British
RADIO AND
TELEVISION
Incorporating "The British Radio Maker and Exporter"

Vol. X No. 5 SEPTEMBER, 1955 By subscription only, £1 a year post free

The PERFECT TEST TEAM

WE SHALL BE AT THE
RADIO SHOW
EARLS COURT
AUG 24 - SEPT 3

Stand No.
116

The illustration depicts a set of modern "AVO" testgear being used to measure the "Q" of the secondary winding of the second I.F. transformer on a chassis of unknown characteristics—just one of many tests which can be performed by this combination of instruments.
A signal of predetermined frequency from the "AVO" Wide Range Signal Generator is being fed into the Electronic Test Unit, where it is amplified and fed to the secondary winding of the transformer. The Electronic Testmeter is connected across the tuned circuit under test and, from the readings obtained and the controls of the Electronic Test Unit, the "Q" of the circuit can be determined.
The three instruments, shown as a team, cover a very wide field in measurement and form between them a complete set of laboratory testgear, ruggedly constructed to withstand hard usage.

ELECTRONIC TESTMETER

A 56-range instrument combining the sensitivity of a delicate galvanometer with the robustness and ease of handling of an ordinary multi-range meter. Consists basically of a highly stable D.C. Valve Millivoltmeter, free from mains variations and presenting negligible load on circuit under test.

Switched to measure:—
D.C. Volts: 5mV to 10,000V.
D.C. Current: .5μA to 1 Amp.
A.C. Volts: .1V to 2,500V R.M.S. up to 2 Mc/s.
.1V to 250V R.M.S. up to 200 Mc/s.
A.C. Power Output: 5mW to 5 Watts.
Decibels: —10db to + 20db.
Capacitance: .0001μF to 50μF.
Resistance: .2ohm to 10 Megohms.
Operates on 100-130v. and 200-260v.. 50-60 c/s A.C. mains.

List Price **£40**

ELECTRONIC TEST UNIT

For measuring small values of A.C. voltage, inductance, capacity, and "Q" at radio frequencies. Although designed primarily for use with "AVO" instruments, it can be used with any suitable Signal Generator/Valve Voltmeter combination.

As a **Wide Range Amplifier**, it is capable of an amplification factor of 40±2—3db between 30 c/s and 20 Mc/s.
As a **Capacity Meter**, it covers measurements at radio frequency from .5pF. to 900pF. in two distinctly calibrated ranges.
As an **Inductance Meter**, it gives direct measurements from .5μH. to 50mH. in six ranges.
As a "**Q**" **Meter**, it indicates R.F. coil and condenser losses at frequencies up to 20 Mc/s.
Operates on 100-130v. and 200-260v., 50-60 c/s A.C. mains.

List Price **£27**

WIDE RANGE SIGNAL GENERATOR

An instrument of wide range and accuracy for use with modern radio and television circuits.
Turret coil switching provides six frequency ranges covering 50 Kc/s. to 80 Mc/s.

Range	1.	50 Kc/s.—150 Kc/s.
"	2.	150 Kc/s.—500 Kc/s.
"	3.	500 Kc/s.—1.5 Mc/s.
"	4.	1.5 Mc/s.—5.5 Mc/s.
"	5.	5.5 Mc/s.—20 Mc/s.
"	6.	20 Mc/s.—80 Mc/s.

Accuracy to within 1% of scale marking. Gives sensibly constant signal of good wave-form, modulated or unmodulated, over entire range. Minimum signal less than 1μV at 120 Mc/s. and less than 3μV between 20 and 80 Mc/s. Gives calibrated output from 1μV to 50mV.
Operates on 100-130v. and 200-260v., 50-60 c/s A.C. Mains.
Battery-operated model also available.

List Price **£30**

Sole Proprietors & Manufacturers:—
THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO., LTD.
AVOCET HOUSE · 92-96 VAUXHALL BRIDGE ROAD · LONDON · S.W.1 *Telephone: VICtoria 3404-9*

the importance of being

DECCA

THE DECCA AGENCY offers you a range of brilliantly designed, skilfully engineered instruments outstanding in presentation, backed by a name that is a household word.

On show for the first time at the Earls Court Radio and Television Exhibition (Stand No. 32), the complete Decca 1955/6 range includes a de-luxe V.H.F.-F.M. four-waveband 7-valve table radio (Model 66), a de-luxe 17 inch console television receiver with V.H.F.-F.M. radio tuning unit (Model DMC/D18) and two high fidelity de-luxe V.H.F.-F.M. radiogramophones (Models RG100 and RG103)*. All these models provide ample proof of Decca's vigour and freshness of outlook. Decca instruments may well comprise just that range for which you are looking to meet the ever-growing better class demand for *out-of-the-rut* television and radio receivers, and radiogramophones. In this lies *the importance to you of being Decca.* Why not take steps right away to see if you cannot acquire the Decca Agency for your District?

DECCA MODEL RG103

*Models 66 and RG100 incorporate two loudspeakers; Model RG103 has three.

DECCA MODEL RG100

HIRE PURCHASE TERMS AVAILABLE FOR ALL MODELS

DECCA RADIO AND TELEVISION

branch of

THE DECCA RECORD COMPANY LTD., 1-3 BRIXTON ROAD, LONDON, S.W.9

for the most uniform response

Of all the different bases that are used for magnetic recording tapes, none can match the precise uniformity of cast cellulose acetate. 'Scotch Boy 111', with its cellulose acetate base, offers recordists the most exact uniformity of response that any tape can provide. 'Scotch Boy 111' is the best of all tapes for high-precision recording, whether of voice, instrument, or mechanical sound.

For laboratory experiments that require the utmost uniformity of response 'Scotch Boy 111' is the natural choice: at 1000 c/s its output variation within each reel is less than

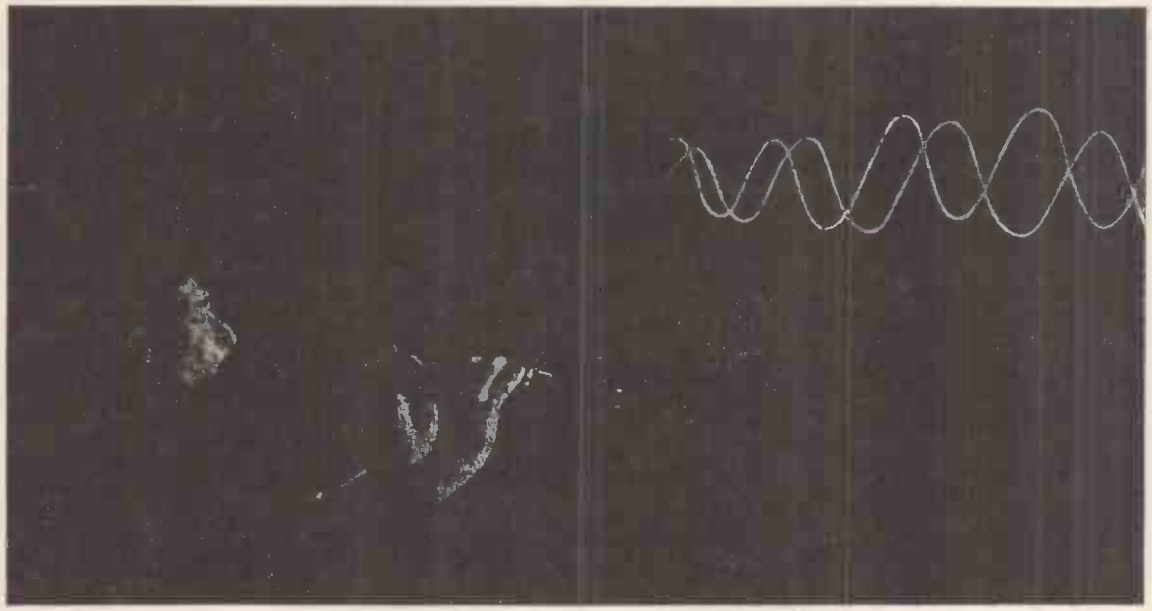
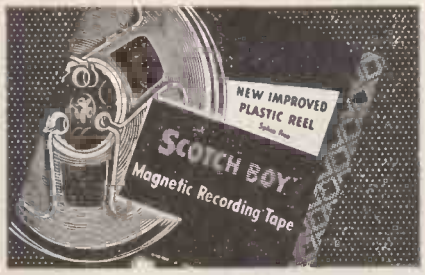


Photo and oscillograph of Cy Laurie playing a characteristically agile embroidery of a phrase from "King of the Zulus"

± ¼ db., and the variation from reel to reel is less than ½ db. 'Scotch Boy 111' is used by the services for experiments that involve the precise measurement of mechanical and other sounds, and by sound technicians and expert recordists all over the world.

'Scotch Boy 111' is supplied in 1200-ft. lengths on easily-threaded, 7" plastic spools, and also in 600-ft. and 2400-ft. lengths. All these lengths are free from splices.



Record on 'Scotch Boy III'
—the tape with the cellulose acetate base

'SCOTCH BOY'

Regd. Trade Mark

MAGNETIC RECORDING TAPE

ANOTHER 3M COMPANY PRODUCT

MINNESOTA MINING & MANUFACTURING COMPANY LTD · LONDON · BIRMINGHAM · MANCHESTER · GLASGOW

NOW—the McCARTHY 7-Valve Bureau Radiogram at only 56 gns.

The radiogram you've been waiting for! McCarthy's Masterpiece! A beautiful walnut veneered cabinet with generous, easily accessible record space, houses this magnificent radiogram, with the superb tone.

TWO TYPES AVAILABLE

1 PP 7 with short, medium and long wave-bands and push-pull output.

2 FM 7 for F.M. areas; complete A.M. reception on short, medium and long wave-bands and F.M. reception over the whole of band II. Single ended output.

200-250 v. A.C.

At 56 guineas, this will be the Radiogram of the year! Make sure of *your* stocks to meet the demand.

- **N.W. ENGLAND.** Ernest Hathaway & Co. Ltd., "Sartor House," 37 Derby Street, Manchester, 8. Hardman & Co. Ltd., P.O. Box No. 23, Hardale House, Baillie Street, Rochdale. S. Hathaway & Co. (Liverpool) Ltd., 1/3 Pall Mall, Liverpool, 3.
- **N.E. ENGLAND.** Robert Hardman Ltd., 3 Queen Square, Leeds, 2.
- **NOTTS.** Robert Hardman Ltd., 3 Queen Square, Leeds, 2. Mansfield Factors (Electrical Supplies) Ltd., 50 Stockwell Gate, Mansfield.
- **LINCS.** Mansfield Factors (Electrical Supplies) Ltd., 50 Stockwell Gate, Mansfield.
- **MIDLANDS.** S. Hathaway & Co. (Midlands) Ltd., 50 High Street, Henley-in-Arden. R. A. Poole (London) Ltd., Cox Street, Coventry. R. A. Poole (London) Ltd., 40-42 St. James Street, Cheltenham. E. A. Wood. Ltd., 100 Aston Road, Birmingham, 6. E. A. Wood, Ltd., "Eltic House," 61 Belgrave Gate, Leicester.
- **KENT.** H. E. Kettle Ltd., Knightrider Street, Maidstone.
- **SURREY AND SUSSEX.** John Street Manufacturers Ltd., 88 Springbank Road, Hither Green, London, S.E.13.
- **S. & W. ENGLAND.** Robshaw Brothers Ltd., 105 Commercial Road, Bournemouth.
- **REMAINDER OF ENGLAND.** Radio & Electrical Mantel Co. Ltd., Felgate House, Studland Street, Hammersmith, London, W.6
- **WALES.** Electrical Wholesalers (Shropshire) Ltd., Alexandra Road, Wellington, Shropshire.
- **CHANNEL ISLANDS.** Robshaw Brothers Ltd., 105 Commercial Road, Bournemouth.
- **SCOTLAND.** Bryterlite Electrical Co. (Glasgow) Ltd., 39-43 Robertson Street, Glasgow, C.2.
- **N. IRELAND.** Bryterlite Electrical Co. (Belfast) Ltd., 11 College Square North, Belfast.

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McCarthy radio

Manufactured by FELGATE RADIO LTD., FELGATE HOUSE, STUDLAND STREET, HAMMERSMITH, LONDON, W.6.

Advertiser's Announcement

New Ace Factory will boost production

FIRST OF A NEW SERIES OF PREMISES BUILT AT BASILDON NEW TOWN

IN the greatest single expansion of productive capacity since 1949, Ace Radio, Ltd. have opened the first of a new series of factories at Basildon, Essex. The factories are being built on the Nevendon Industrial Estate as part of the development of the new satellite town. Picture above shows the front entrance of the new factory.

Increasing demand for Ace radio and television receivers and radiogram models during the past few years has made expansion of the manufacturing premises imperative. Work began on the new factory, known as "Pioneer Works," on June 1 this year, when the new boxing and packing department commenced operations. With the closing of the old department at Tower Works, Willesden, construction of new chassis assembly lines began. These came into operation last month.

Future plans

A new development laboratory, to carry on research into improved circuitry and new techniques in radio, television and audio, has been established at the Ace Basildon factory. Other departments now operating in the building include the coil-winding and sub-assembly shops.

Further plans provide for an extension to the factory, to be opened in January, 1956. In the same year work will start on the building of a large chassis assembly works at Basildon.

New departments which will be opened at Basildon include a cellulose spray and cabinet-polishing plant, model shop, machine shop and metal-pressing plant.

Output doubled

As part of the Ace policy of expansion an associate company was recently formed for cabinet production, and this part of the organisation will also be moved to Basildon in the near future.

The first effect of these new developments and increased manufacturing facilities will be to double the company's output during the 1955-56 season.

Ace Radio was founded in 1930 and produced some of the earliest domestic superhet receivers. The current range includes a.m. and a.m.-f.m. radio sets, contemporary styled 3-speed auto-radiograms, and television receivers. A new 13-channel television set will be released early in 1956.

Design policy

The company's design policy is to produce models styled for elegance and simplicity in the contemporary manner. Manufacture throughout is to an exacting engineering standard.

ACE IN A NUTSHELL

The company started life in 1930, led by Victor Taylor, manufacturing superhet radios in a converted garage in East London.

In 1935, Ace moved to factory premises in City Road, London, and started chassis assembly lines. A cabinet making section was opened.

When the war started in 1939 Ace turned over to war work, producing radio and Intercom units and other components for the Air Ministry. The cabinet works made ammunition cases.

Rapid expansion of production resulted in the move to a modern factory at Tower Road, Willesden.

In 1951 all current Ace models were selected by the Council of Industrial Design for inclusion in their 1951 stock list.

The first Ace television sets were produced in 1952, and in 1955, after ten years of continuous expansion, the New Basildon factory was opened.

Ace Radio is essentially a family business. Managing director is Mrs. E. E. Taylor. Chief designer, and director, is Victor Taylor, junr., M.S.I.A.

Other executives include: Cyril Fulcher (sales); Jim Best (chief engineer); P. Taylor (distribution); S. Parlby (production).

Picture shows part of the new boxing department at the Ace radio factory, Basildon Essex, which was opened recently. Completed radiograms are assembled, tested, burnished and packed on roller conveyors.

Above : The New Yorker

Accent on Design

NEW ACE PRODUCTS

ALL Ace models are distinguished by careful design and modern styling. This is particularly true of the radiogram series where the furniture aspect of the cabinet style is one of the most important factors in marketing. The latest addition to the Ace radiogram range demonstrates that elegance in design can be combined with a competitive price to produce an instrument of considerable sales potential.

The New Yorker

Named the *New Yorker*, Ace's latest radiogram is a new departure in gram design, bringing a luxuriously-finished model of high technical quality into the low-price range. Picture above shows cabinet styling. Finish is in walnut veneer, the interior being lined with patterned leather-cloth to match in colour and design the large-area glass tuning dial and metal-faced controls.

The instrument incorporates the Ace 254 chassis—a 5-valve 2-waveband superhet for operation on 200-250V a.c. mains. A built-in Ferrite rod aerial covers both medium and long waves. Output is 3 watts into a high-flux p.m. speaker.

A BSR *Monarch* autochanger is fitted, and the cabinet contains a generous double record storage compartment. Price of the *New Yorker* is 44 gns. (£35 1s. 10d. list, plus £11 2s. 2d. tax).

AM-FM Radio

A new version of the Ace *Prince* table radio for reception of the new v.h.f.-f.m. service is now available. Cabinet styling is similar to that of the *Prince* (illustrated below) which is made in a.c. (type R354) and a.c.-d.c. (type 354U) models.

The a.m.-f.m. model incorporates a type 455 8-valve 4-waveband chassis which will receive the v.h.f.-f.m. transmissions in Band II in addition to short, medium and long waves. The set is housed in an attractive walnut-veneered table cabinet with switched pick-up facilities.

Price of the *Prince A.M.-F.M.* is 35 gns. (£27 18s. 3d. list, plus £8 16s. 9d. purchase tax)

Ace Prince a.m.-f.m. radio

The earlier models of the *Prince* (a.m. only) are priced as follows: a.c. version 21½ gns. (tax paid); a.c.-d.c. version 22½ gns. (tax paid).

The New Elizabethan

New Elizabethan

The *Elizabethan* radiogram, introduced by Ace last year, is also available in a new a.m.-f.m. version to receive the new v.h.f.-f.m. transmissions in addition to a.m. medium and long-waves.

Designed in the interests of quality, the cabinet is solidly constructed to eliminate distorting resonance and has been carefully proportioned to assist faithful reproduction. The exterior is finished in Persian figured walnut and the interior is finished in cream "linen"-type Rexine and fawn suede cloth. Dial escutcheon and record changer are finished in matching colours.

The instrument includes a BSR *Monarch* 3-speed autochanger and the Ace type R455 8-valve a.m.-f.m. chassis, for a.c. mains operation only.

List price of the *A.M.-F.M. Elizabethan* is 62 gns. (£49 9s. list, plus £15 13s. purchase tax).

ACE ON WHEELS

Higher production means more transport. These two new pantechnicons, designed and built to Ace specifications, were added to the Ace transport fleet earlier this year.

A 155 VHF/FM Table radio with AM. 32 GNS. List price £25. 8. 9. P.T. £8. 3. 3.

ARG 79 VHF/FM 3-speed Auto-Radiogram with AM. 59 GNS. List price £46. 18. 1. P.T. £15. 0. 11.

Regentone

still the finest value in FM

ARG 82 VHF/FM 3-speed Auto-Radiogram with AM. 78 GNS. List price £62. 0. 3. P.T. £19. 17. 9.

British RADIO AND TELEVISION

Incorporating "The British Radio Maker and Exporter"

Vol. X, No. 5 SEPTEMBER, 1955

Editorial and Advertising Offices :

46-47 Chancery Lane, London, W.C.2

Telephone : HOLborn 6201

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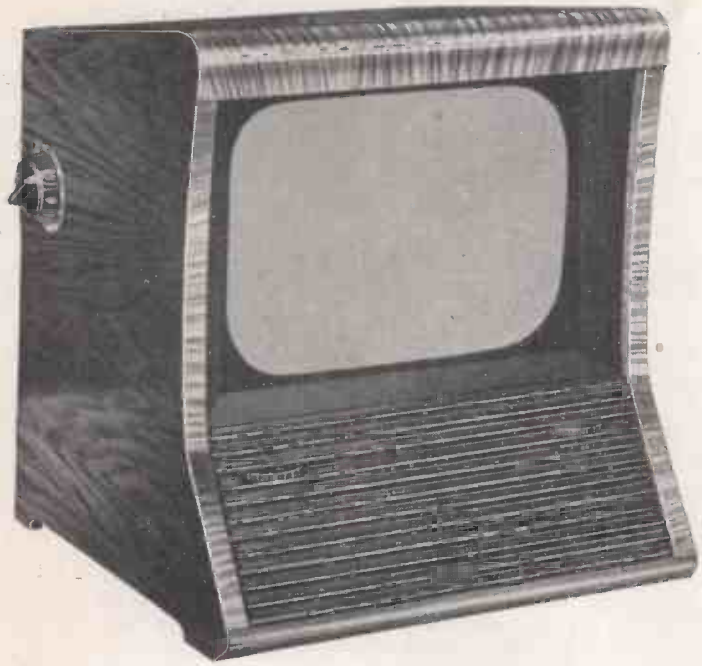
Published on or about the 1st of each month and available by subscription only to bona-fide members of the radio and television trade and industry. Annual subscription to any part of the world £1 post paid.

In this issue:

HUNDREDS OF THOUSANDS OF

Satisfied Viewers

CAN'T BE WRONG!



PYE

Model VT4

The PYE VT4 is fitted with 14″ Black Screen, Automatic Picture Control and 13-Channel Switch Tuning. It is outstanding value at 67 gns. tax paid.

By its very excellence in design and peformance, this tried and trusted set has brought a standard of quality to television that remains unchallenged.

Picture for picture, pound for pound, the PYE VT4 is still Britain's finest value in TV today.

PYE LIMITED OF CAMBRIDGE

Tele-opinion

TV's Independence Day

— SEPTEMBER 22 —

A MONTH to go to Independence Day—when Independent TV will take the air for the first time in the history of British broadcasting. As from September 22 television show business will have the one element essential to the success of any kind of show business that has hitherto been lacking—competition. And under the stimulus of that competition all programmes—whether B.B.C. or Commercial—must inevitably improve.

This is a good state of affairs for the trade, who are intimately concerned with the progress and development of television as an entertainment medium. Better programmes will pull in larger audiences, and larger audiences will buy more sets. The net result will be more business.

Dealers in the service area of the I.T.A. transmitter are already feeling the pressure of increasing CTV business, and reports at the present time indicate that conversion work is saturating available manpower. This pressure is likely to increase once the independent programmes are under way. On the old principle of the dog seeing the rabbit many people will only be stimulated into buying a two-band set or ordering a conversion when they realise (i) what they are missing, and (ii) what they will in effect be buying.

The viewer's right to choose the entertainment he prefers by the simple act of turning a switch has been long overdue. Independent TV will mean the creation of a new class of people—*Independent Viewers.* And pleasing the independent viewer, who will now have the power to select (whereas previously he had only the power to reject or accept), is going to be the main object in life of both the B.B.C. and the I.T.A. programme contractors.

September 22 will be Independence Day in more ways than one.

Let's all go to the Radio Show

THIS year the Radio Industry Council has been inundated with requests from dealers for Radio Show publicity material, including window bills and posters. Taking the trend to its logical conclusion it is reasonable to suppose that Earls Court will in turn be inundated with dealers and their engineers and customers taking time out to see for themselves what the industry has to say for itself in this epoch-making year of Commercial TV and FM.

That the industry has a great deal to say—and show—will be apparent from a glance at the comprehensive Radio Show Preview published elsewhere in this issue. So much prominence has been given to television and television sets in the national and provincial press that the Radio Show is a must for any live wire dealer who wants to keep a jump or two ahead of his customers.

So, Mr. Dealer, let's all go to the Radio Show and keep up to date on our jobs. And while you're there, don't forget to look us up on Stand 109 where we shall be pleased to welcome old and new readers.

In this Radio Show Number

As usual, to help you find your way round the exhibition, we are again publishing our loose-leaf *Exhibition Plan* which you can fold and keep conveniently in your pocket. And to make it easier for you to refer to our *Show Preview*, we have detached *James Huxley's Service Department.*

This issue of *B.R.T.* is double its normal size and contains a record number of pages, special features including an enlarged technical section, the Show Preview, and up-to-the-minute news of Commercial Television.

ROUND-UP OF THE MONTH'S NEWS AND VIEWS

Commercial TV ready to take the air

PACE QUICKENS AS DEADLINE NEARS

WITH only four weeks to go, and high-power test transmissions scheduled to start in a few days, preparations for Commercial TV are rapidly increasing in tempo. The Croydon transmitter is virtually ready and the programme contractors have their programmes planned, complete with commercial advertising spots. Everything is ready to make history on the evening of September 22 when the first commercial programme in British broadcasting will take the air.

Dealers can look forward to receiving high-power test transmissions as from September 5, when the I.T.A. transmitter will take over from the Belling-Lee installation which has done such stalwart work during the past months to enable dealers to instal and convert TV sets.

Associated Broadcasting Co., Ltd., estimate that by the time September 22 arrives they will have spent some £2¼ million on equipment, studios and facilities. They further state that advertising bookings covering the first year of commercial operation amount to a revenue of some £5 million with some air time still available.

Associated Rediffusion also report substantial bookings. Although no figures are available it is thought that the total for the first year will exceed £3 million.

About three-quarters of the A.B.C. programme material will be on film, and the company are currently making programme films for TV in four centres. Some of the films are intended for use by Associated Rediffusion. Certain programmes, *e.g.*, the *Robin Hood* series, have also been sold to Canada for TV showing.

The I.T.A's second station at Lichfield, covering the Midlands area, is expected to be operational by February, 1956, the Bolton station, for Lancashire, by May, and the Yorkshire transmitter towards the end of next year. Commercial TV is unlikely to reach Scotland until early in 1957.

The first commercial television studios in Great Britain were recently handed over to Associated Rediffusion, Ltd.—weekday programme contractors for the London area. The studios have been established at the Granville Theatre of Varieties, Walham Green, founded in 1898 by famed old-time music-hall stars Dan Leno and Harry Randall. The theatre has been speedily adapted and equipped for television broadcasts in four months by Central Rediffusion Services Ltd.

★

Picture (above) shows engineers at work in the control room and (at left) a studio rehearsal in progress.

★

In addition to studios at Television House, Kingsway, London, the programme contractors will have five permanent studio centres and six O.B. units. Two theatres, at Wood Green and Walham Green, London, are being converted for audience-participation shows. A.B.C. is also converting two floors at Foley Street,

in central London, and at Alexandra Palace, where Norman Collin's year-old option has been taken up. At Wembley A.R.TV will use three stages with a combined floor space of 10,000 sq. ft. Two further stages will function later in the year.

The first television O.B. unit, manufactured by Pye, has been delivered to A.R. TV, with three more on order. Average price of each unit is about £35,000.

The first number of *Television Times*, the official Commercial TV programme paper, will appear on September 20, price 4d.

I.T.A. move to Permanent HQ

THE Independent Television Authority which since October, 1954, has been in temporary offices at Wood's Mews, Park Lane, W.1, has now moved to its permanent headquarters at 14 Princes Gate, S.W.7. The telephone number there will be KNIghtsbridge 4341.

NEW R.T.R.A. PRESIDENT

AT a recent meeting of the R.T.R.A. Council, W. R. Stone was elected National President for the year 1955-56. He succeeds T. R. Priest. Elected Vice-President was F. C. Woodward.

Mr. Stone is principal of the retail company W. R. Stone, Ltd., Hoddesdon, Herts, and Mr. Woodward is principal of Kin Electric Co., Nottingham. Both Mr. Stone and Mr. Woodward have been members of the R.T.R.A. Council for some years, and have served on several committees at national level.

Band III Aerials in the Midlands

FOLLOWING a statement in certain papers that viewers in the Midlands would be able to receive commercial television programmes on their present B.B.C. aerials "because the frequency of the Lichfield transmitter is a mathematical multiple of the B.B.C. frequency," a Radio Industry Council spokesman said:

"It is true that some viewers in the Midlands may receive a passable picture without altering their aerials, but an aerial specially designed to receive the Band III signals will obviously be more efficient and will be necessary for the great majority of viewers. A Band III aerial is particularly necessary from the point of view of minimising strength of interference in relation to signal strength."

FOR ALL IN THE TRADE AND THE INDUSTRY

Radio Exports

NEW RECORD YEAR IN SIGHT

EXPORTS of British radio equipment so far this year are running at even higher levels than those for 1954 when a new record was set up, it is announced by the Radio Industry Council.

Provisional value of exports for the first six months of the year is £15,500,000 compared with over £29,000,000 for the whole of 1954, despite interference caused by dock and rail strikes during June when the export total was £2,000,000.

A striking increase continues to be shown in exports of sound reproducing equipment, including record players, tape recorders and public address systems. The value of these exports for the six months was £2,500,000, compared with a record figure of £3,700,000 for the whole of 1954, and as they form an important part of the coming Radio Show at Earls Court (August 24 to September 3) which is attended by buyers from all over the world, a further fillip to exports may well be expected.

Direct exports of capital goods—transmitters, radar and navigational aids and electronic equipment for industry—reached £6,500,000 in the first six months of the year. The total for components was £3,500,000; for radio and TV sets, £1,750,000; and for valves, £1,250,000.

R.E.C.M.F. Display at Copenhagen

THE Radio and Electronic Component Manufacturers' Federation has taken a large stand in the British Exhibition, arranged jointly by the British Import Union, Denmark, and the Federation of British Industries, which will be held in Copenhagen during the period September 29–October 16, 1955.

The R.E.C.M.F. display is designed as a prestige show for the British rado and electronic component industry. It is situated in a commanding position at the entrance to the Main Hall of the Forum and will exhibit the products of between 20 and 30 prominent members of the Federation. It will be the largest display in the exhibition representative of the radio and electronic industry.

Mullard Back Radio Astronomy Project

THE University of Cambridge has recently received from the Mullard Company an offer to provide over a period of ten years the sum of £100,000 for the purpose of continuing and extending the work in radio-astronomy which is in progress in the Cavendish Laboratory

It is intended to set up a new observatory to be known as the Mullard Radio-Astronomy Observatory, and it is hoped that a site near Cambridge will be available for this purpose and that there will be space on it for making a number of observations which have not yet been possible.

Important work in radio-astronomy was started soon after the war both in Cambridge under Mr. M. Ryle and in Manchester under Professor A.C.B. Lovell. At Cambridge special types of radiotelescope have been developed and have been used for detecting the astronomical bodies known as "radio stars" and for special investigations of the sun.

With the instrument which is now in use in Cambridge it has been possible to detect and to measure the radio waves from nearly 2,000 radio stars, and the results suggest that many of these are at distances greater than those of the most distant stars observable with optical telescopes.

At the new site, and with the help of the benefaction offered by the Mullard Company, it is hoped to construct a new radio telescope, capable of observing and investigating radio stars beyond the reach of the present instrument. It is also proposed to install a number of smaller instruments designed for special purposes.

The investigations which will be made at the Mullard Observatory will be largely complementary to those for which a different type of equipment, the large paraboloid radio telescope at Manchester University, is best fitted. The combination of the two different types of instrument will be important in maintaining the lead of this country in this new field of astronomical research.

GRUNDIG H.P.

GRUNDIG announce fresh hire purchase terms covering the *Kenilworth* FM/3D Radio (MkII), following the recent government revision of these facilities.

Minimum deposit now required for the *Kenilworth* is £16 16s. with either twelve monthly payments of £3 4s. 4d. or eighteen monthly payments of £2 6s.

NEW TELERECTION COMPANY

AMONG new companies recently formed is Telerection Developments Ltd., whose object is to co-ordinate and develop the large expansion plan on hand by this group of nine companies. The board consists of G. Lewis (managing director), E. W. Durant (technical director), G. Stobbs (administrative director), J. B. Collins (sales director), E. F. Runyard (production director).

In addition G. Stobbs has also been appointed general manager of Telerection, Ltd., and A. L. Harvey, who was previously Northern Area installation manager succeeds G. Stobbs as general manager of all the installation companies.

B.R.E.M.A. RETAIL SURVEY

Radio and TV Sales still falling

RADIO receiver sales to the public in June of 74,000 and radiogram sales of 14,000 were each 1,000 lower than in May. June television sales at 53,000 were, however, 9,000 (15 per cent) lower than the revised figure for May (the May figures have been slightly amended on recalculation in the light of the latest available information).

These figures show that public buying has followed the trend which could be expected at this time of year, with a comparatively greater falling-off in television sales compared with those of sound receivers.

The June percentages of sets sold on Hire Purchase or Credit were lower than in May for all three classes of product. The percentage of radio H.P. sales was the lowest (40 per cent) since this information was first published, in March.

For the first six months of 1955 retail sales were considerably higher than for the same period of 1954, radio sales having increased by 26 per cent, radiograms by 56 per cent and television by 51 per cent. The growth of 1955 sales over those for 1954 was relatively smaller during the second quarter than in the first.

NEWS ROUND-UP CONTINUED

TV in N. Ireland

THE Northern Ireland television station at Divis, near Belfast, which became operational on July 21, is using equipment of the most modern design. The main transmitters, both vision and sound, were designed and manufactured by Marconi's Wireless Telegraph Co., Ltd. In conformity with standard Marconi practice, the 5kW vision transmitter is designed to handle colour transmissions as well as black and white.

Marconi's are also responsible for the manufacture of the three-stack super-turnstile aerial array, which, used in conjunction with the main vision transmitter, gives an effective radiated power of approximately 12kW.

The new Divis station, has 30 times the effective radiated power of the temporary Glencairn transmitters, will greatly extend the area of good television reception in the six counties—at least as far as Ardglass and Newry in the south, Coleraine and Glenarm in the North, and Dungiven and Aughnacloy in the West.

A further five medium-power television stations are currently under construction as part of the B.B.C's plan for extending television coverage in the British Isles. The main sound and vision transmitters in all these are to be of Marconi manufacture.

New Glass Plant for C.R. Tubes

A NEW robot factory for the manufacture of glass parts for cathode-ray tubes has been opened by Pilkington Bros., Ltd., at their St. Helens works, Lancashire. The plant, which cost about £1,000,000, is the only one of its kind in this country and is fully automatic in operation.

Production capacity is estimated at 2,000,000 units per year, and the plant can be adapted to produce components in quantity for any type or size of British receiver. Pilkington's affirm that the demand for c.r.t. glass components in the domestic TV market will be fully satisfied.

PRICE INCREASE

PRICE of the Marconiphone Model T36AB a.c.-battery portable radio receiver has been increased to £18 7s. 6d. (tax paid). This increase is due to the rising costs of raw materials and labour.

Ever Ready Annual Selling Fortnight Under Way

WITH the advent of the autumn and winter selling season, Ever Ready is introducing its annual *Selling Fortnight*. A publicity campaign is being launched, and a total of £1,000 in awards is being offered by the company for the most ingenious and original window displays arranged by retailers during the period September 26 to October 8, 1955, as part of *Selling Fortnight* activities.

The premier award is £100 for the All-Britain prizewinner. In addition, the country will be divided into four areas: (a) London and Eastern Counties (b) Southern Counties; (c) Midland Counties, Wales and Northern Ireland; (d) Northern Counties and Scotland. For each area there will be a first prize of £50, a second prize of £20, and three third prizes of £10 each. There will also be one hundred consolation prizes of £5 each.

The winning factor will be striking and original presentation but Ever Ready have made it clear that elaborate displays are not essential. Size of window will not influence the judging. What the company are looking for is imaginative thought to be given to the presentation.

Rules are simple—by ordering an Ever Ready *Selling Fortnight* Pack containing good-selling torches and cycle lamps to a total trade cost of £6 6s. 7d. nett, including purchase tax. Separately supplied is a selection of batteries to fit the torches and cycle lamps, at a trade cost of £1 6s. 2d. nett.

The "Selling Fortnight" Folder which has recently been issued contains full details of the competition. An 8in. × 6in. whole-plate photograph must be submitted for each display and retailers will be credited with 25s. towards the cost of photography. Photographs should reach the company not later than November 8, 1955.

The judges this year comprises: E. N. Rowbotham (Chairman of the Ever Ready Co. (G.B.), Ltd.), W. E. Miller (managing editor of *Wireless and Electrical Trader*), Mr. Alban Hills (editor of *Hardware Trade Journal*), and H. Briercliffe (editor of *Motor Cycle and Cycle Trader*). They are being joined by Sir Gordon Russell, C.B.E., M.C., R.D.I., director of The Council of Industrial Design, and Alex. Heath, F.S.I.A., display design consultant of J. Wedgwood & Sons, Ltd.

An intensive advertising programme in the national and provincial press is being launched during the *Selling Fortnight* period so that retailers' window displays will be linked with the nation-wide publicity campaign.

A further addition to the striking showcards being issued by The Ever Ready Co. (G.B.), Ltd., is the Ever Ready B136 Batrymax Showcard. The back plane is lithographed in 7 colours and the battery box is lithographed in 3 colours. Varnish finished, the showcard is constructed of heavy cardboard and a strut is provided at the back. Overall size is: depth 9in., width 13in., height 17¾in. Deliveries of this sales aid are shortly to be made to dealers.

Rugby Radio Extension

LAST month the huge extension to Rugby Radio, the G.P.O's main long-range transmitting station, was officially opened by Dr. The Right Honourable Charles Hill, M.P., Her Majesty's Postmaster-General.

No fewer than twenty-eight high-power transmitters are being installed in the new extension. The entire order for these is placed with Marconi's Wireless Telegraph Co., Ltd., who are also responsible, in co-operation with the Post Office, for the design, supply and installation of much of the associated equipment, including the independent sideband generators, the central control panel, the aerial selector switching and the complex feeder systems. This constitutes the largest single order ever placed for equipment of this type.

Constructed at a cost of £1,000,000, the extension is the result of nine years of concentrated planning.

RTRA Conference — 1956

THE fourth annual Radio and Television Retailers' Conference, sponsored and organised by the Radio and Television Retailers' Association, will be held at Llandudno from 23rd to 24th April, 1956.

As usual the conference will be open to retailers, manufacturers, and wholesalers. Fuller details will be announced later.

Here it is!

the fully-amplified record player you sell for only * 12 GNS TAX PAID

The BROADCASTER REGD. GRAMETTE

The *complete* amplified electric gram. retailing at only 12 gns. including tax—yes *retailing*, no wonder dealers everywhere are rushing to get their orders in. If you haven't sent yours in yet, first look at the star points below then do it to-day without delay.

LOOK AT THESE STAR POINTS

- ★ 3-speed motor
- ★ Plays all sizes of records
- ★ Finished in two-tone washable rexine
- ★ Chassis-Built A.C. Amplifier
- ★ Turnover pick-up head with dual stylus
- ★ Independent tone and volume controls
- ★ Cushion buffer for securing pick-up head
- ★ Non-corrosive bronze fittings

If you haven't already,

SEND YOUR ORDER IN TODAY!

MANUFACTURERS: J. & A. MARGOLIN LTD., PLUS-A-GRAM HOUSE, 112-116 OLD STREET, LONDON, E.C.1

Tel: Clerkenwell 2133 (five lines) Telegrams: Plusagram, Cent, London Cables: Plusagram London

Please quote *British Radio and Television* when replying to advertisers' announcements

BAND III TRADING

FACT AND COMMENT ON BAND III TELEVISION TOPICS FOR DEALERS AND SERVICING MEN ★ by Eric Goldschmidt

NOW that the I.T.A's test signal is longer and stronger, how is the demand for converter units? With 15 working days to go before the public has a chance of judging what Band III has to offer, one finds a brisk, widespread demand.

Dealers in central London, after an initial lull, have as much conversion work on hand as they can cope with. In outlying districts, from Dartford to Watford and from Guildford to Reading orders have been pouring in throughout July and August.

If there is a shortage anywhere, it's self-contained, all-purpose converters, such as Aerialite and Channel put on the market.

The reasons given most frequently for the delayed-action response were holidays, wait-till-we-see-what's-new-at-the-Radio Show, and the belief that commercial TV will resemble the pre-war programmes from Radio Luxembourg. These points emerged from talking to a cross-section of dealers both in North and South London.

They feel that if anything will boost commercial TV it is the sales push behind the programmes. Most dealers approve of the publicity campaign which London contractors started three months ago. They now see that evening papers print detailed announcements of broadcasting, including Luxembourg.

With the arrival of the new *TV Times* on September 20, they expect that both the B.B.C. and commercial television will go all out to attract viewers to their sets.

And it's about time, too. The latest set of figures put out by the B.B.C. shows that people are getting to be really choosy.

While last year 38.8 per cent of all viewers watched on an average night, this figure has dropped to 36.2 per cent. The drop is all the worse when you remember that 45 per cent of all viewers could be found looking at their sets in the first three months of 1954.

* * *

INSTEAD of sizing up the form of commercial TV, I'll chance an arm and predict its immediate and most noticeable result: *better B.B.C. programmes.*

This autumn there will be 20 additional programmes each week on Band I. This means an increase of one-third in weekly programme time. It involves the B.B.C. in an extra £1.3 million a year to put these on. We shall see more of old favourites such as Richard Dimbleby, Jeanne Heal, Max Robertson, Jack Payne, Peter Dimmock, and Lady Barnett.

We shall get week-end programmes which compare with last year's crop as the Home Service compares with the Light programme.

To sustain this fight, the Corporation is putting real energy behind its building programme. At the White City a new block has been completed and a second

(continued on page 381)

CTV Star Spot

Richard Hearne ("Mr. Pastry")

Gracie Fields

Roy Rogers

★ *Sidney Bernstein is building the most modern television centre in Britain on a 4-acre site in Manchester. It should open in the Spring of 1956.*

★ *Norman Wisdom will appear on the bill of* Sunday Night at the London Palladium.

★ *Eamon Andrews will stick to the B.B.C., though he does compere a programme on Radio Luxembourg.*

★ *Max Robertson's place in "Panorama" will be taken by Richard Dimbleby next season.*

★ *Jeanne Heal stays with the B.B.C. for television, but also comperes a series of advertising films shown in cinemas.*

★ *Roy Rogers, together with Trigger, will be shown by A.B.C. every Sunday afternoon.*

★ *Cream of light comedy show, "I Love Lucy" is coming up on A.B.C. every Sunday.*

★ *Top of the bill on September 25 is Gracie.*

★ *Richard Hearne, well-known to American viewers, will make a series of TV films for export.*

★ *America's Lena Horne has been signed up to appear in A.B.C's Palladium Show.*

★ *Chris Chattaway, 4-minute miler and world 3-mile record holder, has signed a contract with I.T.N. as news and political commentator.*

Band III Trading (continued)

is shooting up fast. Hard by, in Hammersmith, the B.B.C. bought the King's Theatre and this will be converted into an audience studio.

In Manchester, the Rusholme studio now has permanent film facilities, the first to be installed outside London.

In Glasgow, permission has been obtained to put up a regional TV centre for Scotland. The Corporation's first medium-power transmitter has been opened, with three more to follow this year.

While Norman Collins and his friends may try to prove that London belongs to them, the Corporation knows that its trump lies in having national coverage.

The bid for London audiences is only a start. It's the battle of Birmingham next year that will determine the first round.

* * *

ACCORDING to the latest Gallup Poll survey 3,000,000 viewers will be watching Commercial TV on September 22. This figure is based on the G.P.O's count of 1,500,000 TV sets in London and the Home Counties, plus the statistical evidence that each set has an average viewing audience of 2.8 adults.

Other facts emerging from the survey, which was conducted by Social Surveys, Ltd., are: 400,000 viewers in range of the Croydon station have their sets converted with aerials fitted and are waiting for CTV-Day; 1,100,000 are in the queue waiting to have their sets converted (not all before September 22); 100,000 people have ordered new two-band sets; and 1,300,000 viewers will probably have their sets converted "after their holiday." In addition there is an estimated "guest" audience of 250,000 viewers. Total, 3,150,000.

The survey was based on a cross-section of 1,000 households in the area and did not take into account the large audience of under-sixteens.

* * *

WITH Dame Edith Sitwell and *Take Your Pick*, with Lord Hailsham and Leslie Mitchell, with horse and soap and classical opera, the men at Television House are going into action.

Their aim is to build an audience for these programmes. They must do this by getting more and more *and* more people to instal new sets or convert existing ones.

Contractors realise that star-names and advertising money are just as important as having studios which work, cameras which are modern, and O.B. units which are really mobile.

They need the efficiency and enthusiasm of new production teams, writers, designers, editors and programme planners so that their viewers and your customers accept, enjoy and ask for more commercial shows.

Ask whom? In the first place retailers who sell the means of tuning into Band III. As Harry Alan Towers, director of A.B.C., said at a dealers' meeting: "*From now on your battle is our battle.*"

Sidney Bernstein, head of Granada TV (Manchester weekday programme company), plans to bring CTV to the North early in 1956.

HOW much has been imported from America? How alien will commercial programmes be? Will there be an American invasion of plugs and pluggers?

In many districts, and particulary in rural areas, customers look to their TV local television dealer for the answer, on these and other programme plans.

It would be surprising if television, as the cinema, did not show some films which were made in America for world-wide release. Just as the B.B.C. screened programmes such as *Orient Express*, Ed. Murrow and *Amos 'N Andy*, we shall see American shows on the commercial wavelength.

They will include the best-liked comedies (*I Love Lucy* and *My Hero*), the best thriller (*Dragnet*) and top-flight dramas made in America with stars such as David Nixen, Charles Boyer, Claudette Colbert and James Mason. There will be children's films with Roy Rogers, Hopalong Cassidy and a series based on Hans Christian Anderson.

In all, these imported films look like occupying 10 per cent of all commercial programme time. The rest will come from Britain and in some cases—*Fabian of Scotland Yard*, *Scarlet Pimpernel*, *Mr. Pastry* among them—these programmes are being exported to TV networks in America.

Faces destined to become familiar on British TV screens—Lucille Ball and Desi Arnaz—stars of the top-rating American light comedy television series "I Love Lucy." This programme will be a regular Sunday date with commercial TV viewers.

As to commercials, I have seen enough of them now to believe that Britain has avoided the mistakes which American advertising put on television during seven long years. There is a style of British commercials, just as there is a peculiar British flavour in Guinness, Schweppes and, for that matter, Murphy advertisements. After spending a fair bit of money on putting over their native wit, these manufacturers are unlikely to scrub it all simply because the little screen is now available to them.

In this belief I was supported by a man who made commercials in both countries. Not just commercials but soap and detergent commercials. When asked how the British version compared with the American, he answered simply: "*Same boot, other foot.*"

* * *

FROM the depth of puzzle corner comes this query: why has nobody in commercial television seized the opportunity to show what the new programmes will be like in the course of this year's Radio Show?

Why has no contractor, no artists agent, no film company booked either exhibition space or made use of the closed-circuit facilities offered by the R.I.C.?

As things are the biggest-ever Radio Show will be out of true. The B.B.C. will telecast its usual big 10 programmes. Advertisers will screen spot commercials at odd points of the day. But the sausage in the hot-dog, and the jam in the sandwich, will be conspicuous by its absence.

* * *

BYE THE BYE: *If you think that conversion is a tough and varied job, remember the effort made by the contractor who converted Billy Graham to the idea that British TV is a suitable outlet for sermons to be given this winter on the I.T.A. wavelength.*

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MAGNETIC RECORDING TAPE

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. . . because it possesses *ALL* the qualities essential to a product that is outstanding in its field.

This PVC based recording tape is naturally a little more expensive than some other makes . . . but the initial cost is more than offset by its performance and extra-long life.

1,000 metre for professional use
1,200 ft. on plastic spool
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Special tapes for GRUNDIG TK.9, TK.819 and STENORETTE, and The New Thin Long playing Tape on the same spool, giving 50% more tape.

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BRAND NEW

The latest in Radio and TV Receivers and Accessories

NEW FERRANTI TV MODELS

Ferranti, Ltd., Moston, Manchester, 10

FOUR new television models have been added to the Ferranti range, and are being shown for the first time at the Radio Show. They comprise: Model 14T5, a 14in. table set; Model 17T5, a 17in. table set; Model 17K5, a 17in. console (with doors); and Model 17SK5, a 17in. console (without doors).

All models have 13-channel tuning covering Bands I and III, and incorporate an 18-valve superhet chassis, with automatic picture and sound control, plus slow-motion drive tuning for Bands I and III.

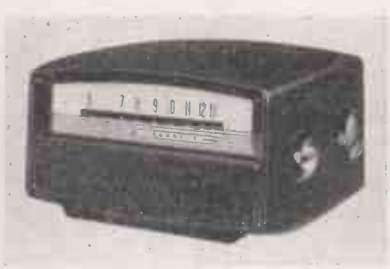
A feature of the design is the single chassis with two-screw quick release for easy servicing accessibility, circuit alignment points being exposed when the cabinet back is removed. Operational controls are situated at the front of the cabinet, including band switch and slow-motion drive tuners. The table sets use a 7in. elliptical speaker, and the consoles an 8in. speaker.

The cabinets are finished in walnut veneer, the consoles being mounted on castors. For operation on a.c.-d.c. mains 200-250V.

Prices are (tax paid): 14T5, 66 gns.; 17T5, 78 gns.; 17SK5, 85 gns.; 17K5, 99 gns.

