



## VOLUME XXXVII

JULY 5th—DECEMBER 27th, 1935.

ALL RIGHTS RESERVED

Published from the Offices of "THE WIRELESS WORLD"  
ILIFFE & SONS LTD., DORSET HOUSE, STAMFORD ST., LONDON, S.E.1.

*Price Threepence net.*



# INDEX—VOLUME XXXVII

JULY 5th—DECEMBER 27th, 1935.

The following abbreviations used after page numbers will save time and labour by indicating the nature of the reference, thus giving an idea of its value or otherwise, to the intending reader. *B.B.* = Broadcast Brevities. *Constr.* = Constructional article. *Corres.* = Correspondence. *Edit.* = Editorial. *Gen.* = General article. *H.T.* = Hints and Tips. *Illus.* = Illustration. *L.G.* = Listeners' Guide. *News* = News of the Week. *R.P.* = Readers' Problems. *S.P.* = Short paragraph *Appar. Commer.* = Apparatus, Commercial. *C.N.* = Club News. *F.G.* = Free Grid. *R.R.* = Random Radiations. *Rec. Commer.* = Receivers, Commercial. *Prelim. Art.* = Preliminary Article. *Parts* = List of Parts.

## GENERAL INDEX

### ABACS:

- VI. Transmission of Sidebands by a Tuned Circuit, 68
- VII. Design of Iron-cored Chokes and Transformers Carrying AC only, 84
- VIII. Design of Gapped Iron-cored Chokes and Transformers Carrying DC, 108
- IX. The Comparative Efficiency of Gapped and Ungapped Chokes and Transformers Carrying DC, 262
- Automatic Calculator, 7 (*Appar. Commer.*)
- Resistance and Condenser Calculation, 39
- Abyssinia, 423 (*B.B.*); 359, 395, 419, 584 (*C.T.*); 459 (*Edit.*); 470 (*S.P.*)
- Acoustics in the Open, 351 (*S.P.*)
- Accumulators, 23, 67, 120, 240 (*Corres.*); 42, 399 (*H.T.*); 290, 482 (*R.P.*); 478, 520 (*R.R.*)
- AC/DC Receivers, 281 (*R.R.*)
- Addis Ababa and Radio Reporters, 423 (*B.B.*)
- Aerial Development during Forty Years, 344, 368, 397, 468 (*Gen.*)
- Aerials, 300 (*H.T.*); 337 (*Corres.*); 360 (*R.P.*); 384 (*R.R.*)
- African Broadcasting Corporation, 615 (*C.T.*)
- Air-Cored Inductances, 490 (*Gen.*)
- Aircraft Landing Systems, 439 (*C.T.*); 567 (*Gen.*)
- All-Mains Receivers and Power Consumption, 432 (*R.R.*)
- Wave Receivers, 152, 536 (*R.R.*); 153 (*Gen.*); 477, 602 (*Corres.*)
- Amateur Performers in America, 91 (*R.R.*)
- Transmitters, 532 (*S.P.*)
- Transmitters and Licences, 467 (*C.T.*)
- Transmitters Repeat History, 491 (*C.T.*)
- America, 54, 78, 347, 370, 467, 584, 615, 639, 661 (*C.T.*); 407 (*B.B.*)
- and Wireless Traffic via England, 502 (*R.R.*); 517 (*C.T.*)
- American Annual Radio Prizes, 546 (*C.T.*)
- High Power Stations, 273 (*C.T.*)
- High Quality Receiver, 23, 67 (*Corres.*)
- Receiver Census by Telephone, 503 (*R.R.*)
- Receivers, 37 (*R.R.*); 78 (*News*)
- Amplifiers, L.F., 678 (*Pat.*)
- Screen-Grid, 608 (*Pat.*)
- Amsterdam and Wireless Masts, 347 (*C.T.*)
- Anglo-American Radio and Television Society, 422 (*C.N.*)
- Anode Current and Tuning, 42 (*H.T.*)
- Anti-Noise League, 78 (*News*)
- Apparatus Reviewed (*see under* APPARATUS, COMMERCIAL, and RECEIVERS, COMMERCIAL)
- Arabia, 192 (*C.T.*)
- Argentina, 107 (*C.T.*)
- Armistice Day, 467 (*C.T.*)
- Athlone to Relay America, 250 (*Gen.*)
- AT THE TRANSMITTING END, 438, 478, 508, 516, 540, 558, 581, 621, 660
- Atmospherics, 264 (*R.P.*)
- Australia, 273, 661 (*C.T.*); 651 (*B.B.*)
- Australia's Oldest and Youngest Operators, 273 (*C.T.*)
- Wave Changes, 439 (*C.T.*)
- Austria, 661 (*C.T.*)
- Automatic Guide, 661 (*C.T.*)
- Noise Level Control, 434 (*F.G.*)
- Record Changers (*see Record Changers*)
- Selectivity Control (*see A.S.C.*)
- Squeal Control, 408 (*F.G.*)
- Tuning Receiver, 154 (*S.P.*)
- Volume Control (*see A.V.C.*)
- Autumn Overhaul, 384 (*R.R.*)
- Avanti Ferranti, 504 (*F.G.*)
- A.R.R.L., 347 (*C.T.*)
- A.S.C., 377, 554 (*Gen.*)
- A.V.C., 122, 264, 482 (*R.P.*); 348 (*Gen.*); 433 (*Corres.*); 630 (*Pat.*)

**BACKGROUND** Noises, External (*see under* TROUBLE, EXTERNAL)

— Noises from Mains or Receiver (*see under* TROUBLE, INTERNAL)

Baffles (*see under* LOUD SPEAKERS)

- Balloons, 227, 314 (*F.G.*)
- Battery or Mains, 246 (*Gen.*)
- Receivers, 477 (*Corres.*)
- Receivers and H.T. Supply, 602 (*Corres.*)
- Receivers and Quality, 158 (*Corres.*)
- Baseball, 439 (*C.T.*)
- B.B.C.:
- Abyssinia, 359 (*C.T.*)
- Alan, A. J., 313 (*B.B.*)
- Alexandra Palace (*see under* TELEVISION)
- Alternative Programmes, 566 (*F.G.*)
- American Relays, 236 (*B.B.*)
- Ashbridge, Sir Noel, 479 (*B.B.*)
- Askew, Paul, 575 (*B.B.*)
- Autographs, 160 (*B.B.*)
- Autumn Plans, 260 (*B.B.*)
- Backward Children, 505 (*B.B.*)
- Bata, 652 (*R.R.*)
- Beaumaris Station, 384 (*R.R.*)
- Beerbohm, Max, 547 (*B.B.*)
- Bewclay Station, 520 (*R.R.*)
- Bisley Broadcast, 91 (*R.R.*)

**A**PART from the General Index, the following twelve classified indices, arranged alphabetically, are provided for the convenience of readers:—

- APPARATUS (Commercial).
- APPARATUS (Constructional).
- BOOKS.
- BROADCASTING STATIONS.
- LOUD SPEAKERS.
- RECEIVERS (Commercial).
- RECEIVERS (Constructional).
- SHORT WAVES.
- TELEVISION.
- TROUBLE (External Interference).
- TROUBLE (Internal).
- VALVES.

- Boulton, Dr. Adrian, 376 (*B.B.*)
- Breakdown Apologies, 423 (*B.B.*)
- Brewer, Charles, 457
- Bridgeman, Caroline Viscountess, 479 (*B.B.*)
- Bridgeman, Viscount, 219 (*C.T.*)
- Bridgewater, Leslie, 479 (*B.B.*)
- Broadcasting House, 376, 615 (*B.B.*)
- Broadcasting House Statistics, 376 (*B.B.*)
- Brooklands Broadcast, 359 (*C.T.*)
- Budapest Broadcast, 194 (*B.B.*)
- Burghead Testing, 601 (*B.B.*)
- Buses, 92, 651 (*B.B.*)
- Cairo Relay, 359 (*C.T.*)
- Cannell, J. C., 505 (*B.B.*)
- Carpendale, Vice-Admiral Sir Charles, 194, 238 (*B.B.*)
- Censorship of Programmes, 97 (*Edit.*); 200 (*Corres.*)
- Changes, 56 (*R.R.*)
- Christmas Holidays, 676 (*B.B.*)
- Christmas Programmes, 601 (*B.B.*)
- Cissies, 260 (*B.B.*)
- Clark, Edward, 376 (*B.B.*)
- Clark, J. Beresford, 92 (*B.B.*)

### B.B.C.:

- Classify Broadcasts for Regular Hours, 655 (*Edit.*)
- Cock, Gerald, 160, 457, 547 (*B.B.*)
- Collins, Al, and Orchestra, 676 (*B.B.*)
- Conductors on Turntable, 324 (*F.G.*)
- Cup Final Broadcast, 358, 432 (*R.R.*); 423 (*B.B.*)
- Current Topics, 336 (*B.B.*)
- Cycling, 530 (*B.B.*)
- Dance Band Audition, 575 (*B.B.*)
- Dance Band Director, 92 (*B.B.*)
- Debates, 338 (*B.B.*); 520 (*R.R.*)
- Deputy Director-General, 238 (*R.R.*)
- Dog Damages, 651 (*B.B.*)
- Droitwich Heard in Australia, 651 (*B.B.*)
- Early Memories Broadcast, 313 (*B.B.*)
- Eckersley, R. H., 66 (*B.B.*)
- Edinburgh Announcer's Oversight, 547 (*B.B.*)
- Educational Broadcasts, 478 (*R.R.*); 530 (*B.B.*)
- Effects Department, 483 (*Edit.*)
- Egyptian Relay, 313 (*B.B.*)
- Empire Broadcasting, 1, 577 (*Edit.*); 15, 43, 230, 336, 376, 479 (*B.B.*); 82, 578 (*Gen.*); 604 (*R.R.*)
- Engineers' Self-effacement, 505 (*B.B.*)
- Errors in Scrapbooks, 638 (*F.G.*)
- Erratic Work in Control Room, 631 (*Edit.*)
- Experimental Broadcasts, 423 (*B.B.*)
- Flat Dance Band Transmissions, 602 (*Corres.*)
- Fletcher's Flying Squad, 676 (*B.B.*)
- Football Broadcasts, 376 (*B.B.*)
- Football Commentaries and Cold Feet, 674 (*R.R.*)
- Gilliam, Lawrence, 625 (*B.B.*)
- Graves, Cecil, 92, 625 (*B.B.*)
- Greene, Felix, 575 (*B.B.*)
- G.W.R. Centenary, 236 (*B.B.*)
- Hall, Henry, 15, 43, 160, 376, 407, 457 (*B.B.*)
- India Reception, 1 (*Edit.*); 120 (*Corres.*)
- In Town To-night, 505 (*B.B.*)
- Kelley, Kneale, 92 (*B.B.*)
- Keying of Programmes, 638 (*F.G.*)
- Johnstone, Maurice, 376 (*B.B.*)
- Lawrence, Brian, and Orchestra, 676 (*B.B.*)
- Little Nationals, 281 (*R.R.*)
- Lotbiniere, S. J., de, 160 (*B.B.*)
- Magic Lantern Idea, 530 (*B.B.*)
- Maida Vale, 92, 479, 615 (*B.B.*)
- Maschwitz, Eric, 92, 287, 505, 575 (*B.B.*)
- Master Mixer, 324 (*F.G.*)
- McCormick, Jack, and Orchestra, 676 (*B.B.*)
- "Memories," 547 (*B.B.*)
- Menzies, Major, 575 (*B.B.*)
- Murray, Gladstone, 66, 92 (*B.B.*)
- Music Hall Audiences, 313 (*B.B.*)
- Music Hath Charms Broadcast, 457 (*B.B.*)
- National Anthem, 43 (*B.B.*)
- Naval Review Broadcast, 91 (*R.R.*)
- New Dance Band, 160 (*B.B.*)
- New Mixer Panel, 336 (*B.B.*)
- New Year's Celebrations, 625 (*B.B.*)
- New Year's Resolutions, 676 (*B.B.*)
- New York Office, 236, 336, 575 (*B.B.*)
- News Agencies, 291 (*Edit.*)
- Nicolls, B. E., 194 (*B.B.*)
- Night Falls on Slow-on-the-Uptake Broadcast, 457 (*B.B.*)
- Norman, Ronald Collett, 407 (*B.B.*)
- North-Eastern Regional Station, 520 (*R.R.*)
- North Scottish Regional Testing, 601 (*B.B.*)
- Observatory, 504 (*B.B.*)
- O'Donnell, B. Walton, 194 (*B.B.*)
- Old Crocks' Race, 676 (*B.B.*)
- Olympia Broadcasting, 236 (*B.B.*)
- Olympia Religious Service, 194 (*B.B.*)
- Olympia Sideshows, 239 (*Gen.*)
- "On the Spot" Broadcast, 575 (*B.B.*)
- Opera Profests, 530 (*B.B.*)
- Outside Broadcasts and More Scope, 25 (*Edit.*)
- Paderewski, Ignace, 370 (*C.T.*)
- Parliamentary Responsibility, 652 (*R.R.*)
- Payne, Jack, 43 (*B.B.*)
- Performing Right Society, 160, 530 (*B.B.*)

