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BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

- FOUR VALVE COMMUNICATIONS RECEIVER
- EASILY CONSTRUCTED OSCILLOSCOPE
- VALVE VADE MECUM

NEW MEMBERS

THE COUNCIL HAS PLEASURE IN ANNOUNCING THAT THE FOLLOWING HAVE BEEN ELECTED TO CORPORATE MEMBERSHIP OF THE SOCIETY

British Isles (Licenced Amateurs)

G2DZ *B. HALL, 11 The Inlands, Daventry.
G3HI *R. SYKES, 525 Huddersfield Rd., Salterhebble, Halifax.
G3QL *C. BROWN, High Lawn, Geraldine Road, Malvern.
G4PB J. E. ATTWOOD, 35 Derby Road, Nottingham.
G5IG G. O. KOLLIEN, 5 Hillview Tce., Blackhall, Edinburgh, 4.
G5NS *F. BROWN, 43 Roker Baths Road, Roker, Sunderland.
G5PW *H. WRIGHT, 6 Crawshaw Fields, Pudsey, nr. Leeds.
G8BA *J. BARNARD, 2 Grangefield Terrace, Rossington, Yorks.
G8JD F. L. FIRTH, 2A Burnett Av., West Bowling, Bradford, Yorks.
G8VI A. R. WILLOWS, 42 Brocklesby Road, Grimsby, Lincs.
2ALL T. A. T. DAVIES, 9 Oakwood, Horbury Rd., Wakefield.
2ATR F. C. KEEN, 15 Vale Road, Aylesbury.
2AVB R. A. O. BAMPTON, 2 Myrtle Cottages, Ball Lane, Kennington, Ashford.
2BBO L. W. OSMOND, 61 Windsor Road, Penarth, Glam.
2BPD H. BENFORD, 54 Rugby Road, London, N.W.9.
2BYK J. C. PAYNE, Welton Manor, Welton, nr. Daventry.
2CHF F. HOLMES, 22 Gloucester Av., Farington, Leyland.
2CLS C. E. D. MCLEAN, 19 Church Avenue, Amblecote, Stourbridge.
2CPI S. H. LEWIS, 108 Hill View, Westbury-on-Trym, Bristol.
2CPY S. SOOTHILL, 26 Colwyn Rd., Dewsbury Rd., Leeds.
2DNP T. W. MORGAN, 49 Albert Street, Miskin, Mountain Ash, Glam.
2FGL T. W. GLEDHILL, 64 Vickerman Street, Halifax.
2FKK W. HILL, 43 Winsford Street, Bristol, 5.
2FXW J. C. MOORE, 33 Bank Street, Hadfield, nr. Manchester.
2HMK T. G. BROWN, 7 Brinkburn Drive, Darlington.

British Receiving Stations (B.R.S.)

1750 *W. C. E. ALLEN, 41 Ashenden Road, Guildford.
2326 *C. P. ABRAHAM, 24 Ravensbury Avenue, Morden, Surrey.
3011 *B. McK. DAVIDSON, 44 Smithfield Drive, Aberdeen.
3124 *W. J. HARTWELL, 247 Lichfield Road, Four Oaks, Sutton Coldfield.
3743 *C. G. HUTCHINSON, Woodlands, Knowle, Braunton, N. Devon.
3836 *R. A. FARMER, 1 West Croft, Hillview Rd., Hucclecote, Gloucester.

* *Denotes Re-elected.*

* * *

6857 T. S. GARDINER, Hatton Castle, Turriff, Aberdeenshire.
6858 C. COULBORN, Newlands, Station Rd., New Longton, nr. Preston.
6859 S. H. PAINE, 70 Lavender Avenue, London, N.W.9.
6860 R. J. LLOYD, 13 Clarence St., Spennymoor, Co. Durham.
6861 J. S. MILLER, 5 Brookside Cres., Worcester Park, Surrey.
6862 F. J. EDWARDS, 28 New Street, Dudley, Worcestershire.
6863 C. A. WARD, 42 Longley Road, Huddersfield.
6864 F. CUTT, 7 Conway Road, Hounslow, Middlesex.
6865 H. DRAPER, 4 Pendle Bridge Cotts, Reedley Hallows, Burnley.
6866 C. WARNER, 108 Spen Lane, Cleckheaton.
6867 G. L. DARNBROUGH, 111 Talbot St., Moss Side, Manchester 16.
6868 B. T. HUGHES, 19 Melbourne St., Clayton-le-Moors, Lancs.
6869 J. G. HOLLAND, 42 Selwyn Road, New Malden, Surrey.
6870 G. J. POPE, The Bush Inn, Horsham Road, Dorking.
6871 M. H. MURRAY, 172 Western Avenue, London, W.3.
6872 N. CHADDOCK, 33 Brecklands, Broom, Rotherham.
6873 D. W. A. NASH, 122 Madrid Street, N. Ireland.
6874 L. ST. P. JARDINE, Castle Farm Cottage, Lifton, Devon.
6875 H. S. W. SIMS, Flat 3, 117 High St., Staines, Middlesex.
6876 J. D. REYNOLDS, Snr., 1 Talbot Road, Bearwood, Smethwick, 41.
6877 J. D. REYNOLDS, Jnr., 1 Talbot Road, Bearwood, Smethwick, 41.
6878 J. J. HUGHES, 14 Hillingdon Av., Long Lane, Ashford.
6879 K. J. WELLEY, 4 Marlborough Road, London, W.5.
6880 W. W. NEWBY, 9 Gladstone Road, Sheffield, 10.
6881 J. A. PEDEN, 124 Main Street, Prestwick, Ayrshire.
6882 J. G. PENRICE, 31 Prebendal Av., Southcourt, Aylesbury.
6883 J. BUSHELL, The Gables, Sandridge Rd., Melsham, Wilts.
6884 C. F. J. YOUNG, 19 Wing Rd., Linslade, Leighton Buzzard.
6885 P. D. COLLINGS-WELLS, Horslake, Cheriton Bishop, nr. Exeter.
6886 A. V. GRANT, Lower Eldon Cottages, nr. King's Somborne.
6887 W. TAIT, 51 Bolsover St., Ashington, Northumberland.
6888 MISS J. D. CLARRICOATS, 16 Ashridge Gdns., London, N.13.
6889 H. R. SINGH, 166 Hamilton Rd., Longsight, Manchester, 13.
6890 A. H. BRAY, Hersham, Parton Rd., Churchdown, Glos.
6891 J. A. BADHAM, 5 The Lilacs, New Rd., Bromyard, Hereford.
6892 A. ELLIOTT, 2 Archdale Rd., Edwards Lane Estate, Arnold.
6893 J. P. CUFF, 71 Barnett Wood Lane, Ashtead, Surrey.
6894 C. L. VOLLRATH, 17 Firswood Av., Stoneleigh, Surrey.
6895 H. DICK, 9 Richmond Street, Westbourne Avenue, Hull.
6896 E. COCKER, Glen Wold, Queens Road, Accrington.
6897 B. B. COHEN, 81 Bristol Road, Edgbaston, Birmingham.
6898 K. G. STOREY, 11 Gallipoli Terrace, Taibach, Port Talbot.
6899 W. HODKINSON, 29 Welhouse Street, Barnoldswick.
6900 T. F. HUGHES, Station Hse., Victoria Av., Colwyn Bay.
6901 J. H. NICHOLLS, 11 Arthur St., Waverley St., Nottingham.
6902 R. C. STEVENS, 68 Breakspeare Road, London, S.E.4.
6903 MISS A. E. DONALD, Newcastle.
6904 W. OTLEY, 78 Thornton Street, Darlington, Co. Durham.
6905 W. HARDING, 206 Stamshaw Road, Twyford Avenue, Portsmouth.
6906 V. TAYLOR, 51 Maindy Road, Cardiff.
6907 A. H. FORMAN, Ravenswood, Church Street, Buckhaven.
6908 J. FARRAGHER, Greeba Mount, Bedford Road, Carlisle.
6909 G. CARTER, 145 Lower York Street, Cambridge.
6910 J. D. CHEAL, 63 Leigh Road, Eastleigh.
6911 J. A. B. HALE, 26 Hayne Road, Beckenham.
6912 J. H. JOSLIN, c/o 36 Victoria Street, Glossop.
6913 J. C. RICHMOND, 10 Wadham Road, Preston.
6914 C. J. ADAMS, 17 Fieldhouse Road, London, S.W.12.
6915 M. TAYLOR, 159 Coteford Street, London, S.W.17.
6916 W. A. H. TODD, 121 Heath Street, London, N.W.3.
6917 T. J. ALLPORT, 1 Old Christ Church Buildings, Woodbine Place, Oxford.
6918 K. R. DINGLE, 26 Chichester Rd., North End, Portsmouth.
6919 R. V. LEE, Tonies, Hanthorn Av., Biggin Hill, Kent.
6920 D. E. JOHNSON, Long Lane, Barnby, Newark.
6921 D. HUGHES, The Manor, Conway, N. Wales.
6922 W. ELLIOT, 14 Main Rd., Seaton, Workington, Cumb.
6923 D. S. T. LAWLER, Old Cottage, Shepherds Hill, Essex.
6924 A. J. BURTON, 1 Hawstead Road, London, S.E.6.
6925 F. R. EASTWOOD, 101 Havencrest Drive, Humberstone Leicester.

A CORDIAL WELCOME IS EXTENDED TO THE

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NEW MEMBERS WHOSE NAMES ARE LISTED

6926 J. S. GRIMSHAW, 8 Galway Avenue, Bispham, Blackpool.
6927 K. S. TURNBULL, 37 Goodden Crescent, Cove, Farnborough.
6928 W. C. VARNES, 24 Trinity Street, London, E.11.
6929 D. SMITH, 1 Ash Grove, Heaton Chapel, Stockport.
6930 J. E. G. KINGSWOOD, 7 Elphick Road, Newhaven.
6931 G. M. BELL, 25 Southville Road, Thames Ditton.
6932 W. R. JORDAN, 39 Beeching Road, Norwich.
6933 J. W. AYLING, 146 Seaforth Avenue, New Malden.
6934 H. R. THOMAS, 40 Mast Lane, Cullercoats, Whitley Bay.
6935 D. W. BURNS, 13 Denfield Drive, Cardenden, Fife.
6936 J. R. MARKS, 55 Furnham Road, Chard, Somerset.
6937 T. E. SCHOLES, 3 St. Helens Road, Bolton.
6938 S. F. BROWNING, 4 Daisy Bank, Lyncombe Vale, Bath.
6939 W. V. SUTTON, Reviston, While Road, Sutton Coldfield.
6940 L. C. BRETT, Ivy Farm House, Kemsing, nr. Sevenoaks.
6941 L. W. POLLARD, 11 Grove Lane, Kingston-on-Thames.
6942 L. E. PROFAZE, 82 Waterfall Road, London, N.14.
6943 W. HEATH, Sycamore House, Denby Dale, Huddersfield.
6944 D. E. HILL, 9 Addington Gve., Sydenham, London, S.E.26.
6945 V. H. MEDERSON, 3 North Cottages, Stockgrove, nr. Leighton Buzzard.
6946 F. J. GUNNELL, 27 Lakers Rise, Woodmansterne, Banstead, Surrey.
6947 J. EGREMONT, New Cottage, Spring Lane, Colden Common, Winchester.
6948 H. N. HALL, 15 Queens Road, Manningham, Bradford.
6949 A. W. LINDSAY, 20 Bellevue Crescent, Ayr, Scotland.
6950 R. A. BOTTOMLEY, Kildonan, Barassie Street, Troon.
6951 G. F. LLOYD, Langdale, Pennington Lane, Lindal-in-Furness.
6952 S. WADE, 118 Fulwell Park Avenue, Twickenham.
6953 J. O. H. N. BURGESS, The Vicarage, Old Sodbury, nr. Bristol.
6954 H. E. NICE, 77 Saxon Road, Ilford, Essex.
6955 H. C. T. SARGEANT, 19 Western Rd., Haywards Heath.
6956 J. F. O'MEARA, The Lodge, Church Lane, Whitwick, Leicester.
6957 J. DEE, 1 Rupert Street, Reading, Berks.
6958 E. W. G. HOBBS, 111 Abercorn Crescent, Harrow, Mdx.
6959 J. W. H. O'CLAREY, 15 Duffield Rd., Walton-on-the-Hill, Surrey.
6960 D. A. GOSLING, 23 Windsor Avenue, Grays, Essex.