TV Tuner Unit

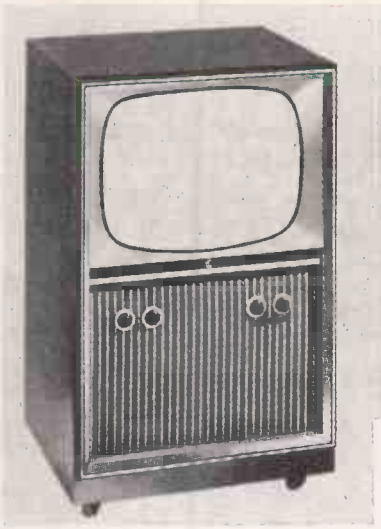
Illustrated is the new Ferranti tuner unit, designed for use with Ferranti superheterodyne 5-channel television



The new Ferranti 2-band tuner unit.

receivers, mounted in a small moulded cabinet which can be placed on top of or adjacent to the set. The tuning range covers the five Band I channels and eight Band III channels.

Two versions are available: one has a self-contained power supply and is for use with a.c. models; the other derives power from the receiver and is for use with a.c.-d.c. models. The unit



uses two valves (PCC84, PCF80), and is for use with the following Ferranti television models: *A.C. Version*—T1205S, T1215, T1125, T1225 T1615, T1405S, T1415, T1425, 14T2, T1625, T1505S, 22K3; *A.C.-D.C. Version*—T1325, 14T3, T1825, 17T3, 17K3.

Prices are: type TU1 standard tuner unit a.c., 7½ gns.; type TU1 standard tuner unit a.c.-d.c., 7 gns.; type TU2 (for internal fixing) a.c.-d.c., 6 gns.

HEARING AID JEWELLERY

John Bell and Croyden, 117 *High Street, Oxford*

TRANSISTORISED hearing-aids in the form of jewellery have been introduced by the company. Incorporating a small transistor amplifier unit, type 555, and a minute battery, the hearing-aid is embodied in a brooch which is available in a number of designs, *e.g.*, a cameo model, a filigree model, etc. In addition there is a "listening necklet" designed as an attractive ornament for occasional wear.

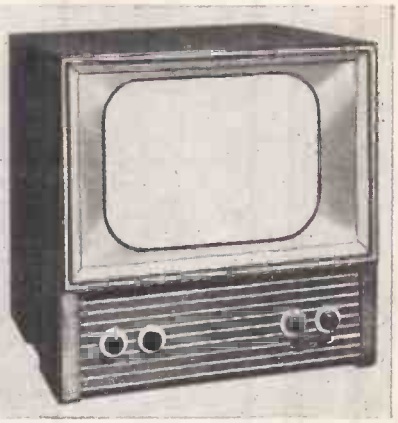
For men there is the standard model which fits inside the tie without leaving a bulge.

The company introduced their first transistorised hearing-aid, the type 101K, last year.

NEW G.E.C. AMPLIFIERS

The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2

A NEW professional high-quality 25-watt amplifier for use in sound reproduction systems where critical and accurate listening is essential is introduced by G.E.C. It is suitable for



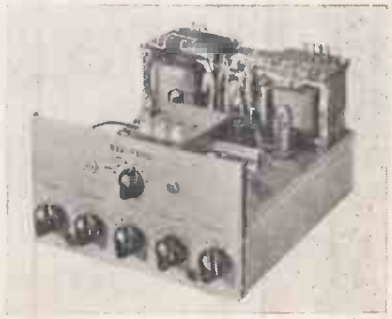
Two new Ferranti TV models—(left) 17SK5, a 17in. console television receiver, and (right) 14T5, a 14in. table TV.

recording studio monitoring, musical appreciation groups in schools and elsewhere, special demonstrations in small halls and for the highest-quality public address systems. The amplifier is also of interest to high-fidelity enthusiasts and connoisseurs since it provides a high standard of reproduction at true natural volume.

The BCS2415/6 comprises a pre-amplifier with control unit and a power amplifier, the two units being connected by means of a multi-way cable and plug-in connection. The assembly is priced at 60 gns.

Total harmonic distortion at full power is 0.4 per cent and the frequency range is 30 c/s to 20 kc/s. There are three alternative inputs: radio, microphone and gramophone, the latter with correction networks. Controls include bass and treble selectors and a continuously variable presence control, used for adjusting the performance of the amplifier to simulate the conditions existing at, for example, either the front or the back of a concert hall. It enables the listener to suit the equipment to his own particular mood or requirements, and thus more completely recapture the atmosphere of the original performance.

G.E.C. has also introduced a modified version of the Osram 912 amplifier, called the 912-Plus, and suitable for radio, tape or microphone inputs. It uses the same basic circuit as its



The new G.E.C. BCS2415/6 25-watt amplifier

EMITRON

REG. TRADE MARK

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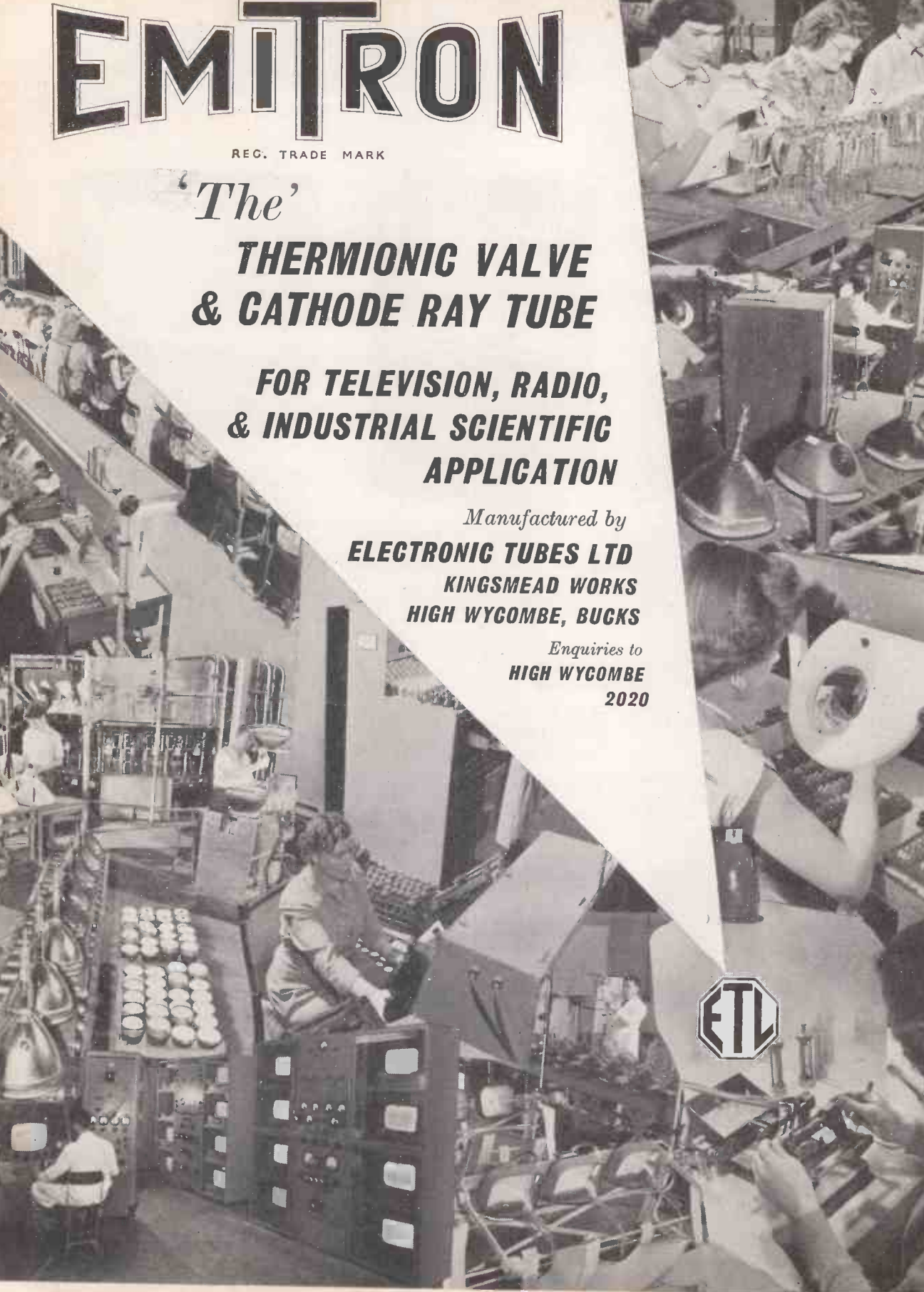
THERMIONIC VALVE & CATHODE RAY TUBE

FOR TELEVISION, RADIO, & INDUSTRIAL SCIENTIFIC APPLICATION



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ETL

BRAND NEW *Continued*

predecessor, but features two alternative input compensating units.

Details of the construction and operation of the amplifier are available in a book published by G.E.C. at 4s. The original Osram 912 amplifier can readily be converted and instructions on how to do this are included in the new book.

The new amplifier is particularly suitable for use with f.m./v.h.f. inputs and like its predecessor it is designed for use with the G.E.C. metal-cone loudspeaker mounted in an octagonal loaded-port loudspeaker cabinet. There is less than 1 per cent total distortion at the maximum output.

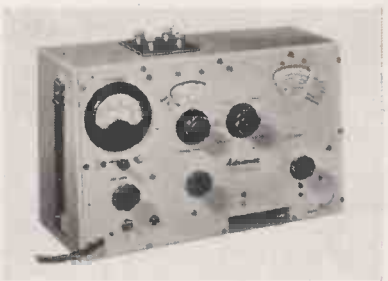
Both of the alternative compensating units incorporate a 6-position selector switch for radio, microphone and various types of records.

G.E.C. are demonstrating the Osram 912-Plus home constructor amplifier and a new 12-watt hi-fi domestic amplifier (type BCS2417/2418) at the Radio Show in addition to demonstrations of 3-D stereophonic sound reproduction.

ADVANCE "Q" METER

Advance Components, Ltd., Marlowe Road, Walthamstow, London, E.17

THE Advance "Q" meter is a compact laboratory instrument of novel design priced competitively at £55 net. Operating from a.c. mains, it provides a convenient method of making r.f. measurements of circuit magnification ("Q"), inductance, capacitance and power factor at frequencies between 100 kc/s and 100 Mc/s.



The Advance "Q" meter.

A signal from an internal oscillator is injected into an inductive loop across which the voltage is metered and adjusted to a set level. A fraction of the loop consists of a stout bar from earth to one of the test terminals, and thus provides a signal with very low input impedance to the test circuit. The coil under test is in series resonance with an internal low loss, variable capacitor. The voltage across the capacitor indicates the "Q," and is detected by a valve voltmeter calibrated directly in terms of circuit magnification ("Q"). The oscillator is modulated at 50 c/s 50 per cent, so that d.c. amplifiers need not be used in the valve voltmeter, thus eliminating zero setting.

An unknown capacitor may be connected in parallel with the standard capacitor, and its capacitance and power factor then obtained by substitution.

Two models from the Imperial range: (left) the *Vinessa* 8-valve table radio with 3 speakers for a.m.-f.m.; (right) the *Opera* 9-valve cocktail cabinet a.m.-f.m. radiogram.

In order to simplify calculations of inductance and impedance, the variable capacitor is calibrated with three scales. The first scale is calibrated in pico-farads; the second scale is calibrated to read "Zf" so that the impedance in ohms may be obtained by dividing the reading by the frequency in Mc/s. The third scale is calibrated to read "Lf^2" so that the inductance in microhenrys may be obtained by dividing the reading by the square of the frequency in Mc/s.

The instrument is mounted on a substantial aluminium panel, which is slightly sloping, and fitted in a steel case finished in grey enamel.

NEW IMPERIAL RADIO RANGE

Radio and Television Distributors, Ltd., 91 Tabernacle Street, London, E.C.2

A WIDE range of radio receivers and radiograms under the trade mark *Imperial*, manufactured by Continental-Rundfunk GMBH, a subsidiary of Deutsche Continental Gas-Gesellschaft, is being distributed in this country by Radio and Television Distributors, Ltd. The models feature push-button wave-band-gram selection, and have f.m. bands in addition to the normal short, medium and long waves.

Special attention has been paid to cabinet design and finish; in the radiogram models in particular, the accent is on the furniture value of the instrument. The *Opera*, *Princess*, *Ballet* and *Cocktail* models combine a small cocktail cabinet with a 3-speed autochange radiogram.

Of particular interest is a 7-valve a.m.-f.m. portable table radio with telescopic aerial designed to work either from a.c. mains or from an internal gas-filled battery with a built-in trickle-charger unit enabling the battery to be recharged from the mains. Price is 40 gns., tax paid, and the battery unit is guaranteed for 20 years.

The Diktat office dictating machine.

The company are also handling the distribution of the *Diktat* (illustrated), an office dictating machine of neat design. This takes standard tape and offers dual-track working, thus accommodating 2×30 minutes recording on each tape. A cancel key facilitates erasure and correction at any point on the tape. The range of accessories available include stethoscope earphones, a single earphone, a telephone adaptor, and foot pedal remote control. The instrument has a frequency range from 150-4,000 c/s, and is for operation on 110-125/150-220V a.c. mains.

Prices of the new Imperial range are as follows: *Vinessa* (8-valve 3-speaker a.m.-f.m. table radio) 44 gns.; *Graciosa* (9-valve 5-speaker a.m.-f.m. radio) 59 gns.; *Countess* (7-valve a.m.-f.m. radio) 28 gns.; *Princess* (8-valve 3-speaker radiogram) 91 gns.; *Helvetia* (8-valve a.m.-f.m. radiogram) 76 gns; *Baroness* (8-valve 3-speaker a.m.-f.m. radiogram) 90 gns.; *Opera* (9-valve 4-speaker a.m.-f.m. radiogram) 155 gns.; *Cocktail* (9-valve 4-speaker a.m.-f.m. radiogram) 139 gns. Specifications of these instruments are contained in the advertisement on pages 495-497 in this issue.

Further details of the *Imperial* range or *Diktat* can be obtained on application to the distributors.

BAND III EQUIPMENT

Validus Aerials, 57 Hornsey Road, London, N.7

THE new Validus cross-over networks for combining the output of both Band I and Band III aerials to be passed to the television receiver by a single 70/80-ohm co-axial cable are housed in attractively-finished bronze steel cases, complete with all fixing terminals at 7s. 6d.

New aerials are combined Band I and Band III arrays, the 3-element version (using dipole for Band I) being 50s. (wall mounting) or 62s. 6d. (chimney mounting). The 4-element versions are priced 2s. 6d. higher and both types are supplied with cranked arm or 6ft. pole and all mounting accessories.

A new universal fixing bracket is now supplied with Validus Band III aerials, enabling the aerials to be fixed to lofts, walls, or attached to existing Band I

BRAND NEW *Continued*

installations. Prices range from 18s. for dipole to 32s. 6d. for 4-element.

Band III pre-amplifiers are supplied in single and two-stage models, both types designed to give high gain, broad band width and low noise level. Adjustable for any channel within Band III, they are aligned to specified channel. Supplied in stove enamelled cases with gain controls and mains switch. Mains input 200/250V a.c. 50 cycles. Input and output coaxial sockets 7/80 ohms. Approx. gain for single-stage model 15dbs. Two-stage 35db.

Single-stage model costs 75s. and the two-stage model 95s. All prices quoted are net trade.

TRUVOX HI-FI CORNER SPEAKER

Truvox, Ltd., 15 Lyon Road, Harrow, Middlesex

DESIGNED for small and medium-sized halls and for use in homes where quality is a vital factor the Truvox high-fidelity corner diffusion speaker is fitted with a sound chamber of unusual design, combining a bass reflex action with a novel means of reproducing the higher frequencies.

The speaker unit is not mounted on a baffle in the conventional manner, but is fitted horizontally to the base of a specially-designed heavy aluminium casting. This casting acts as a deflector of the higher frequencies and is, therefore, highly polished on the inside face. In this way, sound emanating from the speaker is projected outwards and actually brought to a focus some distance away from the cabinet.

The reproduction of the lower registers is assisted by the bass reflex action of the corner cabinet and the upper register reproduction is enhanced by the specially designed acoustic system. The speaker has a maximum handling capacity of 12 watts and a flux density of 10,000 lines and is available with speech coils of 5 or 15 ohms impedance. Total weight of the cabinet and speaker unit is 54lb.

The cabinet only with focaliser costs £26 8s. 6d. and the speaker costs £3, plus £1 0s. 6d. purchase tax.

C.R.T. ISOLATION TRANSFORMER

Norman Rose (Electrical), Ltd., 53 Hampstead Road, London, N.W.1

IN addition to their range of eight types of mains input transformers and 1:1.25 c.r.t. isolation transformers, the company have produced a new type for use with 6.3V cathode-ray tubes; this is similar in size and construction to their type NR12, and is known as the type NR15.

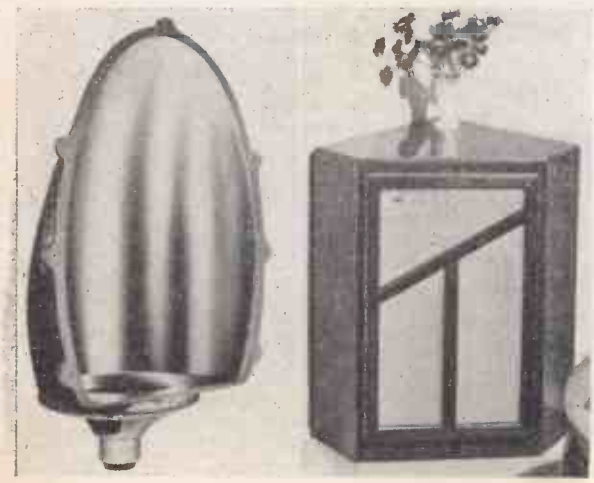
It is a low-capacity isolation transformer for use with c.r. tubes having heater-cathode short-circuit, or for low-emission tubes. Mains input is 220-240V; output 6.3V. The input has two taps which increase the output voltage by 25 and 50 per cent respectively.

Price of the type NR15 is 12s. 6d. net trade. A descriptive leaflet of this and other transformers is available on request from the company.

NEW REGENTONE PORTABLE RADIO

Regentone Radio and Television, Ltd., Eastern Avenue, Romford, Essex

LATEST addition to the Regentone radio range is the "*Double Two*," a compact low-priced mains-battery portable radio selling at 18 gns. tax paid. The set comprises a 5-valve 2-waveband (long and medium) superhet housed in a moulded maroon plastic cabinet, with a 5in. high-sensitivity p.m. loudspeaker and built in aerial. For a.c.-d.c. mains (200-250V) operation or from internal batteries.



The new Truvox hi-fi corner speaker (right) and the novel sound chamber speaker housing (left), incorporating a speaker of 12-watts power handling capacity with speech coil impedance of 5 or 15 ohms.

The Alba Model T436 21 in. console TV.

NEW ALBA 21 in. TV

A. J. Balcombe, Ltd., Tabernacle Street, London, E.C.2

ILLUSTRATED is the latest addition to the Alba television range— a 21in. console television set known as Model T436. It embodies an 18-valve chassis covering both Bands I and III, with automatic gain control on sound and vision. Frame flyback suppression is incorporated. Particular attention has been paid to sound reproduction, which is 4½ watts with excellent quality.

The receiver is housed in a walnut-veneered cabinet of pleasing appearance. For operation on a.c. mains, 200-250V. Price 115 gns. (tax paid.)

NEW MULLARD PRODUCTS

Mullard, Ltd., Century House, Shaftesbury Avenue, London, W.C.2

TYPE E7696 is a new general purpose low frequency ultrasonic generator with an output power of 2kW in the frequency range 10 kc/s to 30 kc/s, and designed as a power source for magnetostrictive transducers used for ultrasonic cleaning, degreasing, soldering, tinning and drilling. Robust construction, conservative ratings, automatic protection circuits, and simple controls, make the generator suitable for every-day industrial use.

A variable frequency r.c. oscillator of the Wien bridge type feeds an amplifier, followed by a driver and push-pull output stage which is transformer-coupled to the load. The output current and the anode currents of the output valves are monitored. Output power is controlled by a variable attenuator in the amplifier stage.

Full protection against overload and open circuit of the output is provided by special circuits.

(*Continued on page 471*)

SEPT 1955.

386a

AUGUST 11 to
SEPT. 3, 1955
AT EARLS COURT

22nd NATIONAL RADIO SHOW

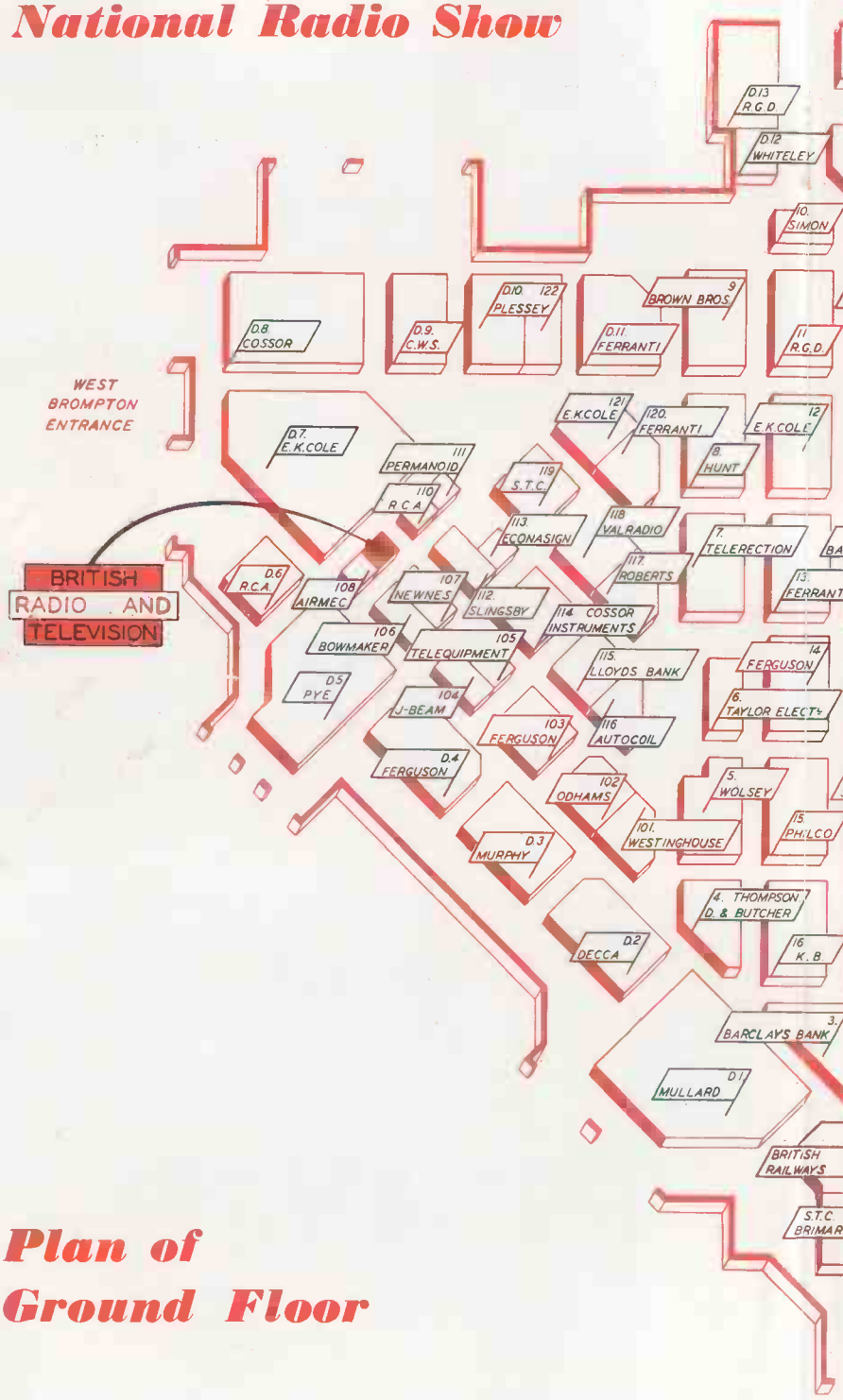
Exhibition Plan

BRITISH RADIO & TELEVISION SPECIAL SUPPLEMENT

Index to Exhibitors

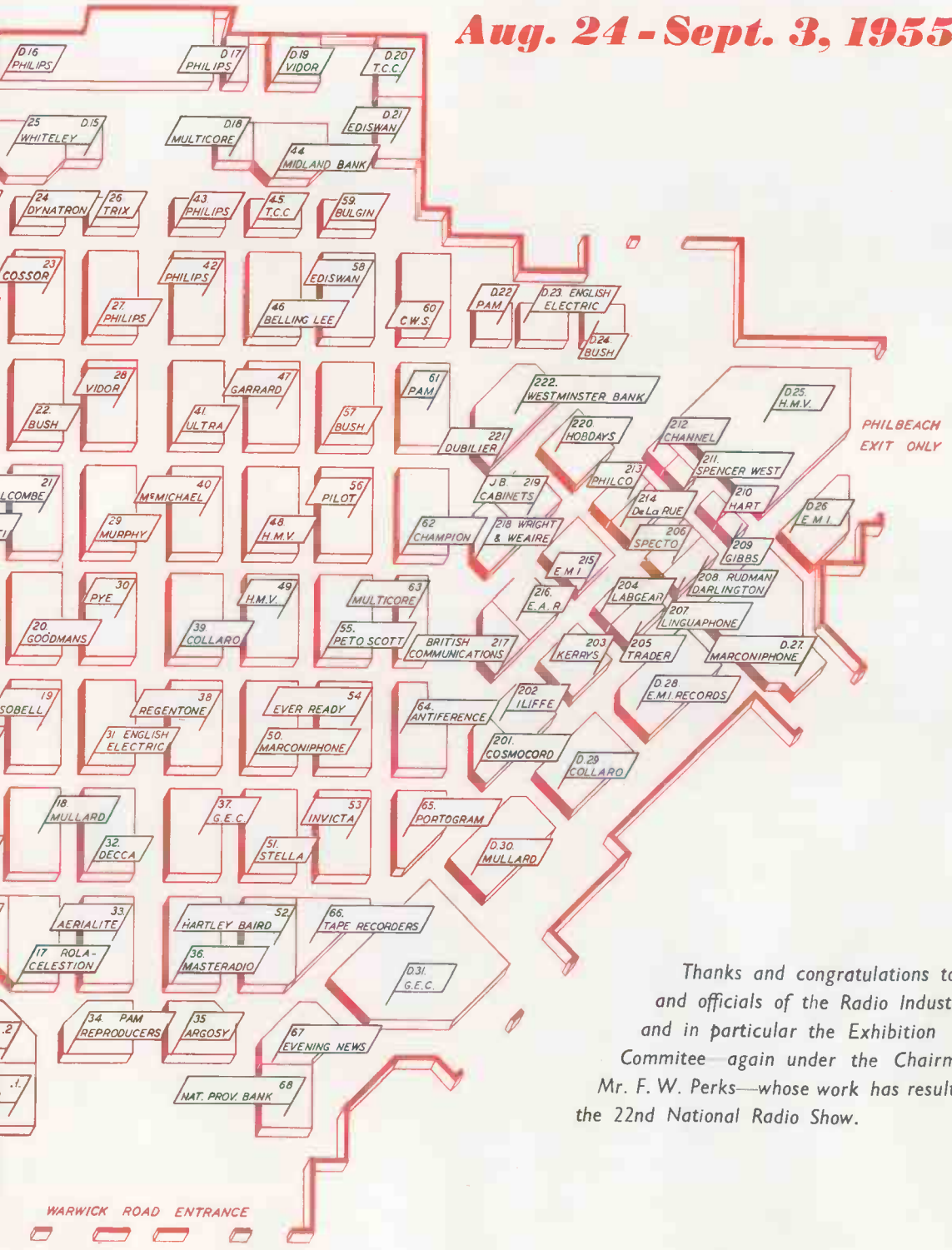
(continued on back page)

National Radio Show



Plan of Ground Floor

Aug. 24 - Sept. 3, 1955



Thanks and congratulations to members and officials of the Radio Industry Council and in particular the Exhibition Organising Commitee again under the Chairmanship of Mr. F. W. Perks—whose work has resulted in this, the 22nd National Radio Show.

(Issued as a special supplement with British Radio and Television, September, 1955)

386 d.

Radio Show — Plan of First Floor

The Radio Show is open from 11 a.m. to 10 p.m. daily except Sunday from August 24 to September 3, 1955, with a preview day for overseas visitors and the Press on August 23

Demonstration Rooms and Offices

Bush Radio, Ltd.	D.24	Marconiphone Co., Ltd.	D.27
Cole, Ltd., E. K.	D.7	Mullard, Ltd.	D.1 & D.30
Collaro, Ltd.	D.29	Multicore Solders, Ltd.	D.18
C.W.S., Ltd.	D.9	Murphy Radio, Ltd.	D.3
Cossor, Ltd., A. C.	D.8	Pam (Radio & TV), Ltd.	D.22
Decca Record Co., Ltd.	D.2	Philips Elec., Ltd.	D.16 & D.17
E.M.I. Sales & Service, Ltd.	D.26 & D.28	Plessey Co., Ltd.	D.10
Edison Swan Elec. Co., Ltd.	D.21	Pye, Ltd.	D.5
English Electric Co., Ltd.	D.23	RCA Photophone, Ltd.	D.6
Ferguson Radio Corp.,	D.4	Radio Gramophone Dev. Co., Ltd.	D.13
Ferranti, Ltd.	D.11	Telegraph Condenser Co., Ltd.	D.20
General Elec. Co., Ltd.	D.31	Vidor, Ltd.	D.19
Gramophone Co., Ltd.	D.25	Whiteley Elec. Radio Co., Ltd.	D.12 & D.15

Index to Exhibitors

(continued from inside pages)

(Issued as a special supplement with British Radio and Television, September, 1955)

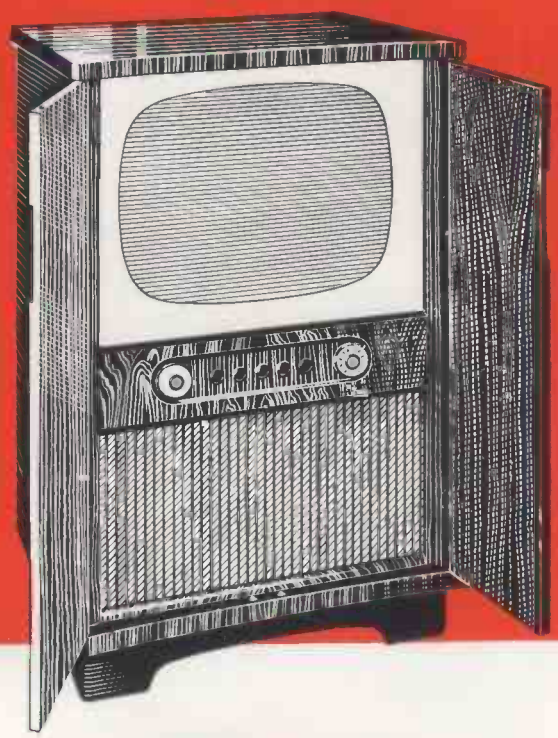
STAND-BY-STAND GUIDE TO THE NATIONAL RADIO SHOW

EARLS COURT, LONDON, W.8.

Ferguson

SET A NEW STANDARD IN QUICK-SELLING T.V.

A fine programme, this Ferguson one for 1955/56! 14" and 17" Table Models and Consoles (with or without Ferguson's exclusive HaloLight) in two series—the New Standard Models for all normal Band I and Band III areas, and the Nine Star Models for 'difficult' areas. Plus the finest Ferguson ever—the majestic 21" Nine Star Console Model 247 with HaloLight and every brilliant new idea in circuits and controls. Here follow brief details of some of them.



14" NEW STANDARD TABLE MODEL 204 12-channel turret-tuned superhet with flywheel synchronisation and AGC on sound and vision. **63 gns. tax paid**

14" NEW STANDARD CONSOLE MODEL 244, as above, with exclusive Ferguson HaloLight and full-length fold-back doors. **88 gns. tax paid**

17" NEW STANDARD TABLE MODEL 206, circuit as Model 204, but with 17" picture tube. **73 gns. tax paid**

The greatest Ferguson ever

21" NINE STAR CONSOLE MODEL 247 with exclusive Ferguson HaloLight and every latest idea in circuits and controls. **135 gns. tax paid**

* *And the famous Ferguson best-seller*

12" TABLE MODEL 998 49 gns. tax paid

See them on Stands 14 & 103, Radio Show

...fine sets these FERGUSON's

AUG. 24 TO SEPT. 3, 1955 AT EARL'S COURT

22nd NATIONAL RADIO SHOW

Your Guide to the National Radio and Television Exhibition

Aerialite, Ltd.

Castle Works, Stalybridge, Cheshire

STAND No. 33 Aerialite are showing a comprehensive range of television aerials for Band I, Band III, and Band I–III combined. The Band I range includes the *Dublex*, *Unex*, *Aerfringe* models and those for indoor and loft mounting. A new single dipole wall-mounting aerial retails at 32s. 6d.

For Band III operation, 3, 4, 5 and 8-element folded dipole outdoor models for separate mounting or as arrays only are shown. These incorporate a special waterproofed insulator and novel mast-head bracket and element fixing arrangements. They are available with various types of masts and mountings.

Also there are special loft mounting 3 and 5-element folded dipoles using strip element construction and ball-joint masthead bracket which provides adjustment of the array to any position.

Add-on *Aerdaptors* are provided for single dipole, H or X aerials so that existing Band I aerials are made suitable for both Band I and III reception.

The range of composite or twin-band aerials for Band I and III combined reception covers single dipoles for Band I with directional Band III sections and H Band I and independently adjustable Band III sections of the three and five element folded dipole type.

Also available are "in-line" twin band aerials with 3-element construction having "H" for Band I and an additional three directors for Band III. These aerials have common directivity for Bands I and III.

Two converters are shown: Model TC3 is a single-channel Band III converter with self-contained mains supply for a.c. only, retailing at £9 10s. Model MC is a multichannel converter, again with self-contained power back for a.c. mains. Band III channels 6-13 are covered by a continuously variable tuning control. Retail price is £10 17s. 6d.

Air Ministry

Whitehall Gardens, London, S.W.1

STAND No. 306 A rocket test vehicle and a pictorial telemetry display can be seen on the stand. Test vehicles are used to obtain direct information from flight tests on a variety of subjects including aerodynamic performance, the effectiveness of control surfaces, motor performance and guidance and control problems. Telemetry is used to obtain information from the vehicle in flight and, with the aid of high-speed cameras on the ground, complete seconds of the readings of meters and other special instruments throughout the flight can be taken and studied at leisure by the research team.

Sonobuoy Exhibit

The use of the "Sonobuoy" is demonstrated in one exhibit. This is a device which is dropped from an aircraft and is used in the detection of submarines. It is housed in a watertight cylinder about 6 inches in diameter containing a microphone and transmitter and batteries. The buoy is dropped by parachute into the sea and automatically the parachute is released, the aerial is erected and the microphone and transmitter is switched on. All underwater noises in the vicinity of the microphone will be picked up and transmitted to the waiting aircraft where an operator will then plot the position of the submarine.

Air Traffic Control

The staff of the Air Traffic Control are responsible for the supervision of aircraft landing and taking off from the airfield. Some of the equipment required to do this is shown in the A.T.C. exhibit.

The controller can "see" the aircraft on his surveillance radar screen and can work out new courses for it to steer from his direction-finding equipment. The radio telephone enables him to communicate with the aircrew. Another radio telephone set provides the controller with immediate communication to the crash tender crews. An inter-communication system links lines with other officers, such as the station commander and the meteorological officer, who are also concerned with the movements of aircraft.

Airmec, Ltd.

High Wycombe, Bucks

STAND No. 108 Airmec are featuring their *Televet* type 877, a versatile television test instrument incorporating wobbulator, pattern generator, a.m. signal generator, l.f. oscillator, oscilloscope, e.h.t. voltmeter, a.c. and d.c. valve voltmeter. Both Bands I and III are covered, and the tester, which is crystal calibrated for accuracy, can be used with a.c. or a.c.-d.c. sets.

The oscilloscope section employs a 2½in. c.r.t. with built-in d.c. Y amplifier. The variable speed time-base has velocity ranges suitable for viewing TV line frame and sync waveforms.

The pattern generator provides an r.f. signal modulated by line and frame sync pulses to produce a raster with two horizontal black bars and one vertical black bar.

A 5 Mc/s crystal inside the instrument enables the oscillator to be set with great accuracy using harmonic check points at 5-Mc/s intervals through the range. The e.h.t. voltmeter will read e.h.t. voltages up to 20kV and h.t. voltages up to 600V.

The *Televet* is designed for operation on a.c. mains, 200-250V, 50 c/s. Price is 57 gns. net trade.

Antiference, Ltd.

Bicester Road, Aylesbury, Bucks.

STAND No. 64 Many new models are being shown in the wide range of Antiference factory pre-assembled television aerials incorporating the exclusive *Snapacitor* principle which simplifies aerial installation, ensures long-life peak performance and eliminates metal-to-metal contacts prone to corrosion.

The accent of the display is placed on aerial equipment for the second television programme. The range of indoor and outdoor aerials covers all possible requirements for Band I and Band III reception. Included also are new composite all-band models and *Addex* Band III adaptors which can be simply fitted to any Band I aerial to adapt it for high and low band reception.

The range of Band III aerials covers a series of folded dipoles from the 3-element array at 41s. 6d. to the 10-element array at 178s. 6d. They are fully pre-assembled with junction units of robust bakelite monoblock construction, fitted with ⅜in. diameter elements and 1in. diameter booms of high grade aluminium. Two of the wall-mounting models (a 3 and a 5-element array) can be adapted for loft mounting by means of a universal bracket supplied as a standard fitment.

A wide range of f.m. aerials is also exhibited together with *Exstat* anti-interference radio aerial equipment which incorporates Ferrite-cored transformers and provides noise-free reception from 10–2,000 metres. Also displayed are the unique *Autex* car radio aerials which can be easily fitted to any position on the car bodywork; plugs and sockets, and other accessories.

Argosy Radiovision, Ltd.

Argosy Works, Hertford Road, Barking, Essex

STAND No. 35 The range on show includes radiogramophones capable of receiving the new v.h.f. transmissions that the B.B.C. has recently brought into operation in addition to the reception of programmes on long, medium and short waves.

Other models are suitable for use on either a.c. or d.c. supplies and all radiogramophones are equipped with the latest 3-speed automatic record changers. A new addition is an a.m.-f.m. radio receiver and to complete the range there is a competitively-priced 13-channel television table model with a 17in.

screen housed in an attractive cabinet and capable of receiving the new alternative programmes on Band III.

Assimil (England), Ltd.

10 *Pembridge Square, London*, W.2

STAND No. 312 The gramophone record used with a suitable text-book is already known as an excellent method of learning a foreign language at home. Now Assimil (England)—a division of E.M.I. Institutes, Ltd.—introduce the Assimil way, based on the method which has won high recognition on the Continent for over a quarter of a century.

For English-speaking people, Assimil courses are offered in French, German, Italian, Russian and Spanish, while other courses are available for people whose native tongue is French, German, Spanish or Flemish.

Automatic Coil Winder and Electrical Equipment Co., Ltd.

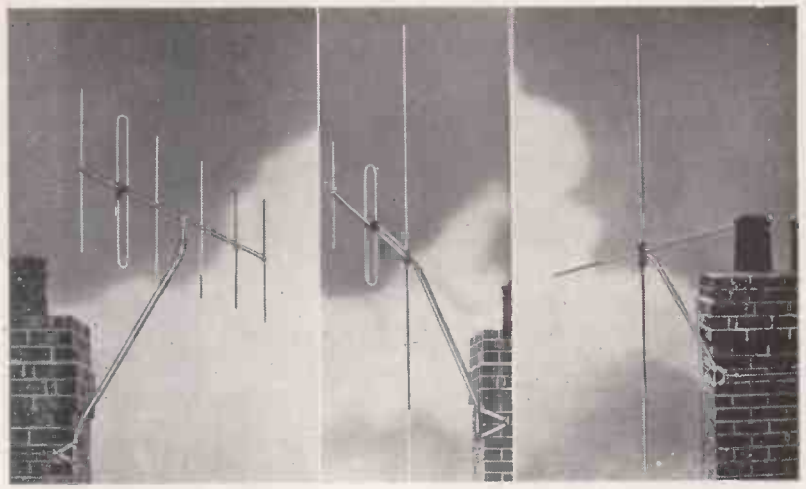
*Winder House, Douglas Street, London, S.W.*1

STAND No. 116 Once again the Company exhibit a wide range of *Avo* electrical and electronic instruments and equipment of interest to the service and production engineer. Of particular interest is the completely new signal generator Mark III, covering 150 kc/s to 220 Mc/s in six bands, thus covering the requirements of receivers catering for the present and future television stations and for f.m. receivers.

Also shown is the *Avo* wide-band a.m.-f.m. signal generator Type TFM, covering 5-225 Mc/s with sine or square wave modulation at 1,000 c/s on a.m. and from 80-100 Mc/s with sync wave modulation at 1,000 c/s for f.m. Production models of the *Avo* Valve Characteristic Meter Mark III are shown and engineers on the stand will be pleased to explain the details of this rather unusual instrument.

Two other exhibits of interest are the Electronic Multimeter (a 96-range valve voltmeter) and the valvetester, Type 160. Both instruments incorporate novel features, are suitable for use in any climate and meet the conditions of various British Inter-Service Specifications.

Alba Model 3211 7-valve receiver covering long, medium and f.m. wavebands.



Three Belling & Lee aerials. Left—6-element folded dipole for Band III. Centre—combined dipole plus 2 for Bands I and III. Right—v.h.f./f.m. adaptor kit for Band I dipole.

A. J. Balcombe, Ltd.

*Tabernacle Street, London, E.C.*2

STAND No. 21 Alba are again showing a wide range of radio and television models. The television receivers incorporate turret tuners for multi-channel operation, the newest model being the T424 17in. console. This, at 84 gns., is claimed to be the lowest priced of its type and it features a 19-valve circuit, a.g.c. on vision and sound, flyback suppression and a front facing speaker. Also shown is a new 21in. console receiver and a Band III adaptor suitable for adding to existing Alba Band I receivers.

Apart from conventional radio receivers there are new sets incorporating f.m. facilities, such as the Model 3211 at 32 gns. The 7-valve circuit has a high quality output stage feeding into a 3in. × 5in. extended range elliptical speaker. It has a built-in aerial for f.m. reception and the ranges cover short, medium and long wavebands in addition to v.h.f.

A new radiogram, the Model 6221, uses the same radio chassis as the Model 3211 and features a 10in. extended range speaker and 3-speed automatic record player. Housed in a two-tone walnut veneered cabinet with record storage space and pneumatic self-closing lid it retails at 72 gns.

Belling and Lee, Ltd.

Great Cambridge Road, Enfield, Middlesex

STAND No. 46 Television aerials on show include combined aerials in a wide range from a *Lofrod* to an "H" with two six-element Band III arrays mounted broadside. Designed for use where "co-siting" of transmitters exists (or where the Band I and Band III transmitters are in line with the receiving aerial.) Special designs can be seen for use in the Midland area where the harmonic relationship between Band I channel 4 and Band III channels 8 and 9 has made this necessary.

Add-on Band III aerials are available for viewers already possessing a good Band I aerial in locations where it is impracticable to add an adaptor. Aerials with 3, 6, 9 or 12 elements are available for indoor or outdoor mounting. These aerials are essential where transmitters are not "co-sited" nor "in-line" or for stacking to produce a highly-directional high-gain array. With these aerials, Diplexer units are necessary to avoid intersection where feeders from the two installations are fed to a common input. Adaptor kits may be added in certain cases to existing Band I aerials including *Lofrod* and dipole or "H" aerials.

Band I aerials for horizontal or vertical mounting are available in a wide range, including the *Viewflex*, *Kayrod*, *Junior* and *Senior* "H" series and the 3-element *Multirod*. This range is designed for areas where "co-siting" does not exist or where alternative programmes will not be available for some time.

A wide range of v.h.f. aerials is available including a *Viewflex* indoor type and a 3-element "fringe" array. Adaptors for giving Band II (v.h.f.) facilities to Band I dipoles are also included.

Interference filters including television filter inductors individually tuned to Bands I and III are shown. The compact *Telefilter* effective on Band I, can be used either as a flex lead filter or for inclusion inside the appliance. Filtering on both television frequencies and on medium wavebands is provided by the choke and capacitor filter L799 suitable for small domestic appliances; also a range of industrial and domestic filters for the suppression of h.t. interference.

British Broadcasting Corporation

*Broadcasting House, London, W.*1

STAND No. 301 The B.B.C. will have the biggest and most comprehensive stand it has yet shown at Earls Court. One section will

feature a detailed model of "Our Port," the result of a recent competition for children in the Television Service. It is made entirely by children under 15.

Many familiar puppets of television will also be on view. Displays will show how much of the world has been brought to television screens, and the prospect of what may be expected in the future. How the B.B.C. prepares its news bulletins for sound and television is shown in a display on the work of the B.B.C. News department.

An important part of the display deals with the biggest development in sound radio—the introduction of v.h.f. broadcasting. A demonstration theatre has been built for this purpose.

The domestic sound programmes, Home, Light and Third, are featured in a series of displays. Visitors will see at a glance the characteristic pattern of each programme and how each is designed to appeal to its particular audience.

British Communications Corporation, Ltd.

Second Way, Exhibition Grounds, Wembley, Middlesex

STAND No. 217 British Communications Corporation's presentation is designed primarily to interest those concerned with communications of a functional nature, particularly in the v.h.f. mobile field. Emphasis is placed on radio equipment for use under all conditions of movement.

The range of equipment displayed will attract the attention of those occupied with the need to control continuously mobile units, and be of particular interest to engineers familiar with the latest developments in v.h.f. technique.

Brown Brothers, Ltd.

Browns Buildings, Great Eastern Street, London, E.C.2

STAND No. 9 The comprehensive display by these well-known distributors includes television and radio receivers, high-fidelity equipment, valves, components and accessories, service equipment, and tape recorders. Products of a wide range of manufacturers, including Alba, Champion, Ever Ready, G.E.C., Invicta, Marconiphone, Regentone and Stella, are on view, and dealers are invited to take advantage of the facilities provided for comparison of makes and models.

A. F. Bulgin and Co., Ltd.

Bye-Pass Road, Barking, Essex

STAND No. 59 Once again the enormous range of Bulgin products is on show, with a still further and even larger number of new additions in various classes, together with existing and current products. Many or all of the standard products are also specially made in materials and finishes to special specifications (such as RIC.1000, Ady.6000R, I.S. RCS.1000, etc.) where such are called for, and also in general "Tropical" civil versions.

Newest models in the range of switches include silent-action, cupboard door, and lid switches, both for surface mounting, flat, and 1-hole fixing through casing, and there are moulded toggle switches of very high insulation properties.

New, also, are the Bulgin *PolyMicro* units, groups of 6 or 12 (or less or more) standard miniature micro-sensitive switches ganged between brackets, with rotary-cam operation by shaft, and with or without indexing or positions, for manual or mechanical drive. These provide robust mains selector-switches of high-rating, small size, for a life of one million or more operations, reliably, and flexibly as to contacting.

In plugs and sockets many new models appear, including special polarised safety mains inlet-to-appliance connectors, with special or improved features, and also many new valve connector retainers, both screened and shrouded. For high-voltage uses, polythene-encased versions of "Standard" and "Octal" top-cap connectors are showing for the first time, and also new anti-corona types, and anti-corona shrouds for 6BA and 5BA connections (stems, terminals, etc.). Shrouded and anti-corona valve top connectors appear for the first time.

New types of moulded and insulated test prods, and with and without fuse, retractable-point (or wide-grip-hook), or plain, are to be seen, red or black, and with new flexible-plastic cable-entry-cap. The twist-grip prods have recently been introduced for the lab. and test bench.

Bush Radio, Ltd.

Power Road, Chiswick, London, W.4

STANDS 22 & 57 The range of television receivers exhibited is of modern design and has only recently been released. The sets are all tunable by means of an exclusive Bush system known as the *Telepic* to any one of the 13 channels on Bands I and III.

There are 14in. and 17in. table sets and console models with 17in. and 21in. tubes, all of which can be seen working either on the Bush main stand (No. 22) or on the demonstration stand (No. 57). In addition, a representative group of Bush television are working in Television Avenue.

For those who own one-band Bush television receivers, details are available of a Bush converter to enable their sets to receive I.T.A. transmissions on Band III. This can be fitted to all models manufactured since June, 1950.

One of the new Bush radio sets, the VHF54, incorporating an f.m. band.

BRITISH RADIO AND TELEVISION

46|47 Chancery Lane, London, W.C.2.

STAND No. 109 A warm welcome awaits readers of this journal at Stand 109, where *British Radio and Television* will be featured, and back numbers, Test Reports, binders, and James Huxley's "Essential Servicing Data" will be available. A member of the staff will be present to answer enquiries and discuss trade matters.