**B.B.C.:**

Pneumonia Plays, 566 (F.G.)  
Programme Preservation, 505 (B.B.)  
Programme Timing, 521 (R.R.)  
Programmes Relayed by Berlin, 359 (B.B.)  
Promenade Concerts, 66 (B.B.)  
Promotions, 194 (B.B.)  
Rat-Catcher Broadcast, 505 (B.B.)  
Raymond and Orchestra, 676 (B.B.)  
Recording Over Long Land Line, 15 (B.B.)  
Recording Rooms at Maida Vale, 479 (B.B.)  
Record and Alternative Programmes, 566 (F.G.)  
Records or Live Turns, 505 (B.B.)  
Reith, Sir John, 119, 194 (B.B.)  
Ribbon Microphones, 15 (B.B.)  
Robb, Eustace, 287 (B.B.)  
Robey, George, 676 (B.B.)  
Ronald, Sir Landon, 395 (C.T.)  
Roy, Harry, 191 (R.R.)  
Royal Christening Broadcast, 423 (B.B.)  
Royal Command Variety Performance, 358 (R.R.)  
Saturday Magazine, 313, 376 (B.B.)  
Scarlet Pimpernel Broadcast, 676 (B.B.)  
Schools Broadcast, 43 (B.B.)  
Schools for Mentally Defective Children, 505 (B.B.)  
Scott and the Antarctic, 119 (B.B.)  
Scottish Regional Interval Signal, 313 (B.B.)  
Scottish Signal Strength Variations, 43 (B.B.)  
Scrapbooks, 601 (B.B.)  
Scrapheaps and Scrapbooks, 547 (B.B.)  
Sharman's Shows, 160 (B.B.)  
Should Advertise its Programmes, 553 (Edit.)  
Siepmann, C. A., 66 (B.B.)  
Snooker Commentary from Thurston's, 547 (B.B.)  
Song Plugging, 433 (Corres.)  
Staff Changes, 66, 92 (B.B.)  
Standard Frequency Broadcasts, 120 (Corres.)  
Statistics at Broadcasting House, 376 (B.B.)  
Sunspot Control, 505 (B.B.)  
Symphony Orchestra Mystery, 194 (B.B.)  
Tallents, Sir Stephen, 66, 119, 313, 625 (B.B.)  
Tatsfield, 313 (B.B.)  
Telescope, 505 (B.B.)  
"The Little Show" Broadcast, 458 (R.R.)  
Time Signal, 194 (B.B.)  
25, Portland Place, 119 (B.B.)  
Ullswater Committee, 25 (Edit.); 92, 336, 457, 530, 651, 676 (B.B.); 152 (R.R.)  
Unemployed Conductors, 201 (F.G.)  
Unrehearsed Debates, 673 (R.R.)  
Use of Gramophone Records, 314 (F.G.)  
Variety of Music, 313 (B.B.)  
Verifications, 260 (B.B.)  
Volume Control, 488 (Edit.); 574 (Corres.)  
Wallace, Edgar, 575 (B.B.)  
Waterloo and Maida Vale, 15 (B.B.)  
Waterloo Studio, 457 (B.B.)  
Watt Bicentenary, 676 (B.B.)  
Wellington, R. E. L., 66 (B.B.)  
Welsh Relay Station, 384 (R.R.)  
Whitley Council, 119 (B.B.)  
Wildest Warwickshire, 423 (B.B.)  
Women Announcers, 37 (R.R.); 313 (B.B.)  
Wookey Hole Broadcast, 160 (B.B.)  
Wright, Kenneth, 376 (B.B.)  
Wynn, Roland, 359 (R.R.)  
Young Ideas Programme, 336 (B.B.)  
Beecham, Sir Thomas, 504 (F.G.)  
Belgium, 107 (News); 219 (C.T.)  
Bell Telephone Co. and Load Lines, 432 (R.R.)  
"Best" Receiver, 432 (R.R.)  
Bias, Automatic, 360 (R.P.)  
Birth in Transmitter Room, 273 (C.T.)  
Blind Aids: Talking Books, 463 (Gen.)  
Landing at Heston, 459 (C.T.)  
Landing Systems for Aircraft, 567 (Gen.)  
Radio Playwrights, 651 (B.B.)  
Wireless for, 584 (C.T.)  
Blueprints for the Home Constructor, 605  
Bohemian Nights Entertainment, 665 (F.G.)  
Bombing of Power Stations, 411 (Edit.); 433 (Corres.)  
Bradford Experimental Radio Society, 422, 494 (C.N.)  
Brailard, Raymond, 615 (C.T.)  
Brazil, 370 (C.T.)  
Bridge Broadcast between U.S.A. and Buenos Aires, 467 (C.T.)  
Bringing an Old Set Up to Date; Ekco Model S.H. 25 DC, 412 (Gen.)  
Britain and Broadcasting: Leslie Bailey's Tour, 436, 464, 602, 492, 518, 560, 616 (Gen.); 546, 584 (C.T.)  
British Receivers Abroad, 44, 67 (Corres.); 107 (News)  
Broad Humour, 552 (F.G.)  
BROADCAST BREVITIES, 15, 43, 66, 92, 119, 160, 194, 236, 260, 287, 313, 336, 376, 406, 423, 457, 479, 505, 530, 575, 601, 625, 651, 676  
Broadcasting (see under B.B.C.)  
Stations (see under BROADCASTING STATIONS)  
Brussels Wavelength Bureau, 301 (C.T.)  
Buenos Aires Wavelength Plan, 261 (Gen.)  
Bulgaria, 301 (C.T.)  
Bulgin Circuits, 325 (C.T.)  
Bulldog and Wireless Danger, 376 (C.T.)  
Byrd, Admiral, 370 (C.T.)  
B.E.R.U., 107 (News)  
Books Received (see under BOOKS)

**CABINETS, 311 (R.R.)**

Cairo Radio Conference, 370 (C.T.)  
Campbell Swinton, the Pioneer, 591 (Gen.)  
Car Radio, 78, 135, 419, 584, 661 (C.T.); 190 (R.R.)  
Radio in America, 563 (C.T.)  
Catalogues Received (see under BOOKS)  
Cathode Ray (see under TELEVISION and VALVES)  
Chelmsford Passes, 358 (R.R.)  
China, 648 (Corres.)  
Children, and Women Broadcasters, 503 (R.R.)  
Chinese Children's Hour, 337 (R.R.)  
Choke Design, 18 (Gen.)  
Input Filters, 644, 672 (Gen.)  
Choosing a Dealer, 435 (Edit.)  
a Milliammeter, 589 (S.P.)  
a Receiver, 162, 590 (Gen.); 600 (H.T.)  
the Intermediate Frequency, 26 (Gen.)  
Christmas, 577 (Edit.); 586 (F.G.)  
Christmas Issue, 577 to 607  
Radio Greetings, 615 (C.T.)

**Cinema Quality, 44 (Corres.)**

CLUB NEWS, 422, 494  
Co-axial Cable, 312 (R.R.)  
Coils, Air-Cored, 490 (Gen.)  
Colonial Broadcasting Service, 651 (B.B.)  
Commercial Enquiries, 203  
Commercial Products (see under APPARATUS, COMMERCIAL and RECEIVERS, COMMERCIAL)  
Components (see under APPARATUS, COMMERCIAL)  
Compton Organ, 395 (C.T.)  
Condenser Testing, 42 (H.T.)  
Condensers for Very Long Wavelengths, 572 (R.P.)  
Contrast Expansion, 374 (Gen.); 433, 508, 574 (Corres.)  
Constructional Articles (see under APPARATUS, CONSTRUCTIONAL and RECEIVERS, CONSTRUCTIONAL)  
CORRESPONDENCE, 23, 44, 67, 120, 158, 200, 240, 280, 316, 337, 382, 433, 477, 508, 574, 602, 628, 648, 674  
Coughlin, Father, 517 (C.T.)  
Counter-Irritants, 504 (F.G.)  
Crocodile-clip Tool, 399 (Illus.)  
Croupiers and Music, 526 (F.G.)  
Croydon Radio Society, 422, 494 (C.N.)  
Wireless and Physical Society, 494 (C.N.)  
Crystal-Controlled Oscillators, 630 (Pat.)  
Fault-Detector, 300 (H.T.)  
Receiver Range, 23 (Corres.)  
Receivers, 238, 312 (R.R.); 382, 433 (Corres.); 411 (Edit.)  
Cup Final Broadcast, 504 (F.G.)  
CURRENT TOPICS, 10, 31, 54, 78, 107, 135, 192, 219, 245, 273, 301, 325, 347, 370, 395, 419, 439, 467, 491, 517, 546, 563, 584, 615, 639, 661  
Customs and Portables, 325 (C.T.)  
Czechoslovakia, 423 (B.B.)

**DANCE Music, 191 (R.R.)**

Data Charts (see under Abacs)  
Day and Night Range, 208 (R.P.)  
Deaf Aid Frequency Generator, 121 (Gen.)  
Aids, 155, 402 (Gen.)  
and Headphones, 432 (R.R.)  
Dealers: Whom to Choose, 435 (Edit.)  
Window Competition, 201 (F.G.)  
Death Ray, 191, 604 (R.R.); 301 (C.T.)  
Ray and Police, 324 (F.G.)  
Denmark, 31, 78, 273, 301, 467, 563 (C.T.)  
De Profundis, 619 (F.G.)  
Depth-Sounding Apparatus for Wreck-Location, 326 (Gen.)  
Development of the Wireless Aerial, 344, 368, 397, 468 (Gen.)  
Dials, Tuning, 338 (R.R.)  
Distant Reception Notes (see RECEPTION NOTES)  
Distortion (see under TROUBLE)  
Divorce and Wireless, 618 (R.R.)  
Does Broadcasting Serve Britain? (see Britain and Broadcasting)  
Dry-Contact Oscillators, 678 (Pat.)  
Dublin's New Announcer, 517 (C.T.)  
Dutch Scientist, 526 (F.G.)  
D.F., 326, 567 (Gen.); 439, 491 (C.T.); 608 (Pat.); 618 (R.R.)

**EALING Radio Society, 494 (C.N.)**

Early Morning Broadcasting on Sunday, 347 (C.T.)  
Earth, 506 (Gen.)  
Earth's Axis, 615 (C.T.)  
Echoes in Public Address Systems, 503 (S.P.)  
Ekco Service Centre, 601 (C.T.)  
EDITORIAL COMMENT, 1, 25, 49, 73, 97, 125, 161, 209, 241, 265, 291, 317, 339, 361, 387, 411, 435, 459, 483, 509, 533, 553, 577, 609, 631, 655  
Educational and Talks Broadcasting Station, 339 (Edit.)  
Egypt, 359, 439 (C.T.)  
Electrical Interference (see under TROUBLE)  
Organ, 119 (B.B.)  
Electric Lighting Installations, 406, 500 (R.R.)  
Electrocution, 301 (C.T.)  
Electron Theory, The, 573 (Gen.)  
Electronics, 573 (Gen.)  
Electrostatic Meter Faults, 392 (S.P.)  
Emergency Broadcasting, 411 (Edit.); 433 (Corres.)  
E.M.T. and R.C.A., 536 (R.R.)  
Empire Broadcasting (see B.B.C.)  
Broadcasts, 82 (Gen.)  
English from Foreign Stations, 44 (Corres.)  
Language and Wireless Nomenclature, 536 (R.R.)  
Esperanto, 301 (C.T.)  
Excess Filament Voltage Dangers, 146 (H.T.)  
Exide Luncheon, 439 (C.T.)  
Exponential Horns (see under LOUD SPEAKERS)  
EXHIBITIONS:  
Berlin, 192, 325 (C.T.); 248 (R.R.)  
Berlin and Olympia Compared, 277, 306 (Gen.)  
Berlin: Fire, 248 (Illus.)  
Berlin Show Report, 266  
Berlin: Television Exhibits, 248 (R.R.)  
Bristol, 325 (C.T.)  
Brussels, 419 (C.T.)  
Edinburgh, 395 (C.T.)  
Glasgow: List of Exhibitors and Plan, 251  
Imperial Airways, 563 (C.T.); 615 (Illus.)  
Inventions, 370, 395 (C.T.)  
Lisbon, 639 (C.T.)  
Manchester, 325 (C.T.)  
Manchester: List of Exhibitors and Plan of Stands, 338  
Need for Demonstrations, 265 (Edit.)  
Olympia, 36, 152, 238 (R.R.); 66, 160 (B.B.); 97, 125, 161 (Edit.); 107, 135 (C.T.); 121 (Corres.); 346 (F.G.)  
Olympia: A Critic of Quality, 226 (Gen.)  
Olympia: Anti-Interference Illustrations, 192 (C.T.)  
Olympia: Diallist's Views, 249 (Gen.)  
Olympia: Electric Organ, 236 (B.B.)  
Olympia: Forecast—Car Radio, Playing Desks, Public Address and Miscellaneous Apparatus, 131 (Gen.)  
Olympia: Forecast—Components, 149 (Gen.)  
Olympia: Forecast—Gramophone Accessories, 152 (Gen.)  
Olympia: Forecast—Loud Speakers, 141 (Gen.)  
Olympia: Forecast—Receivers, AC Mains, 126 (Gen.)  
Olympia: Forecast—Receivers, All-Wave, 131 (Gen.)  
Olympia: Forecast—Receivers, Battery, 130 (Gen.)  
Olympia: Forecast—Receivers, Universal, 129 (Gen.)  
Olympia: Forecast—Valves, 159 (Gen.)  
Olympia: Imhof's Van (Illus.)  
Olympia: List of Exhibitors, 139, 206  
Olympia: Loud Speaker Improvements, 230, 274 (Gen.)  
Olympia: Mechanical Highlights, 234 (Gen.)

**EXHIBITIONS:**

Olympia: Need for Scientific Section, 317 (Edit.)  
Olympia: New Receiver Designs, 210 (Gen.)  
Olympia: New Season's Components, 222 (Gen.)  
Olympia: Plan, 138, 207  
Olympia: Quality of Reproduction, 226 (Gen.); 280, 316, 382 (Corres.)  
Olympia: Religious Service, 194 (B.B.)  
Olympia: Scarcity of Novelties, 209 (Edit.)  
Olympia: Show Report, 168  
Olympia: Sideshows, 239 (Gen.)  
Olympia: Valves for 1936, 237 (Gen.)  
Olympia: Variety Broadcasting, 236 (B.B.)  
Olympia: Year's Factory Output Sold, 452 (F.G.)  
Paris, 245, 273 (C.T.)  
Paris: Baby Grand Receiver, 325 (Illus.)  
Paris Show Report, 328 (Gen.)  
Shipping, 273 (C.T.)  
Stoke-on-Trent, 347 (C.T.)