6961 T. G. PARK, 44 Prebendal Av., Southcourt, Aylesbury.
6962 E. L. MILLWARD, 18 Kingsway East, Newcastle, Staffs.
6963 H. E. STUBBINGS, 32 Sandy Lane, Belle Vue, Doncaster.
6964 C. SYKES, Greyhound Hotel, Birstall, nr. Leeds.
6965 B. DOUGLAS, Cartref, Wortley Road, Highcliffe-on-Sea, Hants.
6966 J. BURT, c/o 78 Minard Road, Shawlands, Glasgow.
6967 W. L. CARDNO, 5 South Street, Mintlaw, Aberdeenshire.
6968 V. L. ATKINS, 47 Thackerays Lane, Woodthorpe, Nottingham
6969 S. A. PEARSON, 88 Portland Grove, London, S.W.8.
6970 J. E. WOOTTON, Junior Grammar School, Compton Road, Wolverhampton.
6971 L. E. W. LANE, Elyn House, West Hill, Wincanton, Som.
6972 A. B. GRIEF, 27 Kensington Road, King's Lynn.
6973 N. W. HARRIS, 83 Cavalry Crescent, Eastbourne.
6974 F. LIGHTBOWN, 89 Breightmet Drive, Bolton.
6975 A. E. PARSONS, 413 Chester Rd., Sutton Coldfield.
6976 A. L. STEVENSON, Jnr., 37 Bearford Drive, Hillington, Glasgow.
6977 A. HALEY, 51 Park Rd., Wáth-on-Dearne, nr. Rotherham.
6978 D. O. DOLAND, 24 Bishops Park Road, London, S.W.16.
6979 E. SLACK, 15 Far West St., East Stanley, Co. Durham.
6980 C. J. DARWENT, 284 Birmingham Rd., Wylde Green, nr. Birmingham.
6981 R. L. ABERY, 158 Woodfield Way, London, N.11.
6982 B. TWELVETREES, 310 Mansfield Road, Nottingham.
6983 H. R. BROOKS, 23 Leicester Street, Sleaford.
6984 E. BURGESS, 2 Hillview Road, Denton, Manchester.
6985 H. A. JOYCE, The Royal Arms Hotel, Sutton, Isle of Ely.
6986 H. MANLEY, 185 Marcliffe Road, Sheffield 6.
6987 R. T. GETHIN, 6 Harrison St., Penydarren, Merthyr Tydfil.
6988 R. WILLIAMSON, 16 Dorking Road, Sunderland.
6989 D. LAMBERT, 191 Hamel Street, Bolton.
6990 R. EVENETT, 42 Hawkins Crescent, Harrow, Middlesex.
6991 J. PURDEY, Karenza, New Village, Dudley Wood, Cradley Heath.
6992 J. A. SMITH, 45 Sharphill Road, Saltcoats, Ayr.
6993 B. H. A. SEELEY, Dyke, Ethorpe Close, Gerrards Cross.
6994 J. HORNE, 35 Prince Street, Rochdale.
6995 R. N. BALMFORTH, 37 Thornacre Crescent, Wrose, Shipley.
6996 H. J. G. WELCH, 25 Sunny Ridge Av., Pudsey, nr. Leeds.
6997 A. N. KIMBLE, The Old House, Lower Road, Rainham.
6998 R. NICHOLAS, 3 Crescent Villas, Johnston, Wrexham.
6999 O. R. HOLBY, 78 King's Hill Avenue, St. Albans, Herts.
7000 T. P. BROOKS, 1 Elvendon Road, London, N.13.
7001 L. THOMAS, c/o McInnes, Ruaig, Isle of Tiree.
7002 R. G. PERRETT, 33 St. Marychurch Road, Torquay.
7003 T. S. ZEALLEY, 6 Norton Green, Stockton-on-Tees.
7004 R. L. WORTLEY, 23 Gwenbrook Road, Chilwell, Notts.
7005 J. G. MILNE, 11 Ashbank Road, Dundee.
7006 W. B. JAGO, 16 Vallis Way, Hook, Sy.
7007 A. E. WOODS, 1 Brandon Tce., Watton, Thetford, Norfolk.
7008 V. CARMICHAEL, 21 Glebe Farm Rd., Birmingham 25.
7009 A. R. AITKENHEAD, 140 Chadacre Rd., Stoneleigh, Sy.
7010 T. I. DOHERTY, 21 Warwick Street, Wolverhampton.
7011 A. S. GUEST, 36 Lennard Road, Dunton Green, Kent.
7012 J. CRANKSHAW, Laleham House, Orchard St., Daventry.
7013 J. S. M. SHEPHARD, 13 Highcliffe Gdns., Ilford, Essex.
7014 A. H. WALKER, 96 Ridge Road, London, N.8.
7015 A. TAYLOR, 58 Ilchester Rd., Dagenham, Essex.
7016 G. B. WESTON, 2 Micheldever Rd., Andover, Hants.
7017 D. M. ALCOCK, Hillcrest, Reservoir Road, Woolton Liverpool.
7018 J. R. H. WRIGHT, 15 The Chesils, Styvechale, Coventry.
7019 R. B. LAW, 83 Kipling Road, Eastleigh.
7020 W. F. SHEPHERD, 28 Henley Road, Brighton, 7.
7021 E. NEWBOULD, 360 Dewsbury Road, Leeds, 11.
7022 H. A. SPENCER, 39 Petersfield Road, London, W.3.
7023 S. A. MORRIS, 1 Cresswell Way, London, N.21.
7024 D. H. ADAMS, 7 Alexander St., Neath, S. Wales.
7025 D. I. THOMPSON, A2, Baghill Lane, Pontefract.
7026 D. B. WARK, c/o Barclays Bank, Oxford.
7027 D. M. MACKAY, A.S.E. Extension, Witley, Sy.
7028 G. H. BARKER, 38 Blackwell Av., Sprowston, Norwich.
7029 A. C. SIMMONDS, 61 Sale Lane, Tyldesley, Manchester.
7030 F. J. LANE, Aurora, Adelaide, Ilfracombe.
7031 H. W. HODGES, Manor Hse., Chilton Polden, Bridgwater.
7032 A. G. HAINES, 33 Kent Road, Swindon.
7033 A. B. KIRK, 87 Elmcroft Avenue, Wanstead, E.11.
7034 L. D. W. FENSOME, 18 Paddock Road, London, N.W.2.
7035 F. F. A. JOHNSON, 19 Grove Road, Leicester.
7036 J. F. DODDS, 31 Gt. North Road, Newcastle-on-Tyne, 3.
7037 T. B. WELFORD, 11 Ash Close, New Malden, Surrey.
7038 J. E. PARTRIDGE, 145 Newcomen Road, Wellingborough.
7039 R. OVERSBY, 73 Church Street, Shildon, Co. Durham.
7040 L. H. A. COLE, 333, Upton Lane, London, E.7.
7041 G. L. APPLEBY, 83 Northover, Bromley, Kent.
7042 J. B. EVANS, 39 Rappart Road, Wallasey.
7043 L. W. BLICK, 46 Betstyle Road, London, N.11.
7044 J. S. SMITH, 56 Dartmouth Park Rd., London, N.W.5.
7045 P. HEATON, 27 Prune Park Lane, Allerton, Bradford.
7046 J. B. FLYNN, 59 Weoley Park Rd., Selly Oak, Birm., 29.
7047 K. J. E. BERKS, 315 Bushbury Lane, Wolverhampton.
7048 J. L. SAMPSON, 35 Locke Av., Barnsley.
7049 CAPT. G. G. GIBBS, 38 Parkway, Welwyn Garden City.
7050 T. R. MITCHELL, 20 Stirling Rd., Hayes, Middlesex.
7051 W. L. COPLEY, 27 Mayol Road, London, E.5.
7052 A. G. W. WILLIAMS, 45 Tany-y-Coed, Burry Port, Carms.
7053 D. V. WRIGHT, Thorncliffe, Harbour Road, Par, Cornwall.
7054 J. W. JONES, 43 Kinloch Drive, London, N.W.9.
7055 P. F. TURNER, 75 Thornhill Road, London, E.10.
7056 C. F. WITHALL, 10 Cecil Street, Chester.
7057 D. WILKIE, 27 Almondbank Tce., Edinburgh, 11.
7058 H. R. PARNELL, 12 Somerford Way, Christchurch.
7059 E. J. WOOD, 7 Alexandra Grove, London, N.4.
7060 J. B. RUDKIN, 23 Ashford Rd., Meols, Hoylake.
7061 R. B. SMITH, 28 Melbourne Crt., Welwyn Garden City.
7062 C. E. B. ADAMS, 18 Horning Rd., Branksome, Bnemouth.
7063 F. V. HUSSEY, 40 Cotswold Avenue, Ipswich.
7064 H. F. RAWLING, 110 Russell Lane, London, N.20.
7065 E. SLATER, 32 Victoria St., Smallthorne, Stoke-on-Trent.
7066 R. E. PLAYLE, Lyndhurst, Danescroft Drive, Leigh-on-Sea.
7067 L. A. LEADBEATER, c/o 7 Lynton Drive, Bebington.
7068 W. H. HILLS, 32 Church Rd., Murston, Sittingbourne.
7069 R. P. TAYLOR, 4 High Street, Norton, Stockton-on-Tees.
7070 S. B. REEDER, Greencroft, Haxby, nr. York.
7071 D. A. THOMAS, 164 Bute Street, Treorchy, Rhondda.
7072 J. A. SLATER, Acre Wood, Dunstan Lane, Burton, Wirral.
7073 A. STRETCH, Capenhurst, Beech Av., Eccleston Park, Prescot.
7074 W. STEPHEN, 11 Fintry Terrace, Longhaugh, Dundee.
7075 J. S. DAY, 50 Primula Street, Bolton.
7076 V. W. WAKEMAN, 11 Lansbury Road, Old Hill, Staffs.
7077 J. W. HAYES, 16 Braemar Av., Purley Oaks, Sanderstead.
7078 W. H. WILLIAMS, 47 Brookwood Rd., London, S.W.18.
7079 F. HALDEN, 56 Charlton Rd., Kenton, Middlesex.
7080 K. C. BROWN, 34 Avondale Road, Bromley, Kent.
7081 D. A. H. ELLIS, Five Gables, Little Eversden, Cambridge.
7082 B. F. YERBURY, 93 Gleneldon Road, London, S.W.16.
7083 G. T. BUTLER, 22 Castleway, Castleton, Rochdale.
7084 S. PLUMB, 61 High Street, Arnold, Nottingham.
7085 F. C. PECKHAM, 43 Northwood Gardens, Greenford, Mddx.
7086 H. MOORE, 106 Rookwood Avenue, Chorley, Lancs.
7087 J. L. CRAVEN, 15 Cromwell Avenue, Aylesbury.
7088 P. W. L. WATSON, 89 Molefield Estate, Aylesbury.
7089 N. C. BURTLE, 30 Regent Road, Aylesbury.
7090 E. MALE, 15 Byron Road, Aylesbury.
7091 A. E. B. HARDING, 95 Stoke Road, Aylesbury.
7092 E. LAWRENCE, 15 Granville Street, Aylesbury.
7093 E. H. T. MING, 8 Mount Street, Aylesbury.
7094 B. LOVETT, 100 Molefield Estate, Aylesbury.
7095 H. HARRISON, 23 Marshall Tce., Austhorpe Rd., Cross Gates, Leeds.
7096 H. C. DIMES, 25 Lowood Grove, Lea, nr. Preston.
7097 L. C. TOWNSEND, 169 Hatfield Road, St. Albans.
7098 J. YATES, 87 The Avenue, Wembley Park, Middlesex.
7099 R. P. MACKRELL, 36 Market Street, Whittlesey.
7100 R. A. KING, 53 Edgehill Road, Winton, Bournemouth.
7101 W. R. WHITMORE, 22 Holden Road, London, N.12
7102 E. COURTNELL, 112 King Edwards Road, London, E.9.
7103 A. C. GRAINGER, 132 Comiston Road, Edinburgh, 10.
7104 E. HOLSTEAD, 541 Plodder Lane, Farnworth, Lancs
7105 P. PIMBLETT, 65 Derbyshire Hill Rd., Parr, St. Helens.
7106 C. G. CLARK, The Spinney, Wigan Lane, Chorley.
7107 N. V. DAVIES, 42 Cranbourne Road, Salt Hill, Slough.
7108 J. R. C. THOMAS, 397 Portland Road, Hove, 3.
7109 N. MARTIN, 143 Heaton Road, Heaton, Bradford.
7110 H. W. M. BARNETT, 14 Normandy Avenue, Barnet, Herts.
7111 T. H. JOHN, 19 Merthyr Road, Pontypridd, Glam.
7112 R. N. OATLEY, Ravenswood, Gerrards Cross, Bucks.
7113 C. A. ATKINS, Salmon Leap, Dart Bridge, Buckfast.
7114 O. T. ALDRIDGE, 20 Hinchsliff Av., Colcot Barry, Glam.
7115 A. H. FRANKLAND, 176 Sirdar Rd., London, N.22.
7116 D. A. HODGSON, 8 Chingford Road, London, E.17.
7117 C. N. WRIGHT, 37 High Street, Mablethorpe, Lincs.
7118 A. D. GORDON, 20 Goldsmid Road, Tonbridge.
7119 A. HALL, 14 Abbott St., Long Eaton, nr. Nottingham.
7120 R. FORD, 54 Adwick Road, Mexborough.
7121 I. C. DAVIES, 10 Windermere Rd., Patchway, nr. Bristol.
7122 N. J. ARNOLD, 14 Midway Road, Leicester.
7123 K. T. CAWSE, 11 Lawn Road, Uxbridge.
7124 H. A. S. PHILIPPART, Over-the-Way, Westerham.
7125 L. A. GAFFENEY, 4 Twitten Way, West Worthing.
7126 P. W. DAY, 14 Crowestones, Buxton.
7127 R. E. SISSONS, 13 Cobham Road, Cheltenham.
7128 R. WALLWORK, 118 Holgate Road, York.
7129 F. A. HORTON, 14 Broadlands Way, New Malden.
7130 R. ELLIOTT, c/o 6 Alexandra Tce., Torpoint, Cornwall.
7131 D. J. HUSKINS, c/o S. O. DAVIES, Lower Heath Farm, Presteigne, Radnor.
7132 F. LEAHY, London House, Strabane, Co. Tyrone, N.I.
7133 L. A. WALLIS, 7 Manor Drive, Aylesbury, Bucks.
7134 A. A. HITCHCOCK, 60 Ashtree Avenue, Mitcham.
7135 H. L. STOCK, 278 Ewell Road, Tolworth, Surbiton.
7136 R. W. ROWSELL, 62 Clifton Road, Weston-super-Mare.
7137 F. R. COPPING, 13 Brenchley Avenue, Gillingham.
7138 A. N. AULD, 10 Whirlow Gdns., Garrowhill, Baillieston, Glasgow.
7139 F. G. GOODE, 21 Eve Street, Louth, Lincs.
7140 G. E. SCOTT, 18 Elm Grove, Urmston, nr. Manchester.
7141 C. J. INGRAM, 213 Church Street, London, N.16.
7142 I. C. HUMPHREYS, 1 Brynewyn Road, Cyncoed, Cardiff.
7143 A. E. H. GRAY, 254 London Road, St. Albans.
7144 R. J. BECKLEY, 19 Badsey Lane, Evesham.
7145 B. SHARP, 688 Edinburgh Road, Lightburn, Glasgow, E.2.
7146 W. E. ATKINSON, Sewage Wks., West Lne., Sittingbourne.
7147 A. JAMES, 17 Yew Tree Road, Ormskirk, Lancs.
7148 F. R. DAVIES, 34 Senga Road, Hackbridge, Sy.
7149 L. G. JENNINGS, 49 Lansdowne Rd., Purley, Sy.

7150 W. H. ROGERS, 109 Bramshot Av., London, S.E.7.
7151 G. WILLIAMS, 11 Worcester Pde., Kingsholm, Gloucester.
7152 S. A. WOOD, 10 Craigerne Road, London, S.E.3.
7153 J. M. PEARSON, 84 Bramley Road, London W.10.
7154 R. F. TAYLOR, 3 Netherpark Dve., Gidea Park, Essex.
7155 C. MELLOR 11 Gayhurst Cres., Norris Green, Liverpool, 11.
7156 K. T. WHITHORN, 34 Tybridge Street, Worcester.
7157 T. ANSLOW, The Oak, New Road, Rubery, Worcs.
7158 W. A. JACKSON, 68 Chesterwood Rd., Birmingham, 14.
7159 F. R. ARMSTRONG, 22 Shenstone Valley Rd., Birm., 32.
7160 S. R. BURBRIDGE, 80 Dudley Road, Brighton.
7161 L. SHEARMAN, 58 Oakland Av., Droitwich, Worcs.
7162 B. J. TAYLOR, 104 Constantine Road, London, N.W.3.
7163 W. LONGMAN, 631 London Road S, Lowestoft.
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OUR NEW PRESIDENT

HAVING served as Executive Vice-President since January, 1941, our new President—Mr. Ernest Lett Gardiner, B.Sc. (G6GR)—takes office with a wide knowledge of current Society affairs. In the field of active Amateur Radio he can claim experience dating back to 1916, when he assisted in setting up radio equipment used for training purposes during the last War. In 1922, whilst still a junior, his first licence was taken out in his father's name, under the call sign 6SO, to be replaced in later years by his present call. Mr. Gardiner remained an active transmitting amateur from the early 1920's until the outbreak of the war, and effected contacts with North America not many months after the first transatlantic amateur signals had been exchanged.

Mr. Gardiner, who holds the degree of B.Sc. London (Physics and Maths.), is the Chief Engineer of a radio manufacturing company well known in the Watford area, and consultant to other companies, and as such he becomes the first practicing radio engineer to occupy the Presidential Chair of the Society. His pioneer work, in co-operation with Dr. J. Robinson, of "Stenode" fame, in the design and construction of communication receivers embodying quartz crystal band-pass filters is well known to all who have read his contribution on this subject to *The Amateur Radio Handbook*. In the field of technical literature Mr. Gardiner is joint-author of *Elements of Radio Communication* (Oxford University Press), whilst his contributions to the technical press of this country have earned for him high praise. At least one series of technical articles published under his name in the T. & R. BULLETIN, were later reproduced in a well known American radio journal. His gifts as a lecturer have been frequently recognised by many technical bodies.

In addition to his work on receiver design, Mr. Gardiner is an authority on measuring equipment for radio purposes, his recent lecture to the London membership on Valve Voltmeters providing evidence of his expert knowledge in this highly specialised field. As a Founder Fellow of the Television Society, Mr. Gardiner was amongst the first amateurs to construct, and operate successfully, both transmitting and receiving apparatus for the 30 line system. Subsequently, in co-operation with Captain R. G. Wilson, he was winner for three consecutive years of the Television Society's Tuke Cup for the best public demonstrations of complete working equipment, first at 60 and later at 180 line standards, shown to the public at the annual exhibitions of that Society. In recent years he has carried out extensive experimental work in connection with high definition television and cathode ray oscillographs.

Mr. Gardiner's station, G6GR, was frequently to be heard in pre-war days on 28 Mc/s. and 56 Mc/s., on which frequencies he conducted numerous experiments with rotary beams and other specialised aerial systems. Although his call sign was perhaps not so well known on the DX bands as that of his predecessor in office, the log books at G6GR bear silent witness to the all-round activity of their owner; whilst as an "old timer" he did not neglect the lower amateur frequencies. He was a regular participant in 1·7 Mc/s. contests and field-days.

Since the outbreak of hostilities Mr. Gardiner has devoted his time and energies to the development and production of numerous radio devices which, it is believed, have proved of considerable value to the Fighting Services. We hope that in spite of this work our new President will find time during the coming year to visit many parts of the country, and to meet some of those who have derived benefit from his many contributions to our Journal and other publications. He takes office at a time when the tide of war is turning steadily and relentlessly in favour of the United Nations. We cannot do better than to wish him a successful tenure of office, coupled with the sincere hope that it will be under his Presidency that the Society holds its Victory Convention. J. C.

A FOUR VALVE COMMUNICATIONS RECEIVER

By W. G. JOHNSON (2BJY).

By a discriminative choice of components, coupled with good circuit design, the performance of the receiver described in this article approaches super-heterodyne selectivity and performance.

THE four-valve "straight" receiver to be described embodies the following features :—

(1) A high standard of electrical and mechanical stability ; (2) negligible hum and noise level ; (3) a "communications" standard of reception ; (4) ease of operation, particularly on the 28, 14 and 7 Mc/s. amateur bands ; (5) a high degree of selectivity ; (6) loud speaker and telephone reception ; (7) simplicity of construction and suitability for substitution of components ; (8) A.C. mains operation.

Resistance-capacity coupling is employed in the L.F. stages, but no decoupling other than a single 8 μF condenser in the detector anode circuit is necessary. Choke filter output is used whilst H.F. chokes and by-pass condensers are fitted in each speaker lead. The 77 type valve was used as several were available when the set was being designed.