In recent years Bush have provided a stand upon which the public could watch and compare the various sets in the Bush television range. This idea has been repeated at this year's Radio Show.

The latest development in sound broadcasting is, of course, the B.B.C. v.h.f. or very high frequency service. Bush are showing two table receivers and their latest radiogramophone for the reception of v.h.f. This latter instrument is a 7-valve receiver with 3-speed gramophone motor and is for a.c. mains only. Other radio models include table receivers for d.c./a.c. mains and a mains-battery portable and portables for d.c. or a.c. supplies.

New television receivers in the Bush range are: Model TV53 (14in. table set) 65 gns. tax paid; Model TV56 (17in. table set) 78 gns. tax paid; Model T57 ("Mobile" 17in. console) 84 gns. tax paid; Model TUG58 (17in. console with doors) 108 gns. tax paid.

Champion Electric Corporation

The Drive, Newhaven, Sussex

STAND No. 62 Champion are showing a full range of radio receivers and radiograms, including models designed for a.m.-f.m. reception. The *Sonata* (Model 841) is a 6-valve a.m.-f.m. table set having three wavebands and three speakers to ensure faithful reproduction of the f.m. transmissions. An in-built dipole is incorporated for f.m., and a Ferrite rod for l.w. and m.w. The instrument is housed in a walnut-veneered cabinet and is for operation on a.c. mains 200-250V. Price 30 gns., tax paid.

The *Continental* (Model 838) is a mains-battery portable of novel design covering the medium and long wavebands, using low consumption valves, and housed in a gold and cream plastic cabinet. It operates on 110-250V a.c. mains or batteries. Price 19 gns., tax paid (ex. batteries).

Champion are also showing an f.m. converter (Model 835) designed to enable any a.c. receiver to pick up the new f.m. transmissions, with only two connections. Price 16 gns., tax paid.

The *Teenager* portable record player (Model 843) is a portable 3-speed player for a.c. mains

(continued on page 394)

BY APPOINTMENT TO HER MAJESTY THE QUEEN. SUPPLIERS OF RADIOGRAMOPHONES, RECORDS, RADIO, TELEVISION & ELECTRICAL HOUSEHOLD APPARATUS. THE GRAMOPHONE COMPANY LIMITED.

Remember

"His Master's Voice"

adds tone to your business . . .

It is relatively easy to secure your share of the "mass" market—it is not so easy to attract to your premises the more discriminating public. Therein lies the value of the "His Master's Voice" dealership which immediately places a "Hallmark" upon any retail establishment. The traditional reputation of "His Master's Voice" for uncompromising quality adds TONE to your business and—if you take full advantage of it—an unrivalled source of profit and prestige.

Full details of the "His Master's Voice" range for the new Season have been posted to all accredited dealers. At the Radio Show will be shown the 2 Band Television receivers with the exclusive Emiscope electrostatic focussing tubes, the new radio for A.M./F.M. reception, superb radiogramophones, and the amazing new Binaural Reproducer.

The Hallmark of Quality

THE GRAMOPHONE CO. LTD · HAYES · MIDDLESEX

RADIO SHOW PREVIEW

(continued)

with amplifier and 5in. speaker, housed in an attractive fibre attache-type carrying case. It sells at 12 gns. tax paid.

Radiograms on show include the *Belgrave* (Model 840)—an a.m.-f.m. console radiogram with three wavebands, three loudspeakers, and a 3-speed autochanger. The cabinet, which is of the bureau type finished in walnut veneer, embodies record storage space. Price 54 gns. tax paid. The *Mayfair* (Model 856) is an a.m.-f.m. console radiogram having four wavebands (including v.h.f.), and using an 8-valve (including tuning indicator) chassis giving an output of 5 watts into three speakers. A 3-speed autochanger is fitted. The cabinet is walnut veneered and has record storage space. Price 70 gns. tax paid.

Other Champion models on show include he *Fidelo* f.m. table receiver, an a.c.-d.c. v.h.f.-f.m. 6-valve table set covering the 88-95 Mc/s v.h.f. band. The cabinet is in two-tone plastic, and the output is 3 watts. Price 19 gns. tax paid.

Channel Electronic Industries, Ltd.

Princess Street, Burnham-on-Sea, Somerset

STAND No. 212 The full range of Channel products is being exhibited, including an entirely new Band III converter. It has nine pre-tuned positions, one in Band I and the others in Band III, and a fine tuning control is incorporated. This easily-installed converter is bronze finished to harmonise with the receiver and retails at 10 gns.

Also shown is the P7 Band III pre-amplifier which gives a gain of 24db and incorporates an ECC84 in a high efficiency cascode circuit. The unit is self-contained with its own power supply and can be tuned over the complete range of Band III. It retails at £6.

The Channel waveform generator provides full coverage of Band I and Band III frequencies, giving a composite pattern with frame and line sync pulses. The direct calibration includes spot frequency points corresponding to all the individual channels.

The exhibit also features various types of distribution boxes with up to eight outlets and priced from 22s. 6d.

The new Channel Type C3 converter with 9-channel selector.

upwards. Television interference filter Type S1 (26s. 3d.), officially tested and approved by the G.P.O., gives an attenuation of 30 dB between 10–30 Mc/s.

E. K. Cole, Ltd.

Ekco Works, Southend-on-Sea, Essex

STANDS 12 & 121 All the Ekcovision receivers exhibited at this year's Show incorporate turret tuning for reception of both B.B.C. and I.T.A. programmes. Other features common to all models include aluminised tube giving 60 per cent brighter pictures and automatic picture and sound control to minimise fading and simplify receiver operation.

Turret tuners for converting earlier Ekcovision superhet receivers are also displayed (price, 6 gns., fitting extra).

In addition to the current range of sets, the following new models are displayed: Model TC267—a 17in. console television receiver housed in a walnut-veneered cabinet. The turret tuner provides a selection of the new f.m. sound broadcasts in addition to Band I and Band III television channels. Features include automatic picture and sound control, fly-wheel sync., and "spot-wobble." For a.c.-d.c. mains. Price to be announced.

Model TC220 is a luxury TV receiver with 21in. screen, incorporating every technical refinement, with a turret tuner accommodating f.m. radio channels in addition to Band I and Band III TV. The cabinet is finished in contrasting walnut veneers, with doors which enclose the screen and controls when the model is not in use. Price to be announced.

Radio

Six different models in the new Ekco radio and radiogram range cater for f.m. reception. They range from the popularly priced Model U243 table radio to the luxury hi-fi radiogram, Model ARG256, designed for the connoisseur.

Among the wide range of radio and radiograms catering for ordinary broadcast reception is the latest version of the *Radiotime* (Model A244), a combination of an electric clock with time-switching facilities and a 5-valve superhet radio.

New models include the TRG252, a 6-valve, plus tuning indicator, 3-speed, table autoradiogram for a.c. mains operation, covering medium and long waves and the new v.h.f.–f.m. band. Features include a 10in. by 6in. elliptical speaker and provision for external speaker with internal speaker muting if required. Price: 46 gns., tax paid.

Car Radio

Available in an increased number of different stylings to suit many current car models, the Ekco car radio, Model CR152, is a 6-valve superhet covering medium and long waves. It is also available in a standard styling for installation in cars of any make or year. The standard model can be supplied in four versions to meet the need of varying speaker types and locations in different cars.

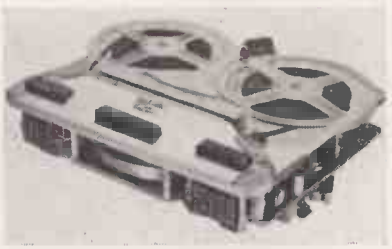
The receiver has a simple and efficient tuning system. Three independent, clearly calibrated tuning drums can each be tuned to a different station, any one of the stations so tuned then being selected at the turn of a switch. Price is £26 10s., tax paid.

Collaro, Ltd.

Ripple Works, By-Pass Road, Barking Essex

STAND No. 39 Collaro are exhibiting their range of gramophone products including the RC54 record changer, AC3/554 gram unit, 2010 transcription unit and pick-ups featuring the *Studio* range. In addition they will be showing for the first time their new development, a 3-speed tape transcriptor which has several interesting features including the following:—

Three speeds—3¾, 7½ and 15 inches per second. It is a twin track n achine equipped with four heads disposed on two distinct levels, *i.e.*, one pair of heads will affect the top track of the tape and the second pair of heads will affect the bottom track. Therefore, both bottom and top tracks of the tape can be either recorded or played back without removing the tape from the deck, the machine being immediately reversible. The fact that four heads are used also means that there is only half the head wear for a given length of tape. On'y two motors are employed, one driving the take-up spool and the other the capstan—their duties being exchanged immediately the machine is reversed.



The Collaro 2010 tape transcriptor.

The drive to both the capstan and the spool is disengaged when the machine is switched off. This eliminates flats on the drive pulleys and contributes towards the removal of wow, flutter and rumble.

Two finishes are available. The standard machine is fitted with a cream polystyrene cover plate and will be retailed at £20. Another version with a clear polystyrene cover plate but sprayed gold on the inside, is priced at £20 10s.

Co-operative Wholesale Society, Ltd.

1 *Balloon Street, Manchester*, 4

STAND No. 60 There are nine receivers in the Defiant television range, all incorporating 13-channel tuning and a 15-valve circuit. Features include an anti-flutter device, a mains filter, shielded line time-base, and interference suppressors. On all table models a 6½in. round speaker is used and on the 13½in console an 8in. round speaker is used; the 14in. console and the 17in. consoles use elliptical speakers. Also shown is a Band III converter (£10 17s. 6d.). with continuously variable tuning over all eight channels and an output adjustable to any Band I frequency.

Several models incorporating f.m. are included in the Defiant radio range. Model RGSH756 is an 8-valve de-lux radiogram with push-pull output (6 watts undistorted) and covering long, medium, short and v.h.f. wavebands. Model TRGSH156 is a table radiogram covering long, medium and f.m. bands and incorporates a built-in f.m. aerial and a Ferrite rod aerial for medium and long waves. A 3-speed auto record player is used.

Cosmocord, Ltd.

700 *Great Cambridge Road, Enfield, Middlesex*

STAND No. 201 This year sees the introduction of a new series of pick-up cartridges. These are known as the High-Definition GP59 series designed specifically for inclusion in high-quality radiograms and record players enabling full advantage to be taken of the new records and recording techniques.

The GP59–1 turnover cartridge is a medium output wide frequency range unit and the GP59–3 is a very high output turnover cartridge for use with low gain amplifiers.

Also on show is a complete range of the Hi-g replacement pick-up heads designed to bring up to date the majority of earlier record changers. Included in the display is a comprehensive selection of microphones ranging from a small hand microphone, suitable for public address work, to various other desk and stand models suitable for tape recording and studio work.

The Cosmocord GP59 turnover pick-up cartridge

Dealers are invited to call at the above stand to discuss any problems arising from record reproduction or microphone application with the technical staff who are in attendance throughout the Show.

A. C. Cossor, Ltd.

Cossor House, Highbury Grove, London, N.5

STAND No. 23 Among the television receivers exhibited are the following: Model 937, a 17in. table receiver, is turret-tuned for the alternative programmes. The specification includes 21 Cossor valves, flywheel synchronism, interference suppression and automatic contrast control for a steady picture. For a.c.-d.c. The walnut veneered cabinet, of modern design, measures 19in. wide by 19¼in. high by 18¼in. plus 3in. deep.

Two more receivers have the same specification as Model 937. One, Model 939F, is a 17in. console with full-length doors; the cabinet, on smooth-running castors, measures 20½in. wide by 36in. high by 20in. plus 3in. deep. The other, Model 938F, is a 14in. table set, measuring 16½in. wide by 17½in. high by 17½in. plus 3in. deep.

Model 935 is a three-in-one model for the connoisseur, incorporating a 17in. television (turret-tuned for the alternative programmes), all-wave radio, and auto-record unit handling up to ten 7in., 10in. and 12in. discs, long-playing and standard, unmixed. For a.c. only. The cabinet, on smooth-running castors and incorporating ample record storage space, measures 39½in. wide by 37½in. high by 19¾in. plus 3in. deep.

Two of the many Cossor receivers on Stand 23. Left—Model 937 17in. table televislon. Right—The latest *Melody Maker* radio, with f.m.

In the radio field, Model 523, the *Melody Master*, a table set with six valves plus magic-eye tuning, 4 wavebands including f.m., self-contained aerials, and a 10in. elliptical speaker housed in a walnut-veneered cabinet.

The second a.m.-f.m. receiver is Model 522, a 6-valve plus magic-eye radiogram with twin matched speakers, the record unit handling automatically up to 10 7in., 10in. and 12in. discs, long-playing and standard, unmixed. The third, Model 524, is an addition to the *Melody Maker* range. This f.m. *Melody Maker* has four wavebands, including f.m., built-in aerials, 10in. elliptical speaker, and is contained in a moulded cabinet.

Cossor Instruments, Ltd.

Cossor House, Highbury Grove, London, N.5

STAND No. 114 Cossor Instruments are staging a full demonstration of test and alignment equipment. On display will be the Model 1322 Telecheck and Marker Generator which, wired to a standard Cossor oscillograph, will present the overall response curve of a television receiver. Using the inbuilt marker generator, very accurate measurements of the response curves are made possible and will be demonstrated.

Model 1324 f.m. receiver alignment generator will be shown displaying the i.f. and discriminator curves of a Cossor receiver, to demonstrate how easily a correct alignment is achieved without the need of laborious spot-frequency techniques.

Visitors will also be able to examine the Cossor oscillograph range from the smallest, a 9½ lb. miniature single-beam instrument, through the selection of general-purpose double-beam types, Models 1052, 1035 and 1049 and the single-beam Model 1058 to the more specialised double-beam wide-band instrument, Model 1059 and the 80 Mc/s oscillograph, Model 1056, designed with the needs of the vast new atomic field in mind.

Accessories, including a pre-amplifier, camera equipment, etc., will also be displayed. Technical staff will be available and pleased to deal with enquiries on the stand.

De La Rue and Co., Ltd.

Imperial House, 84–86 Regent Street, London, W.1

STAND No. 214 The company are giving prominence on their stand to their new grade of laminated plastic, Delaron Copper Clad, which is becoming increasingly important in the radio and electrical industries. The laminate, faced with copper foil, is now being used in the manufacture of printed circuits, with the circuit drawing transferred to the copper clad by litho, silk screen or photo-engraving techniques. Surplus copper foil, not protected by the acid-resisting inks used in the printing of the circuit is then etched away, leaving a permanent electrical conductor serving as a connecting medium for many kinds of electrical components.

Printed circuits of this type have many advantages over the old methods, including uniform reproduction of circuits, virtual elimination of hand wiring and expensive chassis operations, compactness and the saving of material. Assembly work can be speeded up and the attachment of components simplified by solder dipping after mounting. These and other advantages make Delaron Copper Clad increasingly important in the construction of radio and television sets, hearing aids, radar and electronic equipment of all kinds.

De La Rue produce three grades, the base laminates conforming to R.C.S. 1,000 and B.S.S. 1137 specifications.

Decca Record Co., Ltd.

1-3 *Brixton Road, London, S.W.9*

STAND No. 32 On show will be v.h.f.-f.m. and high-fidelity speaker systems with two or three speakers for radio and radiogramophones, and 12-station turret tuning on all television receivers. One of the three new Decca models is a de-luxe 4-waveband (v.h.f.-f.m. and a.m.) superheterodyne table radio receiver (a.c. only) which has two carefully matched speakers, thus ensuring full benefit from v.h.f. transmissions.

A v.h.f.-f.m. tuner is also incorporated in the DMC/D18 17in. console television with doors.

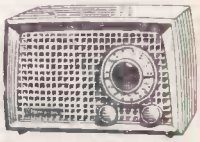
(*continued on page 397*)

Champion
Model 832
MINUET

AC/DC broadcast band receiver only. 4 valves. Bakelite cabinet.

(£7.0.0 + £2.5.0. P.T.) **£9.5.0** Tax Paid

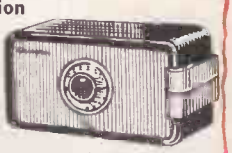
Champion
Model 825
SERENADE



AC/DC, 2 wavabands Superhet. Bakelite cabinet.

(£9.2.9. + £2.18.9. P.T.) **11½ gns.** Tax Paid

Champion
Model 835



FM/VHF adaptor for instant conversion of AC eqpts for reception of FM transmissions. Bakelite cabinet.

(£12.14.3. + £4.1.9. P.T.) **16 gns.** Tax Paid

Champion
Model 826
FIDELO

AC/DC VHF/FM valve (inc. rect.) Table Model receiver. 88-95 Mc/s. 2-tone plastic cabinet **19 gns.**

(£15.2.0. + £4.17.0 P.T.) Tax Paid

Champion
Model 822
MAYFLOWER

Battery suitcase portable, 4-valve Superhet, 2-wave-bands.

12½ gns. (ex btys) Tax Paid

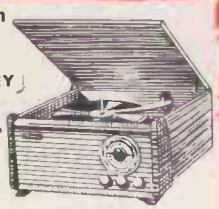
(£9.18.9 + £3.3.9. P.T. ex btys)

Champion
Model 838
CONTI-NENTAL

Mains/Battery Personal Portable. 2 wavebands, low consumption, plastic cabinet.

(£15.2.0.+£4.17.0. P.T. ex btys.) **19 gns.** Tax Paid ex. btys

Champion
Model 830
BERKELEY



AC Table Radiogram, 3-speed automatic record changer, 4-valve, 2 wave-bands, Superhet. Ferrite rod aerial. Walnut veneer cabinet.

33 gns. (£26.4.8 + £8.8.4. P.T.) Tax Paid

Champion
Model 834
CURZON

AC Console Radiogram, 3-speed, high fidelity auto-change record changer. 2 wavebands, record storage.

45 gns. Tax Paid

(£35.15.6. + £11.9.6. P.T.)

Champion
Model 843
TEENAGER

Portable 3-speed Record Player with amplifier and speaker in attractive air luggage-type carrying case

12 gns. (£9.10.6. + £3.1.6. P.T.) Tax Paid

Champion
Model 820
RADIO-REVLER

Luggage type Portable 3-speed radiogram. AC Superhet L & M wavebands.

26½ gns.

(£21.1.3.+£6.15.3. P.T.) Tax Paid

Champion Model No. ?

TOP SECRET TILL THE SHOW

Champion Model 841
SONATA

AM/FM 6-valve Table Model Receiver. 3 wave-bands, 3 speakers. Walnut veneer cabinet. AC mains, 200/250 volts.

(£23.17.0. + £7.13.0. P.T.) **30 gns.** Tax Paid

Champion
Model 840
BELGRAVE

AM/FM Console Radiogram, 3 wavebands, 3 speakers and 3-speed auto record changer. Record storage.

(£42.18.6. +£13.15.6. P.T.) **54 gns.** Tax Paid

Champion
Model 856
MAYFAIR

AM/FM Console Radiogram. 4 bands inc. VHF. 8 valves inc. rect. and T.I. 3 speakers, push-button switching, 3 speed changer, record storage

(£55.12.6.+£17.17.6. P.T.) **70 gns.** Tax Paid

The Hallmark of a Champion

NATIONAL RADIO SHOW STAND NO. 62

for True-to-Life Reception

CHAMPION ELECTRIC CORPORATION · **NEWHAVEN** · **SUSSEX**

London Office : 8 Eccleston Street · London S.W.1 *Telephone :* SLOane 9838

RADIO SHOW PREVIEW

(continued)

Both the RG100 and RG103 radio-gramophones have 4-waveband radio receiving units (this includes v.h.f.-f.m.) while the RG100 incorporates two speakers, and the RG103 three. These are combined with carefully designed high-fidelity record reproducing units, the RG100 with a Garrard turnover crystal pick-up and the RG103 with a Decca *ffrr* pick-up with interchangeable heads, and Garrard 3-speed automatic record changers.

The four following television receivers will also be shown: the DMC/D17, a console model with full-length doors; the DMC/17, a 17in. console receiver; and two table models, DM/D17 and DM/14.

Other exhibits include a new *Double Decca* portable radio, a 4-valve superheterodyne receiver for a.c.-d.c. mains or battery operation; the *Deccalian Model* 81 high-fidelity portable record reproducer; the *Panatrope* high-fidelity record reproducer; the *Portrola* portable radio-gramophone; and the *Deccamatic II*, a table reproducer incorporating a 1½-watt amplifier, Collaro turnover pick-up, spring-mounted triple-speed motor, and 6in. elliptical speaker.

Also displayed are records, 78 and 45 r.p.m., and extended play 45 r.p.m., as well as long and medium play (33⅓ r.p.m.).

Domain Products, Ltd.

Domain Works, Barnby Street, London, N.W.1

STAND No. 305 Domain are showing a wide range of display stands, mini-trucks, nesting chairs, projector stands, television tables and other similar equipment. Of unusual interest is the new universal display system comprising a variety of tiered displays which can be built up quickly with plate-glass and ingenious legs and spacers. Several of the Domain display stands are on show, including stands specially designed to display television receivers.

Television tables are exhibited—there are ten models available from £3—all constructed entirely of metal and including a shelf for radio set and castors for convenient shifting. Mini-trucks for television consoles, radiograms and general showroom use are on view, made from ⅝in. steel tubing and fitted with ball-bearing castors (prices from £1 13s. 9d. trade). There is also a mobile trolley for the Mullard valve tester which has storage rack for the card system and runs on rubber-tyred castors (£6 15s. with side brackets).

Dubilier Condenser Co. (1925), Ltd.

Ducon Works, Victoria Road, North Acton, W.3

STAND No. 221 Here will be seen a comprehensive exhibit of Dubilier capacitors designed to meet the requirements of modern radio, television and communication equipment, including capacitors specially designed for use in printed circuitry and other applications where miniaturisation is essential.

On show are *Duconol* capacitors suitable for application where compactness and non-inflammability are essential features, also a complete range of suppressor capacitors and devices for the suppression of electrical interference with television, radio and radar, made in accordance with British Standard specifications.

Other components on the stand include fixed resistors, including the smallest size fully insulated units, precision wire wound, power wire wound, high voltage and ultra high range resistors; volume controls and potentiometers for television pre-set applications; high stability resistors.

Dynatron Radio, Ltd.

The Firs, Castle Hill, Maidenhead, Berks.

STAND No. 24 The new Dynatron *Ether Pathfinder* radiogram embodies many outstanding features. The radio section incorporates eight valves in the tuner, two in the pre-amplifier, four in the power amplifier, giving an output of 12 watts undistorted. It covers 13-48m., 48-160m., 185-575m., 800-2,000m. and the v.h.f. band 88-100 Mc/s. Separate treble and bass controls are provided and there is also a variable selectivity control.

The record player is a Garrard 3-speed auto-changer with high-fidelity pick-up heads and the twin loudspeaker system consists of an 8in. unit for treble response and a powerful 12in. unit for bass and middle register. The radiogram is housed in a cabinet with record storage compartments, pneumatic lid, concealed free-floating castors. A novel feature is a record compensator, giving correct tone adjustment for different makers' recordings.

Another new radiogram is *The Windsor*, incorporating the FMI 7-valve f.m. tuner which provides for switched pre-tuned 3-station f.m. selection. This feeds into a 2-valve tone control unit TC10 and thence into a large 4-valve push-pull power amplifier LF10. Complete stability of station setting is ensured by an automatic frequency correction circuit. Each unit is separate and quickly removed for servicing.

Another addition to the Dynatron range is the *Condor* television console TV29 and the *Marlborough* console TV29M, the difference being only in the cabinet styling, the former being housed in contemporary cabinet and the latter styled in Queen Anne fashion. The chassis employs 23 valves and two germanium diodes, together with a 21in. aluminised rectangular c.r.t., and embodies a 13-channel tuner. Circuit features include a.g.c. on vision and sound, improved "black spotter" interference limiter, fly-wheel synchronising, anti-flutter circuit to reduce reflection of signals from aircraft, and a specially developed high-frequency i.f. stage to provide high definition and avoid pattern interference.

The chassis is easily removed for servicing and pre-set controls are all accessible from the front. The high-fidelity a.f. push-pull amplifier feeds into a large and wide-response speaker. Tone control is provided. The prices of all the new models are yet to be announced.

Other exhibits include the *Ether Pathfinder* a.m.-f.m. chassis, the 8-valve 5-waveband T10 a.m.-f.m. tuner, the combined 2-valve high-gain preamplifier and tone control unit TC10 and the 4-valve high-fidelity 12-watt amplifier LF10.

E.A.P. (Tape Recorders), Ltd.

546 Kingsland Road, London, E.8

STAND No. 303 Main feature of the stand is the *Elizabethan* tape recorder, a 2-speed twin-track instrument with simple push-button controls. The two speeds are: 7½in./sec. (2×30 mins. on 1,200ft. tape) and 4.8in./sec. (2×45in./sec. on 1,200ft. tape). Frequency response is 50 c/s to 10 kc/s at fast speed, and 50 c/s to 7 kc/s at slow speed; independent amplifier response is 30 c/s to 15 kc/s.

A magic-eye recording level indicator is provided, with a tone control giving variable top cut on amplifier and reproduce positions. The cabinet is finished in two colours with gilt lock and fittings. Weight 34 lb.

The instrument is supplied complete with spool of tape, spare spool, mains lead and crystal microphone. In addition the company are exhibiting two new *Elizabethan* portable recorders together with new console models.

Cossor Telecheck and Marker Generator (see p. 395).

E.M.I. Institutes, Ltd.

10 Pembridge Square, London, W.2

STAND No. 311 The emphasis here is on complete practical home training in radio, television and electronics by combining theoretical instruction with the design, construction, use and servicing of the appropriate technical equipment supplied with the courses.

Educational equipments provided extend from an experimental outfit with which the basic electronic circuits are studied to complete t.r.f. and superhet receivers. Other outfits include a 15in. television receiver, a tape recorder and a record reproducer.

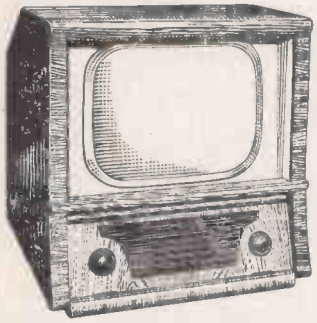
Special equipments are available for overseas students. Courses can also be provided in the theoretical principles only of radio and other branches of engineering.

E.M.I. Sales and Service, Ltd.

Hayes, Middlesex

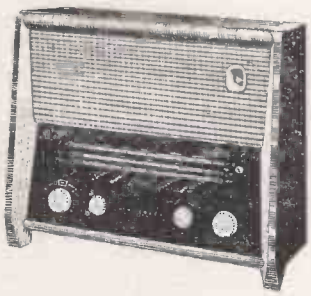
STAND No. 215 This stand, showing a typical range of products marketed by the various divisions of the company, is one of great technical interest, and includes recording equipment and public address equipment.

(Continued on page 400)



TM54—14" All programme Table model. **66 gns.**

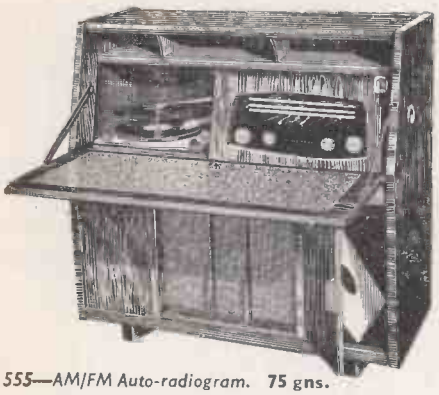
TM417—17" All programme Table Model. **75 gns.**



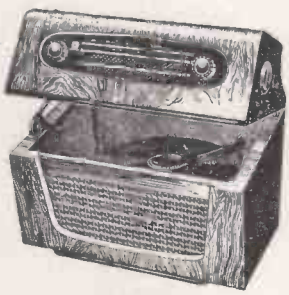
FM55—AM/FM Table Model. **29 gns.**

TT4—Television Table with radio. **£25**

A magnificent range...



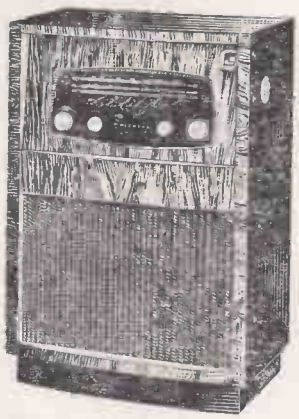
555—AM/FM Auto-radiogram. **75 gns.**



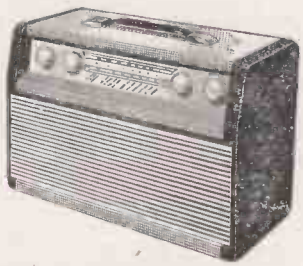
545—Clubman Table Auto-radiogram. **40 gns.**

155—4 waveband AC model. **23 gns.**

855—3 waveband AC/DC model. **21 gns.**



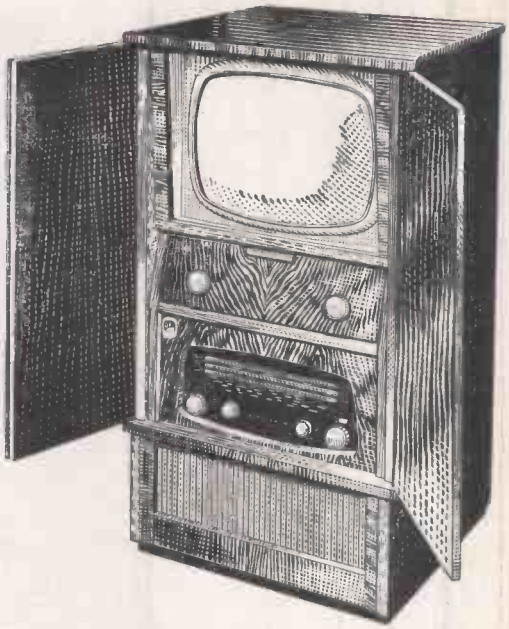
255—AM/FM Console. **42 gns.**



354—Mains/Bty. Portable. **19 gns.**

It's magnificent on

McMICHAEL RADIO LTD., 190 STRAND, LONDON, W.C.2



C417FM—17" Console with separate AM/FM radio receiver. **115 gns.**

With this superb range of up-to-the-minute receivers to call on, McMichael dealers are assured of their best season yet. Stocks are ready for *immediate delivery*.

a magnificent reputation...

McMichael's unique reputation for producing receivers of advanced technical design, high performance and supreme reliability has withstood nearly 35 years keen competition. Each of these models worthily upholds that tradition and represents extra good value-for-money.

and magnificently advertised...

Vigorous McMichael advertising is appearing already in the leading National and Provincial Newspapers, the Radio Times, London's Evening Press, etc. It goes on week after week throughout the busiest season. Literature, Window Bills, Pelmets, Price Cards, Signs, etc., are immediately available, together with Co-operative Advertising in your own local press. So prepare for a big increase in your McMichael turnover this year and place your order now, please.

McMICHAEL

— such reliable sets

RADIO SHOW PREVIEW

(continued)

Recording Equipment Division

This exhibit consists of professional magnetic tape recorders; Emitape "77" and "88" magnetic tape and Emidisc recording blanks.

The largest model—BTR/2 is a high-fidelity recorder designed particularly for professional studio recording. Machines of this type are used for the original recordings from which *His Master's Voice*, *Columbia* and *Parlophone* records are subsequently made, and large numbers of them are also in service with the B.B.C. and with recording companies and broadcasting stations all over the world.

A novel introduction is the new Emitape *Personal Message* tape—a 3in. spool of Emitape "88" sold complete with a greeting or message card and packed in an attractive carton suitable for mailing at 7s. 6d. complete. The spool contains 175ft. of tape, giving 17½ minutes of twin track recording at a speed of 3¾in. per sec. The 3in. spool and carton (without tape) are also available at 3s.

Relay Division

This division has considerable experience in the design and installation of relay systems—both for radio and television—in every kind of site and location. Representative items from the wide range of special equipment is exhibited, and a prominent feature illustrates central aerial radio and television distribution systems for blocks of flats.

Sound Amplification Division

There are innumerable public buildings, military establishments, halls, hotels, factories, hospitals and similar places all over the world where E.M.I. sound amplification equipment is proving its worth.

All types of installations—small and large, simple and complex—are covered by this division.

The Èconasign Co., Ltd.

92 *Victoria Street, London, S.W.*1

STAND No. 113 The company are exhibiting a range of lettering outfits complete with all necessary accessories, alphabets, numerals, ornamentations, etc.

A complete catalogue containing details of various other lettering outfits will be supplied upon request. Artistic showcard and price ticket blanks for use with the outfits in a variety of colours and sizes are also shown.

A new line is the fluorescent cardboard which is now made in six shades, and used extensively by the retail radio dealer for display cards.

The Edison Swan Electric Co., Ltd.

155 *Charing Cross Road, London, W.C.*2

STAND No. 58 Types suitable for f.m. radio and Band III television receivers are included in the selection of Ediswan Mazda valves which form the main feature of this stand. New types include the 6L34 grounded grid triode and its series-run version the 10L1. A display of c.r.t's covers 12, 14, 15, 17 and 21in. types and includes the new CRM124, a 12in. tetrode with the ion trap tetrode gun now fitted as standard in the latest types. A special panel illustrates the use of the ion trap gun.

Also shown is a fully-wired 12-channel turret tuner and two new coaxial feeder cables with cellular polythene insulation and an attenuation factor of 3 and 3.2dB per 100ft. at 200 Mc/s.

A number of industrial, transmitting and special purpose valves are shown, including the 13E1 (a new beam tetrode for stabilised power supplies and servo motor systems) and the ES1001, a new radiation cooled triode for use in industrial r.f. heating equipment with a maximum anode dissipation of 1 kW at 40 Mc/s.

The ESV892 *Vapotron* is the first of a new range of industrial valves using the *Vapodyne* system of cooling by water vapour, a system used successfully by a number of French broadcasting stations and suitable for application in industrial power installations.

Other exhibits include an extensive display of high performance fluorocarbon resins, a number of components incorporating PTFE, a range of blanks for user fabrication and other associated exhibits illustrated photographically.

Electric Audio Reproducers, Ltd.

The Square, Isleworth, Middlesex

STAND No. 216 The E.A.R. range of record reproducing equipment this year includes portable and console gramophones ranging from the *Mascot* miniature portable to the high-fidelity f.m.-gram incorporating a 10-watt amplifier, cross-over speaker network, and a f.m. unit with magic eye tuning. Also exhibited will be E.A.R. audition equipment for the demonstration of records.

All high-fidelity models both portable and console types incorporate independent bass and treble boost control.

One of the new models introduced at the exhibition is the *Armchair Consolette*. This model, without the special stand, is available as a table model in polished cabinet.

English Electric Co., Ltd.

*Marconi House, Strand, London, W.C.*2

STAND No. 31 The 17in. television receivers displayed are all fitted with rectangular tubes and feature 12-channel *Rotamatic* tuning selection with facilities for channels 1–5 in Band I and 8 and 9 in Band III. All models are housed in cabinets of sapele mahogany veneer and are for use with a.c. or d.c. mains supplies.

Two English Electric television models. Left—Model T41, a 17in. table receiver with *Rotomatic* tuning. Right—Model C46, a 21in. console with three-quarter length doors. Both models are available also with switched f.m. facilities.

Model T40 is a table receiver (79 gns.), Model T41 is a table model with doors (85 gns.) and Model C42 is a console version fitted with full-length doors (100 gns.). A matching hardwood stand can be obtained as an optional extra with the table models.

There are two 21in. receivers on show. Model C45 uses 14 noval based valves, four germamium crystals and a metal rectifier and incorporates *Rotamatic* turret type 12-channel tuning. The front-facing loudspeaker is a 10in. by 6in. elliptical unit of high-flux density and the speaker fret is in quaker grey material to harmonise with the tube mask. The cabinet is built of selected sapele veneer, high gloss finish.

Model C46 is also a 21in. console using the same chassis but featuring three-quarter-length doors. Respective prices are 115 gns. and 125 gns.

There are complementary models to each of the six receivers mentioned, these being suffixed "FM." They are similar to the standard models but are fitted with a switch assembly operated by the channel selector control which permits reception of the B.B.C. sound f.m. transmissions of the Home, Light and Third Programmes.

These are received on tuning positions 10, 11 and 12 and the television video circuit is automatically cut out during reception of the sound f.m. programmes. The receivers with these facilities are priced at from £4 to £5 more than the standard models.

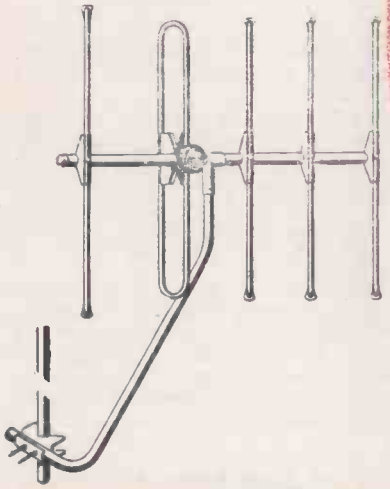
Also shown by English Electric is the Rotamatic Tuner which can be used to adapt existing single-band receivers for multi-band operation. It consists of a beige Vynide covered moulding, housing the 12-channel turret tuner with selector and contrast controls mounted at the front. Connection is plug-in; no soldering is necessary. It fixes to the cabinet or may be used as a free-standing accessory (£10).

All prices quoted are tax paid.

(continued on page 402)

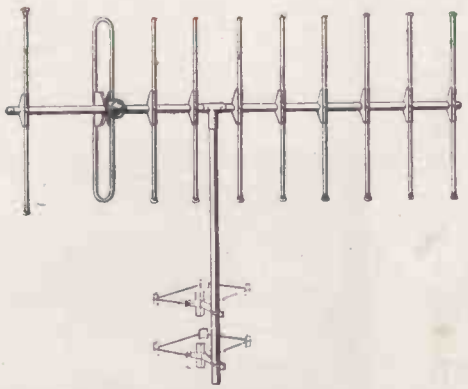
PEAK QUALITY AT A LOW PRICE

350/1C. Five-element array with swanneck mast and "U" bolt clamp for fitting to existing masts from ¾in. up to 2in.
LIST PRICE 52/6



330/1C. Three-element array with swanneck mast and "U" bolt clamp for fitting to existing masts from ¾in. up to 2in. dia.
LIST PRICE 41/6

ANTIFERENCE BAND 3 AERIALS



3102/7H. Ten-element array with 12ft. × 2in. mast and heavy-duty double chimney lashing equipment. **LIST PRICE 178/6**

ALL ANTIFERENCE Band 3 Aerials combine these design features :—

★ Rods and Insulators completely pre-assembled and aligned for peak performance—ready for instant mounting—quickly and easily.

★ Seamless tubing of high grade aluminium used throughout.

★ Boom and rod ends sealed to avoid aerial noise.

★ Monobloc junction units of high grade bakelite—providing exceptional insulating properties and fully weatherproof compartments for cable connections.

The complete ANTIFERENCE range includes aerials for Band 1 Indoor and Outdoor, Band 2 Indoor and Outdoor and several "Addex" units for converting existing Band 1 aerials to dual band reception.

ANTIFERENCE Aerials are made to the highest engineering standards—yet JUST SEE HOW LOW THE PRICES ARE!

ANTIFERENCE LIMITED BICESTER ROAD, AYLESBURY, BUCKS. TEL.: AYLESBURY 1467/8/9

RADIO SHOW PREVIEW

(continued)

Ever Ready Co. (Great Britain), Ltd.
Hercules Place, Holloway, London, N.7
STAND No. 54 Ever Ready is exhibiting a wide range of dry batteries, including the *Batrymax* series—the latest compact layer type batteries for longer life and more power; with combined h.t. and l.t. or separate units they are suitable for every make and type of battery-powered radio receiver. Ever Ready batteries, specially designed for use with hearing aids, photoflash and electronic equipment are also on show.

Amongst the radio receivers is the *Sky Queen*, a portable all-dry battery receiver incorporating new low consumption valves and a 4-valve superhet circuit with m.w. and l.w. bands. Weighing 13lb. it retails at £12 11s. Others include the *Brief Case* portable, a 4-valve superhet with leather-cloth cabinet and covering medium and long waves (weight 13lb., £11 11s. 2d.), the *Sky Monarch* table receiver with 6-valve superhet circuit (£23 15s. 6d.), the *Sky Prince* table receiver with 4-valve circuit (£14 0s. 8d.).

The Ever Ready *Sky Queen* all-dry portable.

Type K portable all-dry battery receiver has a 4-valve circuit with medium and long wave coverage (£12 14s. 11) and type C transportable has a 4-valve superhet covering medium and long waves and featuring a plastic and wood cabinet (£14 1s. 4d.). All prices tax paid.

Ferguson Radio
Thorn Electrical Industries, Ltd., 105-109 *Judd Street, London, W.C.1*
STANDS 14 & 103 Ferguson present their latest range of radio and television receivers, including f.m. models and the new "200" series television models. The new radio receivers on show are the 352U, a 5-valve all-mains transportable in plastic cabinet with crystal plastic scale (13 gns.); the 342BU, a 4-valve battery-mains portable with self-contained dry batteries (16 gns.); the 372A, a 6-valve 4-waveband table radio (27 gns.). Amongst the current range is the 329A, a 4-waveband mains receiver for f.m. and a.m. (34 gns.) and the FMA/1 adaptor for use with any existing receiver with pick-up sockets.

Bureaugrams include the established Model 326RG (69 gns.) and the 375RG, a newly introduced model based on the 326RG (75 gns.), and the 401RG, a successor to the 400RG with its special appeal to the connoisseur and with f.m. band (95 gns.). There is also a radiogram (Model 501RG) giving high fidelity reproduction with no detectable distortion and incorporating an f.m. band (245 gns.).

The 200 series *New Standard* and *Nine Star* television receivers feature a new automatic gain control circuit with a choice of two time constants and an improved adjustable vision interference suppressor. Heading the Nine Star series is the 247T, a 21-in. console with doors and HaloLight at 135 gns. Others are the 245T, a 17in. console with doors and HaloLight (105 gns.); the 235T, a 17in. console with HaloLight (94 gns.); and the 205T and 203T, 17in. and 14in. table models (77 and 67 gns.) in the traditional proscenium style cabinets. Nine Star receivers are designed for satisfactory operation in poor reception areas.

The New Standard series comprises Models 206T and 204T, 17in. and 14in. table models (73 gns. and 63 gns.), the 17in. consoles 246T and 236T (the former with doors and HaloLight) at 100 gns. and 90 gns., and the 244T and 214T (the former with doors and HaloLight) at 88 gns. and 73 gns. All prices tax paid.

Ferranti, Ltd.
Moston, Manchester, 10
STANDS 13 & 120 On Stand No. 13 Ferranti exhibit their range of radio and television receivers. All television models are provided with 13-channel switching with a separate tuning control for each band, giving continuous tuning over all 13 channels. Prominently displayed is the 20T5 table projection receiver which has a 20in. (diagonal) picture and all controls including channel switching conveniently situated at the front of the cabinet. Also shown are working models of all other receivers in the current range. A special display features two types of tuner units which can be fitted to earlier models to convert them to 13-channel reception.

The range of radio receivers includes new a.m.-f.m. models in both table radio and autoradiogram receivers. Model 1055 is a de-luxe high-fidelity 12-valve a.c. autoradiogram with three wavebands (155 gns.). Model 1045 is a 4-band, 6-valve table radio with 10in. elliptical speaker at 34 gns.

Also featured in this stand are four new television receivers, a 14in. table model (14T5), a 17in. table model (17T5) and two 17in. consoles (17K5 and 17SK5). Full details of these receivers are given in this month's *Brand New*.

One of the Ferguson *New Standard* models—204T—a 14in. table receiver.

The Ferranti electronics exhibit is on Stand No. 120 and includes recent valves introduced for use in the 200 Mc/s band and for f.m. reception, and a selection of c.r.t's from 9in. to 21in. Of much interest are the silicon junction diodes, hermetically sealed junction units with very low reverse currents and suitable for high temperature operation. They are the first of such types to be commercially available in Britain.

Other items include stroboscopic lamps, miniature stabilisers, thyratrons, rectifiers, c.r.t's for flying spot scanners and a demonstration unit which presents a picture on a long-afterglow cathode-ray tube by means of a flying spot scanner system.

Garrard Engineering & Manufacturing Co., Ltd.
Newcastle Street, Swindon, Wilts.
STAND No. 47 A full range of 3-speed Garrard gramophone units in the standard finish of cream and brown is displayed. The autochangers will play any number of records up to 10 (except the RC111, which plays 8), either 10in. or 12in. 78 r.p.m.; 7in., 10in., or 12in. 33⅓ r.p.m.; and 7in. 45 r.p.m. at one loading.

An a.m.-f.m. autoradiogram by Ferranti, Model 455

Model RC80M, in common with other Garrard changers, has a patented ultra-sensitive auto-trip, a safety device to prevent the changer operating unless loaded with one or more records,

Model RC90 is a 3-speed autochanger supplied with three spindles, one for 7in. 45 r.p.m. large centre records, a sloping spindle for all other types of records, and a short spindle on centre hole adaptor for playing records manually.

Models RC110 and RC111 are compact inexpensive 3-speed record changers with automatic record size selection and a stainless steel record spindle. The RC110 has a one-piece diecast aluminium pick-up arm while the RC111 has a pick-up arm which will take pick-up cartridges MPM2 plug-in moulding.

The 3-speed single-record players include Models T and TA. Model 301 is a 3-speed transcription motor specially designed to have low "wow" and flutter figure. The three nominal speeds are adjustable by means of an eddy current brake. Supplied complete with plastic stroboscopes, spare motor pulley for alternative frequency fixing screws, washers, etc.

General Electric Co. Ltd.

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

STAND No. 37 The outstanding feature is the range and versatility in styling of the receivers shown. There are three new 17in. console television receivers and two 14in. table television receivers, a traditional and contemporary design of radiogram and two different portable radio receivers.

All television receivers cover Bands I and III and incorporate fully automatic gain control, ganged tuning and interference suppression, and wide angle flat screens with a true natural filter for daylight viewing. Fringe models are available with extra sensitivity. The two new radiograms and the table radio receiver incorporate a v.h.f. band.

Of the three new 17in. console models, the BT5248 is of contemporary design with a woven plastics front panel and contrasting veneers (93 gns.). The BT8245 is similar but is fitted with full-length doors which cover the screen when not in use and will open flush with the sides of the cabinet for viewing (102 gns.). The third model, the BT5347 (89 gns.), has been developed for those preferring traditional presentation and incorporates the same circuit as the other two new 17in. models. A new 21in. receiver will be shown as a type preview, the price and availability of which will be announced later.

The radio receivers include the BC5842, an 8-valve table radio covering f.m. and a.m. bands and housed in a walnut-veneered cabinet of attractive design (30 gns.).

Two portable radio receivers are also displayed: a mains model (BC4644) in a high gloss polystyrene cabinet available in a choice of three colours, and a mains–battery model (BC4444), housed in an attache-case container available in a crocodile grey or dragon blue leather-cloth finish.

A few overseas radio receivers are exhibited, including a mains 3-band table model with its dry-battery version, a mains bandspread receiver with a plastics cabinet and an a.c. bandspread receiver in a wooden cabinet.

The two new radiograms on show both cover Band II in addition to the m.w. and l.w. bands. The BC9642 has a cabinet of contemporary design (75 gns.) and the BC9442 has a traditionally styled cabinet (72 gns.) In both models, the front panel is of woven plastics material and the cabinet has selected veneers. Both incorporate a Collaro 3-speed record changer fitted with a high fidelity lightweight turnover crystal pick-up, which will play 10 7in., 10in. or 12in. records mixed in any order.

One of the new G.E.C. radiograms, the BC9642.

Herbert E. Gibbs, Ltd.

First Avenue, Montague Road, Edmonton, London, N.18

STAND No. 209 A selection of radio and television tables, with or without castors, and record cabinets with sliding doors, is shown on this stand. There are three sizes of radio-television tables, all of which are finished in walnut, are fitted with a shelf and 2in. solid rubber castors. The largest has a top 25in. × 20in.

Also shown are occasional tables, oak finished in light or medium colour, and some record storage cabinets. There are two models, both of which are in walnut finish and have sliding doors fitted with sunk handles. The smaller cabinet houses 170 records; the larger one 340 records.

This record storage cabinet is one of the selection of radio and television furniture shown by Herbert E. Gibbs.

Goodmans Industries, Ltd.

Axiom Works, Wembley, Middx.