**FACTORY Music, 526 (F.G.)**

Factory, The Receiver Through, 195 (Gen.)  
Farmer and Stock-Breeder Supplement, 370 (C.T.)  
Ferranti Factory: How a Receiver is Made, 195 (Gen.)  
Finland: 500 Kilowatts, 395 (Gen.)  
Fluorescent Screens, 23 (Corres.)  
Foundations of Wireless:  
XXVI. More About the Frequency Changer, 21 (Gen.)  
XXVII. The IF Amplifier: Filters, 46 (Gen.)  
XXVIII. Detection and AVC, 70 (Gen.)  
XXIX. Power for the Set, 94 (Gen.)  
Foreign Listening Ban in Germany, 301 (C.T.)  
Receiver Market, 316 (B.B.)  
Fotoliptofono, The, 527 (S.P.)  
Four Cardinal Points, The, 431 (Gen.)  
Frame-Aerials, 653 (R.P.)  
France, 10, 31, 54, 107, 192, 245, 301, 325, 347, 395, 584, 615, 639, 661 (C.T.)  
Anti-Interference Campaign, 325 (C.T.)  
Anti-Pirates' Campaign, 467, 491, 546 (C.T.)  
Licence Collection, 395 (C.T.)  
Listening Post, 301 (C.T.)  
Regional Scheme, 273 (C.T.)  
Radio University, 419 (C.T.)  
Wakes Up, 388 (Gen.)  
Franco-American Broadcasts, 615 (C.T.)  
Free Grid, 194 (B.B.); 508 (Corres.)  
Frequency Generator for Audio Tones, 121 (Gen.)  
or Wavelength, 337 (R.R.)  
Future of Broadcasting, 190 (R.R.)

**GALLIPOLI and E.E.F. Dinner, 584 (C.T.)**

Ganging and Reaction, 42 (H.T.)  
a Receiver, 600 (H.T.)  
Superheterodynes, 122 (R.P.)  
Gangsters, 324 (F.G.)  
General Election, 471, 552 (F.G.); 520, 560 (R.R.)  
Generator for Audio Tones, 121 (Gen.)  
Germany, 31, 54, 395 (C.T.); 503 (R.R.)  
Through the Eyes of, 306 (Gen.)  
George II and Electrical Research, 34 (Gen.)  
Good Old Days Again, 57 (Gen.)  
Start for the New Set, 317 (Gen.)  
Gramophone Pick-ups (see Pick-ups)  
Record Changers (see Record Changers)  
Recording (see Recording)  
Greyhounds and Public Address, 135 (News)  
Guarantees, 311, 406, 453 (R.R.)

**HAPPY Event, 273 (C.T.)**

Hartley Circuit, 572 (R.P.)  
Hayburn, F. S., 639 (C.T.)  
Headphones for the Deaf, 432 (R.R.)  
for Reception, 502 (R.R.); 609 (Edit.)  
Heavy Starting Current, 488 (H.T.)  
Herd, J. F., Obituary, 245 (C.T.)  
H.F. Stages, 482 (R.P.)  
High Fidelity (see Quality of Reproduction)  
Fidelity and Definition Cable, 312 (R.R.)  
Fidelity in the Home, 220 (Gen.)  
Quality (see Quality of Reproduction)  
Water Laws, 471 (F.G.)  
HINTS AND TIPS, 42, 144, 300, 399, 488, 600  
H.M.V. and the Railway Companies, 520, 604 (R.R.)  
Holland, 347, 661 (C.T.)  
Home Recording (see Recording)  
Hopper Upper, 458 (R.R.)  
Hospital Radio, 260 (B.B.); 337 (Corres.); 407 (C.T.)  
Hotel Receivers in New York, 238 (R.R.)  
How Sensitive Need a Set Be? 610 (Gen.)  
Howard Grand Receiver, 23 (Corres.)  
Howling (see under TROUBLE, INTERNAL)  
H.T. Accumulators (see Accumulators)  
Supply for Battery Receivers, 602 (Corres.)  
Huey Long, 347 (C.T.)  
Huizen Closes Down, 248 (R.R.)  
Hum (see under TROUBLE, INTERNAL)  
Hungary 423 (B.B.); 563 (C.T.)

**I.B.U. (see U.I.R.)**

Iceland Telephone Service Opened, 135 (C.T.)  
I.D.A., 54 (C.T.); 260 (B.B.)  
I.E.E., 467 (C.T.)  
Impedance Measurement, 653 (R.P.)  
India, 395 (C.T.); 575, 651 (B.B.)  
Indian Broadcasting Service, 651 (B.B.)  
Inductances, Air-cored, 490 (Gen.)  
Infra-red Noctovision, 281 (R.R.)  
Instability (see under TROUBLE, INTERNAL)  
Installation Problems, 217 (Gen.)  
Institute of Physics, 78 (C.T.)  
Institution of Electronics: Coursey's Lecture on Electrolytic Condensers, 584 (C.T.)  
Interference (see under TROUBLE)  
International Broadcasting and Abyssinia, 411 (Edit.)  
I.R.E., 10 (C.T.)  
Ireland, 54 (C.T.)  
I.S.W.C., 494 (C.N.)  
Italy, 78 (C.T.)

**JAPAN**, 10, 301 (C.T.)  
 Japanese Language and Broadcasting, 219 (C.T.)  
 Jellicoe, Admiral of the Fleet Earl, 423 (B.B.)  
 Johnson, Dr., Up-to-date, 552 (F.G.)  
 Just Think What Two Can Do, 629 (Gen.)

**KANIMBLA**, 661 (C.T.)  
 Kerr Memorial Lecture by David, 615 (C.T.)  
 Kidnappers, 652 (R.R.)  
 Kilocycles or Metres, 337 (R.R.)  
 Knobs, 311 (R.R.)

**LABORATORY** Tests (see under APPARATUS, COMMERCIAL)  
 Land Lines, G.P.O., 508, 603 (Corres.)  
 Large-Deflection Tuning Indicator, 216 (Gen.)  
 Laughter in Court, 491 (C.T.)  
 League of Nations, 419 (C.T.)  
 L.F. Amplifier Economy, 290 (R.P.)  
 — Amplifier Tests, 300 (H.T.)  
 — Amplifiers, 678 (Pat.)  
 Licences: Amateur Transmitters, 467 (C.T.)  
 — British, 439, 546, 639 (C.T.)  
 — Danish, 31 (C.T.)  
 — French, 31, 78, 301, 395, 467, 661 (C.T.)  
 — German, 31, 54, 78, 325 (C.T.)  
 — Norwegian, 517 (C.T.)  
 — R.M.A. Forecast, 245 (C.T.)  
 Listeners' Association, 604 (R.R.); 648 (Corres.)  
**LISTENERS' GUIDE**, 16, 40, 62, 88, 114, 144, 166, 228, 256, 282, 308, 332, 354, 378, 400, 427, 450, 474, 498, 524, 550, 570, 594, 622, 646, 670  
 Locating Wrecks, 326 (Gen.)  
 Long Distance Reception, 120 (Corres.)  
 — Huey, 347 (C.T.)  
 Lost Milliwatts, 193 (Gen.)  
 Loud Speaker Warnings from the Air, 639 (C.T.)  
 — Speakers (see under LOUD SPEAKERS)  
 Low Power Transmission Club Proposed in America, 563 (C.T.)  
 Lucerne Plan and Germany, 503 (R.R.)

**MAGNETRON** Organ, 395 (C.T.)  
 Mains or Battery, 246 (Gen.)  
 — Trouble (see under TROUBLE, INTERNAL)  
 Malaya, 575 (B.B.)  
 Manchester, 54 (C.T.)  
 Manufacturer's Products (see under APPARATUS, COMMERCIAL AND RECEIVERS, COMMERCIAL)  
 Manx Broadcasting Station, 219 (C.T.)  
 Marconi, Guglielmo, 370, 615 (C.T.)  
 — Works Busy, 78 (C.T.)  
 Marine Wireless, 56 (R.R.)  
 Married Man's Receiver, 434 (F.G.)  
 Mast to Ground Communication, 407 (B.B.)  
 McNeil's Infra-Red Noctovision, 281 (R.R.)  
 Metal Rectifiers (see under VALVES)  
 Meter Faults, Electrostatic, 392 (S.P.)  
 Metres or Kilocycles, 337 (R.R.)  
 Midland Autoclub, 287 (B.B.)  
 Milk Episode, 566 (F.G.)  
 Millimeter, Choosing a, 589 (S.P.)  
 Modern Quality Receiver (see under RECEIVERS, CONSTRUCTIONAL)  
 Modernising An Old Set; Ecco Model S.H.25.D.C., 412 (Gen.)  
 Modulating Systems, 608 (Pat.)  
 Morse, Learning, 67 (Corres.)  
 Motor Boating (see under TROUBLE, INTERNAL)  
 Multiple Signalling, 576 (Pat.)  
 Murphy "Bookmaker's Friend" Receiver, 452 (F.G.)  
 Music and Radio Merger, 135 (C.T.)

**NATIONAL** Acoustics Sunday, 407 (B.B.)  
 — Radio Sunday, 407 (B.B.)  
 Navy and Cheaper Radio, 584 (C.T.)  
 N.B.C., 575 (B.B.); 639, (C.T.)  
 Neon Indicators, 146 (H.T.)  
 Neon Lamps (see under VALVES)  
 New Apparatus (see under APPARATUS, COMMERCIAL)  
 — Guinea, 54, 491 (C.T.)  
 — Tuning Indicator, 418 (Gen.)  
 — York Hotel Receivers, 238 (R.R.)  
 — Zealand, 467 (C.T.)  
 — Zealand Parliamentary Debates Broadcast, 584 (C.T.)  
 News in Erse, 530 (B.B.)  
 Newsagencies and the B.B.C., 291 (Edit.)  
 1935 Progress Figures, 656 (Gen.)  
 90-Day Guarantees, 311 (R.R.)  
 Northern Ireland, 467 (C.T.)  
 North Manchester Radio Society, 494 (C.N.)  
 Norway, 219, 439 (C.T.); 287, 457 (B.B.)  
 Novelists and Wireless, 562 (R.R.)  
 N.R.E.A., 273, 395 (C.T.)

**OBITUARY**, J. F. Herd 245, (C.T.)  
 On the Spot (see under BROADCASTING STATIONS)  
 Oscillation (see under TROUBLE, INTERNAL)  
 Oscillator Output, 360 (R.P.)  
 — Simple Test, 300 (H.T.)  
 — Testing, 208 (R.P.)  
 Oscillators, Crystal-Controlled, 630 (Pat.)  
 — Dry-Contact, 678 (Pat.)  
 Ostrich and Microwaves, 201 (F.G.)  
 Output Choke Design, 18 (Gen.)  
 — Transformers and Valve Age, 208 (R.P.)  
 Overheated Waves, 479 (B.B.)

**P.A.**, 220, 574 (Corres.); 351, 503 (S.P.); 406 (R.R.); 509 (Edit.); 552 (F.G.)  
 Paderewski, Ignace, 370 (C.T.)  
 Palestine, 419, 439 (C.T.); 575 (B.B.)  
 — Broadcasting Company, 651 (B.B.)

Papua, 54, 491 (C.T.)  
**PATENTS**, 576, 608, 630, 654, 678  
 Peace Sold by Radio, 407 (B.B.)  
 Penny-in-the-Slot Radio, 370 (C.T.)  
 People's Receiver, 54, 639 (C.T.)  
 Permanent Magnet Industry, 204 (Gen.)  
 Permeability of Nickel Iron Alloys, 337 (Corres.)  
 Phono-Reel, The, 557 (Gen.)  
 Photocells (see under VALVES)  
 Photographs of the Year, 615 (C.T.)  
 Pick-up Accident, 370 (C.T.)  
 — Terminals for HF Feed, 122 (R.P.)  
 Picture Transmission, Miscellaneous, 370 (C.T.)  
 Pirate Transmitters, 37 (R.R.)  
 Pirates and P.M.G., 54 (C.T.)  
 Ploughing Mystery, 227 (F.G.)  
 Poland, 54, 192, 491 (C.T.)  
 Police and Death Ray, 324 (F.G.)  
 — Radio, 111, 406 (R.R.); 273, 491 (C.T.)  
 Political Trivialities, 471 (F.G.)  
 Polyglot Announcers in France, 584 (C.T.)  
 — Stations, 54 (C.T.)  
 Portables on Alps, 347 (C.T.)  
 — and Customs, 325 (C.T.)  
 — for Special Occasions, 346, 352 (F.G.)  
 — "Just Think What Two Can Do," 629 (Gen.)  
 — (see also under RECEIVERS)  
 Portugal, 639 (C.T.)  
 Portuguese People's Receiver, 639 (C.T.)  
 Pounds, Yards and Quarts of Radio, 454 (Gen.)  
 Poznan, 612 (S.P.)  
 Prague, 665 (F.G.)  
 Prison Radio, 219, 491 (C.T.)  
 Progress in 1935, 656 (Gen.)  
 Propaganda Station Proposed, 1 (Edit.)  
 Push-Pull, 290 (R.P.)  
 — Fed from Diode, 208 (R.P.)

**Q.A.V.G.** (see A.V.C.)  
 Quality of Reproduction, 23, 44, 67, 121, 280, 316, 477 (Corres.); 35, 193, 220, 226 (Gen.); 399 (H.T.); 563 (C.T.)  
 Queen Mary's Equipment, 502 (R.R.)