The power unit (Fig. 2), follows a conventional design with the exception of C4 and C5, which are important for the avoidance of modulation hum.

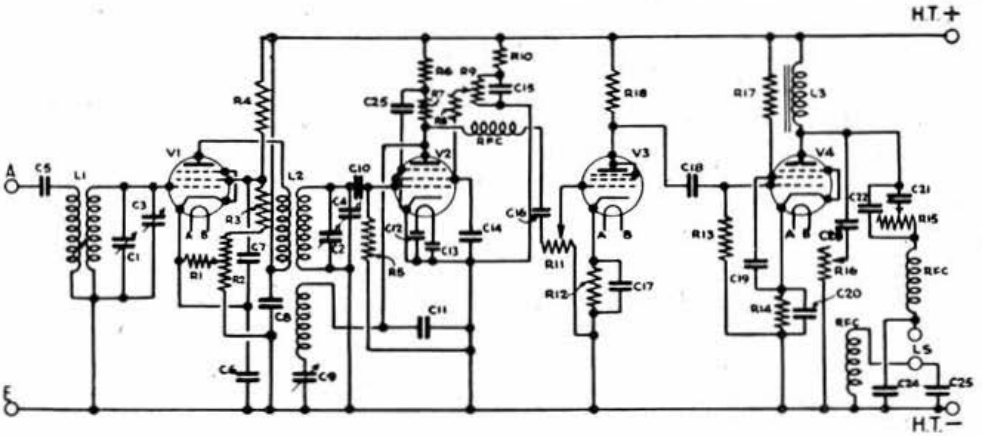

Fig. 1.
Circuit diagram of Four-Valve "Straight" Receiver.

C1, 2	·0001 μF variable.	C19	·25 μF paper.	R7, 18	50,000 ohms 1 watt.	R16	25,000 ohms carbon potentiometer.
C3, 4	·000015 μF variable.	C20	25 μF 25 volts.	R8	100,000 ohms 1 watt.	R17	2,000 ohms 1 watt.
C5	·00005 μF mica.	C21	·1 μF paper.	R9	50,000 ohms wire wound potentiometer.	RFC	2·5 millihenrys R.F. chokes.
C6	·5 μF N.I. paper.	C22	·002 μF paper.	R11	250,000 ohms carbon potentiometer.	L1, 2	Standard S.W. plug in coil.
C7, 8, 14, 15	·1 μF N.I. paper.	C23	·05 μF paper.	R12	1,500 ohms 1 watt.	L3	Audio output choke.
C9	·0002 μF variable.	C24, 25	·0002 μF paper.	R13	2 megohms ½ watt.	V1	6U7G.
C10, 11	·0001 μF mica.	R1	750 ohms 1 watt.	R14	750 ohms 2 watts.	V2	6J7G.
C12, 13	·002 μF mica.	R2	10,000 ohms wire wound potentiometer.	R15	20,000 ohms carbon potentiometer.	V3	77.
C16, 18	·005 μF mica.	R3, 4, 6, 10	25,000 ohms 1 watt.			V4	42.
C17	12 μF 25 volts.	R5	5 megohms ½ watt.				

Circuit Description

Reference to the diagram (Fig. 1) will show that the circuit employs four valves, namely a 6U7G variable-mu R.F. pentode, a 6J7G regenerative detector, a 77 L.F. amplifier (connected as a triode) and a 42 output pentode. Bandspread tuning is provided, whilst bandsetting gives continuous coverage from 3·4 to 30·5 Mc/s. approx. The bandset and bandspread condensers are ganged. Variable gain is provided in both the R.F. and audio stages, together with variable treble and bass controls. Potentiometer and condenser control of regeneration is provided, the later to allow the most suitable value of capacity to be used with different frequencies. After this has been chosen reaction can be controlled solely by means of the screen potentiometer.

Since a regenerative detector is very susceptible to hum troubles, when used with a rectified A.C. supply, particular attention should be paid to the condensers by-passing the heater of the detector to earth, and to those joined between each plate and heater pin of the rectifier valve. It is strongly recommended that the values mentioned be adhered to.

Construction

The base of the receiver was constructed of 7-ply, lined inside with aluminium ; the chassis measurements being 16 in. × 13 in. × 2½ in. Metal screens separate the R.F. from the detector and audio stages, both at the top and beneath the chassis, the top portion being bent at right angles to provide a screen between the bandspread condensers (see Fig. 3). No attempt has been made to indicate by detailed measurement the exact position of each component, but the following special points should be noted : (1) the reaction condenser and potentiometer are mounted as close as possible to the coil and detector valves respectively ; (2) the potentiometer is mounted at the back of a small metal screen which screens the base of the detector valve and the associated wiring (both controls should be extended to the front of the chassis by means of extension rods and flexible couplings) ; (3) the reaction condenser is fitted with a small dial engraved 0–100°, thereby ensuring that once the proper condenser settings have been made the receiver calibrations will not be disturbed ; (4) leads to coils and condensers must be kept as short and

uniform as possible, otherwise the R.F. and detector tuning condensers will not match and there will be a high minimum capacity.

During experimental operation it was found possible to cover the 28 Mc/s. amateur band using standard short-wave plug-in coils of the type labelled "11 to 25 metres." Best quality tuning condensers of low minimum capacity are used; a pie-section wound choke is used in the detector-anode circuit. The R.F. gain control is brought out to the left-hand side, whilst the bass and treble controls and the speaker sockets are located on the front right-hand side of the chassis. Immediately to the left of these later controls is located the on/off switch. The audio gain control is placed opposite the first audio valve and is mounted on the right-hand side of the chassis. On the underside a further metal screen separates the audio from the detector stages. Some latitude may be allowed in the general layout of the components, providing that the condenser and coil connections are kept as short as possible. It is recommended that all grid and anode connections of the audio stages should be screened.

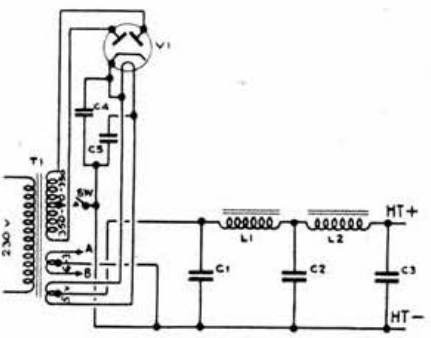

Fig. 2.
Circuit diagram of Power Supply Unit.

C1	2 μF 350 volts.
C2, 3	8 μF 350 volts electrolytic.
C4, 5	·002 μF 1,000 volts mica.
L1	2,000 ohms (speaker field).
L2	20 henry L.F. choke.
Sw	Single pole, single throw switch.
T1	Mains transformer.
	Primary 230 volts.
	Secondary 350—0—350 volts, 60 mA.
	5 volts, 2 amps.
	6·3 volts, 3 amps.
V1	5Z4.

A good quality output choke should be used, but if not available the associated condenser capacity may be increased. If owing to capacity effects in the wiring it is found impossible to tune up to 28 Mc/s., then half a turn should be taken off the grid windings of the coils. It will be noticed that ·0001 μF band-setting condensers are used, and with the receiver in question the following frequencies are covered using standard plug-in coils: 30 Mc/s. to 13·2 Mc/s., 13·8 Mc/s. to 6·2 Mc/s., and 6·5 Mc/s. to 3·6 Mc/s.

If operation is required on the 4 Mc/s. and 1·8 Mc/s. bands, then tuning should be carried out with the band-setting control. For operating on 1·8 Mc/s. a 10,000-ohms 1-watt resistance should be included in the detector-anode circuit in series with the H.F. choke. The set has been used for the reception of local stations and results were found most satisfactory. Since ordinary glass valves are used, all but the output valve should be screened with metal cans. A good slow-motion dial is recommended for band-spread tuning.

Construction of Power Supply

The power supply unit was assembled on a wooden chassis measuring 14 in. × 12 in. with a moving coil speaker mounted on the front with a suitable baffle board. The layout of the components is quite optional. The on/off switch is mounted on the front of the receiver chassis. The connections to this switch, together with the H.T. and L.T. power supplies, are taken *via* a six-way cable and six-pin plug to a six-pin socket at the rear of the set.

Valve Alternatives

Receiver

V1: 6K7G, 6D6, 78.
V2: 6C6, 77, —.
V3: 6C6, 6J7G, 6F5.
V4: 6V6, 6F6, —.

Power Supply

V1: 80, 83, 5Z3, 5Z4.

B.V.A. valves have not been tried with this receiver, but equivalent or near equivalent types to the above may be used providing a suitable power supply is available.

Operating

After the set has been completed and the wiring checked, insert the coils covering the highest range of frequencies and set the band-setting condensers with the vanes at half-way. See that the on/off switch is in the "off" position and switch-on the power supply. Set the R.F., audio gain and reaction condenser controls to the three-quarter position. The treble control should be set at maximum bass response, *viz.* minimum resistance. Now, switch on and advance the reaction potentiometer until a hiss is heard in the headphones. The receiver should go into oscillation quite smoothly and no backlash, hum or howl should be present.

If anything other than a loud hiss is heard at this stage the receiver should be checked. Now move the band-setting control until the 19-metre broadcast band is located. The band-spread tuning can then be brought into operation. Various positions of the controls may now be tried to obtain the "feel" of their use. When extreme selectivity is required the R.F. gain must be reduced and the treble and bass controls adjusted so that only a limited part of the audio range is amplified.

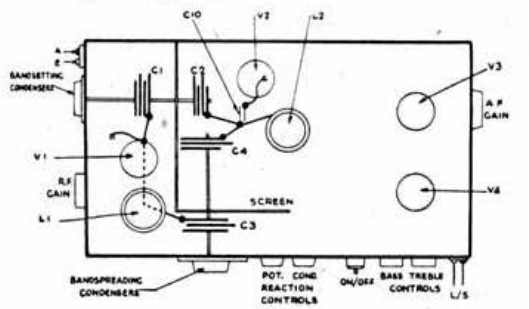

Fig. 3.
Lay-out of components showing top chassis. Also illustrated is the grid circuit wiring of the R.F. and pre-selector stages

Stability Test

When testing for stability, a C.W. station of moderate strength should be tuned in and adjusted for a note of 200 cycles/sec. approximately. The various metal parts of the set should be touched by hand and negligible variation in the pitch of the note should be observed. Now leave the receiver tuned in for some minutes and check that the note remains perfectly steady. The hand should be kept at a reasonable distance from the coils whilst these tests are being carried out.

AN EASILY CONSTRUCTED OSCILLOSCOPE

By Sidney Charles Dunn, B.Sc. (BRS6348)*

THERE are many occasions when a C.R.O. is required but neither linear time axis nor vertical amplifier is necessary. For example, measuring modulation purity and depth, checking the linearity of an amplifier stage, graphing valve characteristics, and, perhaps most generally, verifying the existence of a voltage. For these applications the time base is either derived from the network under test or a 50-cycle sweep is sufficient. There are also many useful measuring methods which simply require that the four plates and anode of the tube be accessible, as in the Radio Research Board's circular time base.

The author hopes that this article will encourage amateurs to construct a small oscilloscope whose salient features are portability and simplicity. Present conditions render the faithful duplication of a prototype very difficult, but this deterrent is a not unmixed blessing, for a good design is seldom achieved without deliberate disposition of components. No doubt the reader has a more compact transformer or a more suitable condenser bank than is described here and perhaps the instrument will gain by the substitution.

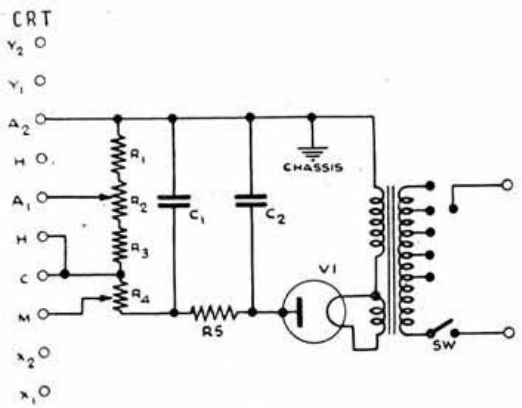

Fig. 1.
Circuit Diagram.

R1	= 0·1 megohm.	C1, C2	= 3, 1 resp. 1 μF units.
R2	= 50,000 ohms.	Sw	= Back of R4.
R3	= 25,000 ohms.	V1	= U12/14 Osram.
R4	= 25,000 ohms.	CRT	= 4081A Osram.
R5	= 20,000 ohms.		

Circuit

The circuit is quite conventional and follows that recommended by the makers of the tube. The mains transformer is a small receiver-type of doubtful ancestry with an embarrassing number of taps. These connections are taken to a 5-pin socket on the rear panel. The variable resistors are chemical type and it is of advantage if they have stiffly bushed rotors. If not, it is worthwhile incorporating a simple drag on the shaft since it is important that the controls be positive in action. Care should be taken that the rectifier is connected in the manner shown, otherwise the transformer is subjected to voltage stresses for which it was not designed. The tube socket on the other hand is more able to withstand these abnormal voltages.

Construction

It cannot be too strongly emphasised that the golden rule in chassis work is " drill before bending." Unlike baseboard construction it is imperative that all components be assembled and checked before laying them out on the metal, since drilling even one extra hole in a chassis can be very awkward, while to shift a valve socket may be quite impossible.

The only component likely to give trouble is the shield, which is of No. 24-gauge steel; this should be bent to a pattern made from stiff wire tried in position over the transformer and control strip. The 9-pin tube socket is mounted on bakelite to avoid risk of flashover to the frame. The mounting holes are not scribed through however until a time axis has been traced on the screen, when the tube may be orientated to the correct position. When all the holes in the chassis have been drilled it may be bent and the transformer, input plug, rectifier socket, control strip mounted. Leads are then soldered between the transformer primary, input plug and the voltage adjusting socket. Any connections at the rear of the transformer should now be made, if necessary leaving them long. The rear panel may then be mounted, and the tap socket affixed.

All the connections may then be made, with the exception of the tube socket and condensers, using push-back wire and again leaving them long where prudent. The condensers are then mounted and wired with bare 20 s.w.g. The shield may be fitted with the bakelite socket panel pinned to the " step."

Adjustment

The following readings will act as a guide to the correct operation of the circuit when the mains supply has been connected :—

Secondary voltage, R.M.S.	=	500 volts.
Final anode voltage ..	=	500 volts.
Focusing voltage ..	=	65/185 volts.
Modulator voltage ..	=	0/−50 volts.

Connect Y1, Y2, X2, and the final anode. Clip a length of flex to the X1 terminal and let it trail on the bench. This will usually give enough pick-up to sweep the spot the full width of the screen. Rotate the tube until a straight line is obtained. If there is a kink in the line, it is due to the field of the transformer and

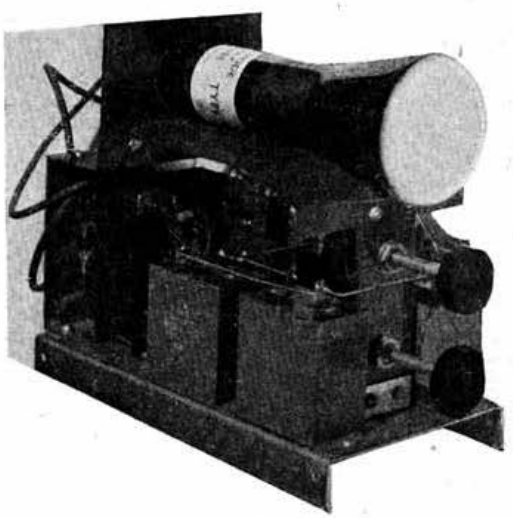

Fig. 3.
The Assembled Unit.
Prior to tracing a line and turning the tube.