STAND No. 20 Goodmans are again using their stand as a demonstration theatre, and this year the seating capacity for 80 people will make it the largest theatre of its type used at a radio show.

Introduced to the trade and public is the Axiom 80 loudspeaker, for sometime popular in North America, which has a frequency range of 20 c/s to 20,000 c/s, the fundamental resonance of 20 c/s being achieved by means of a patented cantilever suspension, the cone being free-edged. This precision-built loudspeaker is intended for applications requiring the highest accuracy of reproduction.

A new range of loudspeaker enclosures is being introduced (the Axiom 180, 280, 480 and 172), incorporating some highly interesting features such as complete absence of cabinet resonances above 20 c/s, response maintained down to 20 c/s when used with the recommended loudspeakers, cone adequately loaded down to zero frequency thereby minimising harmonic and inter-modulation distortion, good transient characteristics and absence of boom.

Demonstrations on the stand take place daily at 12 noon, 1 p.m., 2.30 p.m. and at every hour from 4 p.m. to 9 p.m. Admission is by ticket only, which may be obtained from the stand.

The Gramophone Co., Ltd. (His Masters Voice)

Hayes, Middlesex

STANDS 48 & 49 A new range of 2-band television receivers is shown in which special attention has been paid to ease of tuning and freedom from major adjustments when changing from one band to the other.

Among the new features (many of them exclusive to *His Master's Voice*) are: tilted anti-reflection filter screen; dust-sealing mask giving full picture area over the whole of the tube face; all main controls (new dual type with large knobs for easy handling) at the front; new front-facing 8in. elliptical loudspeaker; new rectangular aluminised *Emiscope* tube with very high brightness; electrostatic focusing giving sharp, completely stable focus over the whole picture; freedom from spot distortion; new high efficiency line-scanning and e.h.t. (15kV) generator unit completely sealed for long life and reliability; shock-resisting tube mounting.

Radio Receivers

Model 1251: a de luxe 7-valve (including tuning indicator) table receiver for a.m. and f.m., covering the long, medium and v.h.f. bands. Features are a wide (10½in.) floodlit tuning scale; simple controls; 10½in. elliptical speaker.

Model 1252 (external): a self-contained f.m. unit in polished wooden cabinet for use with a.c. receivers with pick-up inputs. It incorporates its own tuning arrangements and power supply. Also in chassis form for the adaptation of current and certain post-war *His Master's Voice* radiograms.

New "Stereosonic" Reproducer

Specially featured are the two consoles com-

Two new H.M.V. models, the 1846 17in. table television receiver and the 1620 console radiogram.

prising the home reproducing equipment for the new *Stereosonic* tape records which are being demonstrated in the *His Master's Voice* Demonstration Hall daily during the Show. In addition to full *Stereosonic* quality from the new tapes, this equipment also provides single-channel reproduction of an unusually high standard from normal tape records and all types and speeds of disc records.

Radiograms

A new model is the 1620: a 5-valve, 3-waveband console a.c. radiogram with 3-speed 8-record auto-changer and a novel push-pull output circuit arrangement giving remarkable quality and volume. The polished cabinet also provides record storage.

Models 1617/FM and 1619/FM now incorporate f.m. reception as well as their normal a.m. coverage, while both they and the 1618B are equipped with a new and improved 8-record auto-changer, and a pick-up with a new turnover crystal cartridge covering an extended frequency range. Equalising circuits for 78 and micro-groove records are separately switched, and an auxiliary (tape) input position is also provided.

Current Models

The present range of *His Master's Voice* radio receivers, portable and console radiograms, record reproducers and players will also be prominently featured on the stand.

Hartique Products.

Alfred Hart & Co., Ltd., 249 *Upper Street, Highbury Corner, London, N.*1

STAND No. 210 Featured on this stand is a dining table produced to assist people having limited living accommodation. At each end are record storage cupboards holding 175-200 records. Size is 3ft. 9in. × 2ft. 6in. £10 7s. 6d. There is also the *Consul*, a two-tier bow front record cabinet holding over 400 records (£12 10s.) and a single tier bow-front cabinet with a shelf above (the *Criterion*) holding over 200 records. £10 5s.

Cabinets with shaped fronts are also incorporated in contemporarily designed record cabinets—the *Imperial* (£7 19s.), the *Cambridge* (£10 5s.) and the *Cameo* (£10 5s.). All cabinets have ¾in. thick doors and are mahogany lined.

Also introduced for the first time are two new television tables, Models A5 and A6. With splayed legs they give a wider lower shelf made to accommodate the wide radio sets now appearing on the market.

Hartley Baird, Ltd.

Princess Works, Brighouse, Yorkshire

STAND No. 52 The main feature of the Baird exhibit is their first 21in. console television receiver, in a de-luxe walnut cabinet with full-length doors (£145). Other television receivers include two new models in the 2200 series. Model 2217 (£81) is a 17in. table receiver and Model 2214 (£69 16s. 6d.) is a 14in. table receiver. Both incorporate multi-channel turret tuners, filter screen for daylight viewing and front-facing elliptical speakers, and both operate from a.c. or d.c. mains supplies.

Other models exhibited are the new doorless console receivers TV14BC (14in., £79 17s. 6d.) and the TV17BC (17in., £91), in addition to a de-luxe 17in. console with full-length doors and a.m.-f.m. radio unit incorporated (TV17BCR, £137).

Radio is represented with the new Model 301, a 6-valve, 3-waveband a.m.-f.m. receiver with visual tuning indicator, switched gram. sockets, 3-watt low-distortion output and amplifier response of 60–12,000 c/s (£31).

Hobday Brothers, Ltd.

*Great Eastern Street and Holywell Lane, London, E.C.*2

STAND No. 220 The stand features a display by one of the leading wholesalers of television receivers, radio receivers, radiograms, record players, tape recorders and a range of associated equipment. Dealers can be sure of a warm welcome from representatives of the company who will be in attendance from each branch, and are certain to find something new and of interest in this display.

A. H. Hunt (Capacitors), Ltd.

*Bendon Valley, Garratt Lane, Wandsworth, London, S.W.*18

STAND No. 8 Standard and miniature fixed capacitors for all radio, electronic and electrical industrial applications, and extensive ranges of all types for service replacements are shown by Hunts.

New ranges of Hunts tubular ceramic capacitors are shown in High-K, High-Q, and special purpose types. These miniature capacitors are both precise in their characteristics, and robust in design, and full technical specifications are available on request.

Of topical interest is a new circuit-printing process with a wide variety of applications, and an important new development is the provision of ranges of special capacitors of all types for printed circuit applications.

Service engineers will be interested in a new capacitor analyser and resistance bridge of simple and reliable operation.

The extensive display of capacitors includes midget, standard and high-voltage silvered mica types, stacked-mica capacitors, foil and paper types including *Thermetic* high-voltage tubulars in heat-resisting plastic tubes, *Moldseal* tubulars in moulded casings and complete ranges in cylindrical and rectangular metal cases. The selection of metallised paper capacitors includes a *Thermetic* midget with a temperature range of —100 degrees C. to +100 degrees C., midget *Moldseals* and wide ranges of other types in tubular moulded and metal cases.

Electrolytics include those with standard clip mounting, twist prong and single hole mounting, tubulars and *Tom Thumb* miniatures, high-capacitance high-ripple current types for television and a complete range of high ratio anode construction.

Invicta Radio, Ltd.

100 *Great Portland Street, London, W.*1

STAND No. 53 Invicta are exhibiting their full range of television, radio and portable radio receivers in addition to radiograms. All Invicta television receivers are designed for 13 channel operation, thus covering all five B.B.C. channels as well as the whole of Band III including the new commercial programmes. Featured in this section will be the new Model 126 14in. television receiver, finished in a new style polished wood cabinet having a figured veneer surrounding the screen (62 gns).

Invicta will also be showing a converter unit designed to give existing Band I receiver owners' reception of the new Band III transmissions. It is housed in a brown plastic cabinet (9 gns.). The *Vicki* battery portable is a fully portable receiver weighing under 7 lb. complete and is available in alternative colours (11 gns.).

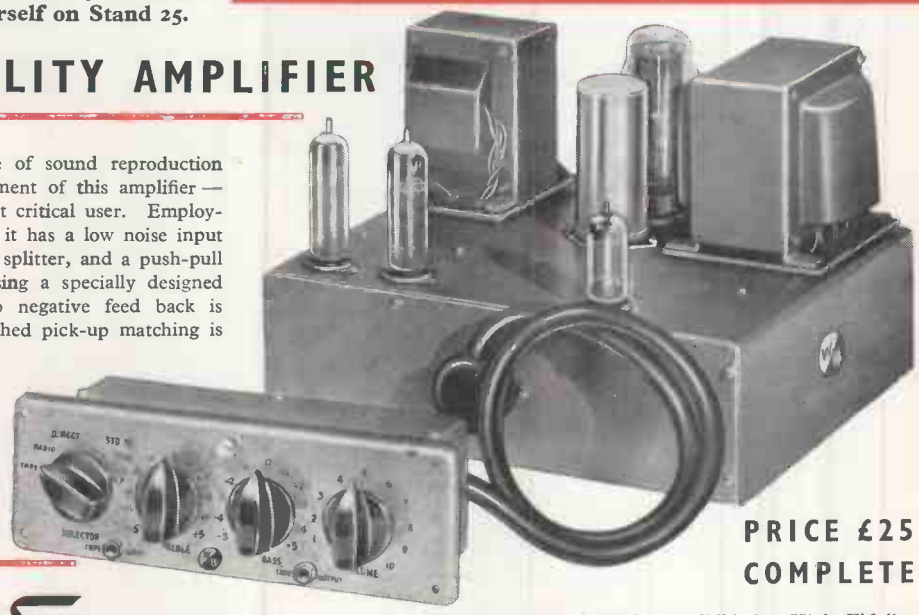
Radiograms and table radios designed to receive the f.m. programmes in addition to m.w., l.w. and s.w. bands are featured. Radiogram

(*continued on page 453*)

THERE'S BIG BUSINESS IN HIGH FIDELITY

● **Interest in High Fidelity is constantly increasing: Our Hi Fi Units have been acclaimed by experts and users all over the world, and now the introduction of the W.B.12 Amplifier, followed by our F.M. Tuner, will mean yet more Hi Fi business for you. See and Hear these new lines for yourself on Stand 25.**

WB12 HIGH FIDELITY AMPLIFIER



Thirty years' manufacturing experience of sound reproduction equipment is embodied in the development of this amplifier — the technical details will satisfy the most critical user. Employing the most recently developed valves, it has a low noise input circuit, feeding the double triode phase splitter, and a push-pull output stage, ultra-linear connected, using a specially designed Whiteley Output Transformer. 25 db negative feed back is applied over the main amplifier. Switched pick-up matching is incorporated in an extremely flexible, compact and easily mounted pre-amplifier tone control unit. Both units are attractively styled and finished in hammered gold.

This equipment, when used in conjunction with Stentorian Speakers, provides most oustanding reproduction.

PRICE £25 COMPLETE

Prov. Pat. 10037/53

Stentorian CAMBRIC CONE HIGH FIDELITY UNITS

Typical of this world-famous range is Model H.F.1012, a 10″ Die-cast unit, incorporating 12,000 gauss magnet, which sells at only £4 17s. 6d. tax paid. Handling capacity, 10 watts. Frequency response, 30 c.p.s.-14,000 c.p.s. Bass resonance, 35 c.p.s. This unit, together with the 8″ and 9″ models 812 and 912, are fitted with universal impedance speech coil (3, 7.5 and 15 ohms).

Prices from 46/6

An outstanding addition to Whiteley High Fidelity equipment is the new F.M. Tuner, designed to take full advantage of V.H.F. transmissions with their extended frequency range and absence of background and noise. It will operate efficiently with any good quality audio amplifier — particularly the W.B.12.

BASS REFLEX CORNER CONSOLE

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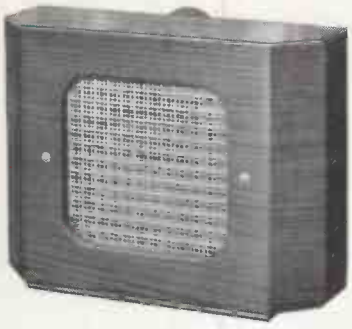

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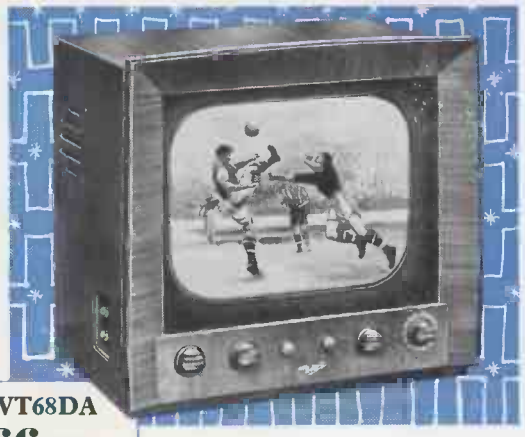

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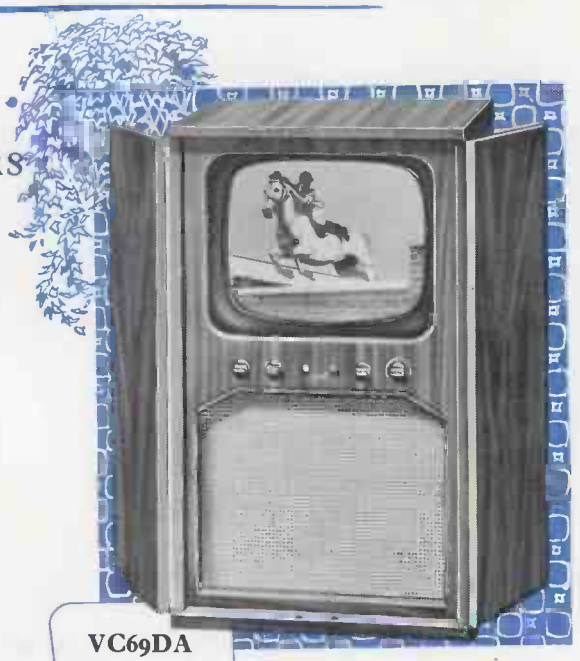

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Issued with British Radio and Television, September, 1955

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60% brighter pictures more contrast extra tube life

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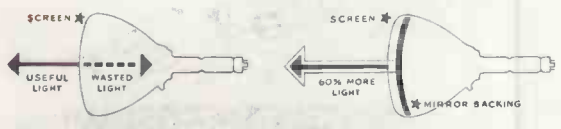

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To counteract this the brilliance must be increased and tube life is shortened.

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RV9

Let's get started on Band III

AN ENGINEER'S VIEW OF COMMERCIAL TV PROBLEMS

NO-ONE can doubt that ours is an exciting industry. It doesn't seem very long ago that our main activities were centred around the broadcast receiver-television, at that time, seeming a thing of the distant future. Then, as though over-night, we suddenly found TV sets in our workshops; we were confronted with problems having a considerably different flavour from those hitherto associated with broadcast receivers.

Progressively, we closely followed the development of the TV set and took for granted the changing ratio of television to broadcast sets awaiting attention in our workshops. Looking back, it seems incredible that a little over 15 years ago our main function was that of charging accumulators—one might well wonder what we did in those days, when the whole receiver was much less complicated that the present-day television time-base, to pass away the time!

We have surely risen from "odd-jobbers" to skilled technicians, and now that the rate of rise of development in our chosen industry is increasing rapidly daily, even more skill and practical knowledge is demanded in order to prevent us falling by the wayside.

In a few years time—when I am writing about colour and stereoscopic vision—our required qualifications, even for servicing, might well be rising to full academic standards, never forgetting, of course, the essential practical experience, which, indeed, will always form the essence of our line of business.

Another stepping stone

Our industry has now arrived at another stepping-stone in its development which will most surely be reflected back to us in the form of new circuit techniques and new and exciting problems.

Unlike Band III TV, which has been going on for some time in other countries, ours is unique in two ways; one is that while other countries (primarily America) use a horizontally polarised signal and negative modulation of the vision signal, we are using vertical polarisation and positive modulation, and two, it is the practice abroad to employ a large number of low-power Band III transmitters so sited that each covers only a relatively small heavily populated area, here we are using very high-power transmitters each to cover large slices of the country.

THIS month sees the beginning of Commercial Television in Band III, and, in consequence, the beginning of servicing and maintenance problems for dealers and engineers who, until now, have been mainly concerned with conversion and installation. In this series of articles the author, who has carried out considerable research on Band III reception, discusses some of the complications which the dealer and servicing man are likely to encounter.

Pioneers

So far as our own particular mode of Band III transmission and reception is concerned, therefore, we might well be termed pioneers and, even though we may get an insight in aspects of receiver design from other countries, we are definitely not in a position to be 100 per cent conclusive regarding actual conditions of reception.

Nevertheless, thanks to the Belling & Lee test signals, most of us now have some idea what local reception conditions are going to be like when the I.T.A. transmitter puts out 60kW on Band III—most of us that is who happen to be in the range of the test transmitter.

At the time of writing this article there are still the best part of two months to go before the I.T.A. really gets under way, but after first considerations it would strongly appear, at the time of writing, that the I.T.A. transmitters are going to have a range somewhat in excess of what was first thought.

It was the contention that the range would be strictly visual, and that at distances from the transmitter bordering on this limit the field strength would start falling exceedingly sharply, so that Band III fringe reception would be confined to the relatively narrow zone merging the limit of the service area into the outside area where the signal would virtually be non-existent.

Outside line-of-sight

It is now well known, of course, that the field strength due to a Band I transmitter falls off more quickly outside than inside the visual range. The fall off outside this range, however, is not all that rapid, for we know that reasonable reception is occurring at distances in excess of 65 miles from a transmitter, which, in some cases (depending on the height of the receiving site), represents a range of some 30 miles outside the visual distance!

I am not going to suggest that conditions are going to be exactly the same on Band III, but I would suggest that, after equalising various factors, the deterioration of reception on Band III is not going to be much more rapid with distance outside the visual range than on Band I.

Now, after sticking my neck out just two months before the I.T.A. programmes are due to commence, I feel I had better qualify this suggestion. Let us start from the receiver itself and work back towards the signal: in the first place, the goodness of a picture a receiver is capable of providing out of the normal service area is dependent on the receiver's sensitivity and noise factor.

With a modern receiver tuned on Band I a feeder signal of something like 70μV will nearly always give a picture of fair quality. Tuned on Band III, however, a feeder signal of double this voltage, or even more, will generally be required to give a picture of equal quality and contrast.

Secondly, the signal losses on travelling from the aerial to the set increase by approximately two times on Band III as compared with Band I.

And thirdly, the quantity of signal actually induced into an aerial depends on its size. We are, of course, well

aware that a Band III aerial array is in the region of a quarter the size of an equivalent Band I array. It therefore follows that even to obtain a feeder signal of approximate equal value to that obtained on Band I—excluding feeder losses and assuming equal field strengths in the vicinity of the aerials—the electrical mass of the Band III aerial array will need to equal that of the one tuned on Band I.

Is it possible to equalise these differing factors

Still ignoring, for the time being, the question of field strength we can very roughly say that the signal pick-up property of a Band III four-six-element array is approximately equal to a two-three-element Band I array, and that a nine-element Band III array possesses a pick-up property comparable with a three-four-element array tuned on Band I.

A good quality, well matched and accurately tuned four-element, or more, Band I array might well require twelve elements on Band III in order to induce a similar signal.

From the aspect of feeder loss, if we assume an average run of, say, 50ft. of reasonable quality coaxial, this will introduce a loss of something like 1db on Band I, which will rise to 2db on Band III. This extra 1db of attenuation on Band III is not a lot to worry about really when we are considering relative losses like this; in any case, the feeder run is often less than 50ft., and in fringe areas it is always desirable to use extra low-loss cable anyway, particularly on Band III, so that it is feasible that the relative feeder loss on Band III will in practice only rise about 0.4db above the loss on Band I.

At this stage let us examine a typical fringe area example. Let us suppose that the receiving site is in the region of 50 miles from the transmitters, of average height and not unduly screened, and that a three-four-element aerial is required to obtain a reasonable fringe area picture on Band I. Therefore, according to the above reasoning we shall most certainly require, at least, a nine-element Band III aerial connected to the receiver through low-loss feeder.

Now, if we assume equal field strengths due to both transmitters, it is reasonable to suppose that the fall-off in performance on Band III (when the receiver is changed from Band I to Band III) is mainly the result of the receiver's lower sensitivity on the higher frequency Band.

Recent tests, aided by the Belling & Lee 1kW test transmission, made in the fringe area (at a distance in excess of 50 miles from the transmitter) would appear to indicate that the receiver is, indeed, a critical factor so far as Band III fringe area reception is concerned. Several receivers gave a picture, some better than others, but some receivers which were tested under these conditions failed to give even a trace of a picture.

After performing extensive sensitivity tests on various receivers and experimenting with a number of aerial systems, it was concluded that the success or otherwise of Band III fringe area reception is very much going to depend on the receiver itself. In the fringe area of Band I, for example, one is almost certain to obtain a reasonable picture on practically any " full-range " model, but on Band III it seems that the sensitivity between receivers varies considerably, possibly to an extent that may demand the careful selection of a receiver in relation to the local field strength!

Other tests

Incidentally, these fringe area Band III tests show that a signal is going to be available outside the line-of-sight distance. In this report it may be of interest to know that the receiving aerial used for these tests was only about 20ft. from the ground, and that the site is fairly screened and on river level.

Other tests were carried out at the same site in an endeavour to discover the kind of picture that will be likely when the I.T.A. transmitter commences operation on full power. A commercial receiver tuned to Channel 9 was used; the vision a.g.c. was disconnected and the video amplifier valve metered to give an indication corresponding to the Belling & Lee vision signal.

This indication was noted, and in place of the B/L signal, an approximately equally modulated signal from a Band III pattern generator was applied to the receiver aerial terminals and adjusted in strength to correspond to the indication given by the B/L signal.

Now, when the transmitted signal rises from 1 to 60kW (the proposed power for the I.T.A. transmitter), the local field strength will rise by a factor which can be approximated by the square-root of the power increase. Moreover, the field strength will also rise proportionally as the increase in aerial height (see, for example, *Problems Outside the Receiver* by Gordon J. King, *British Radio and Television*, July, 1954). As a conservative estimate, therefore, the increase in field strength from the B/L signals to the I.T.A. transmission will be something like eight times.

Accordingly, the generator input signal was increased by eight times. This produced a pattern of sufficient contrast and quality as to be quite " viewable." Measurements also revealed that the resulting input signal strength compared favourably with the signal which is received in the area on Band I Channel 1, although, again, it is interesting to observe that the district where the tests were made is essentially covered for Band I reception by Channel 4 (Sutton Coldfield), and *not* London.

On the face of it, therefore, it would appear, at present, that the London I.T.A. signal (Channel 9) might well be equal, if not better, in this district, than the signal from the B.B.C. station on Channel 1. So far no tests have been made on Band III from a transmitter operating on the site of the Midland I.T.A. station.

Again, various receivers were tried on the generator signal which had been adjusted in strength to approximate the feeder signal expected from the I.T.A. transmitter. All receivers, under this condition, gave a viewable picture, but as with the previous test, remarkable differences between their sensitivities on Band III were well in evidence. Some receivers gave quite a clean pattern, while other exhibited excessive picture " noise."

Freak reception

The possibility of freak reception in the vicinity of the test site was also examined; various Band III signal tests were, in fact, made and examined within a radius of approximately five miles round the test site.

Except in notoriously screened locations a vision signal of sorts was obtained in most cases. The picture (Belling & Lee test card) varied between very poor, where it was possible only just to lock a ghost of a picture on the screen, and fair, where the station call-sign and, in one instance, the frequency details were readable.

At one particular site, however, the picture was comparable with that obtained on Channel 1 (London) when the transmitter is on low-power.

In nearly all cases where a vision signal was obtained, the sound signal was also received, but rarely both together, it was necessary either to tune for sound or vision. This was attributed to the considerable difference between the radiated powers of the sound and vision signals; this difference is normally something like 1:4, but since the Belling & Lee station has only a 50-watt sound transmitter the ratio is 1:20. Even with this low power of sound, in some cases it was possible to read the announcements above the receiver noise.

These tests most certainly indicate that fringe area Band III reception is possible, and that the range of an I.T.A. station is going to be greater than what was at first estimated. They also show that the receiver will represent a more critical factor than hitherto on Band I so far as fringe area reception is concerned.

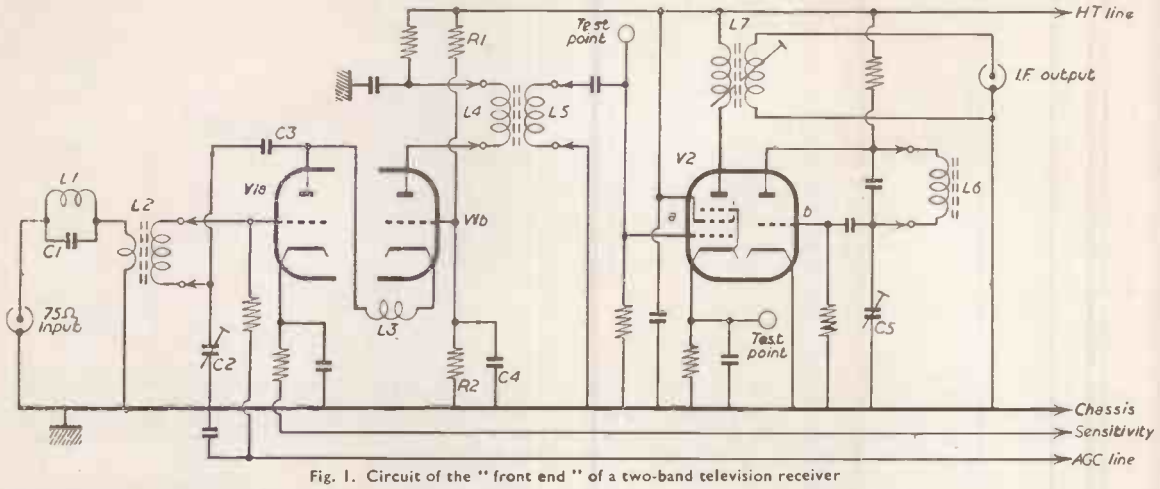


Fig. 1. Circuit of the " front end " of a two-band television receiver

This difference between the sensitivities of receivers will almost certainly be less marked on current production and future two-band sets, and it is also feasible to expect less of a reduction in overall sensitivity between the two bands on receivers of future date. It must be remembered, of course, that some manufacturers have not yet produced " full range " (in the sense as applied to Band I) receivers for Band III operation.

As in the London area, it is possible that a low-power test signal will be made available in various parts of the country before the opening of the I.T.A. stations. It is, therefore, hoped that the foregoing notes will aid dealers and their engineers, operating in future I.T.A. areas, in determining the kind of signal to be expected from the high-power station before it actually goes on the air.

Generally speaking, a picture of viewable quality should be obtained from the high-power station if it is found possible to lock the picture or test card radiated from the low-power station.

The " front end " of a two-band receiver

On older style single-band TV receivers we have become accustomed to the fairly conventional " front-end " which is used in common form in nearly all models. Essentially, of course, this comprises an r.f. pentode stage whose function is to amplify the diminutive signals arriving by the aerial, followed, on most sets, by another r.f. pentode valve operating as a self-oscillating frequency changer. Receivers of more recent years also embody facilities for easily selecting any one of the five channels occupying Band I, of which we are quite familiar.

Such " front-ends " are now out of production. Instead of the " old " r.f. pentode a double-triode valve is arranged to serve the same function more efficiently. In the frequency changer section, a triode-pentode is arranged to do the job of the hitherto self-oscillating r.f. pentode, and these two stages are now often built to form a unit which is entirely separate from the main chassis.

A circuit of one of these two-band sections is shown in Fig. 1. The double-triode r.f. section V1 is known as a " cascode " circuit, which will be dealt with in detail later on.

The question of noise

Fringe area viewers will appreciate how picture " noise "—giving rise to a picture of grainy appearance—can severely limit the maximum useable sensitivity of a TV receiver, even on Band I. For example, in screened areas of low signal strength many will have discovered the hopelessness of advancing the gain of the receiver, or adding on high-gain pre-amplifier stages, in an endeavour to obtain a noise-free picture.

All that happens is that the noise voltage which is developed in the amplifiers which are used to magnify the weak aerial signal simply outweighs the voltage of the signal itself.

Clearly, the only real solution to this problem lies in enhancing the efficiency of the aerial, so that the voltage of the aerial signal is much greater than the generated noise voltage. It should be understood that it is not possible to eliminate noise, though its effect can be reduced to negligible proportions by keeping it low in comparison with the received signal.

The generation of noise is due to various causes. Even a resistor will introduce noise owing to thermal disturbance of its electrons. The electrons which pass from the cathode to the anode and screen in a valve do not flow smoothly as would be expected, but make contact with the various electrodes in a more or less random manner.

Current measured in the anode and screen circuits doesn't indicate this non-continuance electron flow, because the meter reads an average value of current and doesn't respond to random positive and negative fluctuations.

Noise which is contributed by random electron flow has no definite frequency and, therefore, extends over all frequencies. In high-gain a.f. amplifiers and in sound receivers it is characterised by the familiar background " hiss." Owing to the relatively wide-band of a television receiver it is inherently more noisy in this respect than, for example, a narrow channel broadcast receiver.

This kind of noise, by the way, is often referred to as " shot effect," and is always present in varying degrees after other sources of noise have been eliminated.

Another important noise source is that resulting in pentode valves due to " partition effect," that is, the random division of the electron flow from the cathode between the screen grid and the anode. At Band III frequencies this noise can represent a large portion of the total noise produced, so it is here that we gain by using a triode, in which this noise obviously does not exist, in place of an r.f. pentode.

Also, at Band III frequencies the random signals received from unknown sources in space are stronger that at Band I frequencies. It is essential, therefore, that the total noise generated in the set itself is kept to an absolute minimum if satisfactory reception towards the edge of the service area of the transmitter is to be achieved.

It is clear to see that provided the gain of the r.f. amplifier stage is adequate the additional noise contributed by succeeding valves and their associated circuits is negligible. It is most import-

ant, then, to maintain high gain but low noise in the first stage.

The cascode circuit

In the present stage of development the cascode circuit provides these desirable features, and it is used in almost all current two-band receivers. As may be seen from V1 circuit section of Fig. 1 the two triode sections are connected in series across the h.t. supply.

The signal is applied to the grid of section (a) and this valve works in the grounded cathode mode. Triode (b) is arranged as a grounded-grid stage, the grid being earthed from the r.f. point of view by C4. It will also be seen that triode (b) has its d.c. grid voltage fixed by means of the potential-divider comprising R1 and R2.

Now, since the cathode input impedance of section (b) forms the anode load of section (a), the anode voltage is held essentially constant, and the behaviour of both sections is like that of a pentode valve having no screen current and thus no partition effect.

Individually, section (a) produces little gain owing to the relatively heavy damping (loading) of the following cathode circuit, but as the result of its high input impedance it does permit the use of an efficient coupling between the aerial and the grid, and in this respect alone assists in reducing noise.

Section (b), on the other hand, produces quite a degree of gain also coupled with low noise. Moreover, as the grid is earthed a screen is virtually formed between the cathode and anode providing extremely stable operation. Also, since the anode voltage is in phase with the cathode voltage, a tendency exists for the input capacitance to reduce.

It is this factor, coupled with the possibility of reducing electron transit time effects in a triode more easily than in a pentode, which makes the grounded grid triode extremely useful at Band III frequencies.

Although, essentially, triode (a) does not require neutralisation, this function is generally performed by most designers by incorporating two small capacitors in the anode and grid circuits (C2 and C3 Fig. 1). By careful choice of their values it is possible to realise optimum gain and noise performance.

Sometimes C2 is variable, in which case one should never be tempted to alter its setting, for it is critically adjusted during final alignment of the unit, and its misadjustment might well lead to inferior results on all channels.

The small inductor L3—generally in the form of several turns of wire made in a self-supporting coil—is also critically proportioned to resonate in the region of 230 Mc/s. Its purpose is to improve overall gain by tuning out the output capacitance of triode (a) and the input capacitance of triode (b). Care should be taken not to alter its form when it is necessary to make internal adjustments to the unit.

The tuned circuit L1 C1 in the aerial input lead is a rejector and is tuned to the receiver's intermediate frequency.

The amplified r.f. signal appears across coil L4 in the anode circuit of triode (b). This coil, the grid and aerial coupling coil L2, and the oscillator coils L5 and L6 may represent biscuit coils located around a drum of a turret tuner, and individually selected for a desired channel, while, equally, they may represent switched coils, or coils which are tuned over the band by means of iron-dust or brass cores, depending on the mode of channel selection employed. This, as is known, differs considerably from receiver to receiver.

Irrespective of the channel selection arrangements, however, the unit's circuitry is generally based on that shown in Fig. 1. One or two differences may be noticed as, for instance, the method of oscillator voltage injection from the triode oscillator to the pentode mixer. In Fig. 1 inductive coupling is used between coils L5 and L6, while Fig. 2 shows how a small capacitor C3 may be used instead.

Inductive coupling between the cascode stage and the frequency changer occurs by the proximity of coils L4 and L5 in Fig. 1, but this is sometimes modified to capacitive coupling as also shown in Fig. 2 by C1. An additional capacitor C2 is sometimes switched into circuit on change-over from Band III to Band I.

Fig. 3 shows how biasing for triode (b) of the cascode circuit may be altered. Here it will be seen that a conventional cathode bias circuit R1 C2 is used, and that the grid is returned through R2 to the "cold" end of this combination.

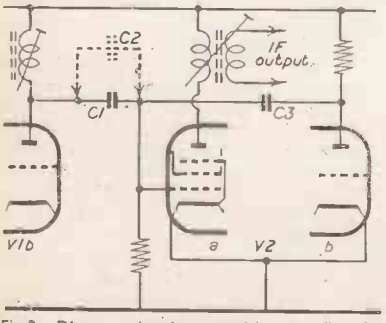


Fig.2. Diagram showing capacitive coupling for signal and oscillator voltages.

The frequency changer

Nearly all front-end units make use of one of the new type triode-pentode valves which have recently been developed and improved for efficient frequency changing on Band III. As will be seen from Fig. 1, the triode section of this valve V2 is employed as the local oscillator working in a Colpitts circuit, and the pentode as a conventional additive grid mixer.

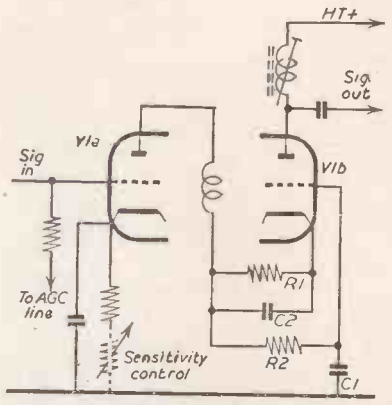


Fig. 3. A modified method of biasing triode (b): it will be noticed that a capacitor C1 is still used to ground the grid to r.f. voltages.

In order to realise optimum conversion gain and minimum noise from an arrangement of this kind, at Band III frequencies particularly, it is most important that the heterodyne voltage injected to the signal grid of the pentode from the oscillator be of a critical value—determined by test and laboratory experiments during manufacture.

To this aim inductive coupling is often preferred, as it is then possible to arrange for optimum drive conditions on all channels simply by means of adjustment to each coupling coil so that the best value of mixer drive is achieved on each channel. This method is adopted on practically all turret-type units, on which, of course, these critical adjustments are performed during the final alignment process at the factory.

With capacitive coupling the danger of over-drive occurring on the lower frequency channels is avoided in most cases by the use of a capacitor whose value is carefully pre-selected to provide optimum gain towards the higher frequency channels, and thus comprising over the entire band, or over the channels to which the receiver is pre-tuned.

To aid in adjusting the frequency changer for optimum performance, two test points connected with the mixer section are generally available on top of the chassis unit. One point is connected to the control grid of the mixer pentode, and the other to the cathode of the same valve section. The heterodyne voltage on the grid can thus be measured on a suitable meter, and generally ranges between 3 and 4 volts a.c., while the cathode current in typically in the region of 6 mA.

(continued opposite)

George R. Wilding discusses

Short Cuts in Television Servicing

ONE of the commonest faults to develop in the modern transformerless television receiver is undoubtedly a valve with an open circuit heater, but as the average receiver employs fourteen or more valves it means that, unless the service engineer is particularly lucky, every valve must be individually tested until the faulty one is found.

Unfortunately, while even this is a tedious time-consuming operation the real snags only become apparent in practice when the line output pentode and the reclaim rectifier have to be removed and replaced in an all enveloping metal can and where it is impossible to see how the valveholder is positioned.

Then there are often valves of the triode-pentode variety mounted well to the front of the cabinet, easily removable but almost impossible to replace without removing the chassis from the cabinet. And most engineers knew only too well how easy it is to bend the pins of a miniature valve in a " blind " spot!

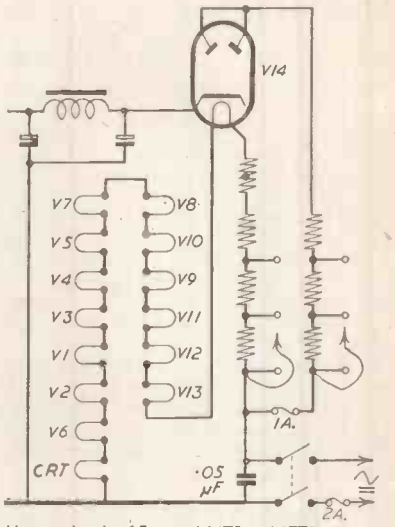
In the course of a week's servicing work many hours can be taken up in removing, testing and replacing valves—especially replacing.

Any system therefore which helps to reduce the number of valve removals when checking a receiver for an open-circuit heater can be of real help.

HALVING THE CHAIN

A useful system is first to locate any valve situated about midway in the heater chain, *e.g.*, the video amplifier or sync separator, then check each half of the now broken valve supply circuit. In this way one immediately halves the number of suspect valves since one section or the other must be open circuit.

Naturally one section of the broken heater chain will lead to chassis while the other section will lead to the pole of the mains input that is not connected to chassis.



Heater circuit of Ferranti 14T3 and 17T3 receivers To speed location of o/c valve heater, split the number of " possibles " by checking each way from V7 or V8

The next step, if the Service Sheet indicates that an awkwardly situated valve may be at fault, is to make another midway check in the section at fault and thus eliminate or confirm it. In this manner an o/c heater valve can be located with the minimum of individual valve tests. At first the service sheet will be a necessity, but as one becomes familiar with the heater circuit layout, its use will become increasingly unnecessary.

H-K SHORT

Another very common fault in the a.c.–d.c. type of receiver is a valve with an internal heater-cathode short circuit which causes all or part of the heater current to pass through its cathode lead to chassis instead of continuing through the rest of the valves that are connected between itself and chassis.

By far the quickest and most certain method of checking whether this is occurring is to simply remove the valveholder base from the cathode-ray tube and test across the mains input with an ohm-meter.

Any reading naturally indicates that the heater chain is being partly by-passed, as of course the c.r.t. is invariably the last valve in the heater circuit, so that if a short-circuit exists anywhere disconnecting the c.r.t. from the circuit will no longer render the heater circuit open.

The service engineer might be tempted to dispense with the continuity test, and simply remove the c.r.t. valveholder base, plug the set in and switch on.

If the valves light up, obviously one of them has a heater-cathode short-

Let's get started on Band III — continued

As a means of combating oscillator drift careful use is made of negative temperature coefficient capacitors in the oscillator section, so that as the temperature of the unit rises the value of the *total* tuning capacitance remains substantially constant, even though individual elements may increase and reduce in value.

It is essential, therefore, that should these capacitors require replacement during servicing they must be replaced with exact types.

Essentially, the same applies to nearly all the components in the unit, for now we should have a good idea how very easily the stability and efficiency of a two-band front-end may be severely disturbed through rough handling and careless servicing.

A " fine " oscillator tuning control is fitted on all units (capacitor C5 Fig. 1). In most cases its value is altered by varying the dielectric constant between two fixed plates, as opposed to the normal method of altering one set of plates with respect to a fixed set. The oscillator tuning slug associated with the coil in circuit is available for adjustment either through a hole beneath the channel selector knob, or from the top or bottom of the unit.

They really represent the only adjustment that should be attempted on the unit, and it should be made for maximum sound consistent with minimum sound interference on vision, when the " fine " tuning control is set to the centre of its range.

Finally, it must be stressed that the spacing between the turns on the coils must not be altered, for by this means they are accurately aligned during initial adjustment.

The coils on some units, mainly the turret-type, are also tuned by very small variable capacitors, and it is also undesirable to alter these adjustments in an attempt to obtain improved performance—one can rest assured that improvement is very rarely possible.

(to be continued)

Short Cuts—

continued

circuit, as, of course, the receivers heater circuit decoupling condensers seldom break down. This system of testing has the disadvantage, however, that if no short-circuit exists the heaters of all the valves in the receiver will be at full mains voltage to chassis, a condition that rather encourages cathode insulation breakdowns.

While on the subject of valve breakdowns it usually pays, of course, to concentrate on the reclaim rectifier first and then those valves at the high potential end of the heater circuit. These are usually the sound valves, noise suppressors and the line and frame generator and output valves.

SWITCH TROUBLE

A not infrequent source of trouble in both radio and television a.c.–d.c. receivers is the double-pole mains on–off switch ganged with the sound or contrast control, and it can be extremely helpful in cases of "no results" to check that the switch contacts are in fact contacting, without having to remove the chassis to do so.

A study of circuit diagrams will indicate that some designers place the switch after the heater chain fuse while others place it before the fuse, but in either case one pole of the switch must of course be connected directly to chassis.

The other side of the mains is then connected to the anode of the mains rectifier and the live end of the heater chain via the voltage adjusting mains dropper.

In most cases therefore the operation of both poles of the on-off switch can be checked by connecting an ohmmeter across these points. If neither side of the mains input connects to chassis and the mains lead itself has been eliminated (ruling out unsoldered joints), the switch must be defective.

On the other hand once the "chassis" has been verified, no continuity between the other pole of the switch and the anode of the rectifier does not positively indicate an o/c switch, as the surge limiting or voltage regulating resistors may be o/c, but continuity *does* prove the switch to be o.k.

"No continuity" between the live side of the mains and the rectifier anode means that the chassis or inspection panel must be removed to effect repair, so that no time is wasted.

H.T. SHORTS

Quite often h.t. short-circuits develop in a television set, and if the faulty component is not fed by a resistor giving symptoms of overheating, it can prove quite a time-consuming job tracking it down.

If the value of the short-circuit is, for example, 1 kilohm, it makes fault location so much easier as in all probability that figure will be the value of the component feeding the actual short-circuit.

But if the reading is very low in value it can be caused by the smoothing condensers, h.t. rail r.f. decouplers, line or frame scanning coils, internal short-circuit in a valve (probably screen or anode to control grid or cathode) or the line, frame or sound output transformer winding shorting to the core.

In such a case it is only good luck if the service engineer finds that on checking his first suspect that he has located the source of the trouble.

The best policy is, undoubtedly, to check the easiest first, so that if the screen or anode of any valve is connected by a low resistance path to the h.t. rail it will be worthwhile to pull out each valve in turn while an ohmmeter is connected across the h.t. supply circuit.

From a study of records it would seem that the line output pentodes and the r.f. pentodes are the most likely types of valve to develop this fault.

FAMILIARITY COUNTS

An important factor in rapid servicing is familiarity with and experience of the particular receiver being dealt with. For instance, in one popular series of Marconiphone and H.M.V. television receivers when investigating an o/c heater chain we invariably first check the B36 duo-triode as we find that this particular valve breaks down much more frequently than any other in the receiver.

Again, lack of brilliance in many Baird receivers is nearly always due to the U25 e.h.t. rectifier having lost its emission, while a ragged left-hand edge to the raster of many Ekco models can almost certainly be pinned down to an SP61 video amplifier or sync separator.

Every receiver has its stock faults some of which can be difficult to trace, and some easy, but knowing them in advance is half the battle and to this end "*Technical Gen for Servicing Men*" is published, but we feel sure that there must be many servicing short-cuts and "dodges" practised by service engineers which would be of help to us all. *So why not tell us all about them*?

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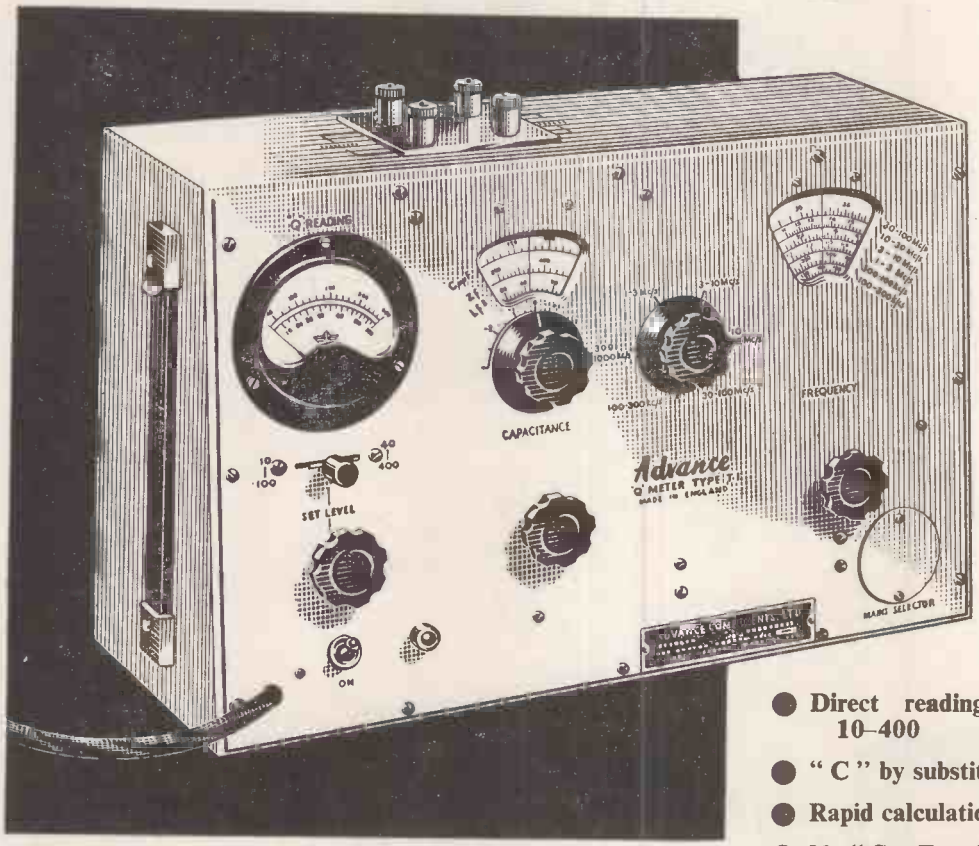

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TECHNICAL GEN for SERVICING MEN

Edited by James Huxley

HELP YOURSELF

to all the technical gen in this feature, which is your feature, presenting details of faults encountered by engineers in current radio and television sets, and explaining how those faults were diagnosed and overcome. The aim of this feature is to guide

AND HELP

all in the radio and TV trade. If you have come across any unusual fault in a set recently, write and tell James Huxley, "British Radio and Television," 46 Chancery Lane, London, W.C.2. All published contributions are paid for, and your contribution may help

OTHER ENGINEERS

Philips 1238U

Series Network Fault On checking the receiver at the customer's house, it was noticed that when the frame oscillator was adjusted to an unsynchronised condition, the picture was excellent. But when the frame was locked, the picture took on a washed out appearance such as might be experienced if the interference limiter clipping level was set below peak white.

Reference to the service manual showed that the frame-hold and interference limiter controls (R65 and R41) formed a series network from the h.t. line through R42 (5.6MΩ) and R79 (2.2MΩ) down to the frame-hold. On checking this circuit R42 was found to have risen in value to over 10MΩ. Replacement of this component cleared the trouble.—J.R.P., Scarborough.

Pye VT4

Poor Line Sync The symptoms were extremely unreliable line sync, which would fail on sudden changes of picture content or if the channel switch was operated. The fault was at its most severe immediately after switching on and would then clear slightly during running. After a good deal of checking, the faulty component was eventually found to be C100.

The capacitor was not s/c or o/c in the normal sense but there was a h.r. leak from C79, which with C100 forms two sections of a three-section 12μF unit in one can. C100 decouples the h.t. supply to the line oscillator valve. The fault was cleared up by disconnecting the C100 12μF section and fitting a separate replacement.—W.S., Warminster.

Marconiphone VC59DA, etc.