**RADIO** Data Charts (see Abacs)  
 — INDUSTRY, 14, 45, 65, 118, 205, 231, 284, 307, 330, 353, 369, 398, 425, 473, 529, 569, 592, 645  
 — Industry Forges Ahead, 636 (Gen.)  
 — Maximo Arvo, 346 (F.G.)  
 R.A.F., 31, 245, 615 (C.T.)  
 Railroad Radio, 347 (C.T.)  
**RANDOM RADIATIONS**, 6, 36, 56, 91, 111, 152, 190, 238, 248, 281, 311, 337, 358, 384, 406, 432, 458, 478, 502, 520, 536, 562, 604, 618, 652, 673  
 R.C.A. and E.M.I., 536 (R.R.)  
 Reaction Control, 208 (R.P.)  
**READERS' PROBLEMS**, 122, 208, 264, 290, 360, 482, 572, 655  
 Receiver, Choosing a, 162, 590 (Gen.)  
 — Through the Factory, The, 195 (Gen.)  
 — Specifications and Measurements, 454 (Gen.)  
 Receivers Reviewed (see under RECEIVERS, COMMERCIAL)  
 Recent Inventions (see PATENTS)  
**RECEPTION NOTES**, 20, 104, 191, 254, 299, 343, 410, 446, 487, 549, 597, 635  
 Record Changers, 346, 434 (F.G.); 433 (Corres.)  
 Recorded and Live Programmes, 546 (C.T.)  
 — Programme Rumour, 619 (F.G.)  
 Recording, Commercial, 44 (Corres.)  
 — for the Blind, 463 (Gen.)  
 — at Home, 324 (F.G.); 553, 655 (Edit.); 674 (Corres.)  
 — News Broadcasts, 347 (C.T.)  
 — on Newsprint, 527 (S.P.)  
 — with the Phono-Reel, 557 (Gen.)  
 — Telephone Conversations, 5 (Gen.)  
 — with Simplot Sound Discs, 630 (Appar. Commer.)  
 Rectification: High and Low Voltage Compared, 133 (Gen.)  
 Re-creating an Old Set (see Second-hand Receivers)  
 Regent's Park Open-Air Theatre, 245 (C.T.)  
 Reinartz Again, 563 (C.T.)  
 Reindeer Stampede, 287 (B.B.)  
 Relays, 31 (C.T.)  
 — in Blackpool, 135 (C.T.)  
 — Remote Control, 408 (F.G.)  
 Reporter and Somnolence, 638, 665 (F.G.)  
 Resistance Gadget, 488 (H.T.)  
 Romania, 192 (C.T.)  
 Roosevelt and Radio, 419 (C.T.)  
 Roosevelt's Microphones, 563 (C.T.)  
 R.S.G.B., 107, 347, 419, 615, 639, 661 (C.T.)  
 R.S.N.I., 325 (C.T.)  
 Russia, 107 (C.T.)

**SCANDINAVIA**, 273, 301, 439, 401 (C.T.)  
 Science Museum, 439 (C.T.)  
 — Museum Receiver, 337 (Corres.)  
 Scott in the Antarctic, 536 (R.R.)  
**SCREENED** Downloads and Ganging, 360 (R.P.)  
 — Reaction Leads, 122 (R.P.)  
 — Watch Wanted, 408 (F.G.)  
 Screening in Steel-framed Buildings, 208 (R.P.)  
 Screwdrivers and Systoflex, 42 (H.T.)  
 Scribers, 146 (H.T.)  
 Second-hand Receivers, 361, 387, 411 (Edit.)  
 — Receivers: Circuit and Performance, 416 (Gen.)  
 — Receivers: How to Retrim and Re-adjust Them, 514 (Gen.)  
 — Receivers: Making a Choice, 415 (Gen.)  
 — Receivers: Overhauling the Loud Speaker, 453 (Gen.)  
 — Receivers: Re-creating an Old Set, 447, 495 (Gen.)  
 Selectivity Control, 377 (Gen.)  
 — Variable, 405 (Gen.)  
 Sensitivity, Selectivity, Quality and Power, 431 (Gen.)  
 — and the Set, 610 (Gen.)

Service Recorder, 56, 111 (R.R.)  
 — Recording, 67, 120 (Corres.)  
 Servicing, 458, 502, 618 (R.R.); 648 (Corres.)  
 — by Aeroplane, 563 (C.T.)  
 Set Reviews (see under RECEIVERS, COMMERCIAL)  
 Sets (see under RECEIVERS)  
 Ship as Broadcasting Station, 661 (C.T.)  
 Ships Without Wireless, 358 (R.R.)  
 Short Waves (see under SHORT WAVES)  
 Signals Officers Dinner, 584 (C.T.)  
 Silence Zone, 107 (C.T.)  
 Silent Tuning, 654 (Pat.)  
 Simultaneous Picture Transmission, 370 (C.T.)  
 — Reception of Normal and Short Waves, 531 (Gen.)  
 Slade Radio, 422 (C.N.)  
 Sleeplessness Cured by Electricity, 408 (F.G.)  
 Small Superheterodyne, The, 444 (Gen.)  
 Smallest Receiver, 107 (C.T.)  
 Smoothing (see under TROUBLE, EXTERNAL)  
 Somnolent Reporter, 638, 665 (F.G.)  
 S O S at Sea, 618 (R.R.)  
 Sound-proof houses, 458 (R.R.)  
 South Africa Broadcasting, 152 (R.R.)  
 — American Broadcasting, 261 (Gen.)  
 — Sea Islands Commentary, 504 (F.G.)  
 Speaking Books, 463 (Gen.)  
 — Newspaper, 527 (S.P.)  
 Stampede of Reindeer, 287 (B.B.)  
 Static (see under TROUBLE, EXTERNAL)  
 Statistics, 661 (C.T.)  
 — of Electric Lighting, 560 (R.R.)  
 Stone-Age Methods, 434 (F.G.)  
 Subterranean Aircraft Beacon, 567 (Gen.)  
 Sun Spots and Telescope, 526 (F.G.)  
 Superheterodyne, The, 122, 290, 482, 572 (R.P.); 278 (S.P.); 358 (R.R.); 399 (H.T.)  
 — Choosing the Intermediate Frequency, 26 (Gen.)  
 — Small Receivers, 444 (Gen.)  
 — Whistles, 302 (Gen.)  
 Sweden, 78, 439, 491 (C.T.)  
 Swiss People's Receiver, 107 (C.T.)  
 Switzerland, 78, 347, 370 (C.T.)

**TALKING** Books, 463 (Gen.); 676 (B.B.)  
 — Newspaper, 527 (S.P.)  
 Talks and Educational Broadcasting Station, 339 (Edit.)  
 Taxi Radio, 419, 661 (C.T.)  
 Technical Language, 278 (S.P.)  
 Telecord, 5 (Gen.)  
 Telephone Girl With Golden Voice, 7 (R.R.)  
 — Load Lines as an Indicator of Broadcast Popularity, 432 (R.R.)  
 Telescope and Sun Spots, 526 (F.G.)  
 Television (see under TELEVISION)  
 Test Oscillator, Simple, 300 (H.T.)  
 Time Base Circuit, 367 (Gen.)  
 Tone Compensation, 252 (Gen.); 316 (Corres.)  
 — Control, 576 (Pat.)  
 Town Criers, Mechanical, 238 (R.R.)  
 Transatlantic Telephony Changes, 502 (R.R.); 517 (C.T.)  
 Transmitters, 608 (Pat.)  
 Transmitter and Receiver Difference, 572 (R.P.)  
 Transmitter in a Bomb-proof Shelter, 612 (S.P.)  
 Tuning, 608, 678 (Pat.)  
 — Dials, 338 (R.R.)  
 — Indicator, 146 (H.T.); 216, 418 (Gen.)  
 — Knobs, 311 (R.R.)  
 — Silent, 654 (Pat.)  
 Two-Programme Reception, 531 (Gen.)  
 — Sets for All, 517 (C.T.)

**U.I.R.**, 10, 31, 419, 615 (C.T.); 56, (R.R.); 376, 407, 423 (B.B.)  
 UNBIASED, 30, 87, 112, 140, 200, 227, 314, 324, 346, 408, 434, 452, 471, 504, 520, 552, 566, 586, 619, 638, 665  
 Universal Receiver, 81 (Gen.)

**VALVES** (see under VALVES)  
 Variable Selectivity, 2, 26, 405, 600 (Gen.); 653 (R.P.); 654, 678 (Pat.)  
 Vocational Receivers, 346, 452 (F.G.)  
 Voltage Measurement, 508 (Corres.)  
 Volume Controls for Extension Loud Speakers, 391 (Gen.); 508 (Corres.)

**WAPPING** Fire, 434 (F.G.)  
 Warsaw, 31 (C.T.)  
 Waveband, Restricted, 360 (R.P.)  
 Wavelength or Frequency, 337 (R.R.)  
 — Nomenclature, 604 (R.R.)  
 Weather and Wireless, 54 (C.T.)  
 Whistles (see under TROUBLE)  
 Wireless Classes, 301 (C.T.)  
 — Engineer, The: American Appreciation, 660 (S.P.)  
 — Engineer, The: Index of Technical Contributions, 573 (S.P.)  
 — League, 563 (C.T.)  
 — Statistics, 661 (C.T.)  
 — Terms, 72 (S.P.)  
 — World Diary, 467 (C.T.)  
 Woman Engineer in America, 54 (C.T.)  
 Wrecks, Locating, 326 (Gen.)

**YEAR'S** Progress, 656 (Gen.)

# CLASSIFIED INDEX

## APPARATUS (Commercial)

(For Receivers, Loud Speakers and Valves, see under respective headings)

Autolog, Hudsons, 384 (Review)  
 B.A.T. Line Resistor, 45 (Review)  
 Benjamin Valveholder, 118 (Review)  
 B.R.C. Short-Wave Converter, 284 (Review)  
 British Television Supplies, Ltd., Chassis for Variable-Selectivity IV, 523 (Review)  
 Bryce Choke for Monodial, 104 (Illus. and brief details)  
 B.T.S. Triple-Range S.W. Coil, 284 (Review)  
 Bulgin Components, 118 (Review)  
 — Five-Way Multi-Switch, 476 (Review)  
 — Half-Watt Resistances, 507 (Review)  
 — I.F. Transformer, 356 (Review)  
 — Q.P.P. Output Choke, 45 (Review)  
 Bulldog Giant Power Battery, 315 (Review)  
 Burgess Snaplite, 677 (Review)  
 Burne-Jones Magnum Multi-Contact Switch, 45 (Review)  
 Calibrator, Hudson's Direct Reading Station, 384 (Review)  
 Challis Television Mains Transformer, 45 (Review)  
 Chapman Spiral Scale Indicator, 20 (Gen.)  
 Claude Lyons B.A.T. Line Resistor, 45 (Review)  
 Clix S.W. Valveholder, 315 (Review)  
 Coils, Air-Cored, 490 (Gen.)  
 Colvern Short-Wave Coils, 456 (Review)  
 Compton Organ, 395 (C.T.)

Deaf Aid Frequency Generator, 121 (Gen.)  
 Eddystone Components, 93 (Review)  
 — Metal Cabinets, 375 (Review)  
 Electrical Research Association's Short-Wave Interference Detector, 216 (Illus.)  
 Epoch Microphone, 569 (Review)  
 Erka Toroidal Mains Transformer, 375 (Review)  
 Ferranti AC 12C Amplifier, AC Push-Pull, 446 (Review); 470 (Correction)  
 — Resistances, 677 (Review)  
 Formo Short-Wave Coils and Condenser, 507 (Review)  
 Fotoliptofono, The, 527 (Gen.)  
 Frequency Generator for Audio Tones, 121 (Gen.)  
 Fuller H.T. Accumulators, 456 (Review)  
 Generator for Audio Tones, 121 (Gen.)  
 Goltone Bull-Dog Connectors, 569 (Review)  
 Hinderlich Microphone Stand, 476 (Review)  
 H. J. Bennett Microphone, 643 (Review)  
 Hudson Direct-Reading Station Calibrator, 384 (Review)

Inductances, Air-Cored, 490 (Gen.)  
 Kabi Ganged Switches, 569 (Review)  
 — Ganged Potentiometer, 476 (Review)  
 Lightning Calculator, 7 (Review)  
 Magnetron Organ, 395 (C.T.)  
 Magnum Multi-Contact Switch, 45 (Review)  
 Microfuses, Ltd., Low Current Fuses, 521 (Review)  
 M.R. Microphone, 356 (Review)

Olympia Forecast, 149 (Gen.)  
 — Exhibits, 222 (Gen.)  
 P.A. in Theatres, 200 (Corres.)  
 Peak High Voltage Condensers, 284 (Review)  
 Presto Plug Adaptor, 507 (Review)  
 Prism Portable Amplifier, 677 (Review)  
 Raymart Components, 677 (Review)  
 Reliance Power Potentiometer, 93 (Review)  
 — Turntable, 476 (Review)  
 Rothermel's Noise-Master All-Wave Aerial, 624 (Review)

Scientific Supply Stores, Ltd., Components for the Short-Wave Two, 569 (Review)  
 Shaftesbury "Bio-Tran" Microphone, 93 (Review)  
 Siemens' New Ballast Resistor, 522 (Gen.)  
 Simplat Sound-Recording Discs, 630 (Brief Details)  
 Sound Sales Choke for Monodial, 104 (Brief Details)  
 — Sales 485 K.C./S. Transformers, 315 (Review)  
 Sterling H.T. Battery, 624 (Review)  
 Strattons Eddystone Components, 93 (Review)  
 T.M.C. Varidep Microphone, 118 (Review)  
 Utility Short-Wave Condensers, 375 (Review)  
 Varidep Microphone, 118 (Review)  
 Varley Air-Tune I.F. Transformer, 456 (Review)  
 Varley Variable Selectivity Transformers, 653 (R.P.)  
 Vexel Ribbon Microphone, 624 (Review)  
 Wavemeter for Ultra Shorts, 28 (Gen.)

## APPARATUS (Constructional)

(For complete Receivers, see under RECEIVERS, CONSTRUCTIONAL.)

Air-cored Inductances, 490 (Gen.)  
 Meter, Universal Test, 58 (Gen.); 117 (Correction); 200 (Corres.)  
 Modulated Test Oscillator, 44, 158, 602 (Corres.)  
 Monodial, 1938: Feeder Unit for Push-Pull Quality Amplifier, 299 (Announcement); 318 (Constr.)  
 Oscillator, Modulated Test, 44, 158, 602 (Corres.)  
 Push-Pull Quality Amplifier: Feeder Unit for 1936 Monodial, 299 (Announcement); 318 (Constr.)  
 — Pull Quality Amplifier: Feeder Unit for Ordinary Receivers, 164 (Constr.); 200 (Illus.); 621 (Correction)  
 Quality Amplifier, Push-Pull (see Push-Pull)

Resistance and Capacity Bridge, 614 (Parts); 632 (Constr.)  
 Test Meter, 58; 117 (Correction); 200 (Corres.)  
 Universal Test Meter, 58 (Gen.); 117 (Correction); 200 (Corres.)