* " Humewood," Highbury Grove, London, N.5.

this may be eliminated by clipping additional sheets of steel under the shield. When a clean line has been obtained the input panel may be mounted and the flanged on its longer sides. When the sides, top and bottom have been rivetted together and the front panel drilled, the latter should be bent, after careful

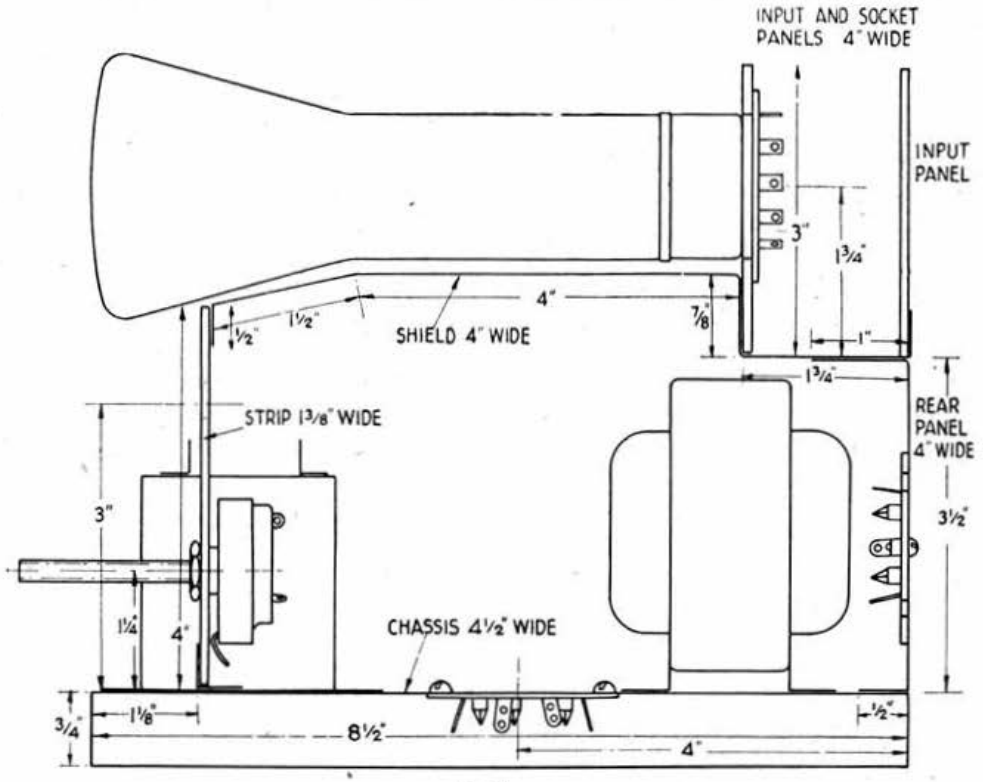

Fig. 2.
Chassis and Frame.
The sections are pinned together with ⅛ in. × ¼ in. brass R.H. screws.

chassis slid into the case which is of conventional design.

Case

Although the design lends itself to rack and panel mounting or case enclosure the latter is usually to be preferred, except where a continuous monitor is required. The model developed in this case is of No. 24 gauge steel and is in five parts. The two sides are channel-shaped with 1 in. flanges. The top and bottom are plain sheets, while the front panel is measurements of the box opening, and inserted. The chassis is held inside the case by two pins passing through the front skirt of the chassis.

Earthing

In the author's experience it is seldom necessary to earth a C.R.O. Should the occasion arise however, the connection should be made to the chassis. It is then important that when the pick-up leads are connected to a circuit the earthed lead goes to the "earthy" side of that circuit.

Holborn W.J.A.C. Needs Instructors

The General Secretary has been asked by the Chairman of the Borough of Holborn Youth Activities Committee to assist the Holborn Squadron Women's Junior Air Corps to obtain instructors in radio theory, morse, calculations, internal combustion engines and other allied technical subjects. Members with the necessary free time and qualifications, who would be willing to assist, are requested to communicate with the Secretary. Parades are held on Tuesday and Friday evenings (6.30 p.m.–8 p.m.) at Herbrand Street schools, near to Russell Square tube station.

New Address

Members of the Experimental Section Receiver Group are asked to note that the address of the Group Manager (Mr. H. R. Heap, B.Sc., G5HF) is now The Rectory, Little Waltham, Essex.

Thanks

The General Secretary and Miss Gadsden thank all members who sent them Christmas and New Year greetings. They appreciated in particular the large number of special airgraphs and airmail letters sent by members serving abroad.

Light Beam Telephony

Mr. H. N. Stott, BRS3675, 134 Mostyn Road, Middleton, Junction, Manchester, writes that a Light Beam Telephone was demonstrated, by courtesy of the Marconi Wireless Telegraph Company, at the Industrial Physics Conference on Vacuum Devices in Research and Industry held in Manchester during March, 1935.

The following description appeared in the Catalogue issued by the organisers of the Exhibition :—

"With this apparatus telephony can be received over distances of a few hundred yards up to two or three miles. A sodium or neon glow discharge tube is placed at the focus of a parabolic mirror which is provided with a searchlight mounting and sighting telescope. The tube is modulated by a small power valve to the grid of which speech currents are input. Alternatively, a constant intensity light source can be employed and the light from this can be modulated by a Kerr cell or other form of light valve. The receiver consists of a pick-up lens, photocell and L.F. amplifier. The diaphragm at the focus of the lens is provided with an adjustable aperture in order that the photocell may receive a maximum of modulated light and a minimum of scattered or extraneous light."

Mr. Stott states that the actual demonstration took place over a distance of about 150 ft. using ordinary telephone units.

A VALVE VADE MECUM

By B. W. F. MAINPRISE, B.Sc.(Eng.), Diploma Electrical Engineering (G5MP)*

PART IV—OUTPUT CURVES—SCREEN GRIDS

40. *Explain the curves shown in Fig. 7.*

Each of the curves shows the relationship between the anode voltage and the anode current when the grid voltage is kept steady at the figure marked at the upper extremity. They thus differ from the mutual conductance curves examined hitherto (and shown in Fig. 6), which were obtained by keeping the anode voltage steady, and noting the anode current for different values of grid voltage. These curves are often called "dynamic curves" and their great advantage is that they enable output power from a valve to be calculated much more conveniently than is possible with mutual conductance curves, which are more suitable for estimating the operating voltages and the permissible grid swing of earlier stages than the output valve.

Like the mutual conductance curves they are straight over a good portion of their length, and they are spaced at equal intervals.

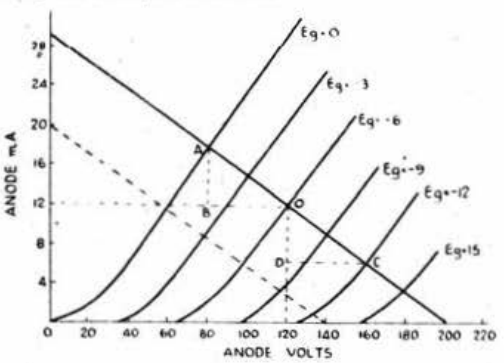

Fig. 7.
Anode voltage/anode current curves, showing a load line AC and output triangle AOB.

41. *Before proceeding to estimate the output power from a valve, a "load line" must be drawn across the dynamic curves. How would you draw a load line of, say, 7,000 ohms across the curves of Fig. 7?*

A load line represents a resistance, which in turn, is the ratio voltage/current. In dealing with slopes of curves we consider changes or increases of the units plotted. Suppose we take a convenient change of anode current, such as 20 mA. Then as our load line must represent 7,000 ohms, we have by Ohm's Law:

$$7{,}000 = \frac{\text{change of voltage}}{20/1000}$$

$$\therefore\ 140 = \text{change of voltage.}$$

(Note the factor 1,000 used to convert milliamperes to amperes.)

Accordingly we set off 20 mA along the current axis, and 140 volts along the voltage axis, obtaining two sides of a right-angled triangle; the closing side gives our load line of 7,000 ohms. which can be moved parallel to itself across the set of curves to any desired position.

* 43 Brunswick Hill, Reading.

42. *Having drawn the load line, how is it employed?*

Suppose we arrange our valve to operate with an anode voltage of 120, and a grid bias voltage of —6. Plotting this point gives the position O, and we can read off the anode current as 12 mA. This current, flowing through the anode load of 7,000 ohms, involves a voltage drop of 84 volts, so the total power supply volts must be (120 + 84), totalling 204 volts, and a load line of 7,000 ohms drawn through the operating point O, will be found to pass through the 204 volt point on the anode voltage axis. When a signal is applied to the valve the resulting anode current variations will move up and down the load line. Therefore, if the signal has an amplitude of 6 volts peak, the grid voltage will vary from its steady value of —6 down to 0 volts and up to —12 volts. The corresponding points on the load line will be A and C, the resulting anode currents being read off as 18 mA and 6 mA respectively.

The power output of the valve is given by the area of the right-angled triangle ABO, for the output is:—

$$\frac{\text{Change of peak volts}}{\sqrt{2}} \times \frac{\text{change of peak amperes}}{\sqrt{2}}$$

$$= \frac{\text{Change of peak (volts} \times \text{amperes)}}{2}$$

= area of triangle ABO, since the area of a right-angled triangle is half the product of its sides. (Note the term $\sqrt{2}$ which converts peak values into r.m.s. values).

43. *How can an amplified voltage be obtained from a valve?*

The valve is set operating with suitable values of grid and anode voltage, such conditions being termed the "static operating conditions." When an alternating voltage, comprising a signal, is superimposed on the grid bias, the anode current will vary, since the grid bias may be regarded as alternatively increasing and decreasing. These anode current variations flowing through the external impedance or "load" in the anode circuit will set up corresponding voltages. Since a small change of grid bias can produce considerable change of anode current, the voltages set up across the anode impedance can be made considerably greater than the ones we started with. Note that for amplification we must have a high impedance (which may be a resistor, inductance or tuned circuit) between the battery and the anode, so that voltage variations may be set up. It will not suffice to connect the battery directly to the anode of the valve, for the internal resistance of the battery, being of the order of perhaps 100 ohms, would act as a virtual short-circuit to the valve. Consequently when under certain circumstances we wish to connect the load of the valve in parallel with the battery instead of in series with it, we must connect a choke between battery and anode.

44. *What is the expression for valve gain?*

A voltage E_g in the grid circuit of the valve is equivalent to a voltage μE_g in the anode circuit. But the total resistance of the anode circuit is made up of R ohms for the load, and R_A ohms for the a.c. resistance

of the valve itself. These two resistances being, as it were in series, form a potentiometer, and so by Ohm's Law the voltage which we can use for applying to the following stage or equipment is given by $\frac{R}{(R + R_A)}$ of the total voltage in the circuit; in other words, $\frac{R}{(R + R_A)} \times \mu E_g$

As we started off with a voltage of E_g the gain has clearly been $\frac{\mu R}{(R + R_A)}$

45. *For high gain, should the anode load be high or low compared with the a.c. resistance of the valve?*

It should be high, for the higher we make it in comparison with the a.c. resistance of the valve, the more nearly will the gain approach the valve amplification factor.

An example will make this clearer. Take the case of a valve having an amplification 15 and an a.c. resistance of 10,000 ohms. If we use it with a load resistor of 10,000 ohms, the gain will be

$$\frac{15 \times 10{,}000}{10{,}000 + 10{,}000} \text{ or } 7{\cdot}5$$

If we make the anode load resistor considerably higher, say 50,000 ohms, the new gain will be

$$\frac{15 \times 50{,}000}{50{,}000 + 10{,}000} \text{ or } 12{\cdot}5$$—a worth-while increase.

The load resistor cannot, however be increased indefinitely, because the steady anode current of the valve would then result in an excessive voltage drop across the load, leaving only a small portion of the H.T. voltage available at the anode, but by using high supply voltages, and high load resistances we can arrange for a considerable voltage gain.

46. *Why is it that a triode valve may give excellent amplification on audio frequencies, but prove difficult to operate on radio frequencies?*

Fig. 8 shows a typical H.F. amplifier circuit employing a triode and tuned plate connection to the following stage. If efficient components are used it will be found that, however carefully the tuned circuits may be screened from each other, oscillations will occur when the plate circuit is brought into tune with the grid circuit, and consequently the usable amplification will be less than might be calculated. The reason for the oscillations is that the two circuits are coupled by the small capacitance which inevitably exists between the grid and the anode of the valve, so that variations in the plate circuit are fed back into the grid circuit for re-amplification and instability results. This coupling capacitance may be very useful in other applications, such as the tuned-plate-tuned grid oscillator, which this circuit really is, or as the capacitance coupling the " top " ends of two band-pass coils, but in an H.F. amplifier it is a great drawback and we have to reduce it as far as possible. We do this by adding a screen *inside* the valve, which we then term a " screen-grid " valve.

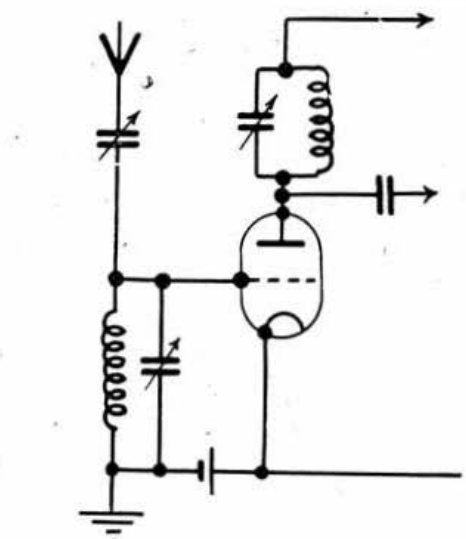

Fig. 8.
A triode H.F. amplifier stage, which readily behaves as a tuned-plate-tuned-grid oscillator.

47. *What does this screen-grid consist of, and how is it connected?*

We cannot put a screen of solid metal between grid and anode of the valve because this would prevent the emitted electrons from reaching the anode at all. Therefore the screen must have perforations. In practice it takes the form, for convenience, of a spiral of wire, much the same as the control grid. At first sight it would seem that this should be connected to earth for maximum screening efficiency, but if this were done the attractive effect of the anode on the electrons being emitted from the filament would be seriously impaired, for the electrons would have to pass first the control-grid, at a negative (and therefore repelling) potential, and then the screen-grid at zero potential. Accordingly we assist the electrons on their way by connecting the screen-grid to a positive tapping, somewhat lower than on the anode and often about 70 volts. The lead from screen-grid to power supply will, however, often be a straggling one, and will reduce the efficiency of the screen at the high frequencies present in the valve. Therefore we connect a condenser straight from the screen-grid pin to the earth line or chassis of the receiver, enabling this to be maintained at practically earth potential as far as H.F. currents are concerned, and yet permitting us to apply a positive D.C. potential at the same time. The value of this condenser is generally around 0·1μF.

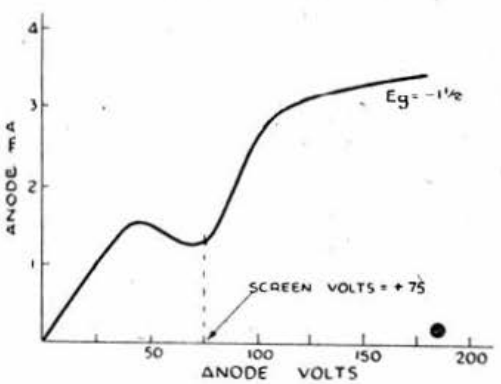

Fig. 9.
Anode voltage/anode current curve for a screen-grid valve. Note the pronounced kink in the curve due to secondary emission from the anode.

48. *What effect will this screen have on the shape of the anode volts/anode current curve?*

This curve for a typical screen-grid valve is shown in Fig. 9. A pronounced dip will be noticed and the reason for this is as follows.

Greetings

UPON taking office as President of the Society, I wish to extend cordial greetings to members everywhere. At this time I think especially of those who have gone from their homes to serve at sea, on land and in the air. May the many personal contacts which the war has brought about between them and the amateurs of other nations, lead to even closer co-operation than existed before, and to a strengthening of the Amateur Spirit when Peace returns.

I should also like to send greetings to the National Amateur Radio Societies of the British Empire, and United Nations. I hope that their members who visit us will return home with a full knowledge of our activities, our hopes and our aspirations.

My greetings also to the I.A.R.U. Societies still operating in neutral countries, and to the members of the I.A.R.U. Societies in subjugated lands, who will one day rise again to continue their work in the cause of radio science.

During my term of office as Executive Vice-President I was prevented by war conditions from devoting to the affairs of the Society as much time as I would gladly have given in more normal circumstances. However, I confidently share the wish, so earnestly expressed by our retiring President, that at some early date during my Presidency we shall witness that decisive victory of our Cause, which will bring with it freedom to resume our normal activities as radio amateurs.

I hope to find increasing opportunities to attend Provincial District Meetings and to visit some of the Service centres at which many of our most enthusiastic members are now to be found.

Finally, I extend my greetings and best wishes for a speedy return, to those members who have the misfortune to be prisoners of war. I trust that this message may find its way to them, and that they will read it as a reminder of the brighter future in which we have such complete confidence.

E. L. GARDINER (G6GR),
President,
Incorporated Radio Society of Great Britain

To obtain the curve, we set the valve operating with (in the case of the curve shown) a grid bias of $-1 \cdot 5$ volts and a screen bias of $+70$ volts. We then increase the anode voltage in steps from zero, observing the corresponding anode currents and plotting our readings.