Scan Coil Hint In this and similar sets, the scanning coils are often stuck to the glass neck of the tube and present great difficulty when it is necessary to remove them. To facilitate the job, all that is necessary is an ordinary bell transformer—9 volts output has been used with great success. The connections to the coils are unsoldered and the coils connected in parallel across 9 volts a.c., then left for 10 or 15 minutes. The heat generated by the a.c. flowing through the coils will be sufficient to make them easy to remove, without deforming the coils or damaging the insulation.

After removing the coils the neck of the c.r.t. should be cleaned with switch cleaner and a layer of waxed paper inserted between the coils and the neck of the tube.—A.M., Edinburgh.

Bush TV24

Decoupling Trouble The faults on this receiver were—picture hum on sound and a very poor line lock at the top half of the picture. The first test was to vary the oscillator tuning, but this produced no encouraging signs. It was then realised that the two faults might, in some way, be inter-connected and so the circuit diagram was studied with this in mind. It was seen that a 16μF electrolytic capacitor decoupled the h.t. feed to the receiver. When a new component was shunted across the original, the hum disappeared and the whole picture locked horizontally over nearly the entire control track as is usual with these models.—K.M., Leeds, 9.

Ferguson 103T

Lines Across Screeen The customer complained of "lines on the screen" and when the set was brought into the workshop it produced good sound and vision except for occasional black lines across the picture. An oscilloscope check showed that the disturbance was coming from somewhere in the video i.f. stages and the fault was then localised to a

(Continued on page 421)

Write to James Huxley

on Service Department matters, and pass on all the hints and tips and dodges that you have found useful in dealing with day-to-day service problems. Articles on all subjects of technical service interest are welcomed. All published contributions are paid for.

The Editor does not necessarily endorse the views expressed by contributors to this feature

"noisy" screen feed resistor (1kΩ) to the first vision i.f. amplifier. On removing the faulty component it was found to fluctuate from approximately 900Ω to 1,250Ω on the testmeter.—G.H., Newcastle.

Cossor 916 Series

Audio Distortion Complaint was distortion appearing after about an hour's running. The audio distortion experienced pointed to a fault in the mains energised speaker and after removing it, it was found to be off centre. The set was rigged up temporarily and the original speaker removed to the shop—where it was found to be perfectly centred!

Being a spot welded framework, the cone was torn out and the speaker checked. The pole piece was found to be loose but only when a fair force was used on it, so apparently the heat loosened it after the field coil had been in operation for some time.—K.M., Leeds, 9.

Ferranti 14T4

Bent Tag Strip Two cases of the following trouble have been encountered, and the intermittent nature of the fault can cause considerable waste of time. Symptoms are that the sound, vision and raster all disappear, though the line whistle can still be heard. Any slight bump on the chassis or cabinet usually restores normal operation.

On top of the chassis, behind V3, is a four-way tag strip. If it is bent forward a little, the tag carrying the junction of the V1 and V4 heaters touches the adjacent earthed pillar, thus removing heater voltage from the first few valves and the c.r.t. Straightening the strip is the work of a moment.—P.B., Bradford.

Philips 385U Series

Distorted Raster Shape A common fault with this type of receiver shows itself as a picture decreased in size, compressed at the centre to form an "hourglass" outline, and accompanied with frame slip. The trouble is due to R7 (1.5kΩ) in the bias chain becoming open-circuit. The reason is that at some time C1 became open-circuit, altering the reactance of S1 and C4a and causing excessive current to flow through R7. Sometimes C1 is open-circuit when brought in for service giving with other symptoms a 50 c/s hum.—W.P., Stevenage.

Ever Ready Model K

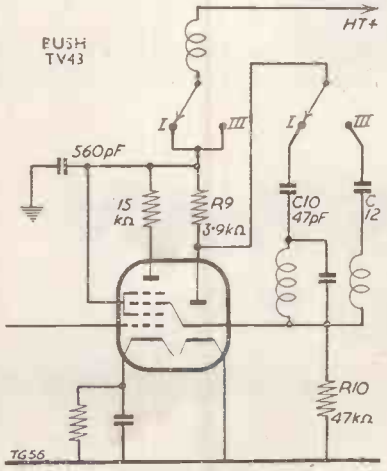
Common Feed Trouble This all-dry battery job came in with the complaint that batteries were short-lived, the set faded and also that it had stopped completely that morning. Upon switching on the set worked but after a time—on full volume—bad distortion was evident. The receiver subsequently cut out completely.

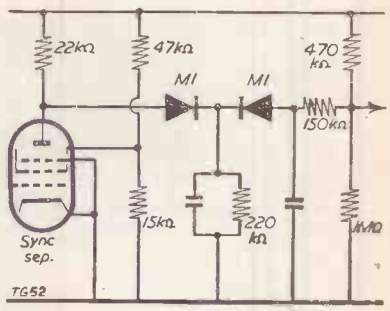
The frequency changer was suspected and in the circuit diagram the oscillator was seen to be fed via the screen of the i.f. amplifier V2. Separate feed was installed via a 47kΩ resistor to the h.t. line, decoupled by a separate 0.1μF capacitor. The fault was cleared and has not returned. A similar modification has been made by the manufacturers in later models. — F.W.A., London.

Bush TV43

Oscillator Fault The symptoms were no sound or picture. A quick check revealed that the 750mA h.t. line fuse had blown and this was replaced after ascertaining that there was no h.t. line short circuit. This resulted in the appearance of a raster but vision and sound were absent. It was then noticed that the oscillator section of the PCF80 was not working but a new valve did not cure the trouble.

On examining the receiver unit, it was found that R9 (3.9kΩ) was charred and was in fact open-circuit due to C10 (47pF ceramic) which had developed a leak of some 17kΩ thus placing a positive voltage on the triode grid of the PCF80, resulting in the valve drawing excessive current through R9 and blowing the h.t. fuse. Replacements of the two components (plus the PCF80, of course) effected a cure.—J.J.W., Long Eaton.





Pye FVI interlace filter

Pye FVI

Erratic Frame Hold One of these models exhibited very erratic frame lock and during most evenings the frame-hold control had to be adjusted three or four times. On test it was found that the line-hold was quite normal, but a new EF80 sync separator was tried just in case. This failed to cure the trouble as did a replacement ECL80 frame oscillator-output valve.

It was ultimately found that one of the M1 rectifiers in the interlace filter had a very high forward resistance and replacement cleared the fault. In connection with this model, however, loss of picture height is nearly always due to loss of capacitance in the 50μF capacitor paralleled across the cathode bias resistor of the frame ECL80.—G.R.W., Liverpool.

Vidor CN4225, 4217, 4218

Varite Breakdown Complaint was that the frame linearity setting was lost after some hours running. First suspect was the Varite temperature compensating resistor and its associated capacitor mounted on the scanning coil yoke. These appeared to be satisfactory, however, so the frame time-base components were checked but were also found in order.

Attention was redirected to the Varite, and closer inspection showed that its wire ends were just breaking through its insulating sleeve at one point where it was clamped to the yoke. It was no bigger than a pin prick. A stronger, but not thicker, sleeve provided a remedy.—T.W.R., Treherbert, Glam.

McMichael TM54

Leak In Metrosil Brilliance and focus were poor, but horizontal and vertical scan was apparently normal. The e.h.t. measured 6kV at the tube and 8kV at the flyback. The usual components and valves were tested and found in order

(Continued on page 423)

but as the symptoms suggested a heavy load on the rectified side of the flyback the leads round the metrosil voltage regulator were investigated.

The metrosil is anchored to a metal bracket between the horizontal output and the recovery diode. On releasing it, the picture brightness returned to normal. It was then obvious that there was a leakage on the insulation surrounding the metrosil but there was no visible arcing or signs of a burn. This condition had occurred several times recently.—R.C., Derby.

Philips 1726UF

Noisy I.F. Stage The symptoms were considerable rushing noises on sound accompanied by a display on the screen similar to very severe car ignition interference. The fault only existed for very short periods, usually after the initial switch-on. Various decoupling capacitors were replaced (such as C17, C18 and C20) and valves in the suspected stages substituted. Then, on removing the chassis for a more detailed inspection, R44 (1kΩ) screen and anode feed to the 2nd vision i.f. amplifier was found to be badly charred on its upper side. This could not be seen until various components had been probed away.

The value had dropped to 500Ω. Although no leak could be detected the decoupling capacitor C38 was replaced together with the new resistor of increased wattage. A point worth remembering about this fault is that despite the alarming effect it had on the side of the receiver, it was actually located in the video section.—J.K.G., Exeter.

English Electric 1650

Hum. On Frame On test the picture appeared to be up to standard except that the frame displayed characteristic flyback lines when locked. The line hold was satisfactory and so the sync separator stage came under suspicion. But after changing the valve and measuring voltages (which were found to be correct) and afterwards checking the smoothing capacitors, the cause of the trouble could not be found.

It was eventually traced to C38b (16μF electrolytic) in the screen circuit of the video amplifier—it had become open-circuit. With the screen decoupler o/c the gain of the video had decreased (and the sync pulses with it) and also introduced a degree of hum which accounted for the false frame lock. The fault did not appear to affect either the picture or the line-hold.—J.N.H., Paisley.

Bush TU32

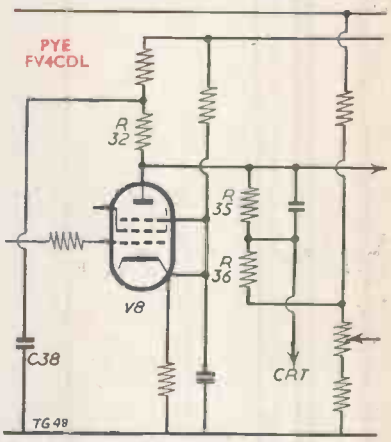
Raster Distorted Thanks to T.F.M., Glasgow (February issue) we were able to cut short a repair on a TU32 which had the same fault as the TUG26 described. The bottom corners of the picture were curling as though through misalignment of the ion-trap with a bright zig-zag then vertical flyback. A difference in this case was that changing C21 (8μF) did the trick—the reverse way up—but we were unable to fault the condenser. This, incidentally, is the first time I have read a fault before experiencing it in this case by three hours.—D.G.W., Farnborough.

Regentone 14 and 17in. TV

Installation Hint Prevention is always better than cure and it is worthwhile mentioning that in connection with the latest versions of these models it is advisable before installing them in the cutomer's home to check that the lead to the anode of the EY51 is positioned well away from the top circular plate in the e.h.t. transformer. Unless this is done it is possible for an arc-over to occur with consequent burning of the plastic sleeving and insulating rings. We have had arc-overs on two of these models due to this cause but if the lead in question is positioned as far as possible away from this ring there will be no possibility of this arising.—G.R.W., Liverpool.

Pye FV4CDL/FV4C

Video Load Fault The complaint was a negative picture, the contrast control having very little effect. The brightness control likewise had a limited effect. On making the usual tests it was found that the cathode voltage on the c.r.t. was rather low and eventually the fault was traced to the video load resistor R32 (6kΩ 4 watt) being open-circuit.



This was checked by substitution on top of the chassis where C38, R35 and R36 are together, temporarily placing a 6kΩ resistor between the hot end of C38 and R35. To replace R32 means removing the chassis as it is mounted below deck.—A.A., Leeds, 13.

Cossor 918

Distorted Sound The complaint here was distorted television sound, although the radio sound was satisfactory. Investigation of the TV sound channel revealed a positive voltage on the grid of the first sound i.f. amplifier. Circuit tracing then showed that the metal rectifier (which holds the a.g.c. line at chassis potential until a strong enough signal voltage is developed) had a disconnected lead. Re-making the open circuit cured the trouble. At first the limiter circuit was suspected but was

(Continued on page 425)

found o.k.; the 20 per cent tolerance margins may mislead some engineers into suspecting this circuit.—K.M., Leeds.

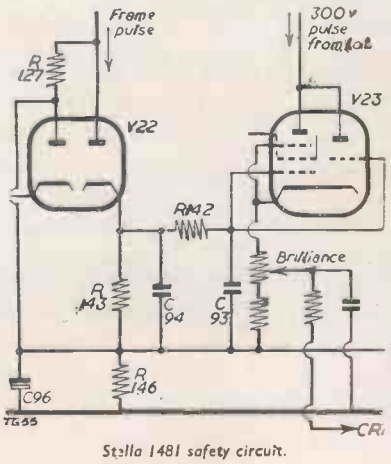
Pye FVI

Lack Of E.H.T. The complaint was no picture and since no e.h.t. existed the line scan transformer was checked and a section found open-circuit. After replacement, however, there was still no e.h.t. The EF80 line oscillator valve was oscillating but the whistle was louder and at a different frequency than usual. On checking the oscillator stage it was discovered that by freeing one end of C32A (100pF), the sync feed to the line time-base, e.h.t. became available. Although the capacitor measured correctly and apparently did not leak, a replacement component cleared the trouble.—J.K.G., Exeter.

Stella 1481 Projection

Safety Circuit Fault The receiver was brought into the workshop with "no picture." The line time-base and e.h.t. oscillator could be heard working but no raster could be obtained. A check of the tube voltages showed that, according to the makers' figures, the frame time-base was inoperative. The oscilloscope, however, traced the correct waveforms right up to the anode of the safety diode V22. One section of this diode developes a negative potential of—16 volts and the safety pentode V23 "stands" on this.

In the event of failure of a time-base V23 is non-conducting and the negative potential on its cathode is tapped via the brilliance control for the c.r.t. grid. When the safety pentode conducts, the negative potential is cancelled out and brilliance is obtained.



Stella 1481 safety circuit.

One anode of V22 receives a large frame pulse and a positive voltage is built up on C94 to the extent of 300 volts. In this case no positive voltage could be obtained on the cathode of V22 although the valve itself was good. Components were checked and C94 was found to be s/c and R143 was o/c. Replacements restored voltages and waveforms to normal and a raster was obtained.—R.E.J., Llanrwyst.

G.E.C. BT5145

Flashes On Screen When the brightness control was increased, the raster came up faintly, and if the control was increased further the raster started flashing brightly as though the brightness control had a high spot on the track. A new temporary control was tried but the fault persisted. Eventually the trouble was found to be the 100kΩ resistor in the e.h.t. lead which was breaking down when the tube began to pass normal current.—R.C., Darwen, Lancs.

Bush TV22

No Line Drive The complaint was no vision (sound was normal). There was no e.h.t. on the tube or characteristic whistle from the line oscillator. All voltage readings were normal except on the line oscillator anode which showed only 1.5 volts instead of the normal 15-20 volts. As the ECL80 proved to be in order, a search was made for leaky capacitors, the only likely ones being the 0.1μF coupling to the output stage and the 800pF horizontal drive trimmer. This trimmer has metal plates spaced by mica sheets, adjustment being by means of a metal screw. On test, a reading of 3kΩ was obtained between plates and this could be increased to about 20MΩ by pressing the end plate tags.

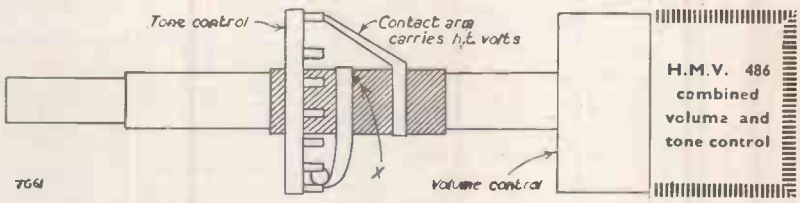
With the receiver operating, the line oscillator functioned normally when pressure was applied to the tags, but ceased when pressure was removed. It was decided to dismantle the trimmer to clear the partial short-circuit.

This type of trimmer is the same as used on some radio chassis for padding or trimming and the fault is caused either by metal dust in the assembly or by displacement of the plates. With care the plates can be separated after removing the adjusting screw and its flat insulating washer without removing the component from the chassis. Cleaning out, reassembly and alignment of the plates and mica results in a permanent cure providing the mica sheets are not punctured.—F.M.J., York.

H.M.V. 486

Switch Cleaner Trouble On two occasions the following fault had been found on the above receiver type. The complaint was that the set was working but there was "a roughness in the volume control that I tried to cure by applying some switch cleaner—and the set has not played since."

I have managed to track down the exact nature of the fault but engineers should always look for two things in such cases—(1) the customer who admits that he has "cleaned" the volume control; and (2) practically no voltage on the V4 anode. If these two items are associated on the same chassis it will be found that there is almost a complete short-circuit to earth through the tone control (see diagram).



A small hole, marked "X," in the insulation was where the customer's cleaning fluid had penetrated on its way to the volume control, hence the lack of h.t. on the V4 anode.—A.A., Bo'ness.

Invicta 31

Poor R.F. Contact This four-band radio was satisfactory on short waves and on the trawler band but it would only pick up the Home Service on medium wave and Light Programme on long wave, although occasionally reception would be normal on all wavebands. The pick-up circuit was normal at all times.

The r.f. and i.f. stages were checked and found in order, as were the coils on an ohmmetre test. The aerial coils were then disconnected and a medium wave aerial coil substituted; performance was then satisfactory but further tests on the original coil and the frame aerial showed them to be in order.

(continued on page 431)

NOTE THAT the following list of Test Reports is correct at the time of going to press, but certain issues may soon be out of print. When ordering, therefore, please state alternatives to be sent in the event of any particular Test Report being no longer available at the time when the order is received. To facilitate checking and to ensure accuracy, please quote R or TV serial number of each Test Report in your order.

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Argosy Model T2 Television Receiver (TV53, June, 54).
Baird Television Receivers, Models P/T 167 (TV35, Dec., 52).
Baird Television Models P1812/14/15 and C1815 (TV39, Apr., 53).
Bush BE15 Battery Radio (R51, Mar., 54).
Bush RC94 AC Radiogram (R34, Nov., 52).
Bush TV22 series television receivers (TV67, Jun. 55).
Cossor 522/523 a.m.-f.m. radio receiver (R72, May, 1955).
Cossor TV Models 919 and 920 5-Channel (TV30, Aug., 52).
Cossor Table TV, Model 926 (TV37, Feb., 53).
Cossor Television Receiver Model 927 (TV42, July, 53).
Cossor 930 series TV receivers, (TV62, Feb. 55).
Decca *Double Decca* Model 51 mains-battery portable (R65, Dec., 54).
Decca Large Screen Projection TV Receivers (TV40, May, 53).
Deccalian Radiograms, Models 91 and 92 (R23, Dec., 51).
Deccalian Model 90, Radiogram, with notes on the Deccalian Table Radiogram (R21, Nov., 51).
Ekco TS105 and TRC124 Television Receivers (TV49, Feb., 54).
Etronic ECS2231 Projection TV (TV46, Dec., 53).
Etronic ECV1523/7 Console TV Receivers (TV27 June, 51).
Etronic ETA632 Radio Receiver (R43, Aug., 53).
Ferranti Radio Receiver Models 005 and 105; Radiogram Model 405 (R36, Jan., 53).
Ferranti Television Models T1205, T1405, T1505 (TV18, Aug., 51).
Ferranti 14T2 and 1225 Television Receivers (TV45, Nov., 53).
Ferranti 20T4D projection TV (TV69, July 55).
Ferguson 103T television series (TV68, July 55).
Ferguson 341BU mains-battery portable radio (R67, Jan., 55).
Ferguson 968T series television receivers (TV60, Dec., 54).
G.E.C. BT5147 TV Receiver (TV51, Apr., 54).
G.E.C. BT7092 and BT7094 TV Receivers (TV44 Oct., 53).
Griffin PA1 projection TV (TV31, Aug., 52).
Grundig 500L & 700L/C *Reporter* Tape Recorder (S3, Dec., 53).
H.M.V. 1807a TV receiver (TV63, Mar., 55).
Kolster-Brandes K.B. FV30, FV40, and FV50 (TV23, Feb., 52).
Kolster-Brandes HG30 Radiogram (R53, Apr., 54).
Marconiphone T/C10A Radio Receiver (R41, June, 53).
Marconiphone VC60DA console TV (TV61, Jan., 55).
Masteradio T851 and T852 television models (TV26, May, 1952).
Masteradio TV and Radio Console Model T853 (TV36, Jan., 53).
Masteradio TD4T and TD7T/C TV Receivers (TV58, Nov., 54).
McMichael *Clubman* model 535 table radiogram, (R62, October, 1954).
Murphy A146CM baffle radio (R75, Jun. 55).
Peto Scott TV1441 series (TV65, Apr., 55)
Peto Scott 1412 and 1712 TV receivers (TV54, July, 54).
Philco Model A.547B Table Radio and Radiogram. A.549A R.G. (R24, Dec., 51).
Philips 141U Portable Radio (R56, June, 54).
Philips 383A television receiver (TV20, Oct. 51).
Philips 1115U TV Receiver (TV50, Mar. 54).
Pilot TM/CM54 Television Receiver (TV41, June, 53).
Pilot TV84/87 Television Series (TV59, Nov., 54.)
Pilot VS9 Console TV Receiver (TV34, Nov., 52).
Pye Car Radio Models P23CR and P24CR (R48, Jan., 54).
Pye Model FV4C and FV4CDL (Television Receivers (TV43, Sept., 53).
Pye Mains-Battery Portable Receiver Mode P29UBQ (R37, Feb., 53).
Pye V4 and V7 television receivers (TV64, Mar., 55).
Raymond F46 radio receiver (R69, Feb., 55).
Regentone "Big 15/5." T & C Television Receivers (TV48, Feb., 54).
Sobell 516AC/U Radio (R57, July, 54).
Stella ST151A radio (R66, Jan,, 55).
Stella Television Receiver Type ST1480U (TV25, Apr., 52).
Stella ST8314U Television Receiver (TV55, Aug., 54).
Strad Model 510 Table Receiver (R35, Dec., 52).
Taylor Electronic Testmeter Type 171A (TI6 Aug., 54).
Ultra Television Models VA72, YA72/73 Series (TV38, Mar., 53).
Ultra "Troubadour" U696 Radio Receiver (R44, Aug., 53).
Ultra "Twin" Portable Radio (R55 June, 54).
Ultra V84 and Y84 Television Receivers (TV47 Jan., 54).

Vidor CN4213 (Console) and CN4215 (Table Model), 5-Channel AC/DC (TV28, June, 52).
Vidor CN4217/8 TV Receivers (TV57, Oct., 54).

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Baird Baffle Radio Receiver (R61, Oct., 54).
Cossor Model 466 car radio (R71, Apr., 55).
Cossor Radio Receiver Model 494U (R38 Mar., 53).
Deccalian Model 81 Dual-Speed. Portable Record Reproducer (R29, Apr.).
Defiant MSH953 AC Radio Receiver (R40, May, 53).
Defiant RSGH89AC radio (R70, Mar., 55).
Etronic EPZ4213 Portable Radio (R52, Mar., 54).
Etronic Radio Receiver Model ETU5329 (R39 Apr., 53).
Ever Ready Model "C" Portable Radio (R50, Feb., 54).
Ferranti 505 a.c.-d.c. mains radio (R33, Oct., 52).
Ferranti 525 radio Receiver (R58, Aug., 54).
Ferranti Model 546 AC/DC Radio Receiver (R45, Sept., 53).
H.M.V. Radio Receiver, Model 1122 (R54, May, 54).
H.M.V. Radio Receiver, Model 1356 (R42, July, 53).
Invicta Model 55 (Mk. 1 & 11) Mains-Battery Portable (R46, Oct., 53).
Kolster-Brandes FB10 Mains Midget Portable (R32, Sept., 52).
Marconiphone P17B Personal Radio (R49, Jan., 54).
McMichael 153 table radio (R75, July 55).
McMichael 493 All-Dry Portable Radio Receiver (R47, Nov., 53).
Portogram "Junior 8" Record Reproducer (S5, July, 54).
Portogram "Preil 20" Portable 25W Amplifier (S4, May, 54).
Philco A536 W/M radio receivers, (R68, Feb., 55)
Pye P43 Radio Receiver (R63, Nov., 54).
Pye 13- channel tuner unit, (TV66, May, 1955).
Raymond F55 table radio (R74, Jun. 55).
Roberts Radio "Junior" All-dry Battery Portable (R26, Feb., 52)
Roberts P5A portable radio, (R73, May, 1955).
Taylor Electrical "Windsor" Circuit Analyser Model 20B (T.1.5, Sept., 52).
Vidor Model CN414, All-dry 2-Band Attache Portable (R28, Apr., 52).
Vidor CN420A portable radio (R64, Dec., 54)

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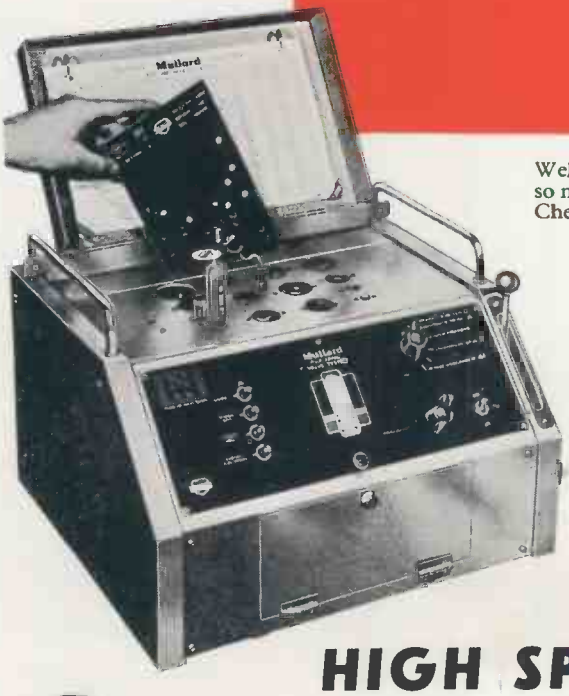

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Two models are now available

Type 405 provides linearity and grading patterns in addition to plain black or white synchronised rasters

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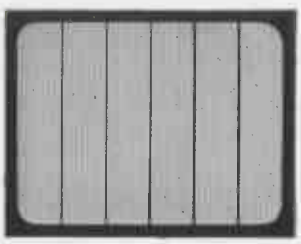

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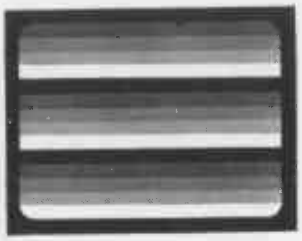
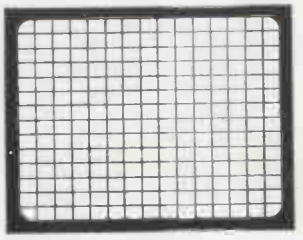


GRADATION. Gradation pattern checks Contrast linearity.



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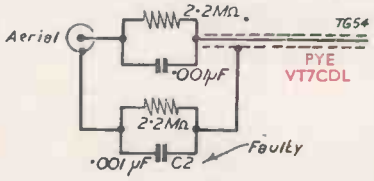
Eventually the trouble was cured by soldering L7, the frame aerial, to its 1 and 2 sockets. This aerial is normally plugged into these sockets at the end of the chassis and although it appeared to be making good contact when checked with the ohmmeter it had evidently been a h.r. contact at r.f.—J.S., Blyth, Northumberland.

Pye VT7CDL

Weak Signal Input

A new stock receiver was checked before going out on demonstration, and it appeared to be perfectly satisfactory. The signal available, incidentally, was far greater than that at the customer's home. The receiver was returned as unsatisfactory and after a few days was taken out to another location only to be returned again.



The instrument was then given a series of routine checks and after removing the chassis for a thorough search it was noticed that C2 (0.001μF) housed behind the aerial input panel was fractured due to having originally been pulled too tightly. The lack of capacitance from coaxial screen to chassis had caused the weak input which was more apparent on the customer's less effective aerial system.—J.K.G., Exeter.

English Electric 16T18

Tube Replacement

In this model the tube mask is a plastic moulding and a rubber surround is interposed between the metal cone of the c.r.t. and the rebate in the mask into which the tube is fitted. When a replacement tube is necessary, reassembly will be made extremely simple if the surfaces of the rubber surround and the mask rebate are first lightly smeared with grease. A slight pressure is then all that is required to ensure that the tube goes home fully into the mask. To try to do the job without the grease calls for a combined effort on the part of workshop personnel and any slight tilting of the tube is sufficient for it to resist all attempts to fit properly.—F.J.M., York.

Alba T372

Scan Coil Fault

The fault here was insufficient width and it was impossible to centre the picture by the adjusting screws on the focus magnet. The output valves and associated components were checked and found to be in order. By the usual process of elimination, only the scan coils remained to be checked and here the fault immediately became apparent.

It was noticed that the cardboard covering of the coils was loose and a close inspection showed that a strip of metal, wound round the coils, had sprung loose when the outer covering had broken thus reducing the inductance of the coils. Re-winding the metal strip and binding with drive cord brought width and centring back to normal.—C.A.F., Clydebank.

Ferguson 400RG and 391RG

Low Distorted Sound

The fault on the above models was the same in both cases—low volume with excessive distortion. The 400RG had only four weeks running and the 391RG only two hours. After checking through the output stages it was found that in the 400RG the capacitor C34 (0.05μF, 150V wkg.) was down to approximately 1kΩ and in the 391RG the capacitor C32 (0.25μF, 250V wkg.) was down to approximately 500Ω. Replacements, of course, cured the trouble.—J.D.H., Ledbury, Herts.

ODD SPOT

I recently installed a 17in. television set in the pavilion of a cricket club and knowing it was a good signal area fitted up a single dipole on a wall bracket. While my assistant was fastening the cable down the wall I went inside to install the set, and found the gain very low. Deciding that a more effective aerial would be required, I removed the ladders which were next to the dipole and while I was fastening them on the van the club secretary came out to say that the picture had gone very bright.

After re-checking and aligning the set. it was obvious that the gain had increased tremendously. The wire strengthening the ladder had been in the ground and had been forming a shield, by-passing the signal to earth.—A.C., Blackpool

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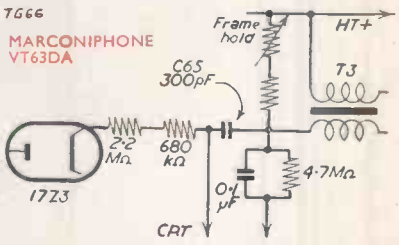
Marconiphone VT63DA

Low Anode Volts

A fault which has occurred in a number of these receivers is complete loss of brilliance. On inspection it was found that the e.h.t., cathode, heater and grid voltages were correct but that the first anode voltage was very low. This was found to be due to the 300pF capacitor C65 going s/c. This particular component is a silver mica type rated at 500 volts but as the voltage in this part of the circuit is at



boost potential (*i.e.*, 400V) it was replaced by a ceramic capacitor of 1.5kV working voltage. In replacements of this type, no further complaints of breakdown have been experienced.—M.A.H., Exeter.

Ferranti T1215, T1415

Hold Control Hint

Lack of vertical hold on the above models is usually due to the frame blocking oscillator transformer losing its efficiency. In an emergency this can normally be cured by paralleling R58 (1.5MΩ), in series with the slider of the vertical hold control, with a 3.3MΩ resistor. This will centre the hold control until a replacement transformer can be obtained.—J.G.H., Glasgow.

Philips 1800A

Mobile Black Bars

A customer phoned our service department complaining that his receiver had black bars running up and down the screen, which he had been led to believe was caused by sound on vision. Unfortunately it turned out to be entirely different. The black bars were independent of the

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audio frequencies and an oscilloscope check traced a near-pure sine wave from the c.r.t. to the video circuits. The frequency of this sine wave was measured against a calibrated time-base and was found to be about 1 kc/s, which could only suggest the e.h.t. oscillator frequency.

It was found that C5 (64μF) was very low capacitance, allowing the oscillation to leak into the common h.t. rail. Replacement effected a complete cure.—R.C., Derby.

Ambassador TV14TM

Leaky Frame Capacitor

A most unusual fault was experienced with this model. The symptoms were a loud hum, controllable by the volume control, together with a "shady" raster, controllable by the brilliance control, from top to bottom of the screen. These symptoms were without aerial. With an aerial connected the faults looked like a heater/cathode s/c in the c.r.t. but the section of the picture on the left was very black.

The fault was traced to a 32μF capacitor from frame coils to chassis. (C58). Replacement effected a complete cure.—C.G.B., Tonypandy, Glam.

Cossor 932

Common Picture Fault

A fault which has been encountered several times on this model has been a general deterioration of picture quality, finally resulting in complete absence of modulation. The cause of the trouble has been R7, the 4.7kΩ decoupling resistor for anode and screen of V1 (6BX6), going high. I now make it a regular practice when checking for this fault to take readings of voltage at the anode and cathode, the correct readings being 140 and 1.5 volts respectively. It is advisable, also, to check the associated 0.003μF decoupling capacitor C3 for leakage when the sensitivity on this model appears to be below normal.—H.W.H., Bargoed.

Vidor 4217

No E.H.T. Volts

The trouble was no e.h.t. and after checking the line oscillator and output valves suspicion fell on the line output transformer, since this has been a common failing in this particular receiver. It was found, however, to be satisfactory; line oscillator and output valve voltages were also o.k.

A very weak line oscillator whistle was audible when the hold control was adjusted and at this point a slightly positive voltage was observed on the triode oscillator grid. The cause of the trouble proved to be the 68pF capacitor coupling it to the line output transformer. This fault has recently recurred on the 14in. version of this model.—B.P.J., Walsall.

Philips 1200U

Low H.T. Volts

The complaint was that when the focus control was rotated towards optimum, the sound and vision signals disappeared though the raster remained. Decoupling was suspected but found to be satisfactory. On test, the h.t. line varied from 105 to 135 volts through the rotation of the focus control, the sound and vision disappearing at around 110 volts. Thinking that this was a large variation, the rectifier circuits were checked and an open-circuit 40Ω anode limiter resistor was revealed. Replacement put things right. The rectifiers were found to be undamaged and the cause of the trouble was that the h.t. had dropped to below minimum operating requirements due to the increased load. It was realised afterwards that the picture width had suffered to a small extent

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but this was not noticed at first due to the chassis being without cabinet or mask (being a trade repair).—K.M., Leeds, 9.

McMichael TM51

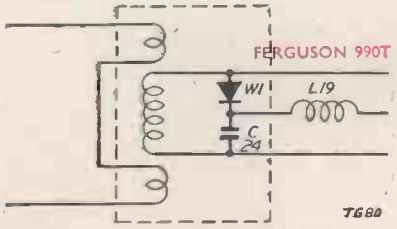
Fault Speed-up Readers may be interested in the below-mentioned method of speeding a "long time" fault used to check a defective component. The fault was inability to lock the picture vertically until the set had been running for about an hour.

The fault was located in the frame blocking oscillator transformer, although the frame scan waveform was near-perfect. A few shorted turns resulted in the non-appearance of sync pulses at the grid of the valve. The transformer was checked by wiring it up externally with fly leads and quickly heating it in a test bench lamp; after two minutes the picture locked perfectly. Then the transformer was placed on ice cubes from a frig.—and in less than two minutes the frame locking again disappeared.—D.G.P., Swainswick, Bath.

Ferguson 990T

Temperamental Diode The complaint was intermittent loss of picture. As valve replacements did not effect a cure, the receiver was put on soak and after many hours the picture finally disappeared leaving a normal raster. The sound was satisfactory.

Voltage tests showed the valves to be working normally, but the signal vanished in the final i.f. transformer. Although s/c turns in the secondary had previously been responsible for a similar fault, this time the transformer was satisfactory, as was the small capacitor. The crystal diode, also, showed up satisfactorily at first with normal forward and backward readings but a subsequent test revealed that the heat transferred simply by holding the component between thumb and first finger was sufficient to cause it to go open-circuit! This effect could be produced at will if it was allowed a few seconds to cool between tests. The i.f. transformer is located between two valves and no doubt the heat from these caused the fault in the crystal to show up.—G.B., Huddersfield.



SERVICE BRIEFS

Ferguson 992T: *Three of these sets recently came in with line output valve failure. The screen resistor in each case read 470Ω instead of 4.7kΩ. Being badly discoloured it was difficult to tell if resistors had gone low or wrong values had been used.—P.E.C., Leigh-on-Sea.*

Murphy V240: *Picture shrunk to small strip about two inches broad, the trouble is generally due to C93 (0.25μF) going open-circuit. Fault experienced on several models.—J.G.S., Paisley.*

Baird P165: *Frequent fault is moving arm of wire-wound potentiometers riding over their end stops. Can be permanently cured by simply soldering a tiny blob of solder to the stops.—R.W., Birkenhead.*

Cossor 912: *Uncontrollable brightness and loss of vision often due to V8 failing which removes voltage from video valve. Lack of height or complete frame failure is usually caused by R216 (3.9MΩ) in anode of frame oscillator going high or o/c.—P.E.C., Leigh-on-Sea.*

Ekco A160: *Continuous crackle after short period of running was due to faulty negative feedback capacitor (4.7pF) from anode to grid of UBC41 valve—B.T.W., Newport, I.O.W.*

Peto-Scott 1415

Frame Break Through A very baffling fault occured on the above model, the trouble being a loud buzz from the speaker due to frame time-base and sync contents in the audio circuits. After preliminary valve checks for s/c electrodes, the set was turned upside down for a component check—and the fault cleared itself.

The trouble was finally traced to a bad rivet to chassis potential and after bonding all the chassis tags around the frame time-base tag strip the fault completely vanished. It is interesting to note that we have encountered this fault on nine of the above models.—J.R.W., Derby.

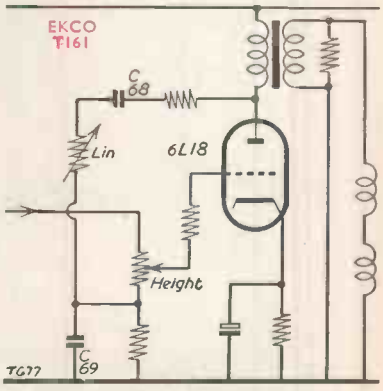
H.M.V. 1360

R.F. Instability This transportable came in for service with the complaint that it "burbled" on long waves. On test it was found that this was, in effect, r.f. instability but the usual checks of electrolytics and screen and a.v.c. decoupling did not locate the fault. It was found, however, that by earthing the speaker chassis to the main chassis the trouble disappeared.

As this was not originally connected it was felt that a further investigation was necessary. A clue which lead to the true cause of the trouble was that when the tone control knob was at maximum top-cut the trouble almost ceased. On checking the fixed tone compensating capacitor, connected between the anode of the output valve and the h.t. positive line, it was found to be open-circuit. The puzzle was—why did this affect long waves only and why did it cause r.f. instability?—H.G., Folkestone.

Ekco T161, TC162, TC166

Some Typical Faults Lack of frame linearity in these models can usually be traced to either C68 (0.0047μF) or C69 (0.0036μF) or both. The condition is a high resistance internal leakage. In the same range of receivers another common fault is that in which the horizontal hold can only be locked at one extremity of it's travel. A cure can normally be effected by changing over the tap on the hold control inductance.—J.G.H., Glasgow.



Bush TV22 Series

No Frame Lock The complaint was no control of frame time-base, with increased height at the top of the picture. Past experience pointed to the need to change the vertical hold control and in so doing the picture could be just locked at the extreme end of the track; the extra height at the top still remained, the form control giving only a

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slight adjustment.

The frame forming capacitor was substituted, to no avail, and while testing associated components it was noted that the frame oscillator transformer had a primary resistance of 2kΩ instead of the normal 540Ω. The Westector in the sync feed had also gone high resistance, making a double fault. While it might appear obvious to go straight to the oscillator transformer, it has been our experience only to have complete frame collapse in oscillator transformer troubles.—D.G.W., Farnborough.

Pye V4, V7, Series

Some Useful Hints

In receivers in this series which have absence of e.h.t. voltage, the following are probable causes for the failure. Measuring the anode voltage of the PL81, which should be 400 volts, the reading actually obtained will help to point to the cause, as follows:—

160 volts—line output transformer faulty.

190 volts—line amplitude or line linearity controls faulty.

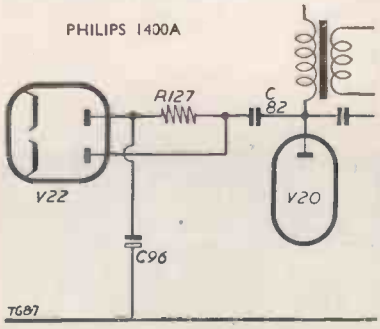
200 volts—insufficient drive from the oscillator to PL81.

300-350 volts—if accompanied with a defocused narrow scan, C106 is leaky.—F.W.P., Datchet.

Philips 1400A

Safety Circuit Fault

Most service engineers are familiar with the usual cure for uncontrollable brilliance on this receiver—after checking the tube, examining R76 and R49 for continuity. The fault encountered in this instance whilst producing the same symptoms was due to a different defect. As R76 and R49 were satisfactory, attention was turned on the safety circuit and on checking across C96 in the V22 circuit the voltage reading was 30 (positive) instead of the normal 150 (negative). Further tests showed that C82 coupling capacitor from V20 was s/c; it is on top of the left-hand chassis at the front and is apt to be overlooked.



Replacement of C82 resulted in correct voltage across C96, and control of brilliance, but it was then impossible to focus sharply even with the focus control fully rotated. This was cured by replacing the bias capacitor (C84) of the e.ht. driver valve, which was s/c,- and replacing the PL38.—R.G.H.,Newcastle-on-Tyne, 5.

English Electric 16T18

Barretter Failure

This receiver had the annoying habit of "blowing" its barretter, a G.E.C. 305, for no apparent reason. Exhaustive checks were made throughout the heater and power circuits but no trace of a short circuit could be found. Eventually it was decided that, apart from an intermittent failure in a valve or component, the trouble could be caused by an e.h.t. arc—quite a likely possibility with a metal-cone cathode-ray tube.

Careful checking of the polythene shroud revealed a small puncture, due to arcing, at a point less than an inch from the double 15Ω mains dropper. The resistor was re-positioned and the shroud rotated. The fault has not since re-occurred.—H.W.H., Bargoed.

Pilot TV84, TV87, Series

Some Common Faults

A common fault with these receivers is poor focus and insufficient width; this is generally due to the h.t. metal rectifier having gone high and caused the h.t. line to drop to about 180-200 volts. When the fault is three bright lines close together about three-quarters up the screen, the trouble can usually be traced to a faulty frame blocking oscillator transformer (T4).

A third common fault is severe trapezium distortion at the bottom of the picture. This is usually due to the 8μF capacitor connected from one end of the frame oscillator transformer primary to chassis, which becomes either open-circuit or short-circuit (C64).—B.P.J., Walsall.

Ferguson 992

Faulty "Good" Capacitors

Later models incorporate a multivibrator oscillator valve driving the line output valve and several sets have been serviced recently with the time-base inoperative or with just a very slight whistle when the hold control is adjusted. In some cases the line output transformer was at fault but it is always wise to first check the 150pF cross coupling capacitors mounted near the ECL80 driver stage (C58, C59 and C25 in service manual). These often test 100 per cent satisfactory but replacements restores normal operation of time-base.—D.C.F., Ilford.

Ultra V815, V816, V817

Some Common Faults

These are some common faults associated with the above series of receivers. A 10 kc/s whistle through the speaker is often due to a bad chassis contact of the 50-50μF capacitor C72/C39. Poor definition and weak or no line hold can be traced to an o/c detector filter coil L17. Line slip is often due to R38 going high resistance. Sound distortion can be caused by the a.g.c. line to pin 3 of V14 shorting to earth tag.—M.A.H., Exeter.

G.E.C. 6541

Erratic Brightness

Complaint was that the picture would darken at intervals but could be restored to normal again by switching the main room light on and off. Seeing that no real difference was observed on sound, attention was directed to the vision i.f. strip, but a general examination and gentle proddings produced no clues.

Thereupon, the r.f. strip was removed for examination and the various components and wiring probed. On touching C18AB (which is a capacitor combined with common earth lead) the picture could be varied in intensity at will. The two-in-one capacitor was replaced and everything was satisfactory. On checking the faulty component, it was found that the common chassis wire could slide in and out of the tubular base, hence the poor contact.—K.M., Leeds, 9.

Your Service Van

NOTES ON THE CARE AND MAINTENANCE OF THE SERVICE VEHICLE

IN any radio and television establishment, it is essential that the service van is maintained in good working order at all times. If more than one vehicle is owned, then a breakdown is not so serious, but when the one and only van is out of commission, a lot of business and money can be lost tn a short space of time. It is, therefore, a good plan to make a routine check on the vehicle from time to time.

Often, a willing engineer or apprentice with an interest in cars can be found who will look after the most important details of maintenance. As well as checking the usual obvious things — such as tyre pressure, petrol, oil, water and battery — the brakes, steering, transmission and many other points need to be attended to, if they are not to deteriorate and cause trouble.

Larger jobs will, of course, have to be undertaken by the local garage, but it is surprising how many large repairs can be avoided by regular attention. This prevents the vehicle being off the road for long periods at a time, and also keeps running expenses at a minimum.

CONDITION

Apart from keeping the vehicle in good working order there is a lot that can be done to improve its condition and efficiency. Defects in the bodywork should be made good before rust sets in and causes extensive damage. Any loose parts, which give rise to annoying rattles and bangs, should be refitted securely and permanently.

Locks on doors may need attention, as a practice should be made of always locking the doors when leaving the van unattended. A nearside mirror is a useful addition, enabling a clear view of oncoming traffic at fork roads.

It is essential that there should be no leaks in the roof. A metal roof seldom gives trouble, but other types have a habit of developing a leak, especially round the edges. It is generally possible to repair any minor damage using a correct sealing compound, but re-roofing calls for a little more skill. If this is attempted, then the right material should be obtained, and care should be

by. S G. Rayner

taken to see that it is stretched tightly on its frame, and seated down properly at the edges.

COMFORT

If the service van is used extensively for long journeys then a lot can be done to improve the comfort of the driver. In the winter time, the cold weather, combined with draughts, can make the cab a very uncomfortable place. It is an easy matter to partition off the cab section from the rest of the van by means of a sheet of hardboard. This is best fitted just behind the driving seat on a wooden framework. If required, this can be made removable and dispensed with during the summer.

A small window must be incorporated in the partition, to give a clear view through to the rear of the vehicle. A sheet of celluloid is ideal for the window, as it is easily fitted and not dangerous in the case of an accident.

Any draughts entering the cab from the front of the vehicle can be effectively stopped by fitting a sheet of cardboard under the dashboard. This will cover all the small holes, through which numerous leads, controls and streams of cold air pass. The rubber piping round the doors may need renewing if any air is getting into the cab from this source.

A great improvement will be noticed if all the modifications to the cab are undertaken, but should additional heating be required, then there are, on the market, some very efficient hot air heaters. The prices of these are about £6 to £7, so for a moderate outlay, complete comfort can be obtained while driving. The heater draws the hot air from the top of the radiator, through a tube by means of a fan, into the cab. One can be installed in a matter of an hour and well repays the small trouble involved.

PROTECTION

The wooden floor in the back of the van is not an ideal surface on which to carry expensive radio and television equipment. If the sets have to be

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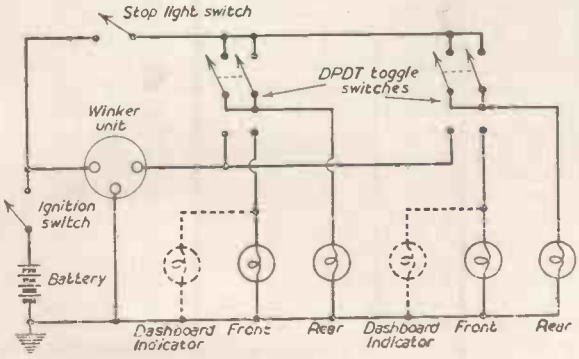

Diagram showing simple method of wiring a winker light system where twin stop lights are installed at the rear of the vehicle.

transported on their sides, then cloths of some sort or old blankets need to be put on the floor. A much better idea is to fit an old mattress over the floor area, and use the cloths to prevent the cabinets knocking together. The mattress also reduces a lot of "boominess" by absorbing extraneous noises.

WINKERS

If the vehicle is not fitted with indicators of any kind, but has twin stop lights at the back, then a simple winker light system is easily installed. Two d.p.d.t. toggle switches are fitted side by side, in a convenient position on the dashboard, and the winker unit bolted underneath. Two flush-fitting white indicator lights go on the front wings, then all is ready for wiring, as shown in the diagram.

The existing wiring to the stop lights and stop switch is disconnected, and a separate lead from each brought to the dashboard. A lead from the winker unit, and one from each front light are connected to the switches. The winker unit is wired to the battery via the ignition switch. If indicator lights are required on the dashboard these are fitted one above each switch, and wired as shown.