## BOOKS

Amateurs Handbook, The, 417  
 British Standard Specification for Components for Radio-Interference Suppression Devices, 106  
 Bulgin's Circuit Book, 643  
 CATALOGUES RECEIVED, 48, 353, 356, 643, 650  
 Cathode-Ray Tube at Work, The, John F. Rider, 497  
 Claude Lyons' "Helping Hand" Catalogue, 353  
 Collins' Wireless Diary, 546 (C.T.)  
 Electrical Encyclopedia, S. G. Blaxland Stubbs, 404  
 Fundamentals of Radio, The, 148  
 Goltone Catalogue, 356  
 Guide to Amateur Radio, 419 (C.T.)  
 Handbook of the Radio Direction Finder, F. G. Loring, 624  
 In Town To-night, J. C. Cannell, 505  
 Interference Suppression, 9  
 Les Ondes Courtes et Ultra-Courtes: Lewis Application. P. Hémardinquer et H. Piraux, 255  
 Manchester Evening Chronicle Wireless Annual, 370  
 Matter and Motion. A Supplementary Text-Book for Students of Elementary Physics and Chemistry, C. H. Creasey, 233  
 Measurement of Inductance, Capacitance and Frequency, 53  
 Modern Radio Communication, J. H. Reyner, 466  
 Noise. A Comprehensive Survey from Every Point of View, N. W. McLachlan, 199  
 Photo-Electric and Selenium Cells, 53  
 Practical Electrician's Pocket Book, The 1936, 660  
 Radiotechnica, E. Montu, 233  
 Sullivan's "Electrical Standards" Catalogue, 650  
 Television, 148  
 — Really Explained, P. J. Risdon, 592  
 Through the Weather House, 29  
 Wireless Engineer Technical Index, 573  
 — Trader Year Book, 517 (C.T.)

## BROADCASTING STATIONS

Addis Ababa, 395, 584, 639 (C.T.)  
 Algiers, 347, 370, 395, 419, 615 (C.T.)  
 American Stations, 245; 584 (C.T.)  
 Athlone, 250, 517 (C.T.)  
 Brasov, 255 (Illus.); 661 (C.T.)  
 Broadcasting Stations, List of (Ordinary Wavelengths), 24, 123, 288, 385, 480, 496, 547, 606  
 — Stations, List of (Short Wavelengths), 124, 289, 385, 481, 607  
 Brussels, 661 (C.T.)  
 Budapest, 419 (C.T.)  
 Cologne, 78 (C.T.)  
 Cracow, 563 (C.T.)  
 Fecamp, 347 (C.T.)  
 Geneva, 419 (C.T.)  
 Heilsberg, 31, 325 (C.T.)  
 Huizen, 419 (C.T.)  
 — Closes Down, 10 (C.T.)  
 Jerusalem, 419, 439 (C.T.)  
 Juan-Les-Pins, 78 (C.T.); 618 (Illus.)  
 Leipzig, 78 (C.T.); 384 (R.R.)  
 Lisburn, 92 (R.B.)  
 Luxembourg, 395 (C.T.)  
 Moscow, 661 (C.T.)  
 Paris, Eiffel Tower, 107 (C.T.)  
 — Radio Paris, 192, 419 (C.T.)  
 Port Moresby, 491 (C.T.)  
 Radio Alger (see Algiers)  
 — Cote d'Azur (see Juan-Les-Pins)  
 — Maroc (see Rabat)  
 — Normandie (see Fecamp)  
 Rome, 419 (C.T.)  
 Saarbrücken, 395 (C.T.)  
 Sottens, 517 (C.T.)  
 Stockholm, 419 (C.T.)  
 Tokio, 419 (C.T.)

## LOUD SPEAKERS

Baffles, 296 (Gen.)  
 Balloons in Jutland, 295 (Illus.)  
 Celestion Speakers, 72 (Gen.)  
 Cone Diaphragm Distortion, 666 (Gen.)  
 Cossor Extension Loud Speaker, 476 (Brief Details)  
 Extension Leads, 290 (R.P.)  
 — Volume Controls, 391 (Gen.); 508 (Corres.)  
 Extensions and Erratic B.B.C. Control Room, 631 (Edit.)  
 French Anti-Noise Campaign, 245 (C.T.)

Garden Nuisance, 111 (R.R.)  
 Headphones as an Alternative, 609 (Edit.)  
 H.M.V. Extension Model, 574 (Illus.)  
 Hum, 408 (F.G.)  
 Impedance, Motional, 285 (Gen.)  
 Infection from Loud Speaker, 471 (F.G.)  
 Location Problems, 241 (Edit.)  
 McLachlan's Polytechnic Lecture, 491 (C.T.)  
 Motional Impedance, 285 (Gen.)  
 "Nuisance" Laws, 406 (R.R.)  
 Olympia Forecast, 141 (Gen.)  
 — Improvements, 230, 274 (Gen.)  
 P.A., 602 (Corres.)  
 — in Theatres, 200 (Corres.)  
 Piezo-Electric Improvements, 608 (Pat.)  
 Remote Field-Feeds, 653 (R.P.)  
 Rola Loud Speaker, 104 (Review)  
 Series for Safety, 300 (H.T.)  
 Simple Tests, 146 (H.T.)  
 Single-Cone Wide-Range Instrument, 515, 598 (Gen.)  
 Sub-Harmonics, 666 (Gen.)  
 Town Crier Substitute, 238 (B.B.)  
 Volume Controls, 391 (Gen.); 508 (Corres.)  
 Warnings from the Air, 639 (C.T.)  
 Wharfedale New Bronze Speaker, 117 (Review)  
 Whiteley Electrical Radio Co's. Special Model for 1936, Battery Monodial, 362 (Review)  
 Wide-Range Single-Cone Instrument, 515, 598 (Gen.)

## RECEIVERS (Commercial)

Aerodyne, Model Aeromag, 6v. AC Superhet. Table, Automatic Tuning, 23 guineas, 420 (Review)  
 Air King, Model 213, 7v. AC Superhet, Table, All-Wave, Push-Pull, 8 watts, 20 guineas, 383 (S.P.); 610 (Review)  
 Andrea, Model I-A-5, 4v. AC, Superhet, Table, 13½ guineas, 310 (Review)  
 Austrian Receivers (see Fidelio)  
 Burndept, Model "All-Wave," 3v. AC Straight, Table, 10 guineas, 472 (Review)  
 C.A.C. Model "Austin Super Six," 5v. AC Superhet, Table, 17 guineas, 528 (Review)  
 Cossor, Model 364, 4v. AC Superhet, Table, 11 guineas, 38 (Review)  
 Dynatron, Model CU63, AC/DC Superhet, Radiogram, 27 guineas, 330 (Brief Details)  
 — Model Toreador, AC/DC Console and Radiogram, 330 (Brief Details)  
 — Model TU63, AC/DC Superhet, Table, 16 guineas, 330 (Brief Details)  
 Ekco, Model S.H.25, 5v. DC Superhet, Table: How to Modernise it, 412 (Gen.)  
 Ever Ready, Model 5003, 4v. AC Superhet, Table, 14 guineas, 596 (Review)  
 Ferranti, Model Nova, 3v. AC Superhet, Table, 11 guineas, 116 (Review)  
 Fidelio, 3v. AC Superhet Reflex, Table, Westector, All-Wave, Reflex, 79 (Review)  
 Forbat High-Voltage AC/DC Receivers, 394 (Review)  
 G.E.C. Model AC 3v. Straight, Table, 9 guineas, 352 (Review)  
 — Model "Superhet Battery Four," Q.P.P. 1.5 watts, delayed AVC, 12 guineas, 556 (Brief Details)  
 Handiset (see Portables)  
 Heayberd, Model 4-Point, 4v. AC Superhet, Table, 14 guineas, (Review)  
 Higgs, Model A56R, 4v. AC Superhet, Table, 11½ guineas, 548 (Review)  
 — New Receivers, 39 (Brief Details)  
 H.M.V. Model 360 "Popular," 3v. AC Straight, 9 guineas, 366 (Review)  
 — Model 370, 3v. AC Straight Radiogram, 16 guineas, 462 (Illus. and Brief Details), 588 (Review)  
 — Record Cabinet, 462 (Brief Details)  
 Howard Grand Receiver, American, 23 (Corres.)  
 Hyvoltstar, Model 10, 8v. AC Superhet, Table, 35 guineas, 626 (Review)  
 Lampex Receivers, 61 (Gen.)  
 Lissen, Model Band-Spread Short-Wave Three, 3v. Bat. Straight Kit, £3 19s. 6d., 669 (Review)  
 Lotus, Model 333, 3v. AC/DC Superhet Midget, £4 17s. 6d., 422 (Brief Details)  
 Marconiphone, Model 245, 3v. AC Superhet Radiogram, 16 guineas, 516 (Illus. and Brief Details)  
 McMichael, Model 235, 3v. AC Superhet, 12 guineas, 33 (Illus. and Brief Details); 90 (Review)  
 Mullard, Model MU35, 5v. Universal Superhet, 12 guineas, 232 (Review)  
 — Receivers, 4 (Illus. and Brief Details)  
 Murphy "Bookmaker's Friend" Receiver, 452 (F.G.)  
 — Model A28C, 8v. AC Superhet, Console, £21 15s., 381 (Review)  
 National Radio Service Co's. Crystal Receiver, 443 (Illus.)  
 Olympia Forecast, 126 (Gen.)  
 — Designs, 210 (Gen.)  
 Philco, Model 98, 6v. AC All-Wave Superhet, 21 guineas, 64 (Review)  
 Philips, Model 575A, 4v. AC Superhet, Table, All-Wave, 18½ guineas, 500 (Review)

Portables: "Handiset" for Phones, 2v. Batt. Straight, £3 15s., 10 (C.T.)  
 — "Wayfarer," 4v. Batt. Straight, 5 guineas, 409 (Review); 629 (Illus.)  
 — "Empiric," 2v. Batt. Super-Regen., 5 guineas, 629 (Illus.)  
 Prisma, 5v. Push-Pull AC Straight Radiogram, 45 guineas, 541 (Review)  
 R.G.D., Model 704, 6v. AC Superhet Radiogram, 55 guineas, 564 (Review)  
 Scott, Model Hi-Fidelity, Twenty-one Valve AC Superhet, Chassis, All-Wave, £145, 640 (Review)  
 Ultra, Model 25, 3v. AC Superhet, 12 guineas, 202 (Review)  
 Wayfarer (see Portables)

### RECEIVERS (Constructional)

Compact Battery Two; Portable for Yachts, 240 (Parts); 242 (Constr.); 290 (R.P.)  
 Imperial Short-Wave Six, 676 (Parts)  
 Modern Quality Receiver (see Monodial, 1936)  
 Monodial, 1936, Battery Model: 323 (Parts); 340, 362 (Constr.); 410 (Illus.)  
 — 1936, Battery Model; Whiteley Electrical Co.'s Special Loud Speaker, 366  
 — 1936, Modern Quality Receiver: 26, 50 (Prelim. Art.); 52 (Parts); 74, 98 (Constr.); 147 (Notes); 192, 417, 655 (Corrections); 290 (R.P.)  
 — 1936, Modern Quality Receiver: Bryce and Sound Sales Choke, 104  
 — 1936, Modern Quality Receiver: Linking Unit for Push-Pull Quality Amplifier, 318 (Constr.)  
 — 1936, Modern Quality Receiver; 602 (Corres.)  
 1936 Monodial (see Monodial)  
 Portable Receiver: Radio Companion, 440 (Constr.); 508 (Notes); 395 (C.T.); 433 (S.P.); 629 (Illus.)  
 — Three-in-One, 271 (Parts); 292 (Constr.); 574 (Corres.)  
 — Two-valve Receiver for Yachts, 247 (Constr.)  
 Radio Companion (see Portable Receiver, Radio Companion)  
 Short-Wave Two, 497 (Parts); 510 (Constr.)  
 — Components, 569 (Appar. Commer.); 653 (Correction)  
 Single-Span Receiver, 281 (Corres.)  
 Three-in-One Portable, The (see Portable, Three-in-One)

Variable Selectivity Four, 444, 593 (Prelim. Art.); 455 (Parts); 469 (Edit.); 460, 484 (Constr.); 653 (R.P.)  
 — Selectivity Four: British Television Supplies Chassis, 523

Yacht Two-Valve Portable (see Portable for Yachts)

### SHORT WAVES

Aerial Feeders, 11 (Gen.)  
 Amateurs' Remarkable Intercommunication, 494 (S.P.)  
 B.B.C. Daventry's Aerials, 479 (B.B.)  
 — Tatsfield, 479 (B.B.)  
 Below the Short-Wave Spectrum, 221 (S.P.)  
 Blind Landing System at Heston, 439 (C.T.)  
 Brussels Checking Station, 80 (Gen.)  
 — Checking Station, August Chart, 350  
 Death Ray, 301 (C.T.)  
 80 Metres and Australia, 661 (C.T.)  
 — -Metre Transatlantic Tests, 615 (C.T.)  
 Electrostatic Amplification, A New Idea, 55 (Gen.)  
 Empire Broadcasting and Shorter Wavelengths, 604 (R.R.)  
 Five-Metre Amateur Transatlantic Tests, 661 (C.T.)  
 — -Metre Field Days, 10, 219, 245 (C.T.); 272 (Gen.)  
 — -Metre Transmission Range, 613 (Gen.)  
 Frequency Doubler, 398 (S.P.)  
 Geneva Anti-Propaganda Conference, 502 (R.R.)  
 German Amateurs, 10 (C.T.)  
 Golders Green Field Day, 31 (C.T.)  
 How Best To Receive Them, 585 (Gen.)  
 Imperial Short-Wave Six (see under RECEIVERS, CONSTRUCTIONAL)  
 Interference Detector of Electrical Research Association, 216 (Illus.)  
 — by Other Stations, 1 (Edit.) 120 (Corres.)  
 I.S.W.C., 192, 422 (C.N.)  
 Japanese Programmes, 301 (C.T.)  
 Lissen Kit Set (see under RECEIVERS, COMMERCIAL)  
 List of Short Wave Stations and Comments, 496 (Gen.)  
 Listeners' Increasing Interest, 509 (Edit.)  
 Long Distance Transmissions of Ultra-Short-waves, 478 (R.R.)  
 Luton Ultra-Short Tests, 135 (C.T.)  
 Marconi and Micro-waves, 281 (R.R.)  
 Mast to Ground Communication, 407 (B.B.)  
 Measuring Ultra-Short-Wavelengths, 320 (Gen.)  
 Micro-waves: Ostrich, 201 (F.G.)  
 — -Waves for Ships D.F., 113 (Gen.)  
 Nomenclature, 604 (R.R.)  
 Oscillators, 654 (Pat.)  
 Paris Conference Plan, 502 (R.R.)  
 Poland's New Service, 491 (C.T.)  
 Reporter's Transmitting Set, 434 (F.G.)  
 Short-Wave Broadcasting (See Weekly Notes)  
 — -Wave Two: List of Parts, 497, 510  
 Simultaneous Reception of Normal and Short Waves, 531 (Gen.)  
 Snowdon Tests, 10, 31 (C.T.); 36 (R.R.)