Take the conditions when the anode is only a few volts positive. Some of the electrons from the filament will have shot through the spaces of the control-grid and be accelerated by the positive potential on the screen-grid. Those aiming between the wires of this mesh will pass through before they have time to be deflected and land; they will find themselves close to the anode, which, although only slightly positive, offers them a haven and they will land on that electrode. Consequently a small anode current will be registered. As the anode voltage is increased, the electrons will begin to land on it with such force that they will dislodge other electrons from the surface, just as a raindrop falling in a puddle splashes other drops from the surface. These dislodged electrons may hesitate for a moment and then decide to move to the screen which is more positive and thus is exerting a stronger attraction than the anode. A flow of electrons *away* from the anode means a reduction of anode current, and therefore a dip in the rising curve. This downward tendency will persist until the anode is made slightly more positive than the screen; then by exerting a stronger force it reclaims the dislodged electrons, which have less inducement to move towards the screen. Accordingly the curve will again begin to rise from this point onwards.

The dislodged electrons are called "secondary electrons" and the effect is known as "secondary emission." Secondary emission may occur at other electrodes in multi-electrode valves and become uncontrollable, resulting in permanent damage.

(To be continued)

A Celebration at "Twemigh"

Our newly elected Honorary Editor celebrated his return to Council by announcing the arrival, on January 3, 1944, of a third junior operator, Roger John Hugo. We offer our warm congratulations to Mr. and Mrs. Milne and wish the young man every happiness. As G6CL is to be his godfather he should at least learn how to dot his I's and dash his T's at an early age!

* * *

Congratulations are also tendered to F./Sgt. and Mrs. S. T. Hall, **G3BR**, who have been proud parents since September 19th last. The junior op. has been christened John Simon.

OUR FRONT COVER

THIS month we illustrate the Mullard ECH35—a representative type from the justly famous "E" range of Mullard Valves. The ECH35 is a triode-hexode frequency changer, suitable for DC/AC operation and having a high value of conversion conductance; variable-mu hexode control characteristics and low internal capacity.

KHAKI and BLUE

Cairo United Nations' Convention

We are indebted to A.C.1 Arthur Goode, 2DTQ, for sending by air mail an account of the United Nations Convention held in "The Bystander," Cairo, on December 7.

The morning meeting was attended by more than 50 amateurs but this figure was eclipsed later in the day when ninety-four persons, including 76 with call signs or BRS numbers, met under the Chairmanship of Mr. W. E. Marsh, SU1WM. No less than 11 SU amateurs, past and present, were introduced to the company, after which messages of greeting were read from G6CL and SU1SG. During the evening a collection, amounting to £8 16s. 0d. was taken for the R.S.G.B. Prisoners of War Fund.

The success of the venture was largely due to the efforts of SU1WM and SU1AX, the latter being responsible, by means of invaluable publicity, for the presence of at least 25 persons. Posters advertising the meeting were sent to many parts of Egypt and displayed in clubs and shops, both in Cairo and Alexandria. A suggestion to hold a meeting in Alexandria is being considered, but details are not yet available.

The following is a list of those who attended the meeting :—

G2LK, 2YK, 3IC, 3KB, GM3LG, G3NZ, 3PX, 3RW, 3TA, G4CG, FV, JY, LV, LW, G5NV, OI, QY, SI, UH, VX, WZ, G6GS, IX, PB, GI, G8DA, 8FF, OQ, PI, UI, 2DKX, DTQ, CGY, CUZ, 2FDT, FPL, FFM, FPY, FXZ, BRS3856, 4049, 4795, 4905, 6175, 6482, 6483, BRS A. Crealy, Fowles, SU1AX, 1DB, 1RD, 1RO, 1GT, 1MW, 1SP, 1WM, SU3CR, 5KW, 8RS, VE3ET/VE5VE, 4YR, 4AAY, ASL, QS, RX, VS1AJ/VU2EO, W2GLH/W8OPJ, W4EHK, W8JSU, W9MWF, ZE1JV, ZL2GT, 2KF, 2TL, 2WK, 2JD, ZS1DC/ZS2TJ, and ZS6A.

T.F.A.R.C.

Not one of Tommy Handley's latest tongue twisters but the initial letters of the latest amateur radio club to "set up shop" in North Africa. "T.F.A.R.C." signifies Tripoli Forces Amateur Radio Club with Headquarters at the Union Club Education Centre, Union Club, Tripoli, B.N.A.F.

From the Hon. Secretary, Sgt. Barns, 2COP, comes the news that membership is now 45, which total includes G3QV, 4LW, 6FK, 8PI, 8SD, GW3QB, 8WJ, 2DDF, 2BYT, 2DHV, 2FVK, BRS3594 and 4023. Newcomers are cordially welcomed to attend meetings of the Club on Wednesdays and Sundays at 17.00 hours. Already 15 short-wave receivers have been constructed and more are under way, whilst Morse instructional classes and lectures are well supported. Several members of the Club have applied for R.S.G.B. membership.

The object of the Club is to recapture some of the pre-war spirit of Amateur Radio. From the information to hand that object is being well and truly achieved.

To those responsible for this venture, we send greetings and best wishes.

* * * * *

● L./Cpl. R. M. Jeremy, **2CMJ,** claims to have been the first radio amateur to land on the mainland of Europe. He got ashore at an undisclosed spot a few hours after the initial landings (other claimants please join the queue !).

● From India comes news of W./O. E. Henman, **G6HM** and F./Sgt. A. Whitehead, **G2PR.** The former has now completed half of his four years spell of duty abroad.

● After four years at No. 1 S. D. W./O. Lambourne, **G5AO,** has left to take up special duties on a new unit.

● Cpl. F. Field, **2CFD,** has arrived in Sicily from N. Africa, and Sgt. Sturmey, **G8KL,** is now with a Combined Ops Unit.

● Friends of P./O. Frank Wyer, **G8RY** will join with us in offering him congratulations on becoming the father of a junior op. born on November 22, 1943. Frank landed in Algeria in September last, later moving into Tunisia, where he met G3UP and G3HA. He sends greetings to all who knew him at No. 1 Signals Depot and also to his friends in District 3.

● Ex-Cranwellians (Vintage 1935) will be interested to hear that S. T. Bindle, **BRS5270** is now proud father of a little lady who will one day answer to the names Katrina Anne. Bindle is now with the R.A.F. at Stafford where he has as colleagues Cpl. De Costa, 4270, and F./Sgt. McLean, 2CLS. His home address is 48 Newfield Road, Sleaford, Lincs.

● A.C.1 E. W. Bonsor, **BRS4702** (SEC. S., R.A.F., Ceylon), is anxious to meet any member serving in the island. He sends New Year greetings to all old friends in the London area.

● Ft./Lt. H. Bean, **BRS5816** after serving for seven years abroad is now back in London. He sends greetings to W./C. Wally Dunn, G2LR, and all ex-members of the Western Desert Amateur Radio Society. Does anyone know G2LR's address ?

● Ken Thompson, **4765,** writing from India where he has been for 18 months, says 4HK, 8HW and 2HKF are with him and that 2UQ was a recent visitor to his station. He sends greetings to all in District 17 and in particular to 2DVQ and 5960.

● Ernie Baker, **G5UQ,** who is still in South Africa, sends news of 6OB and 5KV. The former is in Gib. and the latter in India. UQ wishes to be remembered to his Tunbridge Wells friends.

● A recent visitor to H.Qs. was S./Ldr. John Curnow, **G6CW,** back from Italy after serving for three years in the M.E. and B.N.A. theatres of war.

New R.A.F. Radio Society formed at No. 1 Signals Depot.

F./Lt. John Clarricoats, G6CL (General Secretary of the R.S.G.B.) was the guest speaker at the inaugural meeting of the above Society held on Tuesday, December 21, 1943. The chair was taken by F./Lt. Norman Guy, G2DN, who had the support of G3BR, 5BG, 5BX, 5RF and nearly 50 other R.S.G.B. members and interested friends.

G6CL devoted part of his talk to the historical developments that have taken place since the formation of the Society in July, 1913. He spoke of the early pioneer work of British amateurs and paid a high tribute to the part which has been played and is still being played, by the " 3,000 odd members who have placed their amateur radio experience at the disposal of their country." He also stressed the international aspect of amateur radio and referred to the strength of " ham spirit " both in and out of the Services.

In regard to the future G6CL stated that the R.S.G.B. was pledged to press for the earliest possible restoration of licencing facilities. He referred to the arrangements which have been made with the G.P.O. whereby ex-Service personnel who have served in certain radio trades will be able, after the war, to obtain licences without resort to a technical test. Those who have served as wireless operators will, in like manner, he stated, be exempted from a G.P.O. Morse Test. The speaker looked forward to the creation of a bigger and even better BULLETIN after the war and invited his audience to offer contributions of a non-secret nature. He concluded his talk with an expression of good wishes for the future success of the newly-formed Society, and assured his listeners that there would be no lack of support from his colleagues for future meetings.

Our sincere thanks are extended to " Clarry " for a most enjoyable evening. BRS2689.

Congrats

● From *The Times* dated December 13, 1943, we read that F./Lt. E. Knowles, D.F.M., **G2XK,** of Morpeth, was Captain of a Liberator which combined in a surprise attack on a U boat during recent operations. As a result of the attack the enemy vessel was seen to break in halves and sink, leaving about thirty men in the sea. Ft./Lt. Knowles was a member of the R.A.F. Amateur Radio Society, Cranwell, prior to the war.

● Congrats to E. Y. Nepean, **G5YN,** on his promotion to the rank of Lt.-Colonel. After serving with 8th Army Signals for some time he joined a L. of C. Signals unit under Col. R. W. Bailey, G2QB, later moving on to the Ordnance Directorate, G.H.Q., M.E.F.

● Sgt. Wakeman, **G4FN** (Coastal Air Force, B.N.A.F.) has contacted W3HBJ, 5HDN and 8RVF. GM2ZN and 2BDT are working with him and 2CIW is in the vicinity. 4FN sends 73 to G2CD, 2YH, 3GF, 3GW, 5IL and 6VC and others from the Medway towns.

● F./Lt. Markham, **G6MK,** a medico in Persia, reports his engagement to Miss J. K. Bee of Pietermaritzburg. What about a rhombic and ZS5MK as a call ? " Marky " reports that G8AY and ZU6L are in Italy.

● Sgt. Reg Farr, **G8IJ,** who is with Bert Pashley, G6PJ, in India, puts in a strong plea for the retention of District Notes.

● R. W. Lay, **4268,** one of several British amateurs serving in Italy with the U.S. Army Signals Corps, is in touch with W2NHQ, 8HCA, 1MAR, W5IYQ, G6LZ and 6243. He has also met W8MGQ, who says that at least another half dozen W's are in the area.

● 1st Radio Officer W. E. Priest, **BRS5520,** would like to hear from old friends, who should write c/o International Marine Radio Co. Ltd., Liverpool 3. His home address is Lynfield, Crescent Road, Rhyl, Flints, N. Wales.

● Sgt. Harold Collard, **2CVA,** in a letter from No. 70 Staging Post, R.A.F., reports a meeting with G3UP—his only amateur contact since arriving at his destination. He wishes to be remembered to G3JO, 3LK, 6IF, 2CMR, ON4FT and all old friends in District 14.

Silent Key

The news that L.A.C. John Golder Stokes, of Queensborough, Isle of Sheppey, Kent, has died of wounds in a Java prisoner-of-war camp, will be read with sorrow by the many members who knew him as the operator of G8SS. Reported missing for 18 months after the capitulation of Singapore, the first intimation that he was a prisoner of war came in a telegram a few months ago. To his wife and other relatives we extend our deepest sympathies.

Letters to The Editor

Foreign Languages Vocabulary for Radio Amateurs

DEAR SIR,—With reference to the suggestion, for a Foreign Languages Vocabulary for Amateurs, made by Mr. Bryant (G3SB), in last month's BULLETIN, I think this an excellent idea.

Lack of some simple form of communication has no doubt prevented a number of interesting QSO's being made in the past. I well recall, before the war, hearing an ON calling CQ . . . F. in Morse. I went back to him but he refused to reply until I added to my call-sign the fact that I could work him in French, he then came back immediately.

If Mr. Bryant's scheme proved successful it might be a good idea to devise a new Q signal, which would indicate that the caller was capable of " conversing " in the necessary language.

In order to make the Vocabulary most useful, I suggest that all interested British Amateurs should first compile lists of the most likely phrases. These should then be collated and printed on a form which should be available for all foreign Amateurs willing to co-operate. Space should also be available for additions and suggestions which they might have to make.

The more simple matter of pronunciations of the letters of the alphabet and numbers could be dealt with separately.

If no application has yet been made for the work of collecting and tabulating the information, I should be prepared to undertake the task.

Yours faithfully,
E. H. PAULTON, (G4IT) (ex-Worthing).

Editorial Comment.

Mr. Paulton's offer is warmly appreciated and accepted. All communications dealing with the subject should be addressed to Mr. PAULTON, c/o R.S.G.B. Headquarters and marked " Vocabulary."

Diversity Reception

DEAR SIR,—With reference to Mr. Pittam's letter on the above subject published in the December BULLETIN, commenting on the data for optimum conversion conductance of frequency changer valves, the reason for the meter has been adequately explained in Mr. H. V. Griffiths' reply, but the issues raised by Mr. Pittam go further.

Most Valve Manufacturers publish a curve for mixer valves, plotting conversion conductance against either heterodyne volts or oscillator grid current, with a known and specified grid leak. This curve shows that the conversion conductance rises rapidly with heterodyne voltage to a maximum, then falls slowly to a nearly constant value of about 70 per cent. of the maximum.

The value of heterodyne voltage given in a valve catalogue is an optimum ideal design figure and is usually quoted at a point about 30 per cent. greater than the maximum point on the curve, since it is realised, as Mr. Griffiths points out, that the L-C. ratio in the oscillator circuit will cause variation in this voltage.

From the above remarks it may be argued that it would be better to quote a value say 100 per cent. higher than that for the maximum value but this brings in other questions. For example, the conversion impedance, that is the effective anode impedance, which is a shunt across the I.F. transformer primary, falls with increase in heterodyne voltage causing a further fall in effective conversion conductance. A large value of oscillator voltage causes generation of harmonics whilst at high frequencies another effect takes place which Mr. Pittam may be bothered about. His question to Messrs. Edison Swan Electric Co. was correctly answered but nevertheless he is right in saying that he would not, in effect, obtain the same conversion conductance at say 1 and 30 Mc/s. unless the valve and receiver design were perfect. He would generally obtain a lower figure at the higher frequency, not because the theoretical conversion conductance had dropped but because the effective or apparent conversion had dropped. This effect is brought about by the fact that there is unintentional coupling between the oscillator and the signal circuit both within the valve (in the form of capacities and disturbance of the virtual cathodes in the electron stream) and within the circuit (in the form of inductive or capacity couplings, commonly *via* wiring, and in the gang condenser particularly as a common impedance in the frame and rotor shaft). This unintentional coupling, in the forms mentioned above, is greatest at the highest frequency. The result of oscillator voltage appearing in the signal circuit is that it tends to de-modulate the mixer, producing the same effect upon the conversion conductance as reducing the heterodyne voltage. It may happen that increasing the strength of oscillation effects no improvement at all because this merely produces further de-modulation.

In some cases the voltage appearing in the signal circuit may be greater than the grid bias to the signal grid. If this is so, grid current flows, and if an A.V.C. circuit is used to this grid, a form of delay and squelch action takes place, with the result that all weak signals disappear, although strong signals are unaffected. This condition is obviously worsened if the oscillator output is increased, hence it is undesirable at high frequencies to use more heterodyne voltage than is essential.

Possibly the above remarks may clarify the difficulties which Mr. Pittam has in mind.

Yours faithfully,
D. N. CORFIELD (G5CD).

R.F. Fields or Supersonic Vibrations ?

DEAR SIR,—I have read with interest the letters from Mr. I. B. Clark, 2BIB (June issue) and Dr. G. F. Bloomfield (December issue), respecting Radio Frequency and Supersonic Effects. I carried out some experimental work prior to the present war in connection with R.F. effects on the crystallisation and the recrystallisation of steel. The former state refers to the change after melting, and return to the magnetic state, the latter having reference to reheating for treatment of hardenability.

Varying temperatures were employed (including Sub-zero) using Piezo Electric Quartz-controlled R.F. at fundamental frequencies, overtones and harmonics. Care was taken to ensure that only R.F. was influencing the control and cooling, and whilst some effects were noticed, in particular a very fine grained surface structure akin to a Nitrided deposition or inclusion, the results were not such as to warrant a paper being submitted or even prepared. These preliminary experiments however caused a good deal of thinking and it is hoped to pursue the matter further as soon as such work is again permissible, more especially as there appeared to be indications of both a chemical and physical change, but under the first conditions of experiment the apparatus and power was restricted to one frequency with its relative tones, and carried out with the earth magnetic influence, whereas it is thought that specific frequencies will obtain for specific compounds and in so far as metals (magnetic) are concerned, the field of control will require to be out of the " Magnetic sphere." To reduce any possibility of Thermal Inductive effect it is proposed to radiate the R.F. from remote coupled lines of a non-thermal inductive character.