The operation of the system is such that a stop signal is given when the brake is applied, even though one or other of the back winker lights is working. The front winker lights are completely independent of the stop light circuit. The complete installation is not costly, and has proved reliable in operation.

LIGHTING

An interior light may be fitted, if desired, in the cab of the vehicle, and is always useful for checking job sheets and addresses at night time. A light in the back of the van is really essential for loading and unloading sets after dark. If a light is not fitted, then it is well worthwhile installing one.

An ideal arrangement is to fit a switch, so that when the back doors of the van are opened, the light comes on, and is automatically switched off when the doors are closed. The interior light is wired via the door switch to the rear lights of the vehicle, so that it operates only at night time, when the rear lights are switched on.

The modifications and improvements, which can be made, together with regular maintenance will ensure more reliable service from any vehicle, together with lower running costs. Most of the work can be carried out during the summer months, when there is not so much to do in the workshop.

N.W.T. —or four months in a Radio Assembly Factory

AN ENTERTAINING AND INSTRUCTIVE ACCOUNT OF A TROUBLE SHOOTER'S EXPERIENCES IN THE RADIO INDUSTRY

AFTER selling up a small radio business and while awaiting the completion of a home at Folkestone, I obtained a post in a large radio assembly factory as an h.f. repairer. The job was putting right rejects from the final inspection studios where receivers are given their last aural, visual and mechanical check before being packed for despatch to shops, or, in the case of export models, abroad.

by H. W. Goldsmith

To start with I was given a pair of pliers and a screwdriver and taken to a bench on which a fairly elderly man about my own age and an apprentice were at work. I was introduced to "Dick" the elderly man, and told that he would give me any help or assistance required, and right away I must say that he was very helpful indeed.

My conception of radio repairs as carried out in the average workshop was to dismantle, clean, check valves, repair and reassemble, and if 4 or 5 sets were completed in one day by an individual, things were not going too badly. It was a bit staggering when Dick informed me that 30 to 40 sets were the order of the day. At first, what with the general noise and an 8-watt set going full out on my right, and a standard table set doing the same on the left, I just wondered how I was going to hear any fault which might occur on the set which I was supposed to be repairing, let alone 30–40 per day.

However, after approximately a fortnight I found myself able to isolate myself from the other noises, and managed to repair the required number.

"N.W.T.A.B."

The method of rejection was as follows: the operator in the studios found that a particular set was noisy when tapped on all wavebands and placed it on the reject line with a label marked "N.W.T. A.B." (Noisy when tapped all wavebands). Hence the heading of this article.

The set was picked up by either of us repairers and connected up and checked and repaired and placed back on the line with the sets coming from the production section, and back to the studios again for a further check.

Incidentally, each point to which we connected our receiver for test purposes was connected to the mains via an isolating transformer, and when handling universal sets there was no fear of shocks, as all the secondary windings were completely isolated. Where this method can be afforded, in any radio workshop, it is to be highly recommended.

At first I wondered how the screwdriver and pliers were to serve as my only tools but found ranged along the back of our bench (which incidentally was covered in ¼in. cork lino and very nice to work on) a very useful set of gears as they are called, *i.e.*, signal generators for i.f., medium and long wave, and three sets of s.w. and a modulation panel for use with the latter. There was also an i.f. note generator, approximately 400 cycles, and adjustable for output.

Special cards were made out showing which stud of the switch on each gear was to be used for a particular receiver, to give the correct spot frequency for alignment and checking purposes, and each gear was fitted with its own output meter. On the card was also stated the "db's" required for a specific output. A very comprehensive outfit when I got used to them.

Alignment Troubles

One particular fault which repeated itself fairly often was that in the original alignment of the s.w. it was aligned on the image and not the fundamental and this showed itself up on the cabins by the set not giving signals on certain frequencies which were piped to the studios and modulated with recorded music.

In this particular case realignment was carried out, proof of correctness being found by, say, at 16 meters (to quote one set) the signal was audible and again at approximately 17 meters; in other words the image came at approximately a megacycle up the scale from the fundamental.

Dry joints formed a good percentage of the faults and experience enabled their location to be made quickly. This was mainly by the isolation method (*i.e.*, which waveband) and if in the oscillator or aerial circuit, tests for this were made by shorting each section of the gang condenser in turn, and tapping the set with the handle of the screwdriver.

A quick test to prove if the set was oscillating was to tap the osc. section of the gang with the aerial plug—no double click indicated no osc.

Component Faults

Similar treatment of the aerial section which gave no click indicated a fault in the aerial circuit, mostly coil faults. Valve checking was done by substitution as plenty of valves were available for the particular sets in production.

Sometimes a fault would occur due to a wrong value resistance or condenser being fitted on the assembly line, and on rarer occasions the rotor portion of a wave change switch or tone control switch being incorrectly assembled by being rotated 180 degrees on the spindle.

These faults were more puzzling and naturally took longer to trace and correct. Such happenings, which had to be reported, caused a minor panic on the section of the production line on which they occurred!

Meters, of which we had a very poor selection, were rarely used, but an ohmmeter proved to be the most useful as the resistance from any particular point to chassis proved to be a very important check and one which, personally, I had not regarded with too much importance, but do now!

(continued on page 446)

Attention to Small Details

A PRACTICAL ARTICLE WRITTEN SPECIALLY FOR B.R.T. BY A WELL-KNOWN REGULAR TECHNICAL CONTRIBUTOR

is important to the efficient and effective servicing of radio and television receivers in the workshop. This article underlines the details that need attention.

By D. Winter

WHEN a radio or television set is brought into the workshop, the first job is to find out what is wrong with the receiver. In most cases, this can be done fairly quickly, and the set put in working order if a replacement for a faulty component is at hand. Usually, after estimating for the job, the work is completed, and the set returned. However, if the receiver is more than a year old, it is well worth a little extra attention to the many small defects which may have developed during its working life.

In the case of older radio sets, many annoying crackles and noises can be cured by expending an extra half-an-hour or so in a complete checkover. When a set has come in for an overhaul, it is essential to attend to these smaller troubles.

Visual Check

A visual check on top of the chassis will determine whether the correct valves are fitted. Sometimes, an output valve of heavier heater current than is specified for the set will be found; this should be replaced with one of correct value.

A non-metalised valve in place of a metalised one can cause instability and faulty operation, as can the wrong type of frequency changer valve. If the receiver is fitted with low voltage condensers, then it should also have an indirectly heated rectifier valve. This point should be checked.

Underneath the chassis, a visual check often reveals deterioration in some components, electrolytic condensers for example, which are leaking, and resistors which are charred or burnt. A careful examination with an insulated probe, while the set is working, will often locate a loose connection or badly soldered joint.

Sometimes, noises from a faulty connection are so bad that the slightest touch on any part of the chassis will start or stop them. By feeding the signal generator into different stages, it is generally possible to localise the fault to one area, and to find and cure it.

Rubber insulation on wires is apt to go hard and crack after a few years, and if these wires pass through the chassis, short circuits can easily occur at these places. Grommets also cause trouble in this manner.

Dust and Dirt

The dust and dirt which accumulates on the chassis generally manages to find its way into valveholders and on to valve pins. The pins are easily cleaned, with switch cleaner in most cases, but often it is necessary to clean them with a razor blade or emery cloth. The valveholder sockets should be cleaned using a pipe cleaner dipped in switch cleaner. It is surprising the amount of dirt that can be removed in this way.

With some types of valveholder there is not enough spring left in them to grip the valve pins. These have to be retensioned to be effective. The paxolin insulation between the sockets should be cleaned as a precautionary measure against future breakdown.

★

Noise Clearing

Noisy controls are always a source of trouble. The volume control in particular is worth a careful check. If it is not too bad, then it is usually possible to dismantle it and carefully clean all moving and other parts. The moving parts should be retensioned and greased before reassembling, care being taken to see that everything goes back as it was before dismantling.

The rivets connecting the soldering tags to the track sometimes work loose and cause mysterious noises. Here again, a visual check will ascertain that all is in order. The same treatment applies to tone controls.

The mains on/off switch on the back of some controls is best tested by connecting an ohmmeter across the switch, and then very slowly switching on and off. The slow action will reveal a faulty switch more often than not; the switch or complete control should be replaced if there is any sign of trouble in the switch itself.

While the set is out of its cabinet and the controls are being attended to, the knobs may be looked at to see they are a good fit on the spindle. A grub screw or broken spring may need replacing, a small thing but important as the knobs are always being handled when the set is in operation. To facilitate testing on the bench, the knobs are best fitted, the switches and tuning condensers can then be easily turned.

Wave-change Switch

The wavechange switch is almost always in need of attention; generally a good cleaning with switch cleaner is sufficient. It is important that all surfaces are made bright and dirt free, and not sufficient that the cleaning fluid be

poured indiscriminately over the switch, whilst rotating it a few times.

If bad connections are still present in the switch after a good cleaning, then it may be necessary to retension the fixed contacts. Special tools are available for this purpose and should be used, but if not available, then one can be made to suit the particular job on hand.

Dirt on the paxolin insulation of the switch is best removed, and the insulation checked for leakage. When the wavechange switch is also used for gram connections, even a small leak of voltage to grid circuits, will cause slight distortion, enough to mar the performance of the set.

Any indicators, which may be attached to the switch and lead to the dial should be examined to see that they are working and registering correctly, as they are one of the things which are visible when the set is in its cabinet.

Tuning Dial

Cleaning the dial glass and pointer, and seeing that the pilot bulbs illuminate the dial properly, give that new look to the set. If the dial glass has to be removed for cleaning, then the rubber bands surrounding its edges may need replacing to hold the glass securely in position when it is replaced. The dial cord is often worn and on the point of breaking; renewal with good quality cord will effect a cure.

All pulleys should be free to rotate easily, a little oil will help in this respect. The pointer sometimes slides along a metal strip, which gets gummed up with old grease and dirt; cleaning this, and re-greasing will enable it to work freely again, and not exercise excessive pull on the dial cord. The pointer must not be touching the dial itself, as it may in time scrape and disfigure the station markings.

In some sets, the dial cord and indicators arrangement is quite complicated and may need a little extra time spent in checking it, and making the necessary adjustments. This is worth while, though, as the set is not welcome back in the workshop a few weeks later with a broken dial cord.

Microphony

Microphony in the tuning condenser can cause quite a lot of trouble. More often than not it can be cured by replacing the rubber supports of the condenser. These are sometimes perished with age, and allow the condenser to drop, so that its spindle does not locate correctly through the hole in the cabinet, at the same time allowing a lot of play on the tuning control.

Attention may need to be given to slow-motion drives if they are not working properly. A cleaning and a little oil will ensure that the moving vanes of the condenser are free to move easily, and that they are making good contact via their spring clips to earth.

Intermittent short circuits in trimmer condensers mounted on top of the main tuning condenser are not uncommon. Certain types of trimmer are more prone to this trouble than others, but experience helps in quick location of the faulty types.

The Loudspeaker

The loudspeaker is an important item, and should be in good condition in order to handle the output of the set satisfactorily. A slight buzz may mean that the glue holding the cone in position, has become dry and cracked, so allowing unwanted vibration. This is simply rectified. On some speakers, the centre spider weakens, with the result that the cone drops, so marring reproduction at full volume. A new cone is usually required in this case.

If the speaker cone is just off centre, this can be remedied using a set of cone feelers. Providing the cone or speech coil section is not twisted or distorted, then re-centring is successful, otherwise a new cone will have to be fitted.

Any extension loudspeaker connections, including plugs and sockets should be checked for bad contacts, together with the flexible wires, which usually connect the loudspeaker to the chassis. Other flexible wires, which may be present, can be checked at the same time.

The mains lead and plug are worth a quick look to ascertain that all is in order; also the main voltage adjusting panel. If the adjustment is by a small screw touching a metal strip, then this is often dirty, giving rise to bad contact and subsequent trouble. At this stage it should be noted that the set is correctly adjusted to the mains voltage it will be working on, at the customer's house.

Once the main mechanical items have been looked at, checked, and given any attention they may need, the next step is to see that the set is in good electrical order.

Testing Valves

The condition of the valves should be measured on the valve tester. Older valves with top cap grid connections, may need these resoldered, as the heat of the valve over a period of years causes a bad connection to appear between the leadout wire and the grid cap. Noise from valves is sometimes caused by bad connection to the metalising, this can be re-connected to the appropriate pin and usually cures the trouble.

A routine check of voltages and currents throughout the set will give a clear idea of the condition and operation of each stage. A service sheet is most valuable in this respect, and should always be used if available. Any intricate circuit details will be shown on the service sheet, making the examination of the circuit much easier. The a.v.c. line should receive attention together with all bias arrangements, which may be present.

Component Check

All important condensers, especially electrolytics, should be replaced if they are not in 100 per cent condition. A small leak in a coupling condenser can ruin the reproduction of the set as a whole. Inefficient decoupling condensers cause instability in many forms, while open circuit bias condensers can reduce the overall volume due to negative feedback developing across the bias resistor.

Only after the set has been restored to good mechanical and electrical order can realignment of the tune circuits be carried out. Providing all is in order with the coils and trimmers, the tuned circuits should respond, and the sensitivity of the set will be greatly improved. Calibration on all wavebands should now be correct, and the set should be operating almost as well as when it was brand new.

Cabinet Care

The only remaining item to be attended to is the cabinet of the set. If very badly scratched and marked, repolishing should be included in the estimate. In most cases, however, an application of spirit stain to any scratches, and a complete polishing with a good furniture polish will make the cabinet gleam anew. Bearing in mind the outside of the set is the part that the customer has to live with, replacement of the loudspeaker silk is well worth while. This always pleases the lady of the house. Any missing back screws or rubber feet should be replaced.

A final soak test of the set is best undertaken with the set fitted into the

(continued on page 446)

Attention to Small Details

—continued

cabinet complete with back in position, although if a fault does develop on test, the set has to be taken out of the cabinet again. Sets have a peculiar habit of only developing another fault when they have been finally completed and returned to their cabinets.

TV Treatment

Television sets require much the same treatment as radio sets in as much that they develop similar mechanical and electrical faults. A general check over should first be made, paying particular attention to valve contacts, flexible connecting wires and mains plug connections.

The cathode-ray tube, front glass and screen generally requires cleaning. All variable controls, such as contrast, line and frame hold may need cleaning or replacing, if noisy in operation. The focus control, if by permanent magnet, should be smooth and easy to move.

The time-base circuits may require attention if height or width is low and the hold controls should lock the picture in a midway position, not hard to the end of the control. A replacement for an ageing valve or resistor going high value, will usually effect a cure.

Linearity if bad should be attended to on both frame and line. An e.h.t. reading will ascertain if all is in order in this section of the set. As with radio, a complete check of all valves on the valve tester will show up many faults, and save a lot of time in needless testing throughout the circuits.

With the popular a.c.-d.c. type of circuit, now almost exclusively used in television receivers, a check of valve and tube heater volts and current is advisable. The surge limiting thermistor and its parallel resistor often require replacing, when showing signs of considerable wear. Bad connections on the fuse panel and in the mains on-off switch, and in the mains dropping resistor should be looked for and attended to if necessary.

In the vision and sound receiver, alignment of the tuned circuits should only be carried out if the correct equipment is available. Sound on vision, or vision on sound may be adjusted at the appropriate points in the circuit, after it has been ascertained that other faults such as microphonic valves, are not the cause of the trouble.

Adjustment to the oscillator trimmer in a superhet receiver is often needed as it may not be at an optimum setting for good sound and vision reception. Attention to the sound reproduction of a television set is often forgotten; sound circuits should be checked to see that all is in order.

Picture Adjustment

When the set is finished and replaced in its cabinet, the picture is best adjusted using test card C. It is then an easy matter to see that the picture fills the screen and is square in the mask.

Final adjustments to the linearity controls and picture centring can be quickly made when it is known that all controls are in working order. Adjustment to the ion-trap magnet, if fitted, may produce a brighter picture. This should then be locked firmly in position.

When a television set is returned to the house, it is advisable to inform the customer of the condition of valves and the tube in particular. This is best accomplished on a valve test report, which should be issued with every set.

A complete record of work executed is best kept on a works sheet or card, which can be filed for future reference. This is most important for then any queries regarding the set can be easily settled without loss of valuable time.

Completely overhauling and checking a radio or television set, giving attention to all the small but important details entails a certain amount of extra work, but is well worth while for the results obtained.

In actual fact, if the set is examined systematically, it is surprising how quickly the work can be completed. The satisfaction of a job well done, together with the customers' pleasure and subsequent recommendations are repayment enough, and ensure goodwill for the business in the future.

N.W.T. OR FOUR MONTHS IN A RADIO ASSEMBLY FACTORY

(continued from page 446)

For ascertaining if h.t. was present, stabbing with the aforementioned screwdriver proved sufficient and shorting down the a.v.c. line to earth seemed a satisfactory check to see if this was operating.

This stabbing method with the screwdriver, to ascertain how far back from the loudspeaker the set was lively, reminded me of the wet finger technique around the time of D.E.R. valves about 1924/25. Still it was, and is, quite a quick way of ascertaining things.

Puzzle Corner

A rather puzzling fault which happened on two occasions was insensitivity due to a weak loudspeaker magnet. The sets in question were rejected for "weak all bands" (W.A.B.). Detection of this fault was ascertained mainly by measuring the bias on the output valve. This was o.k., but on tuning in a broadcast transmission much movement of the meter needle was apparent even on very moderate volume. Suspecting and replacing the bias condenser had no effect so another loudspeaker was tried and this put the matter right. The second one with the same fault did not take so long.

Several gang noises due to partial shorts were encountered and the method of clearing these may be of interest. In the case of the mains receivers the leads to the tuning condenser were unsoldered. A connection was taken from the smoothed h.t. via a 500 ohm 5-watt limiting resistor and by means of a crocodile clip, attached to the point on the gang condensers from which the lead had been unsoldered. The gang was rotated from open to closed position and generally one or two sparks occurred which burnt up the offending foreign body and cleared the partial short.

In the case of the battery model this was done in the same manner but using the h.t. battery as the supply source. If, after this treatment noises still occurred the gang condenser was usually changed, but in most cases the treatment put the matter right.

It is realised that the type of repairs found in a factory where components are new does not line up with sets encountered in the retailer's workshop which in many cases have had years of use, but the experience was well worthwhile inasmuch as the speed of execution expected of the individual livens up the wits and makes for rapidity, especially as this has a bearing on the bonus at the end of the week!

Tail Piece

As a tail piece to this short article I must mention "John," a West African, who was in No. 1 Studio as inspector. He had been on the job for two years. Technically and mechanically he was poor, but no set would pass through his studio unless it was perfect. He had passed his B.Sc. at Cambridge and spoke and wrote English very well but had difficulty in explaining the faults concisely on his reject card. These explanations were often the cause of laughter between us repairers.

One case in point was a reject by him which was "N.W.T. A.B.", and he added "Suspect loudspeaker, as when L.S. plug is removed all noises stop!"

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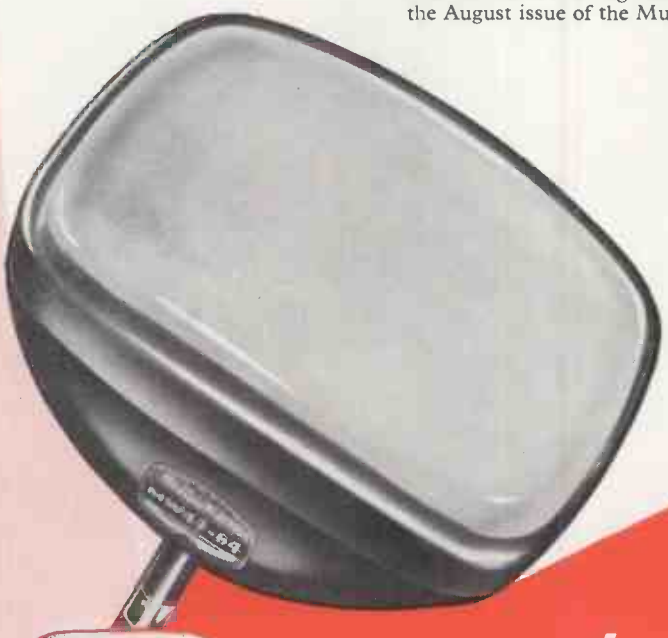
For details of the big Radiant Screen Advertising Campaign see the August issue of the Mullard Outlook.



* *There is a film. Full details about it were given in the July issue of the Mullard Outlook. If you haven't seen it yet write at once to find out when it will be shown in your district.*

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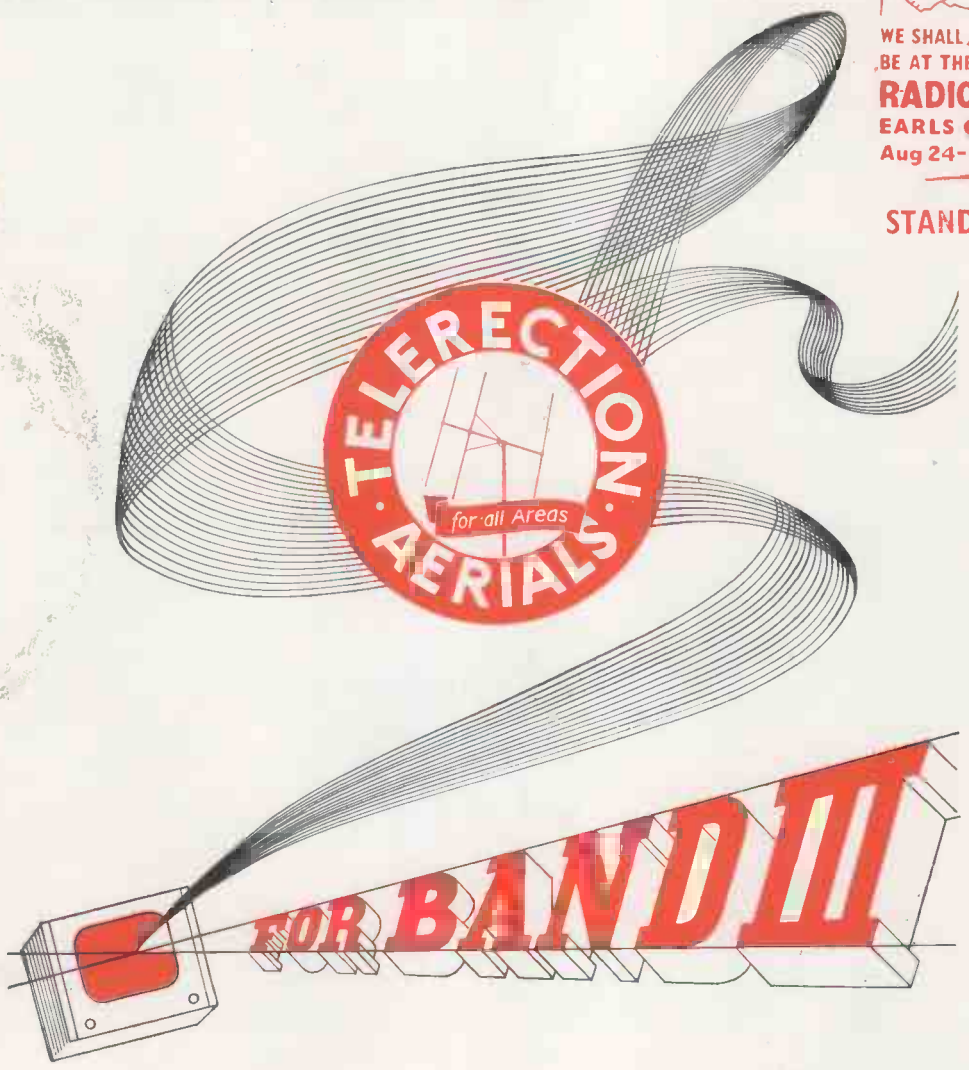

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Type P.7.

Band III Pre-Amplifier.

24 Db—£4 Trade

The P.7 Pre-amplifier is self-contained with own power pack. Ecc 84 is used in highest efficiency cascode circuit. Gain control, mains switch and tuning over whole Band III.

INSTALLATION EQUIPMENT

FILTERS

The S.1 Channel filter is approved by the G.P.O. 30db attenuation is given between 10 to 30 megs. Neat and efficient it is only 17/6 trade.

DISTRIBUTION BOXES

Various types of distribution boxes with up to 8 outlets for showrooms and flats are available from 15/- trade upwards.

THE CHANNEL WAVEFORM GENERATOR

Full coverage
Band I and Band III.
Composite pattern with frame and line sync-pulses and fully adjustable. Direct calibration with individual channel indicators. Attenuator. Guaranteed.

CHANNEL ELECTRONIC INDUSTRIES LTD. BURNHAM-ON-SEA SOMERSET

Presto! the NEW FM Pilots

Here they are—

the sensational new PILOT FM/AM sets your customers will be asking about. Be ready—show these up-to-the-minute models—complete with the latest, greatest development in sound reception.

Pilot FM/AM Table Model T 91

- New Full Range VHF/FM Band
- 'Magic Eye' tuning
- Four wavebands—FM, S, M, L

Also available as model T 92
The normal short waveband (15-50 m) is substituted by a short waveband (50-185 m) to include the Trawler frequencies

30 gns.

SEE US ON STAND 56
RADIO SHOW, EARLS COURT

Pilot Luxury FM/AM AUTO RADIOGRAM RGA/101

All the features of the T 91; with 9 valves (including 'Magic Eye') and with these extra features:

- 8 watts push-pull output
- 10" Speaker
- Garrard 3-speed Auto-changer with magnetic pick-up
- Generous record storage

82 gns.

PILOT RADIO LTD · PARK ROYAL · LONDON NW10

For good looks

'Deep picture' TV from this compact table model with 13 channel programme selector, 15 valves plus germanium crystal and metal rectifier. Vision and noise suppression, automatic gain control vision and sound. Walnut veneered cabinet, 200-250v. AC/DC.
A.1800 17″ screen. Price: 78 gns. *including p. tax.*
A.1497 14″ screen. Price: 67 gns. *including p. tax.*

...and good listening

Stone grey plastic cabinet with red handle and gold finished trims. 4 valves plus metal rectifier. Mains/Battery Portable. Built-in "magnecor" aerial. 5″ p.m. speaker. Standard L.T. and H.T. Batteries, or AC/DC mains 200-250 volts.
A.3634 Price: 18 gns. *including p. tax* (Batteries extra).

AM/FM 6 valve including magic eye tuning + metal rectifier. 4 Waveband receiver of outstanding quality. Highly sensitive circuit permits use on special in-built aerials on all wavebands. High fidelity speaker, attractive specially treated plastic cabinet, 200-250v. AC. 50-60 c.p.s.
A.3658 Price: 32 gns. *including p. tax.*

PHILCO

takes the laurels

Stand No. 15 at the show

All Philco sets for Britain are made in Philco's own factory at Chigwell, Essex.

A.3606
5 valve, 2 waveband AC/DC 200/250v. fully tropicalized. In-built aerial. 14 gns. *including p. tax.*

A.3632
4 valve, 2 waveband battery portable with in-built aerial. 13 gns. *including p. tax* (Batteries extra).

A.3650 and A.3650U
5 valve, 3 waveband, Gram. & extn. speaker sockets. AC Mains (Model U AC/DC) 200/250 v.
20 gns. *including p. tax.*

A.3654 and A.3608
5 valve, 3 waveband, Pick-up sockets AC mains (A.3608 AC/DC) 105/250 v.17½ gns. *including p. tax.*

A.3656 and A.3656U
6 valves including magic eye tuning, 3 waveband, Gram. & extn. speaker sockets, AC mains (Model U AC/DC) 200/250 v. 23 gns. *including p. tax.*

RADIO SHOW PREVIEW

(*continued*)

Model 59 is a neat console receiver, finished in contrasting veneers. The automatic record changer unit plays both standard and long-playing records and the radio section covers the long, medium, short and f.m. wavebands (59 gns.).

A table receiver (Model 37) incorporating these wavebands and featuring a highly polished wooden cabinet is available at 27 gns. All prices tax paid.

J.B. Manufacturing Co. (Cabinets), Ltd.

86 *Palmerston Road, Walthamstow, E.17*

STAND No. 219 Following their usual custom, J.B. present the radio, radiogram and television cabinets which they manufacture for their customers in the industry. A further item of great interest to the set manufacturer this year will be the panoramic scene of the new J.B. factory at Harlow, Essex, which is rapidly nearing completion, and which, when finished, will be the most up-to-date and one of the largest factories in Europe, solely engaged in the manufacture of cabinets for radio and TV.

J-Beam Aerials, Ltd.

Weedon Road Industrial Estate, Northampton

STAND No. 104 The exhibit comprises a comprehensive range of Band I and Band III television, v.h.f. radio, and communication aerials, complete with ancillary equipment. Band I television aerials range from the indoor *J-Flex* to extreme fringe arrays, and will include a complete new *J-Mast Minor* series, vertical and horizontally polarised, two and three element, of robust mechanical construction with assembly features of the established *J-Mast* aerials and a high electrical performance.

Various types of Slot Beam Arrays will comprise the Band III range. These are constructed for simple attachment to existing aerials, and designed for maximum gain, with a minimum of ghosting and interference.

Kerry's (Great Britain), Ltd.

Warton Road, Stratford, London, E.15

STAND No. 203 Kerry's are again exhibiting an extensive range of the latest types of sets and equipment marketed by leading manufacturers. The stand gives a cross-section view "under one roof" of the newest models being shown this year; dealers have the opportunity of making on-the-spot inspection and comparison of the many varied products now available.

Manufacturers represented include—Alba, Argosy, Champion, Ever Ready, G.E.C., Marconi, Regentone and Valradio. Amongst the many exhibits on show is a comparable range of radios, television sets, radiograms, tape recorders, electric gramophones and service equipment of all descriptions.

In keeping with their usual practice, the Kerry Stand is staffed throughout the duration of the show by their own representatives. A welcome is extended to all traders, whether customers or not, to discuss matters and receive advice and guidance from the sales personnel responsible for supplying the dealers home territory.

Invicta's exhibit includes the Model 26 *Vicki* battery portable (right) and Model 59 a.m.-f.m. radiogram.

Kolster-Brandes, Ltd.

Footscray, Sidcup, Kent

STAND No. 16 All K-B television receivers are fitted with turret tuners covering Bands I and III, contramatic picture control (for reducing or eliminating all types of interference) and mirror-backed rectangular tubes for extra brightness in daylight viewing. K-B continue their policy of large screen direct viewing pictures and their exhibit includes new 21in. models.

There are five new models on show. The MV30 is a 14in. table receiver similar to the LVT30 but providing a choice in cabinet design (66 gns.). MV50 is a 17in. table model (78 gns.) and the MV60 is a fringe area version (80 gns.). MF50 is a 17in. console without doors (88 gns.). The fifth new model is the MV100, a 21in. table receiver with detachable metal legs enabling the set to be used as a table or a console model as required (115 gns.).

An inexpensive a.m.-f.m. receiver shown by Kolster-Brandes, the 6-valve 3-waveband Model MR10.

Among other K-B television receivers on show is the LFT100, a 21in. de-luxe console in a compact cabinet with full-length doors and with all the important controls situated at the front (148 gns.). Turret-type 12-position adaptors for Band III are exhibited—they are suitable for all but the very earliest K-B receivers and fit snugly inside the cabinet with only the selector knob protruding (6 gns.).

Two new radio receivers are shown. The FB10FM is the f.m. version of the established FB10, an a.c. midget portable with inbuilt Ferrite rod aerial. It can be used as a standard f.m. receiver or, by switching, may be used as an adaptor to feed an existing a.m. receiver (14 gns.). Also shown is the MR10, a 6-valve 3-waveband receiver in a moulded bakelite cabinet and, at 20 gns., the cheapest a.m.-f.m. receiver in the exhibition.

A new radiogram is the MG30 which features a three-speaker approach to high fidelity known as *Tri-Fi* and embodies three matched and balanced speakers mounted in angular planes with an unusual baffle arrangement (72 gns.). The LG40 is a 9-valve radiogram incorporating a 3-speed record player for standard and long-playing records, a 4-band a.m.-f.m. radio chassis, a 10in. speaker and storage space for 270 records (88 gns.).

Labgear (Cambridge), Ltd.

Willow Place, Cambridge

STAND No. 204 Labgear are showing a wide range of aerials to cover Band III and also combined models covering both Bands I and III. The Band III models are for use with existing Band I aerials. A printed circuit type of cross-over network is available for feeding both signals into a single coaxial downlead. There is a 3-element indoor aerial with high gain and a very discriminating pattern. Among the outdoor versions is a basic 4-element wide-spaced unit which provides considerably more pick-up than the closely spaced arrays. It is available with a wide variety of accessories, such as a special adaptor fixing for attaching the aerial to the mast of an existing Band I aerial without removing this from the chimney stack.

Aerials for both Band I and Band III transmissions include an indoor loft mounting version and an outdoor model. All types are equally effective whether the Band I and Band III transmitters are on the same site or widely separated. Two of the standard 4-element units may be used side by side under fringe reception conditions. Prices range from 19s. 6d. to £5 10s.

Linguaphone Institute, Ltd.

207-209 *Regent Street, London, W.*1

STAND No. 207 The stand features Linguaphone courses in French, German, Spanish, Italian, Russian, English, Dutch, Persian, Polish, Swedish, Afrikaans, Esperanto, Chinese, Hebrew, Modern Greek, Swahili, and other languages. The courses comprise special records and illustrated textbooks giving, in easy stages, the mastery of the structure, grammar, idiom and accent of the languages, and it is claimed that a student quickly acquires the correct accent and intonation, absorbs the "feel" of the language and acquires conversational fluency.

McMichael Radio, Ltd.

190 *Strand, London, W.C.*2

STAND No. 40 The range of television receivers includes Model C417FM which is a 17in. console television set in a de-luxe cabinet incorporating an entirely separate radio unit covering long, medium, short and f.m. bands. Each receiver is independent, using separate valves and speakers. Priced at 115 gns. the television chassis is similar to the standard 17in. models and the radio chassis is the same as the Model FM55.

Model TM417 is a 17in. table model featuring high efficiency interlace circuit, a direct drive line output circuit, automatic brightness control, built-in aerial filter, improved black spotter and a 12-channel turret tuner.

The chassis uses 17 valves and 6 germanium rectifiers and a built-in aerial filter for suppression of v.h.f. signals and short wave harmonics. Circuit precautions ensure that mishandling of the auxiliary controls (concealed behind hinged panel) will not result in complete loss of the picture and that once disturbed it can be quickly and accurately re-set.

The TT4, a novel McMichael television trolley with combined 4-valve radio.

Model TM54A is a 14in. table model with a similar technical specification. Prices are 75 gns. (TM417) and 66 gns. (TM54A). Converters for 12-channel selection are also on show (£10 17s. 6d.).

An unusual item is the Model TT4, which is a television trolley with an in-built 4-valve, 2-waveband superhet a.c.-d.c. radio (£25). The receiver has in-built aerials, provision for pick-up insertion and a sensitive 6½in. speaker. There are sockets into which the mains lead from the television receiver may be plugged, to avoid the need for extra power points and/or unsightly leads.

There are several a.m.-f.m. radio sets. Model FM55 is a 6-valve 3-waveband receiver with a built-in fero cube aerial, a 10in. × 6in. elliptical speaker, negative feedback tone control system, magic-eye tuning indication and flywheel drive (29 gns.). The console Model 255 uses the same chassis but incorporates a 10in. high flux round speaker and separate bass and treble tone controls (42 gns.).

The VT69DA is a new Marconiphone 17in. 13-channel table television receiver.

Model 555 is a bureau radiogram similar to the Model 255 but with a 12in. speaker of special design. The gramophone equipment comprises a Collaro RC54 3-speed record changer and there is provision for storing records (75 gns.).

The Marconiphone Co., Ltd.

Hayes, Middlesex

STAND No. 50 Four new television models are featured: a 14in. and 17in. table model (Model Nos. VT68DA and VT69DA respectively) and a 14in. and 17in. console model (Model Nos. VC68DA and VC69DA respectively)—all housed in distinctive, highly-polished cabinets of modern design, with full-length doors on the 17in. console which fold back for viewing.

Circuit features includes highly sensitive 17-valve circuit; flat-faced aluminised Emiscope tube; inbuilt dark screen and special non-reflecting mask; stable pre-set permanent magnet focusing system. A special vision a.g.c. circuit counteracts fading, aircraft flutter and differences in signal strength between Band I and Band III signals, and so obviates major adjustments by the user when switching from one band to the other.

Appearing for the first time is a new range of radio receivers and radiograms, most of them catering for v.h.f. as well as normal long and medium wave reception.

Model T42A is a 6-valve table receiver for a.c. mains in a handsome polished cabinet. It covers the long, medium and v.h.f. bands, and incorporates a 10½in. elliptical speaker, sockets for pick-up and external speaker, and a vertical floodlit scale. Model T43DA is the latest version of the well-known Marconiphone *Companion* receiver—a 4-valve a.c.-d.c. model covering long and medium waves and incorporating an efficient internal Ferrite rod aerial.

A new table radiogram is Model TARG44—a compact instrument giving excellent reception on the long, medium and v.h.f. bands, and first-class reproduction of all types of records via a 3-speed autochanger and high-quality crystal pick-up.

The two new console radiograms—ARG45 and ARG46—are designed on very compact lines in a modern styling. The former uses contrasting colours of walnut and sycamore, while the latter is finished throughout in a walnut shade. Both provide record storage compartments. Technical specifications of both models include: 6-valves; long, medium and v.h.f. reception; 5 watts output; 3-speed auto-changer; high-quality crystal pick-up.

Masteradio, Ltd.

*Fitzroy Place, London, N.W.*1

STAND No. 36 All Masteradio television receivers have the following as standard features—13-channel tuning, ion-trap, cabinets designed for wide angle viewing, flyback suppression, automatic picture control, a.g.c. on sound, adjustable picture interference suppression, mask easily removable for cleaning (except

Model TE21C), and all are superhet receivers for operation on a.c.-d.c. mains except Model TE21C (a.c. only).

Model TE4T/3 is a 14in. table receiver in a bow-fronted cabinet, finished in walnut veneer (67 gns.). Model TE21C is a 21in. receiver in an imposing console cabinet, for a.c. operation only (126 gns.). Models TE7T/3 and T7C/3 and both 17in. models, the first being a table model with front facing speaker and the other is a console model with full-length doors (79 gns. and 104 gns.).

Among the radio receivers there is the Model D155 (*The Harlow*), a 5-valve 2-waveband a.c.-d.c. superhet in full-sized walnut veneered cabinet which is also available with medium and trawler bands, or medium, long and short band (14½ gns.). *The Elstree* (Model D157) is an a.m.-f.m. table receiver in a walnut veneered cabinet and covering four wavebands. (34 gns.). *The Ripon* (Model D154) is an a.c. table model covering three wavebands and housed in a walnut veneered cabinet (21 gns.). *The Sandown Sapphire* (Model D121) is a neat receiver in a plastic cabinet available in various colours, covering two wavebands and operating from a.c. or d.c. mains (£13 15s.).

Several radiograms are shown on the stand. *The Mastergram* (Model RG356) is a table radiogram covering short, medium and long-wave bands and fitted with a 3-speed auto-changer (38 gns.). *The Epsom* (Model RG355) is a console radiogram incorporating a 3-speed autochanger and providing ample record storage space (49 gns.). *The Cheltenham* (Model RG357) is an a.m.-f.m. console radiogram incorporating a 3-speed autochanger and providing record storage space (price not fixed).

Mullard, Ltd.

Century House, Shaftesbury Avenue, London, W.C.2

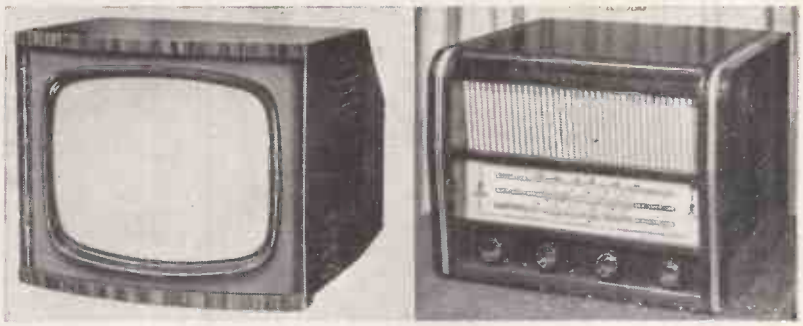
STAND No. 18 On the main stand (No. 18) the theme is of an educational character. Animated demonstrations will explain television, high-fidelity sound reproduction, transistors and frequency modulation. Selected Mullard products are displayed, along with indications of how they are made or used and the importance of research in ensuring progress in electronics is similarly illustrated.

In the centre of the stand educational leaflets are available, explaining in lay terms the functioning of transistors, frequency modulation radio, television, cathode-ray tubes, radio, and radio valves. A new booklet entitled *Television, It's Wonderful* is to be distributed.

High-fidelity enthusiasts, including those who like to make their own equipment, will find much of interest in Demonstration Room D1A. Both the well known Mullard 5-valve 10-watt high quality amplifier circuit and a new 20-watt design are being demonstrated. The 20-watt amplifier circuit uses the new Mullard EL34 output pentode.

Demonstration Room D30 is a "Dealers' Rendezvous" where members of the radio trade are able to see the latest dealer aids, and publicity material, and to talk with Mullard representatives. The latest High Speed Valve Tester is demonstrated.

Demonstration Room D1 is specially for the equipment maker. Manufacturers are invited to this private demonstration room to inspect tubes and components for 90° scanning; transistors for hearing aids; a new grade of "Ticonal" for loudspeaker magnets; and "Ferroxcube" cores for computors.



Two of the Masteradio exhibits. Left—Model TE4T/3 14in. receiver with bow-fronted cabinet. Right—RG356 *Mastergram* table radiogram with short, medium and long wave radio.

Multicore Solders, Ltd.

Multicore Works, Maylands Avenue, Hemel Hempstead, Herts

STAND No. 63 This year Multicore are showing by practical demonstrations how Ersin Multicore solder is used in the manufacture of radio receivers. Operatives from the Radio Gramophone Development Co. using Ersin Multicore solder wire, will show visitors to the stand the complete wiring, assembling and soldering of the new R.G.D. mains-battery portable radio receivers.

It is estimated that more than 20,000 solder joints, using Ersin Multicore 5-core Solder will be made during the run of the show, utilising nearly 5,000 component parts. Daily deliveries of new parts and bare chassis to this miniature factory assembly line, will coincide with the collection of completed chassis which will then be returned to the R.G.D's Romford works for final test and boxing.

New lines shown for the first time on the stand include a new 2s. 6d. Home Constructors' Pack, which has been designed specifically for the amateur enthusiast and contains 20ft. of 18 s.w.g. high-quality 60/40 alloy Ersin Multicore solder wound on a reel.

The Bib wire stripper and cutter which is now fitted with 4BA and 6BA spanner holes in the handles is also exhibited. This three-in-one tool will not only strip insulation from most thicknesses of wire but will also cut wires and split extruded plastic flex. Adjustment for various thicknesses is carried out by a small disc on the stripper. Bib strippers, which retail at 3s. 6d. are packed in individual instruction boxes and one dozen per display carton.

Seen also for the first time at a National Radio Show is the new Bib recording tape splicer. This precision-made tool enables recording tapes to be jointed and edited professionally. The splicer is made from nickel-plated brass and a razor cutter is included which fits conveniently underneath. It is packed complete with instruction leaflet and helpful hints on tape splicing and retails at 18s. 6d.

Another new product, of which a prototype was shown at the Radio Components Show, is the Bib solder thermometer. This simple form of pyrometer will enable users of soldering irons and solder baths to determine quickly the temperature of the solder on the iron or in the bath.

The instrument is completely self-contained and comprises a meter movement which is connected to a thermo-couple mounted at the end of a tube attached to the meter. A scale is graduated in degrees Centigrade and Fahrenheit and the maximum temperature to which the instrument should be subjected is 400°C. (752°F.).

The Bib solder thermometer will be supplied direct to factories at a nett price of £6 12s. 6d.

Murphy Radio, Ltd.

Welwyn Garden City, Herts.

STAND No. 29 The full range of radio, television and radiogram models is shown, one example of each set in the television range being shown working. All television sets incorporate turret tuning and all models in current production up to 17in. are for a.c. or d.c. mains, adjustment being by means of a rotary switch.

The fringe area versions all feature gated a.g.c. on vision and flywheel synchronisation. V240 is a table model with 14in. tube (£69 15s.) and V240C is the console version (£79 10s.). V250 is a 17in. table model (£81 10s.), V250C is the console version (£89) and the V250AD is the console version with doors (£110). Two types of converters are shown, both priced at £7, for internal or external attachment to Band I receivers.

Among the radio receivers are the three a.m.-f.m. Models A242, A362 and A262 and the A242R (£108) which is a radiogram version of the A242. Other radio receivers include the portable mains-battery Models BU183 (£18) and BA228 (£23), the all-dry battery portable B229 (£19 15s.) and the small mains receiver U198 (£13 10s.).

(*Continued on page 457*)

Come and say Hullo!

We'll be delighted to see you

TELESURANCE LTD.

RADIO SHOW—STAND 302

37 FITZROY STREET, LONDON, W.1

RADIO SHOW PREVIEW

(*continued*)

George Newnes, Ltd.

Tower House, Southampton Street, London, W.C.2

STAND No. 107 The stand will feature *Practical Television* and *Practical Wireless*. There will also be a complete display of technical books on subjects covering all aspects of Radio and Television.

All magazines and books on display will be available for sale to the public.

Pam (Radio & Television), Ltd.

295 Regent Street, London, W.1

STAND No. 61 The Pam range consists of four television sets, four radio receivers, one radio-gramophone and record reproducers. All television sets are tunable over 13 channels on Band I and Band III and are for use on a.c. or d.c. mains. The company continues its policy of marketing table television sets in high-quality cabinets with doors.

Model 750 is a popular 14in. table set incorporating new features and housed in a small compact cabinet with walnut veneers and dark screen for reducing light reflection and improving daylight viewing (63 gns.).

Model 751 is a 14in. de-luxe table set utilising the same chassis as model 750. The feature of this receiver is its high-quality cabinet finished in walnut veneers and fitted with doors (67 gns.).

Model 752DL is a luxury table receiver with a 17in. tube. The set is designed to give the best possible picture in areas where the signal strength is weak (84 gns.).

Model 753C is a de-luxe 17in. console in a cabinet with full-length doors, using the same chassis as Model 752DL (99 gns.).

In the radio display is the Pam Pixie Portable, a lightweight battery set using a printed circuit chassis and housed in a cabinet covered with a new "Rexine" of turquoise blue and a black diamond pattern (11½ gns.).

Model 701 is a 7-valve a.m.-f.m. receiver featuring a built-in ferrite aerial for long and medium-wave reception, a built-in aerial for f.m. reception in areas with a strong signal, flywheel tuning, and a 3-position tone control. Housed in a cabinet finished in light walnut veneers this receiver covers four wavebands (28 gns.).

Pamphonic Reproducers, Ltd.

17 Stratton Street, London, W.1

STAND No. 34 This exhibit features amplifiers and associated equipment for p.a. and other purposes, also the Pamphonic delayed sound reinforcement system.

The three main transportable amplifiers are the type 600V, 10 watt, selling at £30; the 601V, 30W selling at £40 10s.; and the 602V, 50W selling at £54. Accessories include a mixer panel, a preamplifier and a microphone mixer unit.

Model 1002/1002A is a high-fidelity 25 watt amplifier with preamplifier, price £42.

The company are also exhibiting a comprehensive range of loudspeakers of various types, microphones, and, in addition, a 4-waveband radio receiver designed for rack mounting with built-in monitor loudspeaker, a pretuned 4-station a.c. mains superhet for rack mounting or transportable use, and a 3-speed portable record player with two lightweight magnetic pick-up heads.

The 25-watt high-fidelity amplifier Model 1002 and the pre-amplifier unit Model 1002a shown by Pamphonic.

A new item is the "Super-phonic" *Westcott* reproducer, a console instrument of modern design incorporating a Garrard RC111 record changer with turnover crystal pick-up, used in conjunction with a push-pull negative feedback amplifier. The cabinet contains storage space for 50 records. Price 45 gns. in oak, or 46 gns. in sapele mahogany.

Permanoid, Ltd.

New Islington, Manchester, 4

STAND No. 111 A comprehensive range of television downlead and high frequency cables is displayed together with many other types of special screened leads and microphone cables which will be of interest to the radio and electronic engineer. Cables insulated with the new dielectric expanded polythene will be a feature of this stand.

Arrell television aerials which have been specially designed to meet all the requirements of reception for Bands I, II and III will also be shown. These aerials range from fringe area arrays to simple dipoles for local reception and incorporate a unique insulator which is both resilient and watertight.