Star Programme Broadcast, 245 (C.T.)  
 Stratosphere Transmissions, 419 (C.T.)  
 Sunspot Cycles, 478 (R.R.)  
 Super-Regeneration on the Short-Waves, 393 (Gen.)  
 Ten-Metre Amateur Transatlantic Telephony, 517, 661 (C.T.)  
 — -Metre Reveillé, 449 (S.P.)  
 — -Metres, 470, 494, 521 (S.P.)  
 Tests Between Broadcasting House and Alexandra Palace, 423 (B.B.)  
 Transatlantic 5-Metre Tests by Portsmouth Municipal College, 546 (C.T.)  
 Transmitter Used by American Forest Scouts, 395 (Illus.)  
 Ultra-Short-Wave Ban in America, 301 (C.T.)  
 — -Short-Wave Generation Methods, 654 (Pat.)  
 — -Short-Wave Link Between Broadcasting House and Alexandra Palace, 651 (B.B.)  
 — -Short-Wave Measurements, 320 (Gen.)  
 — -Short-Wave Rectifiers, 678 (Pat.)  
 — -Short Wavemeter, 28 (Gen.)  
 Variable Conditions, 536 (R.R.)  
 WEEKLY NOTES, 33, 80, 235, 269, 350, 366, 430, 440, 466, 494, 513, 521, 556, 664

### TELEVISION

Aircraft Landing System, 618 (R.R.)  
 American Figures, 54 (C.T.)  
 — Plans, 37 (S.P.); 111 (R.R.)  
 Anglo-American Radio and Television Society, 422 (C.N.)  
 Audiences to be Televised, 530 (B.B.)  
 Australian Plans, 491 (C.T.)  
 Baird and E.M.I. Data, 361 (Edit.); 371 (Gen.)  
 Baird's Kerr Lecture, 615 (C.T.)  
 Barber's Shop Episode, 314 (F.G.)  
 B.B.C. Alexandra Palace, 91 (R.R.); 160, 625, 651 (B.B.); 547 (C.T.)  
 — Old Posters, 651 (B.B.)  
 — Bus Service, 651 (B.B.)  
 — Buys the Gear, 547 (B.B.)  
 — New Department, 336 (B.B.)  
 — Scandalous Performance, 638 (F.G.)  
 — Staff Vacancies, 673 (R.R.)  
 — Viewing Centres, 652 (R.R.)  
 Berlin Exhibition, 192 (C.T.); 248 (R.R.)  
 Broadcast Receivers not Obsolete, 631 (Edit.)  
 Cathode-Ray, 678 (Pat.) (see also under VALVES)  
 Cathode Ray: Time Base Circuit, 367 (Gen.); 477 (Corres.)  
 — Transformer, Chassis, 45 (Appar. Commer.)  
 — Enlarged Image, 414 (S.P.)  
 — Tuning Indicator, 418 (Gen.)  
 Co-Axial Cable, 312 (R.R.); 547 (B.B.)  
 Cook, Gerald (see under GENERAL INDEX)  
 Colour Television, 654 (Pat.)  
 Cup Final Broadcast, 423 (B.B.)  
 Demonstrations Needed, 387 (Edit.)  
 Denmark Declines, 546 (C.T.)  
 Eiffel Tower (see France)  
 Enlarging Images, 286 (S.P.)  
 Factory Spying System in Amsterdam, 661 (C.T.)  
 February Tests, 562 (R.R.)  
 Field-Glass System is Best, 273 (C.T.)  
 Film System, 630 (Pat.)  
 Flat Installation, 661 (C.T.)  
 France: Eiffel Tower Plans, 347 (C.T.); 562 (R.R.)  
 — Eiffel Tower Data, 559 (Gen.)  
 — Eiffel Tower Public Viewing Rooms, 625 (Illus.); 673 (R.R.)  
 — Eiffel Tower Service Inaugurated, 639 (C.T.); 673 (R.R.)  
 German Mobile Outfit, 66, 67 (Illus.)  
 Germany to America, 248 (R.R.)  
 — and Peace, 54 (C.T.)  
 G.P.O. and Special Cable, 547 (B.B.)  
 High-Definition Cable, 336, 547 (B.B.)  
 — -Definition Test Transmitter, 331 (Gen.)  
 — -Fidelity and Definition Cable, 312 (R.R.)  
 Hollywood's Plans, 491 (C.T.)  
 Japanese Plans, 546 (C.T.)  
 Light Valves, 678 (Pat.)  
 Low-Definition Apparatus and Science Museum, 336 (B.B.)  
 Marconi System, 630 (Pat.)  
 Nipkow, Paul, 271 (Illus.)  
 One System is Superior, 547 (B.B.)  
 Paris Show, 245 (C.T.)  
 Photo-Electric and Selenium Cells, 53 (Books)  
 P.M.G. Statement re Baird and E.M.I., 219 (C.T.)  
 Public Misunderstandings, 631 (Edit.)  
 Review of Present Position, 142 (Gen.)  
 Sarnoff's Views, 491 (C.T.)  
 Scandinavian Plans, 219 (C.T.)  
 Scanning Systems, 608 (Pat.)  
 Tekade Mirror Screws, 392  
 Television, 148 (Books)  
 — Really Explained, 592 (Books)  
 Temporary Station Suggested, 238 (R.R.)  
 Tests between Broadcasting House and Alexandra Palace, 423 (B.B.)  
 Thirty-line System Closes Down, 260 (B.B.)  
 Violinist's Dilemma, 661 (C.T.)  
 Velocity Modulation Transmitter, 576 (Pat.)  
 Wide-Frequency Cable, 547 (B.B.)  
 Yorkshire Television Association, 422 (C.N.)

### TROUBLE (External Interference)

AC Mains Leakage, 653 (R.P.)  
 Aerials and Interference, 604 (R.R.)  
 Austrian Anti-Interference Campaign, 347 (C.T.)  
 Crystal Receivers as a Source of Interference to Other Listeners, 488 (H.T.)  
 Electric Lighting Installation Faults, 399 (H.T.)  
 Fan Motor Cures, 382 (Corres.)  
 French Anti-Interference Campaign, 219, 419, 546, 563 (C.T.)  
 — Anti-Loud Speaker Nuisance Campaign, 245 (C.T.)  
 G.P.O. and Electrical Interference, 49, 73 (Edit.); 240 (Corres.)  
 — Engineer on Interference, 659 (Gen.)  
 Hum in Loud Speakers, 408 (F.G.)  
 I.E.E. Interference Conference, 517 (C.T.)  
 — Committee, a Failure, 49, 73 (Edit.); 240 (Corres.)  
 Interference Detector of Electrical Research Association, 216 (Illus.)  
 — Menace Grows, 503 (R.R.)  
 — Suppressors, 478 (Pat.)  
 Mains-Borne Interference and Supply Companies, 339 (Edit.)  
 N.R.E.A. Lecture, 419 (C.T.)  
 Remedial Measures Available to the Listener, 136 (Gen.)  
 Short-Wave Interference, 1 (Edit.); 120 (Corres.)  
 Suppressing Electrical Interference, 659 (Gen.)  
 Trolley-bus Troubles, 245, 639 (C.T.)  
 Urgent Action Needed, 73 (Edit.)  
 Wireless World Campaign Criticised, 135 (C.T.); 154 (S.P.)

### TROUBLE (Internal)

Air-Cored Coils and Hum, 122 (R.P.)  
 Crocodile Test Prods, 488 (H.T.)  
 Electrostatic Metre Faults, 392 (S.P.)  
 H.T. Voltage and Stability, 122 (R.P.)  
 Meter Faults, Electrostatic, 392 (S.P.)  
 Misuse of Receivers, 604 (R.R.)  
 New-Valve Instability, 482 (R.P.)  
 Phantom Resistance, 264 (R.P.)  
 Smoothing, Tuned, 360 (R.P.)  
 Testing Receivers, and Volume Controls, 488 (H.T.)  
 Tuned Smoothing, 360 (R.P.)  
 Volume Controls and Receiver Testing, 488 (H.T.)

### VALVES

Adjustable Electrodes, 630 (Pat.)  
 American 6B5 Valve, 8 (Gen.); 258, 280, 383, 477 (Corres.)  
 Barkhausen-Kurz Adjustment, 630 (Pat.)  
 Bases and Symbols, 548 (Gen.)  
 Cathode-Ray, 654 (Pat.) (see also under TELEVISION)  
 — -Ray: Fluorescent Screens, 23 (Corres.)  
 — -Ray: Motor Industry, 279 (S.P.)  
 — -Ray: Photoelectric Cathodes, 608 (Pat.)  
 — -Ray: Renode, 489 (Gen.); 574 (Corres.)  
 — -Ray: Time Base Circuit, 367 (Gen.); 477 (Corres.)  
 — -Ray: Enlarged Image, 414 (S.P.)  
 — -Ray: Tuning Indicator, 418 (Gen.)  
 — -Ray: Ediswan Demonstration, 661 (Illus.)  
 Data Supplement, 22nd November issue  
 D.H. and I.D.H. Rectifiers, 600 (H.T.)  
 Diodes and Coupling Condensers, 572 (R.P.)  
 Distortion Standards, 280, 477 (Corres.)  
 Dry-Contact Oscillators, 678 (Pat.)  
 Electron Multiplier, The, 533 (Edit.); 539 (Gen.)  
 Few or Many, 668 (Gen.)  
 Filament Filters, 42 (H.T.)  
 Fleming's Letter, 602 (Corres.)  
 Floating-Grid Output Valve, 8 (Gen.); 258, 280, 383, 477 (Corres.)  
 Fluorescent Screens for Cathode Ray Tubes, 23 (Corres.)  
 Graham-Farish Short-Wave Valve, 392 (Review)  
 Guide to Bases and Symbols, 548 (Gen.)  
 Heater-Cathode Insulation, 360 (R.P.)  
 Inaccessible Valveholders, 146 (H.T.)  
 Input Resistance of a Diode or Triode Detector, 32 (Gen.)  
 Light Valves, 678 (Pat.)  
 Longevity, 111 (R.R.); 574, 648 (Corres.)  
 Loose Bases, 264 (R.P.)  
 Metal or Glass? 432 (R.R.)  
 Modern Works, A, 534 (Edit.)  
 Motor Industry and Cathode Ray, 279 (S.P.)  
 Mullard Short-Wave and Ultra Short-Wave Transmitting Valves, 540 (Brief Details)  
 New Power Output Valve, 105 (Gen.)