As Dr. Bloomfield states, there does not appear to be any general published work dealing with, and giving specific results on, these matters, yet it seems to present a vast field to explore, more especially bearing in mind the exception quoted by Dr. Bloomfield in respect to the polymerising effect of a silent discharge at 500 cycles on rubber and a non-thermal vulcanisation of rubber directed by 50 Mc/s. R.F.* Whilst " heat " *via* induction, at Radio Frequencies, has been investigated in America with very useful result in respect of skin hardening of metals, so obviating scale or oxidisation, and without distortion, yet this method is purely the utilisation of a fine control of " heat " and does not enter the sphere of R.F. or Supersonic Vibrations.

High speed mechanical devices such as dynamos, aero engines, gyros, propellors and the like have vibrations set up which are mechanically traceable, yet on the other hand there are also Supersonics and possibly relative magnetic sphere influences which may have relation to that elusive destructive effect on metals, steel in particular, known as " fatigue."

Although this subject is not Amateur Radio yet the very fact of starting as such naturally brings about the application of knowledge gained therein to other spheres of research. Magnetism is one of the primary subjects to grasp for " radio " and it seems that this subject will also become the " final " solution of most of the phenonema of R.F. and Supersonics, the very elementary knowledge of magnetising an iron rod is a far greater and wide-reaching lesson than is at first realised, in addition to which there will no doubt be available to all, after the war, much research data and knowledge which will tend to extend this very interesting field—and more particularly a *new field of research of which little is known.*

Yours faithfully,
EDWARD S. ELLIOTT, M.J.Inst.E.

* " Thin Case Hardening," by Vernon W. Sherman (Federal Telephone and Radio Corporation), in the publication " Heat Treating and Forging," September and October, 1943.

DEAR SIR,—Further to Dr. Bloomfield's letter published in the December issue, I pass on the following few points which may be of interest to him and any other person who has been attracted by the question of High Frequency Fields and Chemical Substances.

Correspondence with Mr. Murfitt (BRS4071) has shown him to be of the opinion that the effects are two-fold. Firstly that the effects are similar to those shown by a silent electric discharge, *i.e.* the production of ozone, and secondly that they are similar to photo-chemical reactions such as are produced when molecules are activated sufficiently for them to react.

It is my own opinion that although the effects are similar to those produced by supersonic vibration, the " manipulative experiment " would have precluded this effect in one or two experiments that I conducted just prior to the outbreak of war.

For published information I am afraid that Dr. Bloomfield is on very barren ground, however the following sources of reference may provide him with some food for thought :—

C. L. Thomas, G. Egloft and C. Morrel, *Chemical Reviews*, 1941, Vol. 28.

A series of papers recently published in *Electronic Engineering* on the effect of R.F. on organisms.

There is a large frequency difference between those experiments quoted by your correspondent and the frequencies used by myself and the Germans (from whom I had my first contact with this subject), and I should therefore think that the results achieved are directly dependant upon the field, and not upon any vibrational effect. But the experimental backing for this statement must, alas, wait until after the war !

Yours faithfully,
I. B. CLARK (2BIB).

Radio Amateurs and the British Manufacturer

DEAR SIR,—We read with interest the letter from Mr. W. E. Beck (2ALG) in the R.S.G.B. BULLETIN, December, 1943, and think it a very good thing that both Amateurs and Manufacturers should get fairly before them the needs and requirements of each other, and Mr. Beck's letter has certainly done this from the point of view of the Amateur consumer. We therefore venture to express a few thoughts from the Manufacturers' point of view. There are two sorts of commodities which the Amateur requires :

(*a*) Those for which the demands are for very large quantities, *e.g.* valves, valve holders, condensers and the like.

(*b*) Components which are individually produced for specific requirements or experiments.

Goods falling within Class (*a*) can, of course, be made both in quantity and price on a competitive basis, and we think that British manufacturers should most certainly endeavour to comply with the needs of the consumer. We have little hesitation in saying that many of these goods have been easily able to hold their own in the past.

Goods manufactured under Class (*b*) are a very much more difficult problem to handle.

This Company has always specialised in Generators, Motor Generators and Rotary Transformers for wireless purposes and we have frequently produced machines which, although built round some type for which there may be a limited commercial demand, have none the less to be individually made, and perhaps no other similar sample has had to be reproduced. In such cases the price must necessarily be higher than could be obtained if made on a production basis and cannot thus be competitively made. On the other hand, we have little doubt that the quality achieved has invariably been of a high order, if we can rely on the letters of appreciation which we have received.

The Amateur can, however, rest assured that insofar as flexibility is concerned, this Company has always been ready to co-operate and endeavour to manufacture for a price which the Amateur can afford consistent with a craft production.

For ourselves, we shall be ready at any time to co-operate with the Society to fill such needs as the Amateur requires as economically as possible.

Recently the Association for Scientific Photography held a meeting at which many Consumers and Producers were present, and as a result of the discussion on Papers given, there is every indication of great promise that Consumers' requirements can be catered for. Might we suggest that a meeting for this purpose be organised by the R.S.G.B. ?

Yours faithfully,
For and on behalf of
W. MACKIE & CO., LTD.
EDWARD MACKIE,
Managing Director.

Aerial Systems and Post War Planning

DEAR SIR,—W3JIA writing in the October issue of *QST* raises a point, which, though the writer cannot recall having seen it discussed in any of the radio publications in this country, may well prove as important over here as Mr. Versace considers it is in the U.S. The attitude of the International Congress of Modern Architecture towards unsightly (?) aerials might quite easily be reflected in the post-war reconstruction plans of this country. Prior to the outbreak of war, I understand that there were quite a few local authorities, whose Regional Planning Committees were applying the " thin end of the wedge " by disapproving of, and in some cases banning altogether, the erection of rotary beam systems.

W3JIA cites as an example of this aerial-less planning, the model town of Greenbelt, D.C. In this community, the local amateurs were reduced to the expedient of working each other with " walkie-talkie " sets in the parks, due to the planners' veto on aerials of any description.

Most of us are interested in plans for the cities of the future, but we also have our own personal post-war plans for going back on the air. There have been many discussions on the renewal of transmitting facilities after the cessation of hostilities, with the result that we have high hopes for the future. Are these hopes to be dashed by some visionary whose eye is offended by some slender mast rising out of a sea of suburban rooftops ? Our transmitting licenses will be so much waste paper if we have no aerials.

In all probability the planners' abhorrence of aerials dates back to the early days of radio, when every back street sprouted a forest of poles of all heights and at all angles to the perpendicular. Admittedly, some of these did tend to become an eyesore with the passage of time and the ravages of wind and weather, but an aerial need not look unsightly, and the average amateur is usually careful to see that his mast is kept in good repair. A well-constructed mast or tower need not detract from the appearance of any property.

In the future, some measure of supervision over the erection and construction of masts, etc., is, perhaps, desirable : but subject to, say, the approval of the local surveyor's department, as in the case of garages, any type of aerial support in any location should be permitted. Should a plan of this type be adopted, perhaps the Society, or some other competent body would draw up a specification for the various types of mast supports, foundations, etc., acceptable to both the local authority and the amateur.

The general public is not wholly ignorant of the part which Amateur Radio and its devotees, are playing in the war effort but the public is notoriously short-minded, and once the war is over, John Citizen will once more remember the amateur only as the fellow who blots out Luxemburg in the middle of a Sunday afternoon broadcast. Is it not, therefore, time to strike whilst the iron is hot and the public in sympathetic mood, and crush, perhaps before its inception, any attempt to deprive us of our sky-hooks ?

Those members now serving overseas, and dreaming of post-war QSO's will not thank us, if, when they come home, they find we have sold their, and our, aerials, for a mess of wire-less architectural planning.

Yours faithfully,
G. E. SHACKLE (2DVQ).

Checking Polarity of D.C. Mains Supply

DEAR SIR,—In Part 2 of " Applied D.C." Mr. Forbes, 2BFC, after giving general precautionary advice, advocated the use of a single 230 volts test lamp to ascertain the polarity and " live " main of a 460 volts, three wire D.C. system. I would like to stress that such practice is, under certain circumstances, extremely dangerous and contrary to Home Office regulations ; only a double lamp of 460 volts rating should be employed where the system is known to be three wire.

Quite a number of such systems are privately generated by works, collieries, etc., and supplied by them to nearby cottages and, at present, military sites : in these cases the mid-wire, as in Public Supply systems, is ostensibly earthed. Since circuits of this type are primarily intended for heavy power supply, power and sub-station circuit breakers are highly set (500–1,500 amps.), and should an earth fault appear on an outer line, the fault current which flows is not normally great enough to trip the circuit breaker. Here we have a condition where numerous earth faults may develop on outer sub-circuit cables which are live to earth, and yet not affect the running of the plant other than by waste of power. Since such faults are usually intermittent, they pass unnoticed, but should all occur at once, as often happens in actual practice, the outer will now be nearer earth potential than the mid-wire. This means that the second outer will be at a potential to earth of any value between 230 and 460, depending on the severity of faults at first outer.

I am enclosing for your inspection chart clippings taken on the " earthed " mid-wire of a commercial system. The chart denotes " Voltage between Mid-Wire and True Earth," the calibration is direct reading timing being 1" per hour. It will be noted that very frequently the mid-wire is at potentials of over 200 volts to earth.

Yours faithfully,
A. L. ANDERSON (BRS4435).

Stamps to Banish Boredom

A communication has been received from Capt. J. S. Timpson, Queen's Royal Regiment, Hon. Administrator of The Forces Stamp Distributing Centre, in which he appeals to philatelists to assist in providing stamps for men on active service.

We quote from the leaflet sent by Capt. Timpson.

" If you knew of a lonely soldier interested in stamp collecting, but without the means to carry on his hobby, would you not gladly spare him a few of your less valuable duplicates ? Serving on isolated Anti-Aircraft Stations up and down the country are large numbers of actual and potential stamp collectors whose greatest enemy is the demon boredom (the Luftwaffe they know how to deal with !).

" To encourage stamp collecting in these circumstances a scheme has been approved by the Command Welfare Officer, Anti-Aircraft Command (Col. H. P. Mitchell, D.L., J.P., M.P.), for a free distribution of packets of stamps to those who desire them, and has been the subject of a Group Order. An envelope containing 100 assorted stamps is sent, from which the recipient is asked to abstract only those which are actually required ; the balance to be returned to the " pool." Further selections are sent as supplies permit.

" The co-operation of members who are philatelists is invited to keep the scheme going. If everyone contributes 100 or so duplicates it will bring pleasure and interest to a great number of enthusiasts who are temporarily cut off from the joys of philately. Old stamp books and catalogues will also be welcomed. All contributions will be acknowledged personally.

" Gifts of stamps, etc., should be addressed to Capt. J. S. Timpson, 51 Herga Court, Harrow-on-the-Hill, Middlesex."

Majestic Receivers

Apropos the paragraph published in the November 1943 issue which referred to the booklet of schematic diagrams etc. recently issued by International Majestic Radio Corporation, Ltd., we feel it desirable to point out that the price charged for the booklet (which contains 14 pages of diagrams and photographs) is two guineas. When making our earlier reference we were under the impression that the booklet was available at a nominal price to recognised Radio Service engineers.

★ **IS YOUR SUBSCRIPTION DUE ?**
PROMPT PAYMENT ASSISTS HEADQUARTERS

BRITISH ISLES NOTES AND NEWS

DISTRICT 1 (North Western)

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

There are few reports to hand due, no doubt, to the after-effects of the festive season. G3BW of Whitehaven writing by air mail from British East Africa invites any member who happens to be in his area to pay him a visit. His address is Ldg. R./Mech. W. H. Hodgson, P/RNSR 8554, c/o Port W./T. Officer, Naval Base, Kilindini, Mombasa. He looks forward to reading District Notes, so what about some reports?

Ashton-under-Lyne.—The next meeting of the Ashton-u-Lyne Radio Society will be held at A.T.C. Headquarters, Thompson Cross, Stalybridge on Sunday, January 23, at 2.30 p.m. Trolley bus 26 or 28. Service members are welcome to attend. Greetings for 1944 to all members. (*via* G5PX.)

The D.R. would like to thank all those who supported his candidature for membership of Council and looks forward to the opportunity of being of service to the Society and to those provincial members who live in this part of the country.

G6CX.

DISTRICT 2 (North Eastern)

D.R.: C. A. Sharp (G6KU), 316 Poplar Grove, Gt. Horton, Bradford. Bfd. 10772. Scribe: H. Beadle (G8UO), 13 Chandos Street, Keighley.

G3HA (R.A.F., B.N.A.F.) has recently been in hospital; we wish him a speedy recovery. 6KU has his double crystal-super in operation. 8JD is at sea again. 2317 (T.R. for Leeds) has been transferred to Carlinghow N.F.S. Batley and hopes to meet some of the locals. His new address is 27 Grovehall Avenue, Beeston, Leeds. 2BXS reports fit and well from the M.E. 4CL reports that the last letter budget was very small. Belated congrats. to 6479 (R.A.F.) on his marriage and promotion to F./Sgt. Mrs. 6479 is in the W.A.A.F. 4MC is now in GM. The T.R. for Halifax and Sowerby Bridge hopes to arrange meetings early in the New Year. Will local members not yet contacted please write him? Offers are also wanted from those able to give a talk on any subject appertaining to radio. The Scribe is willing to keep in touch, *via* mail, with any District 2 member. Best wishes for 1944.

The next meeting of the Morley and District Radio and Television Society will be held at the Morley Electricity Showrooms on February 6 at 3 p.m., wh n Mr. Hunter, Borough Electrical Engineer, will entertain members with a cinema show and a tour round the Electricity Works. R.S.G.B. members will be welcome. G8UO.

DISTRICT 3 (West Midlands)

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

Birmingham.—At a meeting of M.A.R.S., held on December 12, two U.S.A. visitors, W./O. Kiewel W9DPU, and Sgt. Preston, were made welcome. Cpl. Higgins (R. Sigs.) now serving in Wiltshire, wishes to be remembered to old friends.

The D.R. and Scribe send greetings to all members on active service. 2FDR.

DISTRICT 4 (East Midlands)

Deputy D.R.: A. E. Clipstone (G8DZ), 14 Epperstone Road, West Bridgford, Nottingham.

The D.R. extends compliments of the season to all members at home and overseas.

Derby.—G2OU in reporting that a meeting was held during Christmas at 3OZ expresses the hope that now activity has re-started in the town there will be good attendances at future meetings the dates of which will be announced later. He welcomes new member 7328 and extends an invitation to other members who have not yet "made their number."

Leicester.—The meeting held at G4FO on December 12 was a huge success, the Nottingham section swelling the number to 18. Very welcome among the visitors was Miss Joan Clarricoats (W.A.A.F.), BRS6888. The cinema gear was ably demonstrated by 4FO whilst lecturettes given by 2XD and Mr. D. R. Dryden were well put over and much appreciated. 2793, who is at present on the sick list, reports that his son, VS2AR, has cabled to advise the arrival of a second Junior Op. (YL). We wish *bon voyage* to F./Lt. Ridgway, G2RI, who is believed to be heading eastwards. His new address is A867, R.A.F. C/O A.P.O. 5995

Mansfield.—BRS7171 (the new T.R.) is making a tour of members in his area. Should anyone be missed please get in touch with him. It is suggested that local members should get together with a view to making arrangements to attend Nottingham meetings.

Nottingham.—The Christmas social held in St. Saviour's Rooms on December 18, proved a great success, for, in spite of bad weather, an attendance of over 70 was recorded. We were particularly pleased to welcome as our guest Miss Joan Clarricoats, (daughter of G6CL), who is on a W.A.A.F. course in the district. The Leicester and Mansfield T.R.'s were also present with members from both towns. During the course of the evening G8DZ, 5605 and 7171 said a few words to the party. Later a very good performance was given by David Ripon's "Highlight" concert party to whom grateful thanks are recorded. Local members desire to thank the Radio Editor of the *Nottingham Evening Post* for his valuable support during the past year, and look forward to his continued help in the coming year.

Peterborough.—A meeting has been arranged to take place at the home of the T.R., 2FQV, 32 Lime Tree Avenue, at 7 p.m. on January 23. Local members are asked to support this meeting, the first held in that town for some time.

Future Meetings.—Full details of future meetings appear under "Forthcoming Events." G8DZ.

DISTRICT 6 (South Western)

D.R.: W. B. Sydenham, B.Sc. (G5SY), Sherrington, Cleveland Road, Torquay. Torquay 2097.

