U.S.A.) special voice-frequency communication model Crystal Microphone, absolutely as new and perfect, £6 10s.—Box 664, PARRS, 121 Kingsway, London, W.C.2.

OFFERS !—National Senior H.R.O., 200/250 A.C., 5 coils.—Box 645, PARRS, 121 Kingsway, London, W.C.2.

RME.69 with noise silencer, purchased new 1938, idle since 1939, in first-class condition, £55.—Box 666, PARRS, 121 Kingsway, London, W.C.2.

R.S.G.B. BULLETINS, January 1943, to December 1944, £1. *Wireless Worlds*, July to November, 1938 and January 1943, to December 1944, 24s. Unused valves, 5Z4, 8s. ; 6J7, 9s. ; 6V6G, 6SC7, 10s. each ; 6K8, 6K8G, 6Q7G, 11s. each ; 6L6, 14s. Condenser block 1, 1.5, 2 and 2.5 μF, 450 volt, 4s. Small soldering iron, 230/250v 60 watt, 5s. Plug-in coil formers, 9 with 7-pin British bases and 9 with Eddystone 6-pin bases, all in new condition, 1s. each. New mains transformer, 200–250 volts input, output 250–0–350, 120 milliamps, 4v 5A and 4v 3A, 22s. 6d.—Box 654, PARRS, 121 Kingsway, London, W.C.2.

RME.69 for sale.—Grey finish, 110 volt input, noise silencer, crystal gate, special air-spaced trimmers fitted to I.F. transformers by makers ; service and operating manuals ; best offer.—PRICE-JONES, Manoravon, Llandilo.

SALE.—Transformer .200/250v primary, secondaries 300–0–300, 60 mA; 4v, 2A ; 4v, 4A ; 15s. Two Ferranti AF3's, 5s. each. A.F. trans., 3.5 : 1, 4s. Tapped A.F. choke, 4s. Set M. & L. screened, iron-cored band-pass coils C./W. W./change switch, 3-gang condenser, S.M. dial, 15s. Eddystone S.W. coils Y, 6B, 6Y, 2s. 6d. each.—Write BRS4506, Hill View, Bilton Hill, Bilton, Rugby.

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SPECIAL communication receiver, 16 valves, dual superhet 32 Mc/s. to 145kc., 6 bands, logging scale, variable band width, B.F.O., limiter, A.G.C., black and chrome steel cabinet, separate stabilised power supply, A.C., speaker, phones and data, £100 or near.—HAZELL, 34 Beachcroft Road, Leytonstone, London, E.11.

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