A further product by Arrell is a newly designed coaxial plug which possesses many unique features and can be fitted to coaxial cables of varying diameters.

Peto-Scott Electrical Instruments, Ltd.

Addlestone Road, Weybridge, Surrey

STAND No. 55 Featured prominently is the "16" series of television receivers, which consists of a 14in. table model (1416T), a 17in. table model (1716T) and a 17in. console (1716C). All are housed in walnut-veneered cabinets, the 1716C having full-length doors, the table models having 7in. front facing elliptical speakers and the console a conventional 8in. speaker.

The chassis are the same in each model and incorporate a 21-valve circuit for a.c. mains operation. The instrument incorporates a 13-channel turret tuner unit consisting of a cascode r.f. amplifier which is a.p.c. controlled, and a mixer stage giving an i.f. of 34.65 Mc/s. Three stages of i.f. amplification follow, the first two of which have a.p.c.

A variable vision diode noise limiter is fitted prior to a new designed video output stage in a cathode follower output circuit. A frame clipper shapes the frame pulse used to trigger the blocking oscillator. The line time-base uses a multivibrator, driving an output circuit of extremely simple type and much improved reliability. E.h.t. is 14 kV.

Two sound i.f. stages are used, the first of which is a.g.c. controlled, followed by a germanium diode detector. A further diode is used as an interference limiter and a triode pentode output circuit incorporates negative feedback.

The h.t. rectifier is protected by a limiting circuit and the complete heater chain is also operated via a current surge resistor.

Tax-paid prices for these models are: 65 gns. (1416T), 79 gns. (1716T) and 107 gns. (1716C).

Philco (Great Britain), Ltd.

Romford Road, Chigwell, Essex

STAND No. 15 The following range of models for the domestic market is on view: a.m. receivers, 2 and 3 waveband in a.c. and a.c.-d.c., in various colours; portable models in battery and a.c.-d.c.; a.m.-f.m. models in a.c. and a.c.-d.c.; push-button car radios for medium, long, and short-wave reception, in 6 and 12 volt; 14in. and 17in. table television models and 17in. and 21in. console television

One of the Peto-Scott "16" series of television receivers—the Model 1716T, a 17in. model with 7in. elliptical speaker.

models. All employ 13-channel tuners for reception of B.B.C. and I.T.A. programmes.

In addition there is a comprehensive range of fully tropicalised export models on display, including a compact 6-band receiver for complete short-wave and medium-wave reception, operating on all standard a.c.-d.c. mains, or dry battery. Multi-band table model receivers are available with new cabinet styling and choice of decorator colours, also a tropicalised table radiogram, including complete short-wave coverage, de-luxe automatic changer, modern cabinet styling, and operating from all standard a.c. mains.

Other export models include tropicalised auto radios and a shortwave converter to convert any brand of auto radio to world-wide shortwave reception on five spread bands.

Philips Electrical, Ltd.

Century House, Shaftesbury Avenue, London, W.C.2

STAND Nos. 27, 42 & 43 Three stands provide separate settings for radio and television, record-playing equipment and gramophone records. As in previous years, a warm welcome awaits Philips dealers at the Dealer Centre (D.16) which will be manned by Philips sales staff and representatives.

The *Music Maid*—Model 342A—is a combined 5-valve radio receiver and alarm clock. It will act as an ordinary alarm clock, switch the radio on at a pre-set time, and switch the radio off and on again at pre-set times. In addition, it is provided with a special socket for the attachment of any auxiliary electrical apparatus of up to 5 amps rating. This can be made to operate independently of, or in conjunction with, the radio. The *Music Maid* is suitable for operation on 200-250v a.c. 50 c/s and has a 5in. speaker and built-in tuned frame aerial. It is housed in a maroon and cream plastic cabinet (22 gns. tax paid).

Model 543A is a high-quality radio receiver for reception of a.m. and v.h.f. f.m. programmes. It embodies a number of refinements including a rotatable ferroceptor for long and medium-wave reception, a built-in v.h.f. f.m. dipole (which acts as a plate aerial on the short wave), a 7in. double cone loudspeaker and push-button controls (30 gns. tax paid).

Model 643A is a luxury version of the 543A with a cabinet of highly polished wood. It has an 8in. double cone speaker which may be switched off when the external speaker is in use. There is an EM80 "magic-eye" tuning indicator, and visual tone controls are also provided (48 gns. tax paid).

A new car radio, the *MotoRadio*—Model 344V—marks Philips re-entry into this market. Special attention has been paid to the matter of shape and dimensions, and the finished product is a small, compact unit which is designed to fit in the space provided for radio in most British cars. It is for 12v. operation, easily adjustable to 6v., with a 5in. speaker with universal baffle. The metal casing of the set is finished in grey hammer lacquer with a silver-coloured front escutcheon (21 gns. tax paid).

Television

The television range includes Model 1446U, a 14in. table receiver mounted in a wooden cabinet. It is suitable for operation on 200-250v. a.c. 50 c/s or d.c., and is fitted with a 5in. speaker and Philips multi-programme turret tuner for Bands I and III (66 gns. tax paid).

Model 1746U is a 17in. table receiver with a 7in. speaker and two-band turret tuner, for operation on 200-250v. a.c. 50 c/s or d.c. (78 gns. tax paid).

Model 2157U is a console television receiver incorporating a 21in. aluminised tube and 10in. speaker, for operation on 200-250v. a.c. 50 c/s or d.c., with two-band turret tuner. Flywheel line synchronisation and automatic gain control on sound and vision are special features of this model.

Model 2347A is a 23in. console projection television receiver, incorporating a 10in. speaker and a turret tuner, for operation on 200-250v. a.c. 50 c/s. Electro-magnetic focusing with automatic picture brightness control and constant current focus valve are special features (150 gns.).

Model 1756U, is a new table receiver with a 17in. tube and 7in. speaker, with turret tuner, for operation on 200-250v. a.c. 50 c/s or d.c. Automatic gain control on sound and vision and flywheel line synchronisation are incorporated.

A Band III adaptor kit has already been made available for certain Philips television receivers. The tuner is internally mounted and full particulars were recently circulated to the trade. An external type (AT7522) has now been introduced for earlier models with plug-in coils and will be exhibited at the Show.

Radiograms, etc.

Record playing equipment on Stand 42 includes Model 644A (the *Fidelio*), a 6-valve, 3-waveband console radiogram incorporating a 10in. speaker, automatic 3-speed changer unit with pick-up having a diamond stylus for long-playing records and a sapphire stylus for standard groove records. Suitable for operation on 110-150/250v. a.c. 50 c/s. (85 gns. tax paid).

Model 653A (the *Eroica*) is a console radiogram for reception of a.m. and v.h.f.-f.m. programmes. It has a 10in. double cone speaker, a built-in v.h.f.-f.m. dipole, push-button controls, 3-speed autochanger and two playing heads carrying a diamond stylus for long-playing records and a sapphire stylus for standard groove records (98 gns. tax paid).

The 654A is a console radiogram for reception of long, medium and v.h.f.-f.m. stations.

A new model—the *Autosonic Disc-Jockey* AG2124—is a record player incorporating all the features of the AG2121, plus a push-button 3-speed autochanger unit.

Model AG1003 is an automatic record changer unit of new design for home radiogram construction, for installation in existing radiogram or for use with home amplifiers. It is suitable for operation on 220/110v. a.c. 50 c/s. Push-button controls are provided, with a Philips "Featherweight" pick-up and twin sapphire styli for microgroove and standard groove records. High-fidelity pick-up heads may be purchased separately. The baseplate measures 13¾in. wide × 12in. deep.

Three Philips exhibits. Left—AT7522 Band III tuner. Centre—344V Motoradio. Right—2157U 21in. television console.

Pilot Radio, Ltd.

Park Royal Road, London, N.W.10

STAND No. 56 The Pilot range of exhibits includes a new range of television f.m. and radio. The new television range consists of one 14in. table model, one 17in. table model and one 17in. double door console. The 17in. table model has as an optional extra, a special stand, converting it to a console. All cabinets are in contemporary styling finished in contrasting veneers. Tygan covers frontal speakers. The latest model is a 21in. console, DDC121.

All models are for a.c. mains (180/250 volts 50 c/s) employing aluminised tubes. Other important features include the Duo-optic filter in which the face of tube and filter glass are specially tinted, providing a double safeguard against unwanted reflections. Built-in turret tuners are used for 13-channel reception, coils being fitted to all sets for channels 1, 2, 3, 4, 5, 8, 9. Automatic gain control and flywheel sync to eliminate tearing and ragged edges of picture are standard features.

The 14in. table model (TV94) has a frontal elliptical speaker, as also has the 17in. table model (TV97). The de-luxe console (DCC97) has an 8in. speaker and is mounted on casters for easy movement. Tax paid prices are 69 gns., 80 gns. and 105 gns. respectively.

Among the radio exhibits is the well-known *Little Maestro* mains-portable with built-in Ferroxcube aerial and polystyrene moulded brown or cream cabinet (£15 10s.), the BM90 3-way portable with Ferroxcube aerial and contemporary attache-type case finished in leather-cloth in a choice of three shades (£18 10s.), and the 85 and 85U, the a.c. and a.c.–d.c. versions of a 5-valve 3-waveband table radio with side controls (18 and 19 gns.).

The T91 is a table radio in a cabinet of contemporary design covering the f.m. band in addition to medium, long and short wavebands (30 gns.). The T92 is identical except that the standard short waveband is replaced by a trawler band. The RGA101 is a luxury radiogram in a bureau-type cabinet and accommodation for over 120 records.

The gram compartment (fitted with a Garrard 3-speed autochanger catering for all record sizes and using a lightweight magnetic pick-up) automatically lights up when the set is switched to Gram and the bureau flap is felt covered for protection of records and as an aid to acoustics. The radio chassis uses nine valves, with push-pull output, a 10in. high-flux p.m. speaker, and coverage of long, medium, short and f.m. bands, with a built-in aerial for the f.m. band (82 gns.).

Pilot are also showing a special range range of receivers to suit the varying requirements of each market overseas.

Plessey Co., Ltd.

Vicarage Lane, Ilford, Essex

STAND No. 122 The company are showing a wide range of radio components, available exclusively to radio manufacturers

throughout the world, including air and compression trimmers; coils and chokes; small fixed capacitors; electrolytic capacitors; variable capacitors; drive mechanisms and tuning motors; loudspeakers; iron dust cores, rotary and slider wavechange switches; mains, output and i.f. transformers; valve holders; synchronous and non-synchronous vibrators; miniature components; television components; s.h.f. components; plugs, sockets and terminal panels; suppressors; mechanical and electrical ceramics.

Portogram Radio Electrical Industries, Ltd.

"Preil Works," St. Rule Street, London, S.W.8

STAND No. 65 Included in the exhibit is a large and varied range of portable record reproducers, record player units and amplifiers, in addition to a comprehensive range of record storage cabinets and a special section devoted to stylii of all types and accessories. Two interesing new models are being shown.

The HF/65 high-fidelity plus 3D console record reproducer, is of novel design, and operates primarily in the corner of a room, but can be placed in any other position if desired. It incorporates three directional sound deflection, using twin matched speakers working in conjunction with a Portogram hi-fi amplifier with bass, treble and 33-78 matching network controls and a stu:io three-speed mixer changer; with record storage and provision for the addition of f.m. feeder unit. (65 gns.)

The TR/100 takes the form of a console 3-speed tape recorder, incorporating the Portogram Hi-fi amplifier and bass reflex loudspeakers. It has storage compartments for records and tapes and provision for record reproducer, f.m. radio and microphone. (From 100 gns.)

Established lines include the *Junior Eight*—a 5-valve amplified reproducer available in five models, the *Priel Twenty*—a portable 25-watt, 6-valve amplifier (£36 10s.), the RP54—a 3-speed record player with autochange (£13 17s. 6d.) and the record storage cabinets RS1, RS2 and RS3 (£9—£12 15s.).

The Portogram A28 and A33 3-valve amplified reproducers with 3-speed fully mixing autochangers are also on show. (28gns and 33gns.)

Pye, Ltd.

Cambridge

STAND No. 30 The exhibit features the company's latest models, all of which incorporate black screen, automatic picture control and 13-channel tuning, ranging from a 14in. table model at 67 gns. and a 14in. console at 71 gns. to the Luxury 17in. table model at 81 gns. and the Luxury 17in. consoles in contemporary and traditional styling at 100 gns. and 105 guineas.

For those owners of older Pye TV sets who want to receive the new commercial programmes, Pye are exhibiting special adaptor units.

Pilot's latest luxury radiogram, the RGA101, incorporating a 9-valve a.m.-f.m. radio section.

With the advent of the new v.h.f.-f.m. transmissions, the company present their new range of *FenMan* f.m.-a.m. radios and radiograms, specially designed to take full advantage of the extended frequency range and noiseless characteristics of f.m. broadcasting.

The new Pye *FenMan II* table radio at 38 gns. and *FenMan IIRG* radiogram at 85 gns. also incorporate multiple loudspeaker systems which produce an almost three-dimensional quality of sound. The *FenMan I* is a smaller table receiver at 28 gns. and the *FenMan IRG* radiogram is priced at 65 gns.

Other a.m. receivers available include a transportable model in a plastic cabinet at £16 10s., and more powerful table models at 19 gns. and 23 gns. Pye also introduce their new *Jewel Case* portable radio for mains-battery or battery only operation.

A complete range of Hi-Fi amplifiers and reproducers is shown, including the *Black Box*, *Cantata* and *Concerto* loudspeaker systems. Demonstrations of Pye hi-fi and of *Nixa* and *Polygon* records will take place in the Pye demonstration room D.5.

A wide variety of export models are shown, including the new *Golden Star* range of receivers. The Pye export television receiver, Model V1000, in a luxury cabinet, designed specially for overseas markets, incorporates Pye black screen and automatic picture control, and provides a constant black level, regardless of variations in signal strength.

R.C.A. Photophone, Ltd.

36 Woodstock Grove, London, W.12

STAND No. 110 Featured here is the R.C.A. high-fidelity amplifier shown for the first time. Features of this instrument are the imperceptible distortion factors, the maintained peak power output to extreme limits of the frequency spectrum, the versatility of exact control facilities, disc record compensation to 1955 R.I.A.A. agreed standards of the record manufacturers and variable loudspeaker damping to reduce inherent distortion of the loudspeaker assembly.

Inbuilt mixing facilities for microphone to other inputs are incorporated. An extensive system of low-pass filtering and variable filter slopes enables not only high-fidelity recordings to be reproduced with startling realism, but collectors vintage recordings to be given an acceptable reproduction standard.

This combined equipment is to be marketed at a retail price of £48. Individual units will be priced at £28 12s. 6d. for the main power amplifier and £19 7s. 6d. for the pre-amplifier control unit.

Also shown is a range of microphones, four track magnetic sound reproducers and amplifier equipment for stereophonic sound systems.

Radio Gramophone Development Co., Ltd.

Eastern Avenue West, Romford, Essex

STAND No. 11 R.G.D's new season's range of television receivers includes two table models and two consoles, all catering for 13-channel reception on Bands I and III. Model 1455T is a 14in. table receiver with a 17-valve chassis with automatic picture control, "Syncrolock" line circuit, and frame flyback suppression, housed in an attractive cabinet of modern design with front controls. Price 72 gns. tax paid.

The 17in. version, Model 1756T, is priced at 79 gns. tax paid, and the equivalent 17in. console receiver which has a 10in. p.m. speaker, costs 89 gns., tax paid.

Model 1755C is a luxury console receiver with a 17in. screen, 17 valves and 13-channel tuning. The cabinet, which is finished in walnut veneer, has full-length folding-back doors. Sound output is via a 10in. speaker. Circuit features include "Syncrolock" and frame flyback suppression. Price of Model 1755C is 110 gns., tax paid.

The company are also showing their range of radiograms, radio receivers, and record players. The *Three-Ten* is a 6-valve 3-waveband radiogram with hi-fi push-pull output via a 10in. p.m. loudspeaker. Power output is 6 watts with less than 1 per cent harmonic distortion. A 3-speed mixer autochanger is incorporated fitted with turnover crystal pick-up and sapphire styli. The instrument, which is housed in an attractive walnut-veneered cabinet, costs 59 gns. tax paid.

The *Three-Fifteen* radiogram caters for the new v.h.f. f.m. service in Band II in addition to the normal long, medium and short wavebands. The circuit is a 7-valve superhet, with push-button waveband and gram. selection. Output is 3 watts into a 10 p.m. speaker. A tuning indicator is fitted. The gram. side comprises a 3-speed mixer autochanger with turnover pick-up head. Cabinet is finished in selected walnut veneers. Price 65 gns. tax paid.

The *Two-Ten* is a table radiogram with twin 6½in. speakers and a 6-valve 3-waveband chassis with built-in Ferrite rod aerial. A 3-speed Collaro autochanger is fitted. The instrument, which is housed in a walnut-veneered table-top cabinet, costs 42 gns. tax paid.

The *Five-o-Five* is an automatic record player incorporating a Collaro RC54 3-speed autochange unit, housed in a Rexine-covered wood case, for operation on a.c. mains, 200-250V. Price 22 gns. tax paid.

Radio Society of Great Britain

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

STAND No. 310 The main features of the R.S.G.B. stand are "live" demonstrations on a closed circuit of amateur television and a

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RADIO SHOW PREVIEW

(*continued*)

replica of a typical low-power amateur station of the type that takes part in the annual R.S.G.B. National Field Day, the most popular outdoor event in the amateur radio calendar.

A novel exhibit, incorporating an automatic morse sender, has been designed to draw attention to the slow morse practice transmissions sponsored by the society for the benefit of those wishing to take the G.P.O. morse test for an amateur transmitting licence.

Members will be available throughout the Show to answer questions on all aspects of the society's work—amateur transmitting, television, receiving, etc. They will be particularly pleased to help newcomers to the hobby.

Publications for the amateur radio enthusiast including *A Guide to Amateur Radio*, the *R.S.G.B. Amateur Radio Call Book* and the society's journal will be on sale. The current issue (August) of the latter gives details of a high performance converter for Band III.

Radio and Television Retailers Association

15-17 *Goodge Street, London, W.*1

STAND No. 302 On the R.T.R.A. stand retailers will be able to discuss and obtain details of the various dealer-aids and membership services offered by the Association, and in particular the advantages of Telesurance.

The R.T.R.A. are also participating in a special exhibit organised by the Radio Industry Council, and aimed at publicising the many attractive careers available to young people entering the trade and industry. The R.T.R.A. will, of course, concentrate on the retail side.

As a special attraction to the public, a number of well-known stars of the entertainment world will visit the stand during the exhibition, where they will sign autographs and meet visitors to the stand.

Regentone Radio and Television, Ltd.

Eastern Avenue West, Romford, Essex

STAND No. 38 Television, radio, radiograms, and record players are featured on the Regentone stand. Two table television sets are available: Model 143T is a 14in. model incorporating an anti-flutter device, housed in a walnut-veneered cabinet, for operation on a.c.-d.c. mains. Price 66 gns., tax paid.

There are two 17in. models, the 173T (table set) and 173C (console), both for operation on a.c.-d.c. mains, and incorporating an anti-flutter device. Prices (tax paid) are: 173T 79 gns., and 173C 89 gns.

The Regentone 173 combination is a combined television-radio-gramophone, incorporating a 17in. screen and a 7-valve 3-waveband high-fidelity radio chassis with push-pull output and magic-eye tuning. The gram section incorporates a 3-speed autochanger with lightweight pick-up. Output is via a 10in. p.m. speaker; a separate 8in. speaker is used on TV sound. For a.c. mains operation. Price 159 gns.

Two Regentone models. The *Handy-gram* HG3F (left) and the new a.m.-f.m. table radio A155.

A new set for reception of the v.h.f.-f.m. service is Model A155, and a.m.-f.m. superhet radio with 7 valves (including magic-eye) and four wavebands (l.w., m.w., s.w., and f.m.) waveband and gram. selection is by push-button. Built-in aerials cater for f.m. and l.w.-m.w. reception. Output is via a 10in. × 6in. p.m. speaker. For operation on a.c. mains 200-250V. Price 32 gns. tax paid.

The Multi 99 is a 3-speed table radiogram selling at the competitive price of 36 gns.tax paid. It incorporates a 5-valve superhet radio and a BSR autochanger.

Regentone are also showing their range of record players and reproducers, including the *Handy-gram*, (15 gns.), the *Automatic Handy-gram*, (Model AHG3F) at 20 gns. and the *Automatic Three-speed Handy-gram*. (Model AHG3W) at 22 gns. A record player, Model RP2, is also available at 9½ gns.

Radiograms on show include the ARG77—a 5-valve 3-waveband autoradiogram with 3-speed changer and 10in. speaker—and the ARG79—a 7-valve 4-waveband radiogram for operation on the new v.h.f.-f.m. service in addition to the l.w., m.w., and s.w. bands. Prices respectively are 49 gns. and 59 gns. tax paid.

Roberts Radio Co., Ltd.

Creek Road, East Molesey, Surrey

STAND No. 117 Roberts' are showing their range of portable radio receivers including Model CR, an a.c. mains-battery superhet covering medium and long wavebands and available in rexine covered case in blue, green, red or priory honey (£21 3s. 6d.; zipper type carrying cover £2 10s.).

Model R55, also available in choice of four colours, is a 4-valve 2-band superhet with self-contained Ferroxcube aerial, large full-vision tuning scale, unbreakable plastic window and 5in. high-flux moving-coil speaker (15 gns., including batteries).

The RP4 and RMB are the all-dry battery and a.c. mains-battery versions of a 4-valve 3-waveband superhet with a 6½in. high-flux speaker. (£20 7s. 6d. and £24 5s., including batteries, respectively). Housed in a rexine case available in choice of three colours, the receiver is fitted with a hinged lid to protect control panel, a spring loaded leather handle, an unbreakable scale, a concealed steel mesh protective loudspeaker grille and a ball-bearing turntable to enable the directional properties of the receiver to be fully utilised.

Rola Celestion, Ltd.

Ferry Works, Summer Road, Thames Ditton, Surrey

STAND No. 17 Rola, Celestion and Truvox (now "Linked in Leadership") show for the first time a range of speciality models manufactured by them for the special products divisions of well-known companies. On show are loudspeakers for a wide variety of purposes such as car radio and mobile public address, transport inter-communication, maritime signals, ship's public address, warning systems over large areas,

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One of the portable receivers shown by Roberts, the a.c. mains-battery superhet Model CR.

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(continued)

underwater communication, loud hailers and megaphones and flameproof units for coal mines and petrol refineries.

The display covers models from 2½in. to 18in. as used by many of the manufacturers at the exhibition, and a complete range from 2½in. to 12in. including two elliptical speakers for domestic use.

Rudman Darlington (Electronics), Ltd.

Wednesfield, England

STAND No. 208 On show is the latest addition to the company's *Reflectograph* range of tape recording equipment, Model RR100, which has a completely transistorised preamplifier ensuring absence of hum on playback. With an overall frequency response of 65-12,000 c/s and a tape speed variable between 3.75 and 8.5in/sec. the instrument offers versatility and high-quality performance for professional and industrial use.

The RR100 uses separate record and playback units, but no provision is made for a power output stage as it is intended to be fed into a high-quality amplifier and loudspeaker system, or direct into an oscilloscope. The transistorised preamplifier draws its power supply from a small dry battery.

The company are also displaying their standard range of equipment, including the *Reflectograph* Model P and Model LS, and the *Reflectograph* tape drive mechanism.

Sapphire Bearings, Ltd.

96A *Mount Street, London, W.*1

STAND No. 304 The company are showing their new "flame-fashioned" stylus plus their usual range of products. This latest stylus will be on show for examination by the public through a Zeiss Opton microscope and also on the most modern shadowgraph. The shadowgraph allows the radius of the Sapphire point to be checked to within 0.0001in. tolerance.

Simon Sound Service, Ltd.

Recorder House, 48-50 *George Street, London, W.*1

STAND No. 10 Simon Sound are exhibiting their new SP/2 tape recorder, recently introduced, and also their latest development in long duration tape monitoring equipment. This equipment, which is to be seen working, is an exact replica of that recently installed in the control tower at Farnborough Royal Aircraft Establishment. The exhibition stand incorporates two demonstration rooms in which the new tape recorder is being demonstrated continuously.

The SP/2 incorporates a combined record/replay amplifier which can be used as an independent p.a. amplifier or for record reproduction. The available output for replay or p.a. is 10 watts, with independent bass and treble controls. Total harmonic distortion at 10 watts is not greater than 3½ per cent and the frequency response is 50-12,000 c/s ±3dB at

The new Simon Sound tape recorder Model SP/2.

7½ i.p.s., or 50-7,000 c/s ±3dB at 3¾ i.p.s. The speaker is a 10in. high-flux type with its own gain control for monitoring. Wow and flutter is better than 0.2 per cent at 7½ i.p.s.

Tape loading is by means of a simple drop-in operation and control and handling of the unit is straightforward. Switching is mechanically controlled and, for ease of maintenance, the connections between the deck and amplifier are made by plug and socket. Special provision is made for accessibility. A jack is provided for headphones monitoring or, alternatively, during replay, for external speaker.

H. C. Slingsby, Ltd.

89, 95 & 97 *Kingsway, London, W.C.*2

STAND No. 112 The exhibit on this stand is devoted to the better and safer handling of television receivers and television receivers and the like. The equipment consists of a light metal tubular truck of special construction. Truck is fitted with a newly patented tensioning device, two straps, and a protective apron. A light metal skid enables loaded truck to be pushed easily into van by one man, and off-loaded in a similar manner.

Sobell Industries, Ltd.

Langley Park, Slough, Bucks.

STAND No. 19 The range of Sobell sets covers radio receivers in both plastic and wooden cabinets, a table radiogram and three console radiograms. In addition to amplitude modulated receivers, two designs for frequency modulation are included.

All models are for a.c. mains 200-250 volts. The radio designs have provision for external loudspeakers and gramophone pick-up.

The radiograms have provision for external loudspeakers and for muting the internal loudspeakers. Large "slide-rule" type scales with flywheel tuning are used on all models.

The television designs include three table models and two console types. They all embody turret tuners, increased sensitivity, automatic picture control, flywheel suppression, sound and vision noise suppressors and other improvements.

Specto, Ltd.

Vale Road, Windsor, Berks

STAND No. 206 On show is the *Spectone* 5-10 Mullard amplifier, providing an output of 15 watts with a frequency response of ±0.5dB from 10 c/s to 20,000 c/s and incorporating continuously variable treble and bass controls (18 gns.). Reproducing equipment for the H.M.V. Stereosonic tape records is also exhibited.

Prominently featured is the Spectone Magnetic Reproducer, developed for use with the playback tape records now available. The tape head is designed solely for reproduction, thus enabling the full frequency range available from tape records to be fed to the equalising pre-amplifier, and the tape drive speed is variable for accurate pitch setting. The pre-amplifier is designed to play records recorded to the C.C.I.R. characteristic.

The Reproducer is available in two models. Type 120 includes the power amplifier and gives a maximum power output of 15 watts with a total harmonic distoration of between 0.2–0.4 per cent at 10 watts. Model 122 is less the power amplifier, the output (cathode follower) being variable up to 4.5 volts r.m.s. low impedance and equalised to C.C.I.R. characteristic. Prices are £85 and £58 respectively.

Spencer-West, Ltd.

Quay Works, Great Yarmouth, Norfolk

STAND No. 211 A feature of the Spencer-West converter units is the provision of a remote switch panel for selection of the desired programme. All models have power supply units. High gain is provided, enabling the receiver to operate at low gain thus reducing the risk of direct pick-up at the receiver. Output filters are fitted, providing a rejection greater than 40dB for all models.

Three types of Band III converters are on show. Type 30 is a popularly-priced converter intended for simple conversion to Band III and complete with power supply for a.c. operation. This unit provides reception of one Band I and one Band III channel. Provision for the later reception of a second Band III channel is included in the chassis design. Price (retail) is £8 5s. The type 32 switch unit is available for use with this converter, permitting remote switching of two programmes. Price £1 5s. complete.

Type 33 is a converter with remote switch panel for two programmes in Band III and one in Band I. A neutralised triode stage is associated with a pentode mixer and a twin triode oscillator each half of which has its h.t. supply switched to provide the two Band III channels. This unit is supplied complete with the remote switch panels and the price is £10 2s. 6d.

(Continued on page 465)

Permanoid introduces a new range of Television Downlead Cables specially designed for Band I and Band III reception

Permanoid EXPANDED POLYTHENE DOWNLEAD CABLE

THESE CABLES PROVIDE A SUBSTANTIAL SAVING IN COST WHEN COMPARED WITH CONVENTIONAL AIR-SPACED CABLES GIVING AN EQUIVALENT PERFORMANCE

The requirements of local, intermediate and fringe area reception of both Band III and Band I signals can be met by one or other of the cables whose characteristics are shown in the table below. The use of the new expanded polythene dielectric enables us to produce a range of cables having smaller dimensions than were necessary under conventional designs used in the past, with resultant saving in cost.

Cat. No.	Overall Diameter Ins.	Characteristic Impedance Ohms.	Attenuation db/100 ft.	
			50 Mc/s.	200 Mc/s.
300 E.P.	.167	75	3.0	6.3
307 E.P.	.202	75	2.3	5.0
308 E.P.	.290	75	1.5	3.3

★ Arrell TV Aerials are manufactured to the same standards of quality and performance which characterise Permanoid Television Downleads. Specify one of the extensive range of Arrell Aerials for your Band III and Band I Television installations.
Descriptive brochures are available on request.

The PERFECT DOWNLEAD FOR BAND III & BAND I TELEVISION

Permanoid ltd
GIVES THE LEAD TO THE WORLD!

NEW ISLINGTON MANCHESTER 4
TELEPHONE : COLLYHURST 1371/4

London Branch : 48 Woburn Place, London W.C.1. Museum 3808
Bristol Branch : 46½ Whiteladies Road, Bristol. Bristol 36974
Wolverhampton. 558 Wolverhampton Road, East. Fighting Cocks W'hampton 38367

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(*continued*)

The range of converters is completed with the *Adder* which is a completely self-contained 13-channel converter unit having its own power supply and contained in a case having dimensions rendering it particularly suitable for mounting on the side of the television receiver, when it becomes an integral part of the receiver presenting the station selector switch conveniently for the user.

Various i.f. outputs are available and the circuit arrangement permits the converter to be employed connected into the first i.f. stage of a receiver or, in the case of a 5-channel receiver, the receiver can be operated on any convenient channel and the *Adder* converter's output fed into the aerial socket. In either case "break-through" is completely avoided.

Standard Telephones & Cables, Ltd.

Footscray, Sidcup, Kent

STANDS 1 & 119 On Stand No. 1 the Valve and Transistor Division of S.T.C. are once again showing a wide range of products including a comprehensive display of Brimar valves and teletubes, a special display of transistors and a novelty exhibit which should appeal to all members of the public.

In addition to the established C14FM and C17FM picture tubes the 21in. tube C21HM is shown. All Brimar tubes feature an aluminised screen and are fitted with an improved tetrode gun assembly giving complete overall focus and minimum astigmatism.

A special display is made of junction and point contact transistors now available and a range of Brimistors is displayed including new types for heater chain and mains switching surge suppression. Of particular interest is the miniature Brimistor for the protection of filaments in battery-mains portable receivers.

The exhibit on Stand 119 shows a range of *SenTerCel* selenium metal rectifiers, including radio and television types; h.f. types M1 and M3; e.h.t. tubular rectifiers, and "*Q*" type unistors. Three groups of high voltage lightweight aluminium rectifiers, including "Aircraft," "Type Approved" and "Customer's special requirements" will be shown.

In addition to three Band III converters, Spencer-West exhibit this 12-outlet distribution unit for Band III.

Included in the display will be a group of *SenTerCel* germanium junction power rectifiers and photoelectric cells, including a new type of power rectifier, R60A.

The Star

12-22 *Bouverie Street, London, E.C.4*

STAND No. 309 On *The Star* stand visitors can test their knowledge on all aspects of radio and television—programmes, personalities, history, technical progress and so on.

Also, each day during the Radio Show, *The Star* is awarding a TV set, adapted to receive I.T.A. programmes and installed in the winner's home, complete with aerial, in a free-to-enter popular competition. Details will be published daily in *The Star*.

Stella Radio and Television Co., Ltd.

Oxford House, 9-15 Oxford Street, London, W.1

STAND No. 51 New models making their first appearance include a portable radio receiver, a portable record player with built-in amplifier, an a.m.-f.m. console radiogram and a table television receiver.

Making its debut is the ST108AB, an a.c. mains-battery portable 4-valve

2-waveband radio. It has a built-in ferrite aerial of high sensitivity and is housed in a maroon plastic cabinet with a carrying handle which folds flat when not in use. Great economy in battery consumption is claimed, with rapid and easy changeover from battery to mains operation.

Among the other radio receivers is the ST106A, a 5-valve 3-waveband model with high sensitivity and selectivity on all bands, continuously variable tone control and bass compensation at low settings of the volume control. In a moulded plastic cabinet, and with a built-in plate aerial for local reception, it sells at 20 gns.

The new Stella ST541A portable record player with amplifier.

A new record player is the ST541A, incorporating a 3-valve amplifier, a 7in. speaker and a 3-speed changer with auto-stop switch. A Stella Petal Touch pick-up is used and the playing head carries twin sapphire stylii for long-playing and standard records. Another portable record player is the ST50A, without amplifier, but otherwise similar to the ST541A in the playing unit, and designed for maximum portability and compactness (10 gns.).

ST308A is a new console radiogram, incorporating a 7-valve circuit covering long, medium and v.h.f. bands. It incorporates an internal ferrite rod aerial for a.m. stations and a built-in dipole for f.m. reception. The gram unit is a Philips AG1003 3-speed autochange model with push-button controls and the featherweight pick-up is supplied with two playing heads, one for long playing and one for standard records, each using a sapphire stylus.

In the television range ST8517U is a new 17in. table receiver incorporating an all-channel turret tuner, a.g.c. on sound and vision, p.m. focusing in its 16-valve circuit. It is housed in a walnut-veneered cabinet with moulded speaker grille. Also on show is the ST6414U table model with 14in. tube, sapele-veneered wood cabinet and turret tuning (68 gns.). An external converter, recently introduced, for earlier Stella receivers using plug-in coil arrangements, is also being exhibited.

Tape Recorders (Electronics), Ltd.
3 Fitzroy Street, London, W.1

STAND No. 66

Three new releases in the Editor range of tape recorders are the *Playtime Plus*, the *Editor Hi-Fi* and the *Editor Super Hi-Fi*.

The *Playtime Plus* (35 gns.) is claimed to be the smallest lightweight tape recorder in the world. There are no press-button controls, operation being by a novel "joy stick" type, the single knob functioning for Play, Record, Fast Forward and Fast Reverse control.

It incorporates a newly developed spot-on-line *Neoglow* recording level indicator, instant drop-in tape loading, mechanical braking linked with control unit, and automatic erasure of unwanted recordings. Giving a running time of an hour and fitted with a large elliptical speaker, the recorder is supplied complete with desk microphone and spool of tape. It weighs 16 lb.

The *Editor Hi-Fi* (49 gns.) is similar to the Editor but has a 10in. speaker built into the removable lid so that it can be used conveniently for dances, meetings, p.a. applications, etc. The amplifier has the standard 5in. speaker.

The *Editor Super Hi-Fi* (60 gns.) is likewise similar to the standard model (*Editor Super*) except for the addition of the detachable 10in. speaker.

Also shown are the established models. The *Playtime* at 26 gns. is the lowest-priced tape recorder on the market, with single-knob operation and incorporating infinite impedance output for good matching into the playback medium. The *Editor* and the *Editor Super* (55 gns.) are also exhibited.

Taylor Electrical Instruments, Ltd.
419-424 Montrose Avenue, Slough, Bucks.

STAND No. 6

Taylor are showing a comprehensive range of their test equipment. A new introduction is the valve tester, Model 45C, an improved version of previous types 45A and 45B, measuring practically all up-to-date valves, British, European and Continental. It has also available facilities for checking TV cathode-ray tubes by means of an adaptor.

Model 92A TV sweep oscillator is specially designed for alignment of TV sets, and covers a frequency range of from 3 to 250 Mc/s with the sweep controllable from 2 to approximately 15 Mc/s at all frequencies.

Signal generator, Model 67A, covers frequencies from 100 kc/s to 240 Mc/s, which includes, of course, the new commercial television requirements for servicing.

Electronic test meter, Model 171A, is essentially an accurate valve voltmeter with a.c. volt ranges from 1-250 a.c., d.c. volts from 1-1,000 and 25 kV by means of external adaptor. The resistance ranges go up to 1,000 megohms.

The new R.C. oscillator, Model 191A, generates sine and square waves of exceptionally good waveform; 10 c/s to 100 kc/s; output level is maintained constant with ±1db throughout the entire range.

One of the models shown by Tape Recorders — the Editor Super Hi-fi.

Taylor Electrical show their valve tester Model 45C, above, in their exhibit of test equipment.

Telegraph Condenser Co. Ltd.
North Acton, London, W.3

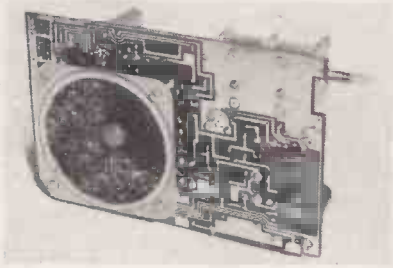
STAND No. 45

The main theme of the T.C.C. exhibit on Stand 45 is the development of new condensers for television receivers incorporating Band III, Band IV and other multi-channel tuners. These are all in the ceramic group and consist of Miniature Hi-K lead-through and stand-off condensers, and two Low-K trimmers. The latter provide pre-set adjustment of r.f. and oscillator circuits in TV tuners where only small capacity sweeps are required.

In the electrolytic group, the introduction of the *Superlytic* condenser sets a new standard in the performance of this class of condenser in that, for the first time, it is possible to think in terms of insulation resistance for an electrolytic. They are primarily intended for grid coupling in low frequency amplifiers, but they are suitable for other applications where high capacity and exceptionally low leakage are desirable characteristics.

As leading suppliers of printed circuits, part of the T.C.C. stand and demonstration room has been devoted to demonstrating the applications and uses of printed circuits in the radio and TV electronic industries.

Among the wide range of circuits shown are the following: high-quality amplifiers, radio receivers of the a.c.-d.c. and battery types, portables with contained battery, TV tuners for Band I and Band III, aerial filters for TV receivers, cross-over networks, i.f. transformers for TV, i.f. transformers and amplifiers for TV, transistor computor panels, telephone distribution panels, flexible circuits, etc. Also on show are complete amplifiers and radio receivers.



A 4-valve battery portable assembly using a printed circuit, shown by T.C.C.

Telerection, Ltd.

Antenna Works, St. Pauls, Cheltenham

STAND No. 7 A comprehensive range of Telerection aerials and auxiliary equipment covering the existing Band I, the new Band III, and f.m. frequencies (Band II) is on show. For Band I operation aerial types range from the simple indoor to the *Multimus* array designed for fringe area TV reception, incorporating the delta-matching technique for which the company are well-known.

Band II aerials for v.h.f. f.m. sound broadcast reception follow the same principles as those used for Band I horizontal frequencies, but at reduced prices.

For Band III operation there is a complete range of units to cover every contingency in this field from conversion kits to high-gain Yagi stacked arrays. Also on display is the *Dual Band* aerial which covers both Band I and Band III frequencies. It is interesting to note that all Band III aerials employ a new production principle which presents the aerial as a completely assembled unit ready for installation.

The Telerection converter is a small self-contained unit for converting existing television receivers to enable them to receive both Band I and III without alteration to the set.

Telequipment, Ltd.

1319a High Road, Whetstone, London, N.20

STAND No. 105 Telequipment, Ltd. specialise in the manufacture of test equipment for the television manufacturer and dealer. The WG/44 two-band television pattern generator will be demonstrated. This instrument provides a choice of patterns including definition check, and with synchronising waveforms to B.B.C. standards.

Also in operation will be a monoscope equipment which provides, for the manufacturer, a high-quality test-card signal suitable for distribution to a large number of test positions. An equipment of this type was recently supplied to Belling & Lee, Ltd., to provide picture signals for their G9AED experimental Band III Transmitter at Croydon.

The Television Society

164 Shaftesbury Avenue, London, W.C.2

STAND No. 315 The Television Society was founded in 1927, and is the first Society in the world for the study and furtherance of research in television and allied subjects.

Its membership now numbers over 1,000, drawn from professional engineers and the television industry, and it has active Centres in Bristol, Bedford and Manchester. Meetings are held fortnightly in London and the proceedings are published in the Society's quarterly Journal, specimen copies of which are on view at the stand.

A selection of books and reprints of papers by members includes the newly published "Introduction to Colour Television" by G. G. Gouriet, of the B.B.C. Research Staff.

Thompson, Diamond and Butcher, Ltd.

5-9 University Street, London, W.C.1

STAND No. 4 Manufacturers of products bearing trade-marks *National Band*, *Convertogram*, *Meritone*, *Lamplifier*, *Estrella*. Every *Convertogram* and every amplifying gramophone will play a 12in. record with the lid closed.

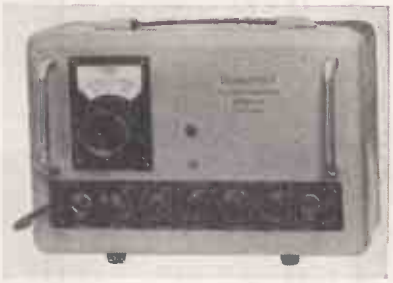
Exhibits include: *Convertogram* record players incorporating latest Garrard and B.S.R. units for a.c. or a.c.-d.c. operation, *National Band* de luxe amplifiying gramophones, *National Band* portable gramophones (hand wound), *Meritone* electrically amplified gramophones, *Lamplifiers*—combination of a.c. amplifying unit with an 8in. loud speaker, available either in walnut or cloth covered cabinet, with control knobs and everything to connect with any a.c. playing desk (however old) and transform it into an amplifying gramophone. *Estrella* record carrying cases and albums are also shown.

Trix Electrical Co., Ltd.

1-5 Maple Place, Tottenham Court Road, W.1

STAND No. 26 Trix are showing their range of amplifiers which range from 4 watts to 150 watts in single units and higher powered equipment when required. In addition to the a.c. types, several a.c.-d.c. models are available, also amplifiers for 6-volt and for 12-volt battery operation.

Examples of rack-mounted equipments combining power amplifiers with radio units, control switching, etc., are also shown together with *Trixette* gramophones in re-styled and improved designs covering a variety of 3-speed models in single playing and automatic types, each incorporating a suitable amplifier and loudspeaker. The Recital Console model gramophone is included in the exhibit.



The Telequipment WG44 two-band television pattern generator.

Ultra Electric, Ltd.

Western Avenue, Acton, London, W.3

STAND No. 41 Ultra are showing a complete range of television receivers, a.m.-f.m. and a.m. radio receivers and a new radiogram. One console and three table television receivers are shown, all equipped with multi-channel switching. A Band III tuner is available for use with certain older models.

The new a.m.–f.m. *Ultragram* is shown for the first time and incorporates a 3-waveband radio and separate treble and bass tone controls and compensated volume control. The 3-speed auto-changer handles the three standard record speeds and the featherweight pick-up is of the turnover type with sapphire stylus. The walnut veneered cabinet has provision for record storage (78 gns.).

The new a.m.-f.m. table radio receiver is also shown for the first time and sells at 24 gns. The established *Ultra Twin* is on show, the a.c.-d.c.-battery portable now being available in a new presentation known as the *Twin De-Luxe* with sliding doors to cover the controls and speaker grille when not in use and the choice of two different finishes. (Twin 17 gns., Twin De-Luxe 21 gns.). Also exhibited is the *Troubadour*, an a.c.-d.c. set of transportable type with inbuilt aerials and supplied in brown or cream finish (21 gns.).

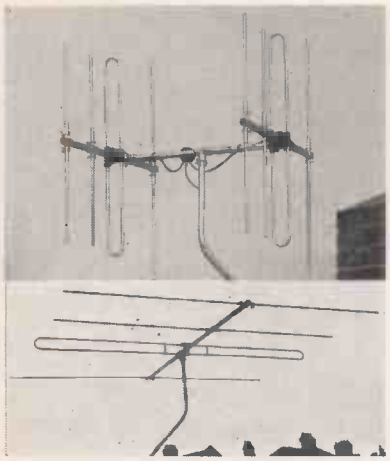
Valradio, Ltd.

New Chapel Road, Feltham, Middlesex

STAND No. 118 Featured on the stand are large screen projection television receivers, 13-channel tuners and a representative range of d.c.-a.c. converters. The range of projection TV receivers on show, include the 13-channel Model V10, which projects a 27in. × 20¾in. picture on the lid of the cabinet.

Model V5 is a 13-channel large screen receiver with a separate screen of 4ft. × 3ft. The V6 Mini-console projects a picture of 34in. × 25½in. on to an attractive corner cabinet screen. All models are working during all demonstration periods.

Valradio 13-channel tuners suitable for the conversion of most commercial television receivers for Band III operation are on show together with the established range of Valradio d.c./a.c. vibrator converters and models for operating specialised equipment such as tape recorders, etc.



Two folded dipole arrays by Wolsey. Above—the BAY4 for Band III fringe. Below—A four-element Band II aerial.

Vidor, Ltd.

West Street, Erith, Kent

STAND No. 28 Another portable radio, the CN.432, has been added to the Vidor range. This is an upright all-dry battery receiver. A ferrite rod aerial is employed and the finish is in two-tone plastic leather cloth, with brass and plastic fittings. Two wavebands, long and medium, are covered by the 4-valve circuit. Output is via a 5in. p.m. speaker.

Turret-tuning and a further step in the provision of maximum picture size are featured in the two new table television receivers—CN4230, 14in. tube and CN4231, 17in. tube. The method of fixing the cathode-ray tube provides for exposure of the entire face of the tube so that maximum possible picture size is provided. Vision automatic gain control is incorporated.

In addition to these new receivers Vidor are showing these among the current range:—

CN431: *Marquisa*—an all-purpose transportable which can be operated from a.c. or d.c. mains or battery.

CN430: *Lady Anne*—new for 1955, this a.c. mains or battery portable features a new battery-saving circuit, which considerably reduces l.t. consumption.

CN429: *Lady Margaret*—a lightweight battery portable in the attache-style. Its weight is only 6½ lb., complete with batteries, and its size is 8in. × 8in. × 4in. approximately.

Westinghouse Brake and Signal Co., Ltd.

82 *York Way, King's Cross, London, N.*1

STAND No. 101 Westinghouse are showing single and double voltage element rectifiers, including those for high power applications and for radio and television power supplies, with a special emphasis on such types as the germanium crystals, copper-oxide rectifiers, *Westectors*, sub-miniature high voltage units and contact cooled units. The latter are specifically designed for reliable and compact source of d.c. power; mounted flush to chassis, they dissipate their heat through it and dispense with the bulkiness of cooling fins.

Also shown are sealed tubular rectifiers for use in c.r.t. networks. Containing the quadruple-voltage *Westalite* element, they produce very high-working voltages in small length and provide a source of e.h.t. without the need for filament windings on the e.h.t. transformer.

Westinghouse also exhibit a range of copper-oxide rectifiers for use in measuring instruments, telephones, relays and similar applications. The standard Westalite units are shown, including newly introduced types suitable for use in temperatures of up to 70 degrees C.

The display will be backed with a selection of technical literature on the many applications of metal rectifiers, whilst qualified representatives will be in attendance to advise on problems connected with rectification.

Whiteley Electrical Radio Co. Ltd.

Radio Works, Victoria Street, Mansfield, Notts.

STAND No. 25 The main feature on the stand will be the new WB12 high-fidelity amplifier. Employing the most recently developed valves, it has a low noise input circuit, feeding the double-triode phase splitter, and a push-pull output stage, ultra-linear connected, using a specially designed Whiteley output transformer. Some 25db negative feedback is applied over the main amplifier. Switched pick-up matching is incorporated in a flexible, compact and easily mounted preamplifier tone-control unit. Both units are attractively styled and finished in hammered gold. Retail price complete £25.

Other new lines include an f.m. tuner, 15in. p.m. speaker unit, 15in. concentric duplex, ready-to-assemble corner reflex cabinet for housing 10in. and 12in. units. Also a "Junior" TV table, 21in. high and 20in. square, fitted with easy-running 2in. castors, packed flat ready for instant assembly—retail price 82s. 6d. (tax free).

The Whiteley Electrical high-fidelity amplifier WB12 with tone control unit.