Torquay.—A most successful meeting was held at the home of the D.R. on December 19. G2GK, 5SY, 2CAA, 2FWB, BRS3789 and 4543 were present. BRS 1006 was unable to attend to give his talk on modern methods of recording, but he sent along a number of records, including one in which he and his wife addressed the meeting. The demonstration proved very interesting and instructive and we thank Mr. Aldous for his help.

Exeter.—His many friends will be sorry to hear that Mr. Jago is still seriously ill in hospital. We most sincerely hope that he will soon be well again.

North Devon.—The D.R. was very pleased and gratified to be able recently to meet G3GH and 3BO. G5SY.

DISTRICT 7 (Southern)

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

Bournemouth.—There were few visitors last month, but contact was maintained between the locals and with absent friends—2DP, 4IJ, 4KV, 8BW, and 8BR. (*via* G2NS.)

Coulsdon.—4458 reports that one of his fellow workers used to operate under the call 2TV in the "spark" days. A welcome is extended to Mr. G. Light, ex VE3ABW, who has come to live in the area. (*via* BRS3003.)

Croydon.—The December meeting was attended by 2HP, 3DF, 3ST, 4NI, 5BT, 5PY, 8ID, 2BLA, 2FWA, 2HHD, 2HNO, 1545, 3003, 4063, 4095, 4324, 4814, 6064, 7212, 2DP and two visitors. A talk on Radio Transmitter Theory, given by 8ID was much enjoyed by all. Many questions were asked and satisfactorily answered by the speaker. 2FWA donated four tickets for B.B.C. Shows which were sold in aid of the P.O.W. Fund. The proceeds plus a collection produced £1 11s. 6d. A further collection made on behalf of the Y.M.C.A. Fund produced 16s.

See Forthcoming Events for details of next meeting.

(*via* G2DP.)

Reading.—Members resident in Reading and the surrounding area are cordially invited to attend a meeting to be held in that town on Saturday, January 22. As there have been several requests from Berkshire for a resumption of local activities it is now up to you all, old timer and new member alike, to support this meeting and so ensure regular Society gatherings in the town. (See Forthcoming Events.) Further details from Mr. Nash, 9 Holybrook Road, Reading. The D.R. hopes to attend this meeting.

General.—Sgt. Marwick, 2YK (Richmond, Surrey), in a letter from the Middle East, mentions that 3RW and GM3LG are in his unit and that 5QY and 5GB are within easy reach. He had a good time at the Cairo Convention on December 7 in company with 95 fellow amateurs. 4LV, also reports from the M.E. in a letter which had been rescued from "the drink" on its journey. He has met 2CIX and has traced 6RF as being in the neighbourhood. G5WP.

DISTRICT 11 (North Wales)

Deputy D.R.: C. Spillane (BRS1060), "Woodside," Meliden Road, Prestatyn.

BRS5520, just home from Dakar, made a number of contacts with District members during his leave. He has a store of experiences as radio operator to relate. 5770 (Coventry) reports by airgraph from India, where at his QRA the weather is about 120° in the shade! 6170, now at a South Wales sanatorium, is hoping to be quite fit again soon. In the meantime he is studying maths and radio theory and is looking forward to getting on with some practical work when he returns home.

GW4CK is now at an R.A.F. Station in the District, whilst 5FU is now in District 2. BRS1060.

DISTRICT 12 (London North and Herts)

D.R.: S. Buckingham (G5QF), 41 Brunswick Park Road, New Southgate, N.11. Enterprise 3112.

North London.—In spite of the fog G1YL, 3UH, 3FD, 5FA, 5QF, 6CL, 6OT, 6QM (plus YL) and 2FVX arrived to enjoy an evening meal at The Cock, Cockfosters, on Friday December 17. The festive spirit was in evidence—need we say more?

The next meeting will be held at BRS3386 on January 23. Book to Chase Side Tavern by 244 bus from Southgate tube station. (See Forthcoming Events.)

St. Albans.—Only G8FJ attended the last meeting at BRS4659. Others, including the T.R. were prevented by illness and for this reason no meeting has been arranged for January.

G5QF.

DISTRICT 14 (Eastern)

Scribe : L. J. Fuller (G6LB), 167 Galleywood Road, Chelmsford. Telephone : Chelmsford 3929.

The December meeting at G6LB was again well attended ; the locals were pleased to see G3SI from Thaxted. Two late, but very welcome visitors were W4GHK and W8WKO, recent arrivals in this country and both making their first visit to a British Amateur Station. They related many interesting stories about Amateur Radio in the U.S.A. W4GHK received his licence on September 2, 1939, and had the mortification of seeing, or rather hearing, the World's DX vanish under his very nose. Our old friend G2WG, of Hutton, Essex, reports all well, and busy on police duties. District 14 members, and all amateurs stationed in the locality, are asked to make a special effort to attend the Romford meeting on January 30. (See Forthcoming Events.)

G6LB.

Forthcoming Events

Jan. 22	District 7 (Reading section), 7 p.m. at The Comrades Club (first floor), Oxford Street, Reading.
Jan. 23	District 15, 3 p.m. at The Excelsior Hotel, 1 Ladbroke Gardens, Notting Hill, W.11
Jan. 23	District 4 (Nottingham section), 6.30 p.m. at G8DZ, 14 Epperstone Road, West Bridgford. Radio Quiz No. 5
Jan. 23	District 4 (Peterborough section), 7 p.m. at 2FQV, 32 Lime Tree Avenue, Peterborough.
Jan. 23	District 12, 3 p.m. at BRS3386, 22 Church Hill, Winchmore Hill. (Bus 244 from Southgate Tube Station to Chase Side Tavern.)
Jan. 23	District 15 (High Wycombe section), 2.30 p.m. at BRS 4782, 43 Melbourne Road. (326 Micklefield Estate Bus from Castle Street to Terminus. Postcard if attending.)
Jan. 29	London Meeting, 2.30 p.m. at the I.E.E. Presidential Address. (See separate announcement.)
Jan. 29	District 4 (Leicester section), 2.30 p.m. at 5605, 292 Gwendolen Road, Leicester.
Jan. 30	District 14, 3 p.m. at the Y.M.C.A., Romford.
Jan. 30	Scotland " A " District, 3 p.m. in the Royal Technical College, George Street, Glasgow. Enter by Montrose Street.
Feb. 6	District 7 (Croydon Area) and District 13 (South Central and Eastern Areas), 3 p.m. at Croydon Y.M.C.A., North End, West Croydon.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

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

It is with a certain amount of pride that we offer congratulations to our newly elected President, Mr. E. L. Gardiner (G6GR) who hails from this district, and we take this opportunity of assuring him of our support during his tenure of office. We are sorry that Mr. Hamer (G8BW) was unsuccessful in the Council elections, but admire his offer to come to London to attend meetings if he had been voted in.

Several members, including SP1HA, SP1QA and G5KT (now stationed in Somerset), sent good wishes for the New Year to their friends in the district.

Aylesbury.—Most members are too busy for radio, but the T.R. is trying to organise a dinner.

High Wycombe.—The T.R. extends New Year greetings and reports visits from 5156 and 5881. The latter home from VE, is congratulated upon obtaining his commission as is 4994 on his recent marriage. We offer him our best wishes for future happiness. G6IF, 4781 and 4782 are busy with gear.

G6WN.

DISTRICT 16 (South Eastern)

Deputy D.R. : W. A. Scarr, M.A. (G2WS), 8 Beckenham Grove, Shortlands, Bromley, Kent. Beckenham 1131.

The Deputy D.R. was glad to receive an illustrated Christmas greeting card from Sigm. George Haylock. Eddie Trowell, 2HKU (Sheerness) also received one of these cards. Cyril Olsen has been to see him.

District correspondence having dropped off very much of late the Deputy D.R. will be glad to hear from any member who is still active and interested.

G2WS.

DISTRICT 17 (Mid East)

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

BRS 7716 has been on leave from GI, where he sees quite a lot of the Atlantic. G2FT (B.B.C.) who is " hot " on the making of scale model aircraft, just missed being home for Christmas. G6GH sent seasonal greetings from the M.E. to all old friends. G5LL is " wintering in Sicily."

The D.R. regrets the brevity of these notes, but if you are a District 17 member the remedy is in your hands !

G5BD.

DISTRICT 18 (East Yorkshire)

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

Hull.—Our sympathy is expressed to G8UL, whose father has been seriously ill for the past few weeks and is still in a critical condition. We welcome a keen new member in Mr. Dick, 6895. 4530 (R.A.F.) was posted for overseas, but taken off draft the day before he was to have come on 14 days embarkation leave (much to his disgust). Mr. Woolridge, a M.N. radio officer, on sick leave, has applied for membership. 4590 is in the west country where he hopes to recruit some new members. 6OS is believed to have changed his business address. (*via* G3PL.)

Mr. R. C. Mayman, 859, who has left the Hull N.F.S. for the R.A.F. and is now on a radio mechanics course sends best wishes for the New Year to all his old friends and hopes to make some new ones in District 2.

Scarborough.—G6SO expresses thanks to all who sent him letters and cards of greeting and thanks all members who in any way helped to keep District 18 " on the map " during 1943. He appeals for continued and increased support (by way of more reports) for the New Year. Best Wishes to all and a speedy return to normal times once again.

G6SO.

Scotland

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

News is very meagre this month.

" A " District.—The usual monthly meeting was held on December 26. The next will be on January 30.

" H " District.—GM3ND, who was recently in Cairo, has now moved on to somewhere in North Africa. 8KQ has joined his ship and is again on the high seas. 8MQ reports, but has no fresh news. 2NQ has met several amateurs, including 8SQ, who sends 73 to all old friends in " H." The D.O. sends best wishes to " H " members abroad and at home.

GM6ZV.

Northern Ireland

D.R. : J. N. Smith (GI5QX), 19 Hawthornden Drive, Belmont Belfast. Telephone : Belfast 63323.

Northern Ireland members will learn with regret of the death within a very short time of one another of the sister and mother of the D.R., Mr. J. N. Smith, GI5QX. Our deepest sympathies are extended to Mr. and Mrs. Smith in their double bereavement. 5QX has himself only just resumed activities after a very severe attack of influenza. We also extend sympathy to Mr. Harold Mills, BRS5796, who lost a relative recently.

Ron Jenks, 2DYZ, has left us for other spheres—our good wishes go with him. Ian Campbell, 2DDI, on an aircrew course reports meeting old friends of earlier training days. Tom Arnold VU2AN, hopes to be back home soon. He has been serving in India for several years. We welcome new member Eric Sandys,

(*Continued on page* 111).

★ LONDON MEETING ★

Mr. E. L. GARDINER, B.Sc. (G6GR)

WILL DELIVER HIS

PRESIDENTIAL ADDRESS

at

A Meeting of the Society to be held at

The Institution of Electrical Engineers

SAVOY PLACE, Victoria Embankment, W.C.2

On SATURDAY, JANUARY 29th, 1944

The meeting will commence at 2.30 p.m.
followed by TEA at 4 p.m.

COUNCIL 1944

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, A.S.A.A., G2YD.
Honorary Editor: A. O. Milne, G2MI.
Immediate Past President: A. D. Gay, G6NF.

* *

Members: F. Charman, G6CJ, D. N. Corfield, D.L.C.(Hons.), G5CD, Wing-Com. G. R. Scott Farnie, GW5FI, F. Hoare, G2DP, Wing-Com. J. Hunter, G2ZQ, W. E. Russell, G5WP, H. W. Stacey, G6CX.

General Secretary: John Clarricoats, G6CL.

Annual General Meeting

Minutes of the Seventeenth Annual General Meeting of the Incorporated Radio Society of Great Britain, held at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2, on Saturday, December 18, 1943, *at* 2 *p.m.*

Present.—Mr. A. D. Gay (President) in the Chair, Mr. E. L. Gardiner (President Elect), Mr. H. A. M. Clark (Hon. Secretary), Mr. A. J. H. Watson (Hon. Treasurer), Messrs. Charman, Farnie, Matthews and Russell (Members of Council), John Clarricoats (General Secretary), and about 90 Members.

(1) *Previous Minutes.*

The President called upon the Hon. Secretary to read the notice convening the meeting after which Mr. Cullen proposed, Mr. Winsford seconded, and it was unanimously resolved that the Minutes of the Sixteenth Annual General Meeting, as published in the January, 1943, issue of THE R.S.G.B. BULLETIN, be taken as read and approved.

(2) *Audited Annual Accounts.*

Mr. Watson, in moving that the Audited Annual Accounts of the Society for the year ended September 30, 1943, be approved and adopted, explained that the purpose of the Past Presidents' Photographs Reserve Fund was to provide framed enlargements, after the war, of Past Presidents' photographs for display at Headquarters.

Mr. H. Bevan Swift (Past President) in supporting the motion that the accounts be approved and adopted, offered his congratulations to the Council upon presenting such a successful Balance Sheet.

The motion was carried unanimously.

(3) *Council's Report.*

It was proposed by Wing-Commander Farnie, seconded by Mr. Russell, and unanimously resolved, to accept and adopt Council's report for the year ended September 30, 1943.

(4) *Council Elections,* 1944.

The President announced that the following members had been elected to serve on Council for the year 1944 :—

Officers.

President, Mr. E. L. Gardiner, G6GR	Returned unopposed
Executive Vice-President, Mr. S. K. Lewer, G6LJ	
Hon. Secretary, Mr. H. A. M. Clark, G6OT ..	
Hon. Treasurer, Mr. A. J. H. Watson, G2YD ..	
Hon. Editor, Mr. A. O. Milne, G2MI	949 votes.

Members.

Mr. D. N. Corfield, G5CD	1,408 votes.
Mr. F. Charman, G6CJ	1,373 "
W./C. J. Hunter, G2ZQ	1,292 "
W./C. G. R. Scott Farnie, GW5FI	1,192 "
Mr. H. W. Stacey, G6CX	1,140 "
Mr. W. E. Russell, G5WP	1,109 "
Mr. F. G. Hoare, G2DP	966 "

The President reported that 1,492 Ballot Forms had been accepted and 45 rejected by the Scrutineers.

The following members were unsuccessful in the Ballot.

For the position of Hon. Editor.

Mr. E. H. Simmonds, G8QH	543 votes.

As Members.

Mr. F. Hamer, G8BW	808 "
Mr. G. A. Jessup, G4HG	638 "

The President congratulated those who had been elected and extended thanks to the unsuccessful candidates for allowing themselves to be nominated. Mr. Gay also thanked the Scrutineers (Messrs. Winsford, G4DC, and Laister, BRS3386) for judging the ballot which proved to be 300 per cent. heavier than any previous ballot.

(5) *Honorary Auditor.*

Mr. Watson moved, Mr. Hoare seconded, and it was unanimously resolved that Mr. John Ockleshaw be re-appointed Honorary Auditor for 1944.

(6) *Vote of Thanks to I.E.E.*

Mr. Bevan Swift moved that a hearty vote of thanks be recorded to the President and Council of the Institution of Electrical Engineers for permitting the Society to use the Institution for meetings during the past year. Mr. Swift also referred to the kindness of the President and Council of the I.E.E. in allowing Society members to attend meetings of the Wireless Section.

The motion was carried with acclamation.

There being no other business the President declared the meeting closed at 2.15 p.m.

* * *

Following the Annual General Meeting Dr. Smith-Rose (Honorary Member) delivered his lecture entitled " Measurements in Radio Experimental Work." (The paper will be published in an early issue.—Ed.)

The following members contributed to the subsequent discussion: Messrs. Charman, Dedman, Milne, Cullen, Emary, Gardiner, Hooke and Hobson. A vote of thanks to Dr. Smith-Rose proposed by Mr. E. L. Gardiner was carried with acclamation.

Before concluding the meeting Mr. Gay extended his personal thanks to the retiring Council for the support given to him during his term of office as President.

Presidential Address

Mr. Ernest Lett Gardiner, G6GR, will be installed as President of the Society at a meeting to be held on Saturday, January 29, 1944. Following his installation the new President will deliver an address. Members and visitors are cordially invited to attend the meeting which will commence at 2.30 p.m. Tea will be served free of charge at 4 p.m.

November Council Meeting

Resume of the Minutes of a Council Meeting held at New Ruskin House, on Monday, November 22, 1943, *at* 6 *p.m.*

Present.—Messrs. A. D. Gay (President), A. E. Watts, E. L. Gardiner, A. J. H. Watson, H. A. M. Clark, S. K. Lewer, F. Charman, D. N. Corfield, G. R. Scott Farnie, W. H. Matthews, W. E. Russell, W. A. Scarr, E. H. Simmonds and John Clarricoats (General Secretary).

Apologies were received from Messrs. Hunter and Jessup.