Oscillators, Dry-Contact, 678 (*Pat.*)  
Olympia Forecast, 159 (*Gen.*)  
— Exhibits, 237 (*Gen.*)  
Osram U16 Rectifier, 650 (*Review*)  
Photocell Guide, 661 (*C.T.*); 665 (*F.G.*)  
Photocells, 576, 678 (*Pat.*)  
Photo-Electric Cathodes, 608 (*Pat.*)  
Pruning the List, 537, 648 (*R.R.*)  
Rectifiers for Ultra-Short-Waves, 678 (*Pat.*)

Relationship of Amplification Factor, Impedance and Mutual  
Conductance, 270 (*Gen.*)  
Renode, The, 489 (*Gen.*); 574 (*Corres.*)  
Second-Hand Receivers; Renewing Valves, 424 (*Gen.*)  
Secondary Emission Multiplier, 533 (*Edit.*); 539 (*Gen.*)  
Short Wave Types in Germany, 576 (*Pat.*)  
Siemens' New Ballast Resistor, 522 (*Gen.*)  
Symbols and Bases, 548 (*Gen.*)  
Symptoms of Age, 208 (*R.P.*)

"362" Valves: A.C.P.X.50 Output, 567 (*Brief Details*)  
— Valves: UFC AC/DC Heptode, 567 (*Brief Details*)  
Thyratrons, 334 (*Gen.*)  
Time to Renew, 264 (*R.P.*)  
Tungsram APP4C Output Valve, 573 (*Review*)  
Valves, 533 (*Edit.*)  
What Valve Ratings Mean, 270 (*Gen.*)

## ILLUSTRATIONS

**ABERDEEN'S** Aerials, 664  
Abyssinian Emperor, 601  
Addis Ababa Station, 470  
Air Ministry Mobile Wireless Station, 656  
Alexandra Palace, 142  
Amateur Transmitter, G2YL, 494  
— G5CV, 10  
— G5ZN, 603  
— Transmitter G5CV, on Snowdon, 10  
American Applause Machine, 359  
— Polyiron Coils, 373  
Announcers, Frankfurt's Polyglot, 517  
Applause Machine, 359  
Army Signallers, 135  
Atherton, Effie, 595  
Automatic Tuning Receiver, 154

**BABY** Grand Receiver at Paris Exhibition, 325  
Baird Television Transmission, 142  
Balbon, André, 571  
Ballad Concert, 570  
Balloon Loudspeaker in Jutland, 295  
Bangkok Telefunken Station, 449  
Bangor Staff of B.B.C., 625  
Bank Holiday, 115  
Barcelona's Woman Announcer, 676  
Bartlett and Rae Pianoforte Team, 524  
Bath Pump-Room, 525  
Beach Broadcasting from Côte d'Azur, 160  
Beerbohm, Max, 671  
Belgian P.M.G., 517  
Berlin Amateur Announcers, 245  
— Dramatic Control Panel, 547  
— Exhibition Fire, 248  
Best, Edna, 570  
Big Ben, 670  
Boars Head at Oxford, 646  
Boris, Francina, 676  
Bournemouth Pavilion, 333  
Brasor Station, 255  
Brumaire, 354  
Budapest, 92, 333, 376, 407  
Buenos Aires, 261

**CAIRO**, 378  
Campbell Swinton, A. A., 591  
Carlyle Cousins, 228  
Car Radio at Marconiphone Works, 592  
Centenary Pictures of G.W.R., 256  
Chelmsford's Mast, 358  
Copenhagen's New Broadcasting House, 575  
Cork Cathedral, 313  
Corney, Germaine, 671  
Coury, Nellie, 494  
Covent Garden, 400  
Coward, Noel, 88  
Crocodile-Clip Tool, 399  
Crystal Palace Band Contest, 354

**DANISH** Dance, 144  
Daventry Aerial, 82  
De Profundis, 619  
— Quincy, 427  
Devon City Wireless Room, 658  
D.F. on Trawler, 656  
Dickens, Charles, 670  
Dusolina Giannini, 229

**EDEN** End, 499  
Ediswan Cathode Ray Tube Demonstration, 661 (*C.T.*)  
Effects Studio, 119  
Eisteddfod, 114  
Empire Programme Department, 83

**FIVE-metre** Field-day in Kentish Town, 422  
Forest Scouts Ultra-Short-Wave Transmitter, 395  
Fraser, Sir Ian, 463

French Licence Stamp, 661 (*C.T.*)  
Friday the Thirteenth, 252

**G.B.S.** in Finland, 260  
Geneva Recording Cradle, 581  
German Amateur Station, 419  
— Announcers Competition, 107  
— Mobile Television Outfit, 67  
G.P.O. Switchboard, 657  
Grace, Dr. W. G., 451  
Grahamstown Transmitter, 406  
Grand Prix, 229  
Graves, George, 355  
Green, Hughie, 308  
Groves, Olive, 282  
G.W.R. Centenary Pictures, 256

**HALL**, Henry, 15, 62, 144, 457  
— Henry, and Band, 62  
— Henry in "Music Hath Charms," 457  
Handley, Tommy, 256  
Harvest Festival Radio, 370  
Henderson, Roy, 401  
Hibberd, Stuart, 119  
H.M.V. Radiogramophone in Science Museum, 439  
Holmes, Leslie, 646  
Hubert, Claude, 256  
Hyden, Walford, 647

**IMHOF'S** Exhibition Van, 312  
Interference Detector of Electrical Research Association, 216  
Italian Army Wireless, 301  
— Field Set in Abyssinia, 563

**JACK** Payne's Radio Party, 426  
Jackson, Jack, 623  
Japanese Woman Amateur, 584  
Juan-Les-Pins Poster, 618  
Jungtraujoch, 283

**KALUNDBORG** Embankment, 325  
Keen, Malcolm, 570  
Kentish Town Radio Society, 422  
Keys, Nelson, 400, 551  
Kiernan, Dr. T. J., 250  
Konetzni, Amy, 427  
Krish, Serge, 62  
Kunz, Charlie, 525

**"LADIES** Only" Studio Party, 401  
Lawrence, Gertrude, 88  
Leaflet Transmitter, 656  
Lehar, Franz, 308  
Lindrum, Horace, 594  
Lisburn Aerial Mast, 92  
Little Show in Harlem, The, 474  
Livingstone and Stanley, 550  
Lloyd George, 114  
Lopez, Luciano, 451  
Lwow Studio en Fête, 530

**MANCHESTER** Studio, 191  
Mantovani, 427  
Marchesi, Bianche, 333  
Marconi Diorama at Science Museum, 615

**NAMIKO** San, 551  
N and K Receiver, 281  
Naval Review, 40  
N.B.C. Applause Machine, 359  
— Street Broadcasts, 194  
— Vice-President, 313

Nipkow, Paul, 271  
Norwegian Engineer's Adventure, 287  
Nottingham Police Radio Equipment, 491

**OLD** Crocks on the Road, 546  
Olympia Anti-Interference Bureau, 219  
On the Spot, 594

**PADEREWSKI**, Ignace, 475  
"Please Teacher," 524  
Police Radio, 192  
Polish People's Crystal Receiver, 505 (*B.B.*)  
Polyglot Announcers at Frankfurt, 517  
Portable Midget at Olympia, 219  
Potter, Gillie, 474  
Poznan Time Signal, 521  
Promenade Concert, 378

**QUETTA**, 276

**RED** Sarafan, 40  
Regent's Park Open-Air Theatre, 245  
Reindeer Stampede, 287  
Reith Sir John, 15  
Rocky Mountaineers, 622  
Roy, Harry, 308

**ST.** Hilary's Church, 646  
Salzburg, 114  
Samuel, Sir Herbert, 15  
Sarony, Leslie, 646  
Scarlatti, Domenico, 308  
Scott in the Antarctic, 498  
Servicing by Aeroplane, 563  
Shaw, G. Bernard, in Finland, 260  
Short-Wave Interference Detector of Electrical Research  
Association, 216  
— Waves for Recalling Children, 347  
Sibelius, 595  
Snow Maiden, 622  
Sokolova, Lydia, 282  
Somerville, Mary, 66  
Spanish Armada, 228  
Stampede of Reindeer, 287  
Stanelliphone, 423  
Sten, Anna, 450  
Strathmore Wireless Room, 657  
Swedish Band, 647  
Swiss Radio Orchestra, 623

**TAJ** Mahal, 167  
Talents, Sir Stephen, 66  
Tekade Mirror Screws for Television, 392  
Television in France, 639  
— Looking-Rooms in Paris, 625  
— Transmission by the B.B.C., 143  
1066 and All That, 88  
Trawler Direction-Finder, 656  
Twain, Mark, 570  
Two Leslies, 646

**VERDI**, 499  
Vesuvius, 43  
Vichy Casino, 166  
Vienna, 63, 571

**WAGNER**, Winifred, 475  
Welch, Elizabeth, 550  
Western Brothers, 379  
Wilno Effects Studio, 671  
Wilson, Marie, 333  
Winn, Anona, 63  
Woman Broadcast Engineer, 36, 54, 584  
Wood, Sir Henry and Orchestra, 145

**YOUTH** Sings Over the Frontier, 450

## AUTHORS

**ABRAHAMS**, J. Godchaux, 496  
Aisberg, A., 328  
Auditor, The, 16, 40, 62, 88, 114, 144, 166, 228, 256, 282, 308,  
332, 354, 378, 400, 427, 450, 474, 498, 524, 550, 570,  
594, 622, 646, 670

**BAILEY**, Leslie, 436, 464, 492, 518, 560, 616, 662  
Beatty, R. T., M.A., B.E., D.Sc., 68, 84, 108, 262

**CATHODE RAY**, 35, 57, 81, 278, 374, 405, 431, 454, 506, 573,  
591, 629, 668  
Cocking, W. T., 2, 26, 50, 74, 98, 147, 153, 164, 318, 340, 362,  
444, 460, 484  
Coombes, J. E. M., 334  
Corbett, B. D., 554  
Crawley, Lt.-Col. Chetwode, M.I.E.E., 656

**DENT**, H. B., 28, 272, 393, 510  
Diallist, 6, 36, 56, 91, 111, 152, 190, 238, 248, 281, 311, 337,  
358, 384, 406, 432, 458, 478, 502, 520, 536, 562, 604,  
618, 652, 673

**EXER**, D., 20, 104, 191, 254, 299, 343, 410, 446, 487, 549, 597,  
635

**FREE GRID**, 30, 87, 112, 140, 200, 227, 314, 324, 346, 408, 434,  
452, 471, 504, 526, 552, 566, 586, 619, 638, 665

**GRAHAM**, M. S., 133, 193

**HARRIES**, J. H. Owen, 105  
Heptode, 82

**KINROSS**, R. I., 377

**LUCIFER**, 292

**MACCARTHY**, Desmond, 367  
MacLanahan, W., 447, 495  
McLachlan, N. W., D.Sc., 155, 296, 402, 606  
Martin, Ernest, M., 58  
Megacycle, 33, 80, 235, 269, 350, 366, 430, 440, 466, 494, 513,  
521, 556, 603

**NICOLL**, R. S., 216  
Norman, M. W., 274

**PARSONS**, D. R., 613  
Partridge, N., B.Sc., A.M.I.E.E., 644, 672

**REYNER**, J. H., B.Sc., A.M.I.E.E., 11, 331, 348, 418, 440, 568  
Rollason, Norman, 515, 598

**SCHRAGE**, W. E., 557 (*Gen.*)  
Scroggie, M. G., B.Sc., A.M.I.E.E., 246, 252, 270, 302, 320,  
424, 537  
Slee, J. A., 344, 368, 397, 468  
Smith, H. F., 136, 217  
— Maxwell G., 391  
Sowerby, A. L. M., M.Sc., 21, 46, 70, 94, 610  
Strafford, F. R. W., 285

**THOMSON**, E., C., 389, 578

**WANDERING** Wave, 305, 612  
Wayne, John, 531  
Wilhelmy, H. J., 306



# The Wireless World

THE  
PRACTICAL RADIO  
JOURNAL  
25<sup>th</sup> Year of Publication

No. 827.

FRIDAY, JULY 5TH, 1935.

Vol. XXXVII. No. 1.

Proprietors : ILIFFE & SONS LTD.

Editor :  
HUGH S. POCOCK.

Editorial,  
Advertising and Publishing Offices :  
DORSET HOUSE, STAMFORD STREET,  
LONDON, S.E.1.

Telephone: Hlop 3333 (50 lines).  
Telegrams: "Ethaworld, Sedist, London."

COVENTRY: Hertford Street.  
Telegrams: "Autocar, Coventry." Telephone: 5210 Coventry.

BIRMINGHAM:  
Guildhall Buildings, Navigation Street, 2.  
Telegrams: "Autopress, Birmingham." Telephone: 2971 Midland (4 lines).

MANCHESTER: 260, Deansgate, 3.  
Telegrams: "Iliffe, Manchester." Telephone: Blackfriars 4412 (4 lines).

GLASGOW: 26B, Renfield Street, C.2.  
Telegrams: "Iliffe, Glasgow." Telephone: Central 4857.

PUBLISHED WEEKLY. ENTERED AS SECOND  
CLASS MATTER AT NEW YORK, N.Y.

Subscription Rates :  
Home, £1 1s. 8d. ; Canada, £1 1s. 8d. ; other  
countries, £1 3s. 10d. per annum.

*As many of the circuits and apparatus described in these  
pages are covered by patents, readers are advised, before  
making use of them, to satisfy themselves that they would  
not be infringing patents.*

## CONTENTS

	Page
Editorial .. .. .	1
Variable Selectivity .. .. .	2
Recording Telephone Conversations	5
Random Radiations .. .. .	6
New Output Valve .. .. .	8
Current Topics .. .. .	10
Feeders for Short Wave Reception	11
Broadcast Brevities .. .. .	15
Listeners' Guide for the Week ..	16
Design of Output Chokes (Con- cluded) .. .. .	18
Foundations of Wireless XXVI..	21
Principal Broadcasting Stations..	24

## EDITORIAL COMMENT

### Interference with Empire Reception

#### India Takes a Hand

**I**N our issue of 17th May we referred to the distressing interference with short wave reception caused by morse stations, complaints of which from abroad were reaching us in large numbers. In our issue of 26th April we also published a letter from Mr. H. R. Meredith, discussing conditions of reception in Patna, India.

Mr. Meredith has now written further to us on the subject and has forwarded a number of cuttings from Indian newspapers, showing how seriously the matter is regarded there. It will be remembered that in our Leader we said that mere complaints of interference served little purpose, as it was no help in locating the source of trouble and we appealed to readers to endeavour to identify the interfering stations wherever possible. It is, therefore, of particular interest to learn that the Director-General of Posts and Telegraphs in India is taking steps to this end, for he has recently issued a statement saying that the matter has been under observation for some time, and that it is realised that considerable interference is experienced, usually from telegraph stations. It is stated that identification of the interfering stations must first be made and then representations can be forwarded to the administrations controlling them. The Department of Posts and Telegraphs is taking this course of action.

We hope that this example will be followed elsewhere. If official bodies join in an effort to clear short wave broadcasting channels and particularly Empire transmissions from this interference, a very valuable improvement in reception conditions may be ex-

pected to result. Listeners all over the world should bestir, first themselves, and then their proper authorities, to action.

This does not mean that individual efforts to identify interfering stations should be slackened because authorities may be prepared to undertake the work officially. In many places the authorities may not have the necessary facilities, and in any case, successful efforts on the part of listeners to identify offenders and report them is the best possible evidence to the authorities that the listening communities view these interruptions of the short wave programmes seriously.

### Propaganda Wireless

#### Proposals for this Country

**A** STATEMENT has recently been published to the effect that a scheme is on foot and approaching realisation for the establishment of a broadcasting station in England, the avowed object of which is to broadcast propaganda to counter continental broadcasts which are inimical to the interests of communities here.