1. It was unanimously resolved to elect 265 Corporate Members and 12 Associates (56 applications for Corporate Membership were accompanied by references, whilst the remainder were sponsored by Corporate members). Mr. Marshall Harvey, Junior, BRS3996, was elected a Life Member.

2. The Shenstone Technical Society (A. C. Cossor Ltd.) were granted affiliation.

3. Owing to restrictions on the special paper required for the standard engraved membership certificate issued by the Society, it was decided, as a war-time measure, to design a small letter-press certificate.

4. It was reported that the Society had approached the newly-formed Radio Industry Council, with a view to being represented on that body. The Secretary of the R.I.C. had however intimated that the Council was comprised of representatives of manufacturing organisations only.

5. The Society's printers (Sir J. Causton & Sons, Ltd.) stated, in a letter, that due to further wage increases in the printing trade it had again been found necessary to increase the printing charges for THE BULLETIN by a further 7½ per cent. Council agreed to record that it had no alternative but to accept the increase, unless it sought competitive quotations, a procedure which would not be desirable at the present moment.

6. It was announced that sufficient paper had been allocated from the Book Publishers Reserve, to reprint 22,500 copies of the Handbook and 15,000 copies of the Supplement, instead of 30,000 copies of each as ordered. It was reported that 5,000 Handbooks and 4,000 Supplements from the new printings had already been ordered by the trade.

7. The monthly statement of account, and balance sheet were approved.

8. It was unanimously resolved that (*a*) the sum of £37 6s. 5d. depreciation be written off the Furniture and Fixtures Account, (*b*) the sum of £500 be placed to the credit of the Post-War Development Fund, and that this sum be invested in 2½ per cent. National War Bonds 1952–54 issue.

9. It was unanimously resolved that the audited Annual Accounts as submitted by the Honorary Treasurer be signed, printed and presented to the membership at the Annual General Meeting.

10. It was reported that Mr. A. O. Milne, G2MI, had been nominated for the office of Honorary Editor, and that Messrs. Hamer, G8BW, and Hoare, G2DP, had been nominated as Members of Council. It was recorded that steps had been taken to conduct a ballot in accordance with the terms laid down in the Articles of Association. To save expense the notice convening the A.G.M. and a copy of the Annual Accounts would be included in the envelope containing the ballot form and ballot envelope. Steps had been taken to conform to the requirements of Control of Paper Order No. 59 (1943).

11. The Annual Report of Council was examined and approved for presentation to the membership at the Annual General Meeting.

12. A statement prepared by the Committee set up to investigate and report upon suggestions for broadening provincial representation on Council after the war, having been circulated to members of Council prior to the meeting, it was agreed to place a copy in the Minute Book, and to draw the attention of future Councils to the recommendations which had been put forward.

The meeting closed at 8.15 p.m.

I.E.E. Wireless Section

At the I.E.E. Wireless Section meeting to be held on Tuesday, January 18, 1944, Mr. J. A. Smale, B.Sc., will open a discussion on "Comparative Merits of Different Types of Directive Aerials for Communications." Tea will be served from 5 p.m. and the meeting will commence at 5.30 p.m. By courtesy of the Council of the I.E.E. Society members are invited to attend this meeting.

Headquarters Address

A considerable amount of official correspondence continues to be sent to the General Secretary's private address. Members are asked to note that the address of the Society is now: New Ruskin House, 28/30 Little Russell Street, London, W.C.1. Those who act as sponsors to applicants for membership are kindly requested to record the above address on the application form, if the latter bears the temporary war-time address of the Society, *viz.* 16 Ashridge Gardens, Palmers Green, London, N.13.

Changes of Address

Members who change their permanent address are reminded that at least one month must elapse before the change can become effective for BULLETIN despatch purposes.

The Society cannot, under existing conditions, send the BULLETIN direct to a Service address. Members on Active Service should arrange for re-direction from their home address. Provided re-direction is effected promptly, no additional postage is required.

Technical Publications

Members are again reminded that no facilities exist at Headquarters for obtaining technical publications other than the A.R.R.L. and Radio Handbooks listed in the August issue of this Journal. Considerable inconvenience is caused by members who send cheques and postal orders for other publishers books when forwarding either their subscription or an order for American handbooks.

Cash Sales Department

The following items are now in stock at Headquarters:—

Members' Notepaper (new style), 100 sheets	3s. 6d.
Car Plaque of Emblem	3s. 6d.
Rubber Stamp of Emblem	3s. 0d.
Kilocycles to Meters Conversion Booklet	1s. 6d.

All the above items will be sent post free to any address in Great Britain on receipt of remittance. Orders for Eire are despatched *via* the Censorship authorities.

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

DONATIONS.—The General Secretary acknowledges with thanks on behalf of Council, receipt of donations from:—F. Taylor, 4249, 10s.; S. Buckingham, G5QF, 10s.; District 5 (Bristol), per G6RB, £1; L. Hill, G5WI, 5s.; District 14 (Romford), per G6LB, £1 1s.; W. A. Whitehouse, 7238, 1s. 6d.; Mrs. Jackson (wife of G6ZU), £1 1s.; D. R. Pugh, 3735, 2s. 6d.; W. L. Grummitt, 2CMP, 5s.; H. B. Jefferies, GM8HJ, 6s.; Anon, 4s. 7d.; E. F. Dawson, 5781, 10s.; Mrs. Woollatt (wife of G3ZI), £30; H. E. Webley, GW6JW, 10s. 6d.; J. V. Davis, 5625, 5s.; 2CNC and Office Friends, £2 12s. 6d.; F. L. Firth, G8JD, 5s.; J. R. Davis, 5966, 5s.; D. C. Derry, G8PQ, £1; A. Deeley, 5355, 5s.; H. W. Simpson, G8DI, 10s.; Lt.-Col. Bisdee, VS7MB, £1; L. W. Morgan, 7400, 5s.; Mrs. Woollatt (wife of G3ZI), £1 13s. 2d.; J. W. Trelease, 5815, 5s.; District 4 (Leicester), £1 13s. 6d.; P. M. Carment, G5WW, £5; A. E. Game, 5890, 15s.; Mrs. D. Neale (widow of G6GZ), £1 1s.; Anon, £2 5s.; D. T. Aldridge, 7114, 5s.; I. M. Gaye, 3580, £1; A. G. Cole, G3GS, 3s. 6d.; District 4 Social and A. E. Clipstone, G8DZ, £2; District 7 (Croydon), £1 11s. 6d.; A. P. Arnfield, G3LX, 10s. **Receipts to date, £1023 17s. 6d. Expenditure to date, £492 19s. 4d. Balance in hand as at December 31st. £531 18s. 2d.**

DESPATCHES.—Parcels were sent in October to 18 members and five non-members. Invoices for November and December despatches are not yet to hand.

SPECIAL THANKS.—To Mrs. Woollatt, wife of G3ZI, who has made a donation of £30 to the R.S.G.B. P.O.W. Fund—the proceeds of a sale of work held at the home of Mrs. Woollatt, Snr. A further £1 13s. 2d. was obtained from a raffle for a lemon.

News from the Kriegies

"Snowy" Campbell, **VK3MR** who was originally in Italy, now writes from Stalag Luft III (8B) under date of October 12, 1943, to say that he has been promoted to the rank of sergeant. His full address is Sgt. M. R. Campbell, R.A.A.F., No. 29604, Stalag Luft III (8B), Germany. (W.I.A. and other interested parties please note.)

The many friends of Lt.-Col. T. Whimster, **G8UJ**, of Driffield, Yorks, will be glad to hear that his family received a postcard from him on Christmas morning—the first direct news since his capture in Malaya two years ago.

1944 Edition A.R.R.L. Handbook

The 1944 Edition of *The Radio Amateur's Handbook* is now available to order through Headquarters. Delivery approximately 3 months. Price 10/6. Service or government establishment addresses must not be used.

Defence Edition A.R.R.L. Handbook

We understand from the A.R.R.L. that a few copies of this extremely useful publication are still available. The Defence Edition which runs to nearly 300 pages contains 15 chapters on a variety of subjects including Formulæ and Graphs, Electrical and Radio Fundamentals, Valves, R.F. Power Generation, Radio Telephony, Keying, Receiver Principles and Design, Power Supplies, Wave Propagation, Aerial Systems, Radio Equipment, Measuring Equipment, Workshop Practice, etc. Copies can be ordered through Headquarters, price 8s. 6d. each. Delivery three months. Service addresses must not be used.

"Radio" Handbook

Editors & Engineers Ltd. advise there will be no 1944 edition of the *Radio Handbook*.

The Recording of Cathode Ray Oscillograph Traces

The technique of recording cathode ray oscillograph traces was the subject chosen for the November meeting of the Association for Scientific Photography, the speakers being Mr. W. Nethercot (E.R.A.) and Mr. N. Hendry (Rotax Ltd.).

Mr. Nethercot's paper dealt with the recording of high speed transient phenomena by hot-cathode glass-bulb tubes and examples were shown of waveforms of 20 Mc/s. and over.

In single transient recording the beam traverses the screen only once and the exposure time of the film is therefore determined by the duration of the glow from the screen, since the actual traverse time may be only a fraction of a micro-second.

Photography by direct contact of the film with the screen has so many disadvantages that it is only suitable for transients of simple wave-shape where blurring of the trace and curvature of the screen do not affect the result appreciably.

The most satisfactory method is by means of a camera specially designed for daylight recording if necessary, and capable of using both slides and roll film. Negatives of useful dimensions can be obtained from a 5½ in. tube with a lens of 2 in. focus. Recent experiments have been made with a 2½ in. focus f.1 lens with the glass surfaces coated to reduce reflection losses.

It was suggested by the author that since the majority of the light emitted from a blue-screen tube (the optimum material for recording) is in the blue-violet region, it would not be necessary to use an achromatic lens, and also that the corrections necessary for a high grade camera lens would not be required for oscillographic recording at a fixed distance. It had been found that the best results were obtained with Ortho emulsions, such as the Kodak R.55 film, or Ilford 5.G.91. With panchromatic films the flow of the tube cathode frequently caused fogging on the centre of the record. Optimum development is given by a maximum speed and contrast developer such as the Kodak D.19.b. or Ilford 1.D.2., four to five minutes at 65°F. giving maximum density with no fog. An appreciable increase in negative density can be obtained by uranium intensifier.

Mr. N. Hendry, in dealing with the requirements of both cameras and tubes for recording, pointed out that small changes in the setting of the brilliancy control made large differences in the apparent recording sensitivity due to change in spectral emissivity of the screen with beam current.

For many purposes, particularly where the reproduction of records is not required and the highest speed is not necessary, recording paper is as satisfactory as film and more economical.

He had found two methods of intensification to give good results. The first was the usual mercuric iodide intensifier and the second one recently described in the *British Journal of Photography*.

Extreme cleanliness and the use of distilled water is essential to avoid staining. Certain types of film do not, however, respond to this treatment, the reason not yet being apparent.

In the discussion which followed Dr. H. Moss (A. C. Cossor) spoke of the correction necessary for screen curvature of the tube and Mr. G. Parr (*Electronic Engineering*) showed four simultaneous traces on recording paper taken from two gas-focused tubes with electronic switching of the beam.

BRS 7388

Section officer Margaret Mills, whose home is in Eastbourne, Sussex, is the holder of BRS number 7388. Mrs. Mills has just completed a W.A.A.F. signals officers' course at an R.A.F. radio school.

DISTRICT NOTES—*Continued from page 109.*

2FHN, now in India with the R.A.F. Cpl. Bradshaw, 2CIR, is a newcomer to GI. Ted Sutton, G3BN, who used to attend regularly at GI6YM sends greetings to all at the Y.M.C.A. Radio Club; we hope he still cherishes the Guinness QSL Card! The Club still continues to flourish and the Morse classes, which are held every Monday and Friday night, are very well attended. Although no report is to hand from Derry we understand that meetings are still going strong. The D.R. and T.R.'s wish the staff at H.Q.'s and all members a Happy New Year coupled with the hope that the incoming year will see the old familiar faces back again with us.

GI5HU.

EXCHANGE & MART—ADVERTISEMENT RATES

MEMBERS' private advertisements 2d. per word, minimum 3s. TRADE advertisements 4d. per word, minimum 6s. Box Numbers: 6 words, plus 1s. 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 30th of the month for following month's issue.

ALL KINDS OF PRINT.—Send your enquiries to G6MN, Castlemount, Worksop.

EDDYSTONE "All-World Two" wanted. Complete and in good order. State price delivered London.—Box 276, PARRS, 121 Kingsway, London, W.C.2.

FOR SALE.—Varley 3-stage permeability tuner, complete with dial, etc., two Raymart 465 kc/s. type IFA, DFA, IF transformers, two Bulgin, one Kinva, midget screened H.F. chokes. New, unused Bakers triple cone P.M. speaker, 15 ohms. Unused editions, Newnes *Complete Wireless*, set four volumes. Dowsetts *Handbook for Wireless Telegraphists*. Ferranti's *True Road to Radio*.—Offers G3LB, 25 Clotherholme Road, Ripon, Yorks.

GM6JJ requires 100 kc/s. crystal.—Full details and price to CRAIG, Glenlyon, Rotchell Road, Dumfries.

R.S.G.B. BULLETINS.—1935 to 1943, volumes 11 to 18. Also 36 copies *QST*, 1937 to 1939. All in good condition.—Offers GW6JW, 8 Bilton Road, Neath, Glam.

SALE.—Unused KT8, 6A6G, 15s. each. MHL4, 7s. 6d. Cosmocord Crystal Pick-up, 35s. Wanted: Good preselector, Skyrider 5–10, Hallicrafters HT7 frequency standard, "Radio" handbook. "Radio" 8, Cyldon or Polar condensers. Exchange perfect Sky Champion and cash for Skyrider SX16, SX17 or SX24.—Box 275, PARRS, 121 Kingsway, London, W.C.2.

SALE or Exchange.—1,800 British Colonial stamps, catalogue over £50. Also two loose-leaf Kent albums, one unused. Wanted: Universal meter, valve tester, oscilloscope.—Box 277, PARRS, 121 Kingsway, London, W.C.2.

SALE.—Hickock AC/DC electronic frequency modulator, £8. 6AC7/1852 valves (unused) £1. Wanted: 465 kc/s. crystal.—G4HV, 16 Keswick Gardens, Ruislip, Middlesex.

SALE.—B.T.H. pick-up and arm, 17s. 6d. Parmeko intervalve transformer, 15s. Parmeko 50 H. 50 mA choke, 10s. Eddystone quench unit, 3s. 6d. Ferranti AF6 transformer, 7s. 6d. Ferranti AF8 transformer, 5s.—G2YZ, 32 Onslow Drive, Sidcup, Kent.

TWO DA100 valves, two GU5 rectifying valves and Ediswan thermal delay switch, Rich & Bundy transformer, Primary 180–230 volts, Secondary 1,250–1,000–925–0–925–1,000–1,250 volts at conservative 125 m/amps, R. & B. transformer, Primary 200–230 volts, Secondary 2–0–2 volts at 7 amps for above rectifiers and delay switch. Condensers: T.C.U. type 121A, 1,500 V.D.C. working, 1–4 mfd, 1–8 mfd, 1–1 mfd, and type 131, 2,000 V.D.C. working, 1–1 mfd, also one "Peak" condenser 4 mfd, 1,500 V.D.C. working. All the above in working order but dismantled, £15 the lot. Many other R. & B. transformers, L.F. chokes, fixed condensers and resistors. Various unboxed and unused Eddystone short-wave components. Flexible couplers, Cat. No. 1009; U.S.W. coil bases, Cat. No. 1051; insulating pillars, Cat. No. 1028; S. W. & U. S. W. H.F. chokes, Cat. Nos. 1010 and 1011. New and unboxed Valves: two Cossor MVS-Pen, six Mullard TSP4, one Osram MSP4. Offers considered for Ferranti moving-coil M/ampmeters, 0–20, 0–50, 0–100 and 0–150, all in new condition. Seen by appointment after 8 p.m. Purchaser must be prepared to collect.—A. S. B., Rugeley, 7 Sandhurst Road, Sidcup, Kent. (Foots Cray 2559.)

WANTED.—Back numbers *QST* 1939 and 1940.—LACROIX, Templewood Lane, Farnham Common, Bucks.

WANTED.—Thordarson T29C27 high impedance choke. Good price offered.—J. NELSON, Sherwood, Queen's Promenade, Douglas, Isle of Man.

PATENTS AND TRADE MARKS

KING'S Patent Agency Ltd. (B.T. King, G5TA, Mem. R.S.G.B., Reg. Pat. Agent), 146a Queen Victoria Street, London, E.C.4. Handbook and Advice on Patents and Trade Marks free. Phone: City 6161. 50 years' refs.

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