However sympathetically such a proposal might be received it can be stated without fear of contradiction that there is not the remotest chance of a licence being granted for the establishment of such a station here, and those who are promoting the scheme are evidently doing so in ignorance of the position. The State has vested a monopoly of Broadcasting in the B.B.C., and this was done for the very purpose of ensuring that stations should not be set up by independent bodies.

It would be intolerable if concessions were made which permitted independent propaganda broadcasting when the very principle is offensive to national opinion in this country.

# Variable Selectivity

By W. T. COCKING

*SINCE the requirements of selectivity and quality are conflicting, it is clear that the ideal receiver would be fitted with variable selectivity in order that the optimum conditions for any and every station may be realised. The attainment of variable selectivity has hitherto proved difficult, but it is shown in this article that it is by no means hard to obtain a wide range of control if the design be carried out correctly.*

AT a time when the attainment of the highest standard of quality demands the retention of modulation frequencies up to 10,000 c/s and the requirements of selectivity necessitate the sacrifice of frequencies higher than 4,000 c/s, it is clear that some compromise between selectivity and quality is essential. The most pleasing result to the ear is not secured by perfection of reproduction if this entails a large degree of interference, nor is it given by complete absence of all interference if this leads to the absence of the entire upper register from the reproduction. Most listeners prefer a compromise between the two extremes, for few will dispute that a pleasanter effect is obtained when the quality is sacrificed only as far as is necessary to reduce interference to the point at which it is not intrusive although it may not be completely inaudible.

It will be clear, therefore, that since the interference conditions are different for every station, and even vary frequently for each station, the optimum degree of selectivity must also vary for every station, and will be different for the reception of the same station in different localities. The ideal receiver would consequently be fitted with continuously variable selectivity so that its characteristics could be altered at will to suit the particular receiving conditions existing at any moment and in any district. This has

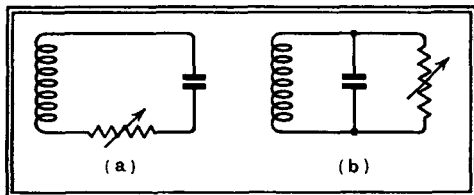


Fig. 1.—The selectivity of a single circuit can be varied by means of a series variable resistance, (a) of low value or a shunt resistance, (b) of high value.

long been recognised, but it is surprisingly difficult to devise a means of varying the selectivity of a receiver which is satisfactory from all points of view, and it is only recently that any considerable degree of success has attended the efforts of designers.

There are two distinct methods of

obtaining variable selectivity. With the first, the inherent selectivity is of such an order that no serious degree of sideband cutting occurs, and it is increased when necessary by the application of reaction. This method has been adopted in the Single-Span receivers so far described in *The Wireless World*, and it has the great merit of simplicity. It is, however, open to the objection that the degree of selectivity obtainable is limited by the appearance of self-oscillation. With the second method, the inherent selectivity is made as high as the designer judges necessary for the avoidance of interference, and it is reducible by some means for reception under conditions of moderate or little interference. A much wider range of control is possible in this way, and it is the means to be adopted which we have now to consider.

## Methods of Varying Selectivity

Since the selectivity of a tuned circuit depends upon the  $Q (= \omega L / R = \text{reactance} / \text{resistance})$  of the circuit, and the inductance must normally be fixed, an obvious method of varying the selectivity is to vary the resistance. This may be done in two ways: a variable resistance of low value can be connected in series with the circuit as shown in Fig. 1 (a), or one of high value in parallel as in Fig. 1 (b). Where only a single circuit need be controlled, either of these methods is satisfactory, although open to the objection that the sensitivity must vary also. When we remember, however, that the IF amplifier of a modern superheterodyne may contain as many as six tuned circuits, we can see that the control of one circuit alone is likely to have little effect. Even if its selectivity were completely destroyed, the remaining circuits would normally cause excessive sideband cutting. Each circuit must be controlled if satisfactory results are to be secured, and the difficulties of controlling six circuits by this means are obvious, for six variable resistances, each independently screened, and ganged for operation by a common spindle, would be needed!

Now, in IF amplifiers the tuned circuits are usually arranged in coupled pairs, and it is well known that the degree of selectivity obtained depends very greatly upon

## Improving the Standard of Quality

the coupling. If a pair of tuned circuits be coupled loosely together, the resonance curve takes the form shown by curve A of Fig. 2, while if "optimum" coupling be used, the curve is broadened to the shape shown by B. If the coupling be still further increased, two humps appear (curve C) and the system becomes of the band-pass type. Unless the coils are of low  $Q$  it is inadvisable to couple them very tightly, otherwise the trough between the peaks becomes very pronounced. On the other hand, unless the circuits have a large value of  $Q$  the selectivity with loose coupling will be low.

Ideally, therefore, the resistance of the

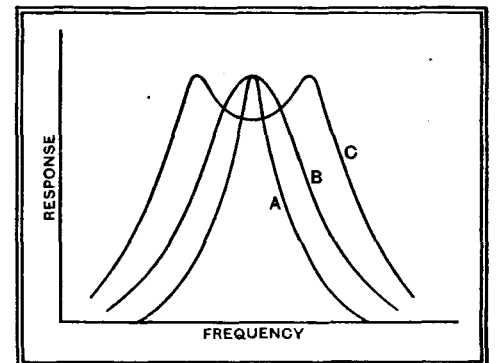


Fig. 2.—The resonance curve given by a pair of coupled tuned circuits varies with the degree of coupling. With loose coupling, it is sharp (A) but with optimum coupling (B) it is still single-peaked, while with tighter coupling (C) two peaks appear.

circuits should be increased with the coupling so that the double-hump appears only as a minor irregularity in an otherwise flat-topped response curve. So much depends on the band-width required, or, rather, the ratio of the resonance frequency to the band-width, that it is impossible to lay down any hard and fast rule, and experience shows that with a fairly high resonance frequency a variation of resistance is unnecessary for high quality sound reproduction.

Before going more deeply into this question it is as well to consider methods by which the coupling can be varied. The chief systems of coupling are shown in Fig. 3. With common capacity coupling (a) the band-width is controlled by the capacity of the condenser C, and it would appear that this would offer a simple means of obtaining continuously variable coupling by the use of a variable condenser for C. There are two objections to this,

**Variable Selectivity—**

however, and the first and less serious is the difficulty of obtaining a condenser of large enough capacity, since a variation of some 0.005  $\mu\text{F}$ . would be needed. The second objection is that the response is not

to intermediate frequencies of the order of 465 kc/s, for it is not difficult to demonstrate that with a lower frequency of some 110 kc/s it is desirable to increase the circuit resistance with the coupling in order to prevent the appearance of exces-

of 2,000  $\mu\text{H}$  is needed. Coils having this order of inductance and unscreened gave resonance curves of the type shown in Fig. 5 when used with a VMP4 valve and having only the load of a valve voltmeter on the secondary. Curve A is for the case of untapped coils with optimum coupling, and a stage gain as high as 300 times is obtainable. The curve is not quite symmetrical, for it gives an attenuation of 7.5 times at 10 kc/s off resonance on one side as compared with six times on the other. The gain, however, is rather high for safety in a practical receiver in even one IF stage, and with two stages it would probably be impossible to maintain stability. It was reduced, therefore, by tapping down both primary and secondary, to 91.5 times, and the resonance curve then became B. A considerable improvement in selectivity is evident, for the attenuation at 10 kc/s off tune now becomes 16 times and 14 times for the two sides, and it is very clear that the losses in the external circuit are playing an important part.

When an attempt was made to screen a transformer of this nature, however, many difficulties arose. Owing to the large field

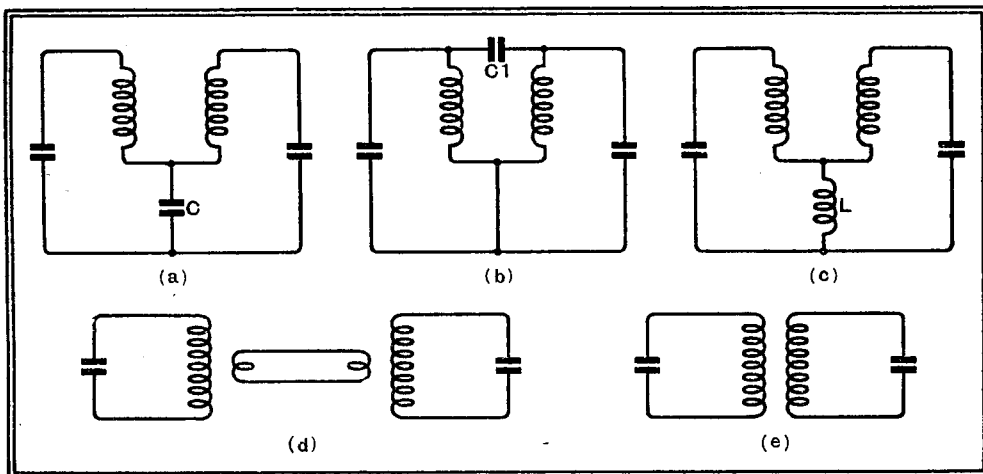


Fig. 3.—The chief methods of coupling circuits are shown here. At (a) the coupling is by common capacity and at (c) by common inductance, whereas with (b) a top-end capacity coupling is used. The link-filter is shown at (d) and mutual inductance coupling at (e).

broadened by an increase in coupling an equal amount on either side of resonance. Referring to Fig. 4, if A be the response curve with loose coupling, that with tight coupling takes the form of curve B. It can be seen that if a change be made in the coupling, the receiver must be retuned so that the carrier frequency lies in the centre of the resonance curve.

**Filter Couplings**

When top end coupling is used (b) the capacity of the coupling condenser  $C_1$  is of more manageable proportions, being of the order of 1  $\mu\text{F}$ . This circuit still suffers from the objection that the peaks do not open out symmetrically about the resonance frequency, but to one side, as in Fig. 4. The second peak occurs on the other side of resonance, however, and this applies also to inductive coupling (c), which has also the objection that a small variometer L would be needed to alter the coupling. Another and at first sight attractive circuit is link coupling (d), but this again suffers from the same disadvantage in the manner in which the peaks open out.

When we turn to the fifth circuit (e) in which the coupling is provided by the mutual inductance between the two coils, we find that, as long as the coupling is due to this alone, the peaks open out symmetrically, and we obtain the type of curve exhibited by Fig. 2. This system of coupling is thus the only one which theoretically can give the desired results, and, as practice amply supports theory, it is accordingly the only method which need be considered.

Before we can consider the precise arrangement which we can adopt, it is necessary to decide on the coils which are to be used, for the degree of coupling necessary will depend on their efficiency. We shall, moreover, confine the discussion

sively prominent humps in the response curve. Moreover, the use of low intermediate frequencies is less prevalent than formerly on account of the greater ease of elimination of second-channel interference with a moderately high frequency.

In designing a coil we have not only to consider the efficiency of the coil alone but its efficiency when connected in circuit and used with its tuning condenser. At the frequencies under consideration, dielectric losses in the condenser, valve-holder and valve base are by no means negligible, and profoundly influence the choice of a coil. Compactness is also a point of importance, and it is hardly practicable to employ a coil with a larger overall diameter than one inch, nor one having a length much greater than this figure. The use of an iron-core of suitable type, therefore, becomes very desirable.

Owing to its comparatively low losses an air-dielectric trimming condenser is de-

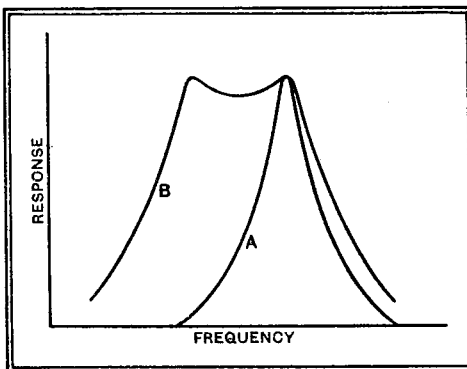


Fig. 4.—Certain methods of coupling give an unsymmetrical opening of the peaks. Curve (A) shows the results with loose coupling, and (B) when it is tight enough for the two peaks to appear.

sirable, but types at present available of suitably small dimensions have a capacity no more than 65  $\mu\text{F}$ . For resonance at 465 kc/s with this capacity an inductance

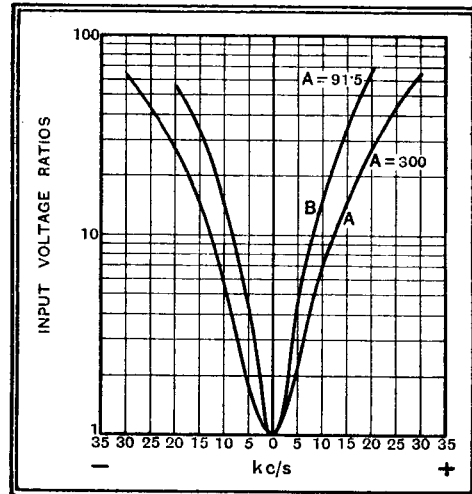


Fig. 5.—The results obtained with unscreened coils of 2,000  $\mu\text{H}$ . inductance with air-dielectric trimmers are shown here for two different degrees of coupling.

of the high-inductance coils, the screen considerably lowered the efficiency, and it also proved difficult to obtain sufficiently loose coupling between the two coils in a can of reasonable dimensions, while the physical dimensions of the air-dielectric trimmers added to the difficulties. Now experience had shown that it was possible to produce a considerably more efficient coil, although of lower dynamic resistance, if its inductance were lower, for in the given winding space it was possible to employ greater sectionalisation. A coil of 500  $\mu\text{H}$  inductance was found to be about the optimum when wound with Litz wire in ten sections. It is out of the question with such a coil, however, to employ an air-dielectric trimmer, for the capacity required to tune it to resonance is some 300  $\mu\text{F}$ .

The question arose, therefore, as to whether the more efficient coil would still be better if it were tuned with a mica-