Relay loudspeakers, potted components, transformers, volume controls and special products produced for the Ministries complete the display. A separate demonstration room will be available for the continuous demonstration of Whiteley high-fidelity loudspeakers and audio equipment.

Wolsey Television, Ltd.

43-45 *Knight's Hill, West Norwood, London, S.E.*27

STAND No. 5 Displayed is an array of Band I and Band III television aerials, Band II f.m. aerials and various accessories. Model Y4 is a 4-element Yagi with a special polythene junction box flooded completely round the folded dipole to ensure maximum electrical efficiency and moisture proofing; a snap fitting cap allows easy access to the terminals.

The array gives a forward gain of 8dB and a front-to-back ratio of 25dB, the acceptance angle being 90 degrees at 3dB points. Complete with chimney lashings it sells at 77s. 6d. and is available for wall mounting. The fringe version is the BAY4, consisting of two Y4 units parallelled with matching lines and splitter box. It has a forward gain of 11.5dB and a front-to-back ratio of 30dB with an acceptance angle of 60 degrees at 3dB points. It costs 115s.

Other Band III aerials are the Y3 and Y3W, the former with chimney lashings (62s. 6d.) and the latter with bent swan neck arm and bracket (45s.). These are 3-element yagis, mechanically similar to the Y4 and incorporating a new "purse" type junction box which is unbreakable and waterproof. To meet the demand for a simple indoor Band III aerial Wolsey have introduced the *Minor III*, a directional aerial which can be fitted quickly either in a room or loft and will be suitable for locations within 5-10 miles from the transmitter (12s. 6d.)

Wright and Weaire, Ltd.

131 *Sloane Street, London, S.W.*1

STAND No. 218 Two main exhibits on the stand feature Wearite components and Ferrograph recorders. The usual range of Wearite coils, i.f. transformers, audio transformers, and mains transformers, ceramic switches, and vibrators are on show, including some new coils and transformers for f.m.

The Ferrograph exhibit covers all models including home, industrial, and Services recorders, as well as the *Tape Deck*.

The exhibits on the following stands are self-evident and no description has been included in this preview:—

	Stand No.
Barclays Bank, Ltd.	3
Bernards (Publishers) Ltd. ...	314
Bowmaker, Ltd.	106
British Railways	2
Evening News	67
Iliffe & Sons, Ltd.	202
Keith Prowse & Co., Ltd. ...	69
Lloyds Bank, Ltd.	115
Midland Bank, Ltd.	44
National Provincial Bank, Ltd.	68
Odhams Press, Ltd.	102
Royal Navy	307
Trader Publishing Co., Ltd. ...	205
United Appeal for the Blind ...	316
War Office	308
Westminster Bank, Ltd. ...	222

BRAND NEW *Continued*

LUSTRAPHONE POWER TRANSISTOR AMPLIFIER

Lustraphone, Ltd., St. Georges Works, Regents Park Road, London, N.W.1.

AS announced in our June issue, Lustraphone have developed a fully transistorised portable amplifier for audio frequency applications capable of delivering 10 watts into a standard loudspeaker and incorporating sufficient pre-amplification to enable the amplifier to be fully driven by the output from a dynamic (*i.e.*, moving coil) microphone.

Two different models are available, offering varying facilities. Model TPA455S has a frequency response sensibly flat from 50 c/s to 10 kc/s, and incorporates both tone and volume controls. Model TPA555G has a frequency response sensibly flat from 150 c/s to 10 kc/s, and is fitted with volume control only and press to talk facilities.

Power supply requirements are 200mA at no signal and 1¼A at maximum signal. Power supplies can be obtained from dry batteries or a small 12V accumulator. Lustraphone microphones recommended for use with these amplifiers and which can be adapted with fitments for special requirements are: Model HD/54 with press-to-talk switch incorporated in microphone case; any model from the L/59 range of microphones; Model VC/52 noise-cancelling microphone for high ambient noise locations.

Production of the amplifiers will start in the autumn, and as only a small quantity can be manufactured initially due to the present slow supply of power transistors, orders can only be booked on a date placement schedule. Demonstrations can be arranged on request with prototypes now available.

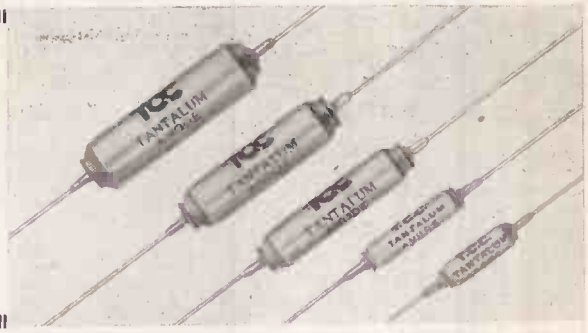
T.C.C. TANTALUM ANODE CONDENSERS

The Telegraph Condenser Co. Ltd., North Acton, London, W.3.

DESIGNERS of electronic equipment are continually in search of electrolytic condensers which can take the place of those with a paper dielectric construction without impairing the desired performance of the finished product. As a contribution towards solving this problem, T.C.C. have introduced a range of tantalum anode condensers, which combines the advantages of high capacity values and small size, for use under low voltage d.c. conditions.

In addition to the normal applications of by-passing, grid coupling, and blocking, these condensers are suitable for equipment where low temperature conditions are encountered, or in apparatus which must operate satisfactorily for long periods without the servicing, or which is subject to remote control.

Picture shows T.C.C.'s new range of tantalum anode electrolytic condensers, which combine high capacity values with small size, for use under low voltage d.c. conditions.



The most important feature in the constructon of the T.C.C. tantalum anode condenser is the use of foil in preference to a block of sintered tantalum, which limits the electrolyte to one of a corrosive nature. Tantalum foil imposes no such limitation, although it does tend to increase the size of the finished condenser for any given capacity. Also of importance is the use of an electrolyte which is substantially neutral. This means that if as a result of mechanical damage to the equipment, a tantalum anode condenser began to leak, no corrosive damage would occur to other components around it.

The condensers are available in a wide variety of capacity values for different working voltages. The following figures give capacity limits for the voltages concerned: 6V d.c.—16-200μF; 12V d.c.—8–150μF; 25V d.c.—4–75μF; 50V d.c.—2–40μF; 100V d.c.—1–20μF; 150V d.c. 1–15μF. Leakage current is 0.01μA/μF/V after 10 minutes at working voltage. Capacity tolerance ±20 per cent.

NEW MULLARD TRANSMITTING TETRODE

Mullard Ltd., Century House, Shaftesbury Avenue, London, W.C.2.

THE Mullard QYE 65 is a versatile new transmitting tetrode with a rated anode dissipation of 65 watts and a maximum operating frequency of 250 Mc/s (150 Mc/s full rating). The valve is of compact all-glass construction (seated height 4 inches). It has a quick-heating thoriated tungsten filament (6.3V., 3.5A.), which makes it suitable for aircraft and marine mobile aplications where conservation of power during standby periods is important.

The QY3-65 is suitable for use as an r.f. driver, power amplifier, or power oscillator, or as an a.f. power amplifier. It may also be used as a linear r.f. amplifier for single sideband working. R.f. power outputs up to 280 watts are obtainable under CW conditions, and power gain is high. H.t. voltages ranging from 600 to 3,000V may be employed.

Mullard Junction Transistors

The maximum permissible collector dissipation of Mullard junction transistors OC70 and OC71 has been raised from 6mW to 25mW. The original rating was deliberately made small in order to ensure adequate margins of safety. The increase reflects the experience gained by the practical application of these new devices.

The maximum d.c. collector voltage is 5V, and the maximum ambient temperature is 45 degrees Centigrade.

PLESSEY 100-WATT VIBRATOR

The Plessey Co. Ltd., Ilford, Essex

IN many commercial electronic and communication equipments designed for mobile operation, it is undesirable to employ motor-generators to produce the necessary a.c. supplies from d.c. inputs. Vibrators are the usual answer to the problem, but where medium power requirements have to be met ordinary vibrators are inadequate.

Plessey have produced a 100-watt heavy-duty vibrator designed originally for Services use, but which is now commercially available. It can be used in a power pack to give a variety of a.c. output voltages for supplying bias circuits, valve heaters requiring isolation, e.h.t. supplies, etc. For instance, a power pack specially developed by Plessey for Services use has the following operating figures:

Input	...	24V 8A d.c.
Output	...	350V 140mA d.c.
		175V 145mA d.c.
		12V 500mA a.c.
		6.3V 3.25A a.c.
		6.3V 1.1A a.c.
		6.3V 0.85A a.c.
		6.3V 350mA a.c.

Overall power pack efficiency—60 per cent, including rectification, smoothing and r.f. filtering.

(*continued on page 472*)

BRAND NEW *Continued*

The heavy-duty vibrator has a number of advantages over the rotary transformer, including a reduction in weight, space and noise, an improved circuit flexibility and higher efficiency. A power pack incorporating the vibrator has an overall efficiency of 55 per cent–65 per cent. compared with an average of 40 per cent. from a rotary transformer.

The Plessey vibrator is a robust unit, made to withstand the temperatures, humidities, vibration and shocks to which Services equipment is liable. It is hermetically sealed in a robust aluminium case of such wall thickness that mechanical noise is kept to a very low level. Its performance and size (4¼in. high and 2¾in. diameter) will make it popular in a wide range of applications both in service and commercial electronic and communications fields.

The vibrator is of the synchronous type, working at a frequency of 110 c/s nominal, having a split reed and a separate drive, taking a maximum of 5 watts driving power. The platinum-iridium tipped drive contact screw connects to a platinum-iridium contact spun on to the drive contact spring, made from high-quality spring steel. The power contacts are manufactured from close-grain swaged tungsten. It employs twin reeds and, to ensure uniformity of material, the reeds are manufactured in one piece connected together by a small web which is removed after the vibratory system is assembled.

Ground ceramic spacers are used throughout to ensure high mechanical electrical stability during the life of the vibrator and all materials used in the construction are carefully chosen so that no injurious gases are produced over the entire working temperature range.

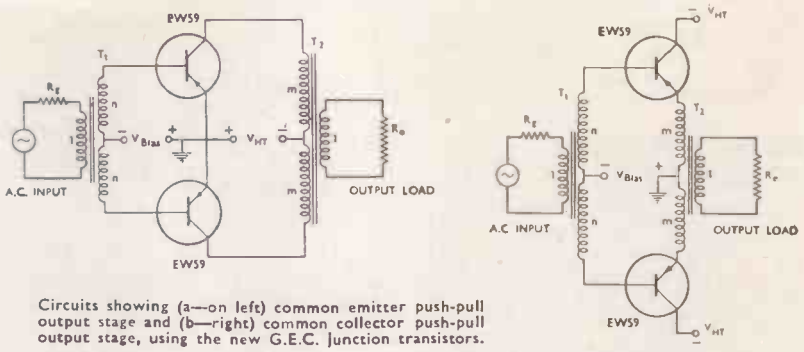
Because the life and performance of the vibrator is affected by the type of transformer with which it is used, the Plessey Company will advise on the transformer and circuit, or supply a specification of the power unit incorporating the vibrator.

NEW RANGE OF JUNCTION TRANSISTORS

The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2.

THREE new germanium alloy type p-n-p junction transistors, which offer the designer a range of ratings and characteristics, are introduced by G.E.C. Type EW58 is intended for low voltage (up to 5V) audio frequency applications such as hearing-aid amplifiers. Type EW59, on the other hand, can be used at supply voltages up to 20 volts; as a small signal amplifier it can be used at frequencies up to about 0.5 Mc/s, whereas in Class B audio frequency output stages outputs of up to 300mW can be obtained at low distortion. Type EW53 can be used at supply voltages up to 10 volts, but has a slightly lower frequency and power output range than the EW59.

All three are hermetically sealed in gold-plated metal cans, and are therefore independent of variations in humidity. They are mechanically strong and will withstand considerale mechanical shock and vibration. The cans are identical for all three transistors and measure 11mm. in length by 5mm. in diameter.



Circuits showing (a—on left) common emitter push-pull output stage and (b—right) common collector push-pull output stage, using the new G.E.C. junction transistors.

The maximum allowed collector dissipation for the three types is 70 milliwatts at an ambient temperature of 20 degrees C reducing to 10 milliwatts at 45 degrees C.

The mean collector voltages are limited to maximum values of 10, 5 and 20 volts for the EW53, EW58 and EW59 respectively. Peak voltages are limited to double these values. (All these values relate to an ambient temperature of 20 degrees C).

The maximum storage temperature is 50 degrees C for the three types.

Device Performance

One parameter that limits the performance of transistors in high-frequency amplifiers is the reduction of current gain factor with increasing frequency. However, it is found that the combination of the collector capacitance and the extrinsic base resistance usually introduces a more serious limitation, and it is therefore desirable that the value of these parameters and, in particular, of their product be kept as low as possible.

The current gain factor, measured in the common base arrangement, at a collector voltage of —5V and an emitter current of 1mA, reduces to 0.7 of its low frequency value at 700 kc/s in a typical case. This frequency, known as the alpha cut-off frequency, increases with collector voltage and for a typical EW59 transistor a value of 1 Mc/s is obtained at a collector voltage of —20 volts.

The EW53 and EW58 types are each available in two different categories having different ranges of current gain. Current gain figures for all types, when measured in the common emitter arrangement at a collector voltage of —5 volts and emitter current of 1mA, are: EW53/1—15; EW53/2—30; EW58/1—15; EW58/2—30; EW59 —15.

The noise factors of transistors are generally measured at a frequency of 1 kc/s, with reference to a source resistance of 500 ohms. A typical EW58 transistor, operated at a collector voltage of 5 volts and an emitter current of 1mA, is 12db. This noise factor is substantially independent of collector voltage, but increases with increasing emitter current.

A.F. Output Performance

The new junction transistors have several advantages over other amplifying devices in audio frequency (up to 10 kc/s) output stages. For example, they can be operated from low voltage power supplies (1.5 to 4.5V in hearing-aid amplifiers and up to 20V in higher power applications) and are also extremely efficient because the collector characteristics "bottom" at almost zero voltage (less than 0.1V) and "cut off" at substantially zero current (usually less than 0.1mA).

In class A arrangements the maximum power output at 20 degrees C is approximately 30mW for all three types of junction transistor. With the EW53 and EW59 types in a class B push-pull arrangement, operating at a collector voltage of —10 and —20 volts respectively, maximum power outputs of 150 and 300mW per pair are obtainable at less than 10 per cent 3rd harmonic distortion.

The ultimate limitation to the power handling capability is the maximum permissible operating junction temperature which is usually expressed indirectly in terms of the maximum collector dissipation at a given ambient temperature.

Three types of class B arrangement are possible: common base, common emitter (Fig. a) and common collector (Fig. b). The first has a very small amount of distortion, but gives the lowest value of gain; the second gives the highest value of gain, but also has the highest distortion level. The common collector amplifier offers a good compromise between gain and distortion

NEW ARCOLECTRIC SWITCHES AND LAMPS

Arcolectric (Switches) Ltd., Central Avenue, West Molesey, Surrey.

TEN new additions to the Arcolectric range of switches, signal lamps, etc., are described in the current issue of the company's catalogue, copies of which are available on request to Arcolectric. Many of the existing designs have been improved and in some cases completely redesigned. The catalogue also shows the new prices of products, some of which have been increased because of the rising cost of raw materials.

ELECTROTHERMAL PRECISTOR

Electrothermal Engineering Ltd., 270 Neville Road, London, E.7.

THE company are producing a range of special high-stability wirewound resistors for home and export markets, under the name of *Precistor*. The *Precistor* is a precision wire wound high-stability resistor with the lowest temperature co-efficient obtainable, *i.e.*, 0.002 per cent per degree C., adjusted to a resistance tolerance as low as ±0.1 per cent.

Values obtainable range from 0.1 ohm to 1 megohm and any value or wattage rating can be made to specific requirements. They can be supplied untapped, tapped or multitapped. All types have a maximum operating temperature of 150 degrees C. and conform to specification MIL-R-93A.

(continued on page 473)

BRAND NEW *Continued*

Applications for this precision resistor will be found in all highly accurate electronic circuits such as negative feedback circuits, computor circuits, predictor equipment, meter shunts, galvo shunts, amplifiers, modulators, etc. Precistors are wound on specially designed low-loss plastic formers. The most up-to-date constructional methods are used to ensure a perfect gas and moisture proof seal.

A leaflet giving full specifications of the range can be obtained on application to the manufacturer.

NEW EDISWAN MAZDA 12 in. C.R.T.

The Edison Swan Electric Co. Ltd., 155 Charing Cross Road, London, W.C.2.

A NEW 12in. cathode-ray tube is now available from Ediswan. Characteristics of this tube are given below and it will be noted that this is the only 12in. tetrode so far manufactured by Ediswan. The price of the CRM.124 is £12 15s. plus £4 19s. 6d. purchase tax.

This is a 12in. magnetically focused and deflected cathode-ray tube, with an aluminised screen and a clear glass face. It is fitted with a standard tetrode gun and requires an ion trap restoration magnet. A layer of Aquadag has been applied to the external surface of the bulb, which, in conjunction with the internal Aquadag layer, acts as a filter capacitor, the glass serving as dielectric. This external coating should be earthed.

Ratings		
Heater Voltage	Vf	12.6V
Heater Current	If	0.3A
Max. Final Anode Voltage	Va2 (max.)	10kV
Min. Final Anode Voltage	Va2 (min.)	7.5kV
Max. 1st Anode Voltage	Va1 (max.)	400V
Typical Operation		
Final Anode Voltage	Va2	10kV
1st Anode Voltage	Va1	300V
Grid Bias for cut-off of Raster	Vg	29–71V
Average Peak to Peak Modulation Voltage for Modulation up to 150	μA	25V

Base. B12A (5-Pin)

E.M.I. TELEVISION PICTURE MONITOR

E.M.I. Electronics, Ltd., Hayes, Middx.

SHOWN for the first time at the British Instrument Industries' Exhibition at Earls Court recently was a new high-quality television picture monitor, type 1, designed and produced by E.M.I. Electronics Ltd. to a specification drawn up by a leading broadcasting authority.

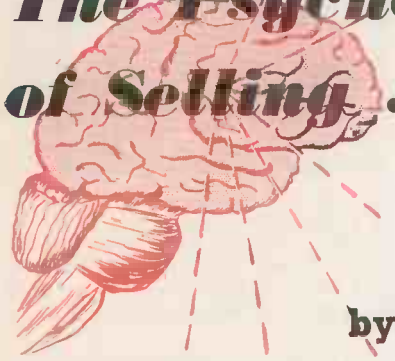
The new Philips *MotoRadio* car radio, details of which were given on page 289 of the August issue. This set will be seen at the Radio Show.

Suitable for use with studio, relay, O.B., modulation or other video transmission equipment. It incorporates an aluminised 14in. rectangular cathode-ray tube with grey glass screen, operating at a final anode voltage of 14kV. Focusing is by permanent magnet, with fine control by current coil. Linearity of the scanning circuits is less than 2 per cent positional error for line or field.

Chief characteristics of the video amplifier are: rise time, 0.075 microsecs., with negligible phase distortion; variation of d.c. level not greater than 0.5 per cent of total signal for a picture change black to white; equalisation for cable lengths up to 1,000ft. Dimensions are: 17in. × 15in. × 22in.

Full details and price are available from the company.

The Psychology of Selling



Part 5
INDIVIDUALITY

by H. J. Campbell

MOST adults do not need telling that people are individuals. But few people realise the importance of this idea in their lives. Their lives would be to a considerable extent more happy and more successful if they did realise it. *You* need to get to grips with it from the special point of view of the radio dealer.

Every person is unique. There is no one else exactly like him. This is commonly seen and accepted in such fields as food fads and art appreciation It gives rise to the old saying that one man's meat is another man's poison. Yet we don't seem to recognise it so well when applied to abilities.

We all accept the fact that we can't all be geniuses. Only a fortunate few can make eternal music or discover important drugs or run a mile in a minute or two—that much we all understand.

What we have to try to understand further is that there are degrees of accomplishment below these levels, which many of us will never attain, try as we will.

limitation

We have our limits, in action and in mental abilities. To try to pass these limits is not only futile, it is psychologically harmful, too. Many an old grouse got that way because he tried to take a tilt at nature to prove that he was some kind of a god that can transcend natural limits.

Of course, to accept a level of performance, physical or mental, *below* your natural limits is equally stupid, though much more easy. It's the lazybones' way out—the artist who is going to paint a picture one day, the reporter who is going to write a novel one day, the assistant who is going to open his own shop one day, the poor pathetic dealer who one of these days is going to do something about increasing his sales.

There's not much one can do for these chaps, except hope that they retire and make room for somebody with a bit more gump.

consolidation

The important point is not that you should not strive—excusing yourself by mumbling about natural limits—but that you should first of all make sure that your performance is really up to your limits and then simply keep it there, without getting all het up and neurotic because you're not as good as the fellow down the road.

Bear in mind that your success as a radio dealer cannot be measured simply in terms of the number of pieces of radio-ware you sell. Your bank account is extremely important, but it is not all-important. You have some kind of a soul, self, personality, ego—give it any name you like; it is the inner *you*—and you have, perhaps, a wife and family. Your success as a dealer includes all these.

If your shop is doing marvellously and you are a bundle of nerves and your wife is miserable and your kids terrified of you, you are *not* a success. You are a menace. Further, you are a *failure*. As a man. As a citizen. As a husband. As a father.

You don't want to get like that, do you? What you want to do is to have a thriving business that leaves you happy and contented enough to play the bigger and more exacting role of domiciliary chief.

The only way to do that is to push yourself to the utmost of your individual limits and leave it at that. Don't envy the dealer down the road who is making twice as much as you are, and living in hell because of it!

Remember that long before your customer will react to your sales technique he will respond to your personality as an individual. If you are friendly and informal, and obviously happy, then he is not likely to raise a mental barrier against your sales message.

But if you are impersonal and consumed with a burning desire to make a sale, then he will instinctively resist your efforts, and the dealer down the road may benefit after all.

inter-relation

In other words, selling is a personal relationship between two people, and personal relationships are a reflection of the inner nature of the people concerned. If you are a happy character, then your customers will be happy, and business will prosper. But if you allow your problems to colour your personality, your customers will be on their guard. And that means sales resistance.

How do you find your individual limits? That is the simplest thing in the world. It can also be the most cruel and disappointing thing in the world. You find them when, try as you will, you come to a full stop.

Whatever your ambitions may be, you cannot achieve them if your natural limits lie below them. You simply do everything in your power to effect those ambitions—by reading, studying, working, doing your darndest to get where you want—until you find you can't go any further.

It is the mark of the grown-up person to stop, quite happily, when he reaches that point. Children and immature adults go on striving out of obstinacy and false pride.

realisation

True happiness is not based upon the acquisition of this or that amount of material possessions, or upon the attainment of this or that professional position. It is acquired by the knowledge that you have done the best you can with the equipment that fate has given you.

In other words, being a successful dealer means being a happy dealer, and this is true of all trades and careers and professions In life. Selling is important, personality is important, business acumen is importent—but without that inner happiness all these things are undermined. They become less effective.

That is the psychology of selling as applied to you, the dealer. We have already dealt with its applications to your customers. Let us summarise the chief points we have made in this series.

(Continued on page 476)

Psychology of Selling — CONTINUED

Previous articles have dealt with the role of sensation, attention, motivation and personality in successful salesmanship, and here is a resume of the highlights of those articles.

recapitulation

Sensation—Remember always that your customers have eyes, ears and nose. Make sure that your shop, its decor, your sales talk, your appearance, your noise-production do not assault the customer's senses. Let his senses be lulled and comforted and gently stimulated by all these things that are in your own hands.

Have a pleasant decor, uninterrupted by posters and piles of merchandise. Dress yourself to look like what you are, not like a tramp and not like a lawyer in court.

If you must have a radio going, let it be music, and *softly*. Don't let the place smell of disinfectant or eucalyptus or midnight on the Somme; something faint and a little tangy is required, like ozone.

And do, do remember that busy, hard-working customers like to sit down and, perhaps, take a little refreshment while you expound the virtues of your wares. A chair costs so little and does do much.

Most of all, make sure that you cultivate a pleasant, informal, unautomatic line of sales talk—and don't leave it all to manufacturer's pamphlets; many customers eye them with suspicion as to their complete veracity!

Attention—When the customer walks into your shop his attention is undirected inasmuch as it directed at almost everything. You've got to get his attention rivetted on what you want to sell—which may or may not be what he thinks he wants to buy.

You can only do this if what you want to sell is what he really needs. Only then will he properly pay you attention.

But even then, his attention will wander or will be at a low ebb if there are distractions around. Beautiful blondes may be terrific for getting attention to a poster, but they tend to take the customer's mind off radio-ware! Here again the noise factor comes in.

Getting the customer's attention starts with your window. Orange and yellow are the best attention-getting colours. Use them in contrast to their complementaries for pinpointing a special line or a new product. Don't splash them everywhere or their effect will be quite lost.

Bear in mind, too, the well-founded truth that the attention-getting value of a display is directly proportional to the square-root of the area. A display *B* that is four times the area of display *A* will get only twice the attention.

Whatever the attention-getting value of a thing, this drops with time, or, more precisely, with familiarity. Change your window as often as you can. Take your line from the composers: have recurring themes with variations. Make your sales technique a symphony!

PREVIOUS articles in this series were published in the following issues: Pt.1—*Sensation* (March); Pt.2—*Attention* (April); Pt.3—*Motivation* (May); Pt.4—*Personality*. Copies are obtainable price 1s. 8d. each post free from our Back Numbers Dept.

Motivation—People don't walk into your shop just to get out of the rain. They come in for some *reason*. This may not be the reason they give you. You have to find out what is the customer's motivation in coming into your shop, a radio shop.

Once you've done that, you can either try to change the motivation—assuming you can't sell him what he is looking for—or you can simply satisfy the motivation.

You have to remember that motives are closely linked with tensions. All our activities are the result of tensions of varying strength. You have to satisfy and remove the tensions from your customer. And you can't do that until you've found out what the tensions are.

You will find that they are complex, that they involve many things besides the simple acquisition of radio-ware. Only when you fully understand this will your sales talk have a sufficiently broad basis to deal with all the tensions.

People are complex and rarely know what they want so precisely that they can put it into words. Your job is to analyse them to find out.

Personality—Probably 99.9 per cent of your customers think. The way each one thinks determines his personality. His personality determines the way in which you are to deal with him. So, you must find out what kind of a personality he is totting around with him.

It is possible that the customer's personality clashes with your own. Then you change your own and don't try to change the customer's. You are not spreading any kind of gospel; you are merely selling radio-ware.

If there is something wrong with you customer's personality, let his priest or his wife or the police deal with it. All you want to do is to sell him something. You'll find that difficult enough!

Bear in mind that things are things and disagreements about them exist in the disagreers. Disagreement is a problem. But if you know your customer's personality, you know his opinions and you can agree with them. The problem is thereby avoided. Far better than trying to *solve* it.

It doesn't matter, for sales purposes, whether you are right or he is right. All that matters is that he buys something. Be a salesman, not a politician or philosopher.

education

All this is all very well. It will help you no end, I think. But you need to learn a lot more than I have been able to pin down in these articles.

If you agree with me that psychology can play a truly enormous part in your business success, then you ought to go a bit further into the matter.

I don't suggest that you should immediately start to go to evening classes or take a university degree in psychology, because you'd probably become so interested that you'd give up radio-dealing and then where would the poor public be?

What I suggest is that you spend a few evenings reading and thinking about the whole business. I'm appending a list of useful, not-too-advanced books to this end. But don't just read them. Take notes all the while, and try to relate what you are reading to what you are doing—selling radio-ware.

There are no books on this topic that I could confidently recommend. You must use your common-sense to select the appropriate parts of the books in the list below.

One final point. Psychology isn't a cure-all, or a sales gimmick, or a short-cut to soaring sales. It is a key which enables you to understand more clearly your fellow-humans, and to appreciate more clearly the how and why of their behaviour.

And in the man-to-man business of retailing, understanding is an important stepping stone to achieving a satisfactory customer-dealer relationship—the abstract on which concrete business-building depends.

Bibliography

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Social Psychology, W. McDougall, Methuen

RADIO AND TELEVISION DIGEST

★ Topicalities from Everywhere ★

This photograph was taken from the screen during the demonstration of Pye industrial television at the Material Handling Exhibition at Wrexham and shows a conveyancer fork truck with an operator using a radio-telephone. Between 500-600 guests assembled at the opening saw a selection of the many exhibits.

Latest idea from America: Certain Zenith television receivers are fitted with four photo-electric cells, one by each corner of the screen. The viewer is provided with a pistol-grip flash gun which he can point at the receiver—the beam of light, according to the photo-cell at which it is aimed, will automatically turn the set on or off, change the channel or cut off the sound during long-winded commercials! If ideas like this continued to be introduced, the ultimate will doubtless be a robot viewer which will sit in front of the receiver and save the viewer the trouble of watching the programmes.

A special exhibition, coinciding with the International Electrotechnical Commission, is being held at the Science Museum, South Kensington, London, S.W.7., until October 31. One of the objects is to show the origin and derivation of the various electrical units and an exhibit of particular interest is the complete set of the original B.A. units of resistance made in 1864 and constituting the oldest set of accurate electrical standards now in existence. The museum is open weekdays from 10 a.m. to 6 p.m. and on Sundays from 2.30 p.m. to 6 p.m. Admission is free.

Standard Telephones and Cables have received an order from Japan for an extensive s.h.f. radio network to cater simultaneously for telephone and television requirements over a route of 385 *miles between Osaka and Fukuoka.*

At the Model Engineer Exhibition, Chloride Batteries, Ltd., demonstrated two novel models powered by special *Exide* water-activated batteries—one a stern-wheeler paddleboat and the other a flashing light. Another unusual exhibit was a Harmonograph which enabled the visitor to take away with him his own "harmonic"—the pattern drawn by the apparatus when set in motion.

Two veterinary surgeons in partnership in the Midlands have recently installed Pye radio-telephone to save time and mileage and enable a speedier and more efficient service to be rendered.

An **R.C.A.** *electron microscope which enlarges specimens more than* 300,000 *times has been installed by the Rockefeller Institute for medical research. The instrument will be used in research studies exploring fundamental problems of differentiation, growth and repair of body tissue.*

At the International Exhibition on the Peaceful Uses of Atomic Energy, the English Electric Company, Ltd., participated in the United Kingdom section. They showed the part played by the company in the development of atomic power for the generation of electricity in a feature depicting not only the provision of generating plant, but also in the design of nuclear power reactors, and the development of reactor coolant apparatus.

All 14 *vessels of the Shell-Mex and B.P. coastal fleet are being fitted with* 17*in.* 13*-channel TV receivers installed by Pye Marine, Ltd. This is the first time that an entire fleet has been equipped at the owners expense for the benefit of the personnel. Considerable research was necessary to evolve the special omni-directional omni-frequency aerial which must give satisfactory results even with a rolling ship and regardless of the direction in which it is headed.*

Pye underwater television camera on board H.M.C.S. Beaver two miles outside Toronto harbour. The demonstrations, in connection with a recent international trade fair, were televised by the C.B.C. network and were claimed to be the first live broadcast of underwater television on the American continent.

During June, the number of television licences increased by 52,505, bringing the total to 4,676,422. At the end of June the total number of broadcast receiving licences was 14,035,567, including 275,910 for car radios. Note: In the U.S.A. there are now over 36 million television sets.

Cost of producing a one-minute cartoon film for commercial TV advertising is quoted as approximately £1,000–£1,600. *Colour, when it comes, will increase costs by only* 20 *per cent.*

The spectacular saving in space and weight which can be achieved by using transistors was demonstrated by Mullard at the S.B.A.C. Show, Farnborough, when they showed a transistorised loud hailer. Essentially a megaphone of normal dimensions, but containing batteries, a microphone, an amplifier using junction transistors, and a loud-speaker, the equipment is completely portable and to all intents and purposes treated as a normal megaphone with the advantage that speaking into it at normal voice level produces an output loud enough for carrying long distances.

A new line of RCA television receivers is claimed to feature the first major change in TV styling since the introduction of table models and open-face consoles. The new sets completely eliminate any visible controls from the front of the cabinet, many of the receivers using a vertical chassis with recessed top tuning controls. Each receiver also incorporates printed circuits.

Two thousand six hundred G.E.C. radio receivers were distributed among the population at the inauguration of the new Sarawak Broadcasting Service, sponsored by the government to bring entertainment, news and educational matters to the scattered peoples whose outlook in the past has been confined to their own river valley and who have never heard radio before. The receivers are battery-operated 4-valve superhets, covering medium and short wavebands

(Continued on page 480)

RADIO & TV DIGEST
—continued

and designed for simple and reliable operation and robustness in construction.

Brig. General David Sarnoff, Chairman of R.C.A., predicted, in a statement to the F.C.C., that pay-television (coin-in-the-slot programmes) would degrade and ultimately destroy free television. "The . . . philosophy of cash-on-the-barrelhead television is not in the public interest," he declared, "Their standard of public interest is No Fee—No See."

He claimed that the major points against subscription TV were that free TV programming quality would suffer, outstanding programmes and stars would move to subscription TV as would sports promoters, public service programming would suffer, motion-picture producers may gain control of TV programmes, and subscription system would black-out free television for millions of viewers.

A new TV Club in Dublin has been started by a group of enthusiasts who plan to buy old transmitting equipment to cover sporting events in the district. Discussions of reception and servicing problems will be held weekly. A spokesman of the Post Office says the erection of a full-fledged transmitting station is remote, due to the cost of running.

Reception of the signals from the Divis station (Belfast) is reported to be excellent throughout the 26 counties and in Dublin, radio engineers have been working long hours dealing with the large demand for aerial installations. There has also been a brisk business in TV insurance policies.

Colour TV was seen in Switzerland for the first time at the recent Pye Industrial TV demonstrations at Zurich. The colour pictures were displayed on a large 21in. screen.

A submarine telegraph repeater—or valve amplifier in a watertight container—inserted in one of the Porthcurne-Gibraltar submarine cables by the Cable & Wireless cableship *Recorder* is the first to be put into operation in any of the company's submarine cables. It is expected to increase its word-carrying capacity by 50 per cent. A similar repeater will be inserted at the Gibraltar end.

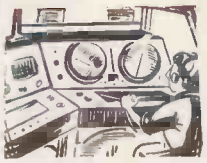
A large animated display showing how floating meteorological balloons automatically provide weather information by means of the Mullard radar sonde system was shown at an exhibition in Manchester. This is the world's first fully automatic weather balloon system, the balloons being interrogated from the ground station and send back radar signals which are decoded by automatic electronic computors.

A native girl in a Dayak longhouse listens attentively to the programme of the new Sarawak broadcasting service coming from the specially designed G.E.C. receiver.

Walkie-talkie control of building operations has been introduced with success in Scotland to assist in the speeding up of mechanised construction. The foreman, by 2-way radio, is able to instruct tower crane operators with speed and accuracy unobtainable by hand signals.

Radio Show Notes

Biggest Temporary Studio in Europe



THE advent of commercial television and the introduction of the B.B.C's v.h.f. sound system are likely to attract more people than ever to the twenty-second National Radio Show at Earls Court, which is being opened by Dr. Charles Hill, Postmaster-General on August 24.

One of the biggest problems which the organisers have to face is the building of a studio for the B.B.C. from which both TV and sound broadcasts can be made. This must have all the features of a permanent studio and a few more, and has to be erected in a challengingly short time.

It must, of course, be soundproof and have a stage large enough to take several stage sets at once, so that the cameras can switch from one to another. It must be strong enough to carry heavy equipment, adaptable enough to allow freedom for cameras and lighting, and adequately ventilated to counter the abnormal heat generated by 400 kilowatts of lighting.

It must have four control rooms (raised above the acting area, designed to hold 25 people and much heavy equipment), switch rooms and an auditorium to seat 650, which is twice the number catered for last year. And all this within the limitations of the permanent exhibition building.

It is, in fact, the biggest temporary broadcast studio in Europe.

One of the attractions of past Radio Shows has been the demonstration of outside broadcasts. These will again take place in an arena which, this year, to avoid sound interference, will be sited well away from the studio.

Construction

The exhibition architect to the Radio Industry Council, Mr. Ian Jeffcott, L.R.I.B.A., who is acting on this project also for the B.B.C., decided that the way to fulfil all the requirements in the time available was to use steel scaffolding.

The studio is 130ft. long, 76ft. wide and 27ft. high, with lighting gantries on two sides. The acting area is separated from the auditorium by a proscenium arch 26ft. high. Spanning the whole width of the acting area are four welded tubular beams and a catwalk box girder supported on tubular columns and wall framing. Three more welded beams support the roof over the auditorium. The lighting gantries have to stand the weight of the dozens of spotlights to be hung from them. Steel scaffolding in the studio and arena will carry more than a ton of lighting equipment.

The four control rooms are built at a height of 13ft. 5in. over the switch rooms on one side of the studio. This year, the design provides for a much improved line of vision, giving a completely unobstructed view of the entire acting area.

Arena

The arena consists of an oval timber track enclosing a centre of turf 3¼in. thick. There is seating accommodation on three sides for the audience. Round the arena are static lighting bars of tubular rods 35ft. high, from which over half a ton of spotlights will be suspended. There are eight lighting triangles over the actual arena, and two more static lighting bars over the audience, for the front lighting of artists.

On one side is an elevated control room on a tubular structure 72ft. × 16ft. with a gantry above for camera and lighting. There are three other cantilevered camera gantries and four spotlight towers all about 26ft. high.

For taking aerial shots there is a mobile scaffolding tower 15ft. high, carrying a platform 8ft. × 6ft. on which the camera will be mounted.

All the scaffolding work is by the Steel Scaffolding Co., Ltd., with their Big Ben equipment, as sub-contractors to Earls Court, Ltd.

RAINBOW RADIO SHOW

THIS year's Radio Show is even more colourful than usual, eau-de-nil green, pale magenta, primrose yellow, royal blue, orange and gold all being used in the official colour scheme. Green, pale magenta and yellow are the main colours with royal blue lettering and orange and gold used for "high-spotting" certain features. In addition, exhibitors are free to use whatever colours they select on their stands.

The main, Warwick Road, entrance hall is to be draped in pleated, chalk-white fabric, as will be the staircase at the west end of the exhibition hall.

General lay-out and colour scheme for the exhibition are under the direction of Mr. Ian Jeffcott, L.R.I.B.A., architectural consultant to the Radio Show.

Dealers ask for 30,000 Show posters

A RECORD number of dealers throughout the country have asked the Radio Industry Council to supply them with window bills and posters advertising the National Radio Show. These are the bills on which appear Emwood's caricatures of well-known broadcasters.

Up to the time of going to press some 30,000 applications had been received from dealers, more than ever before.

"*We are grateful for the help the R.T.R.A. have given us*," an R.I.C. spokesman said, "*and to the trade papers for making known this opportunity for dealers to exploit the nation-wide publicity radio and TV at Show time.*"

It is expected that dealer attendance at the Show this year will reach new high figures, and that many dealers will co-operate actively by bringing parties of customers along.

O.B.'s from Earls Court

TEN television programmes will be broadcast from the B.B.C. O.B. arena on the ten consecutive nights of the Radio Show. In addition to a 15-minute preview of the Show on August 23 telecast from the arena, the following programmes will be featured.

August 24 (Opening Night): *Double-Top*—a circus programme from two rings, combining acts from Smarts and Chipperfields circuses. August 27: *Sports Jackpot*—tests of skill with experts, personalities and celebrities. August 26: *Country Comes to Town*—magazine with rural and country flavour. August 27: *Youth in Command*—one of the most successful programmes of last year, reintroduced and featuring some 500 young people drawn from various youth organisations. August 29: *The Commonwealth Show*—variety-magazine show representing as many countries of the Commonwealth as possible. August 30: *Army Guest Night*—an Army show with drill, gymnastics, etc. August 31: *Holiday Time*—a selection of quick shows from nine holiday resorts. September 1: *TV Cup Final—Five a Side*—seven teams from various countries in 5-minute football heats with a 10-minute final. September 2: *It's Easy when you Know How*—an audience participation show. September 3 (Final Night): *O. B. Parade*—outside broadcasts from the various regions.

The size of the arena is the same as last year—120ft. × 80ft. Audience capacity is now double: 2,000 at a time, and 10,000 a day. Novel feature is a V.I.P. box with a special personality for each programme.

(Continued on page 484)

Radio Show Notes—continued

Electronics and Careers Display

SPECIAL exhibits organised by the Radio Industry Council at the Show cover Electronics, Careers, and Radio Servicing. Subjects to be shown include the following:

Electronics of To-day: *Air Transport* (including a model of the new control buildings at London Airport); *Medical* (a television operating theatre, by E.M.I.); *Counting and Sorting* (an electronic coin sorter, by Teledictor, and a batch counter, by B.T.H.); *Communications* (automatic teleprinter and message sending and receiving equipment, by A.T. & E.); *Weather* (Radio Sonde Equipment, by Mullard); *Cleaning and Heating* (ultrasonic cleaning, r.f. wood glueing and levitation induction melting, by Redifon); *Marine* (echosounding display, by Marcom International, and a marine autopilot, by Hartley-Baird); *Radar* (equipment and aerials, by Decca Radar and Cossor); *Testing, etc.* (vibration tester, by Goodmans, *Stroboscopes*, by E.M.I., and *Spring Testers*, by Northern Polytechnic); *Amusement* ("Try your Strength" machine, by Elliotts, and Mullard Gold Ball); *Business* (automatic dictating machine, by E.M.I.).

Electronics of the Future: *Atomic Power Supply* (an animated model of a nuclear reactor power station, by C.E.A.); *Electronic Home* (domestic control of housework from a master panel); *Electronic Factory* (demonstration of automation in industry); *Future of Travel* (possible future developments in travel, by B.O.A.C. and the British Interplanetary Society).

Careers: *Film Strip* (film strip plus electronically controlled tape recording on careers in the industry, by A.T.E.); *I.E.E. Film*, "*The Inquiring Mind*" (seen recently on television); *Radio Training in a Technical College* (display by the Northern Polytechnic).

Radio Servicing: A display of servicing arranged by B.R.E.M.A. Service Managers Committee, the subject being covered under four main headings:—

(*a*) *recognition and identification of components and reading circuit diagrams;*

(*b*) *the use of test equipment in checking receiver performance;*

(*c*) *observing symptoms and tracing faults;*

(*d*) *a model servicing bench including all the equipment needed and used by the service engineer.*

B.R.E.M.A. suggest that the names and ages of all boys visiting the display be collected; and after the Show each should be sent specially prepared literature on what the industry has to offer by way of a career.

Enquiry Section: An enquiry counter and two interview rooms where possible recruits to the industry, and their parents, will be able to obtain further information.

An artist's impression of the 1955 Radio Show stand designed by Beverley Pick Associates for Ediswan.

RADIO SHOW ANNOUNCERS

JOINING Vera McKechnie as Radio Industry Council announcers at the National Radio Show, Earls Court, London (August 24 to September 3) are Helen Bailey and Rolf Harris.

All three announcers will be working under the direction of the Radio Industry Council's programme officer, Mr. John Goss. The assistant programme officer, with special responsibility for the Band III closed circuit, is Mr. Christopher (Chris) Doll, husband of Josephine Douglas.

R.I.C. Studio at Earls Court

THE Radio Industrial Council has its own television studio at the Radio Show. This is near, but separate from, the Radio Industry Council's control room on the first floor.

The R.I.C. studio is equipped by J. Arthur Rank Screen Services, Ltd., and their executive producer, Eric Fawcett, will be producer in charge of the R.I.C. programmes from this studio, amounting to about four half-hours daily.

The B.B.C. will be using it every day for broadcasting Women's, Children's and *Starlight* programmes, but it will also be used by the Radio Industry Council for live programmes on the two television closed circuits—Band I and Band III.

Telesurance Stand is 135 ft. long

TELESURANCE, LTD., the nation-wide television maintenance and insurance firm, have a stand 135ft. long, and extend a special welcome to dealers. Part of the stand is occupied by the R.T.R.A.

Special features of the stand include:

Photographic blow-ups illustrating the complexity of the modern TV receiver with appropriate captions explaining the function of the various components.

A tube tester specially built by their own engineers will also be on display. This is used to diagnose accurately the faults of suspect cathode-ray tubes submitted by agents.

A TV Camera will, it is hoped, be focused on the crowds so that members of the public may see themselves as images on the TV screen.

The Celebrity Dais, which was so popular a feature of the Stand last year, will be repeated and, to date, over seventy top-line TV stars have agreed to appear in person, sign autographs and say "hello" to viewers. The idea is to bring the TV image to life for viewers and give the stars a chance to "step out of the picture." For most of the time, of course, the problem at Telesurance is to "keep them in the picture."

Autograph cards picturing famous TV stars and carrying brief biographies on the reverse will be distributed throughout the Show.

Telesurance representatives are in attendance to discuss their insurance and maintenance scheme with dealers.

TV AVENUE

TWENTY-EIGHT exhibitors, occupying 31 booths, are demonstrating a total of 82 TV receivers in Television Avenue on the first floor of the Radio Show. Individual firms will have in operation anything from one to as many as six receivers.

To avoid confusion of sound, all sets in Television Avenue are operating on the Band I (B.B.C.) frequency, demonstration of the Band III facility being confined to exhibitors' stands and demonstration rooms.

Firms represented in Television Avenue, with the numbers of sets in brackets, are as follows:—

Balcombe (3), Bush (4), Cossor (4), E. K. Cole (3), C.W.S. (3), Decca (2), Dynatron (1), English Electric (2), Ferranti (6), Ferguson (6), G.E.C. (4), Gramophone Co. (3), Hartley Baird (1), Invicta (2), K.-B. (2), Marconiphone (3), Masterradio (3), Pam (2), Pilot (2), Philco (2), Peto Scott (3), Philips (3), Pye (6), R.G.D. (3), Regentone (3), Stella (2), Ultra (2), Vidor (2).

The E.M.I. team again took top honours in the annual Inter-Company Apprenticeship Athletic Meeting, held this year on the Handley Page ground at Hendon, and retained the Handley Page cup by scoring 72 points, beating their nearest rivals (Sangamo Weston) by 13 points.
The photograph shows the victorious team with the trophy which they have now won for two consecutive years. Behind them are members of the E.M.I. management and officials of the company's sports and social club.

BERNARD CHARLES SENDALL, C.B.E., has been appointed Deputy Director General of the Independent Television Authority. Mr. Sendall, who is 42, was Principal Private Secretary to the Minister of Information from 1946–49 and Controller of the Festival of Britain Office (and deputy to the Director-General of the Festival) from 1949–51. Since then, he has been an assistant secretary in the Admiralty; he was awarded the C.B.E. in 1952. He will be in charge of the administrative work and questions of policy arising from the Television Act, and in particular of the Authority's relations with the present and future programme companies. The Authority's chief engineer and its finance and establishment officers will continue to be responsible direct to the Director-General, Sir Robert Fraser.

E. LAWRENSON, M.A. (Oxon) has been appointed chief engineer of Wireless Telephone Company, Limited, Sheffield, a member of the Plessey group of companies. Before joining Wireless Telephone Company last year, Mr. Lawrenson was a senior engineer in the advanced development laboratory of Standard Telephones & Cables, Ltd.

Miss Vera McKechnie is one of the Radio Industry Council's announcers at the National Radio Show, this being the second time she has announced for the radio industry—she was one of the R.I.C. announcers at the Northern Radio Show in May.

During the last seven years, Miss McKechnie has been with most of the B.B.C's radio departments, including short stories, drama, features, and has also announced and commered programmes.

Miss McKechnie is under the immediate direction of Mr. John Goss, seconded from the B.B.C. to act as Radio Industry Council programme officer, in the Council's own glass-walled television studio. She will be seen by visitors to the show both in person and on the 500 television screens scattered about the hall.

PEOPLE in the picture

L. J. CURTIS, previously manager of Brown Brothers, Ltd., branch at Bournemouth, has been promoted to an appointment at their Head Office in connection with their garage equipment interests. **A. S. RENWICK,** who has been with the company for 27 years, and has managed the Stoke-on-Trent branch since 1938, is appointed manager at Bournemouth. **S. J. HILLIER,** formerly assistant manager at Wolverhampton, takes over the management of the Stoke-on-Trent branch.

The Board of Electrical & Musical Industries, Ltd., announce that Sir **PERCY H. MILLS,** Bt., K.B.E., has been appointed a director of the company.

At a dinner given by the Plessey Football Club, **TED FENTON,** manager of West Ham United F.C., was the guest of honour. The Plessey team were the winners of the Essex Business House League (Premier division), the Essex Business House Cup, and the Ekco Cup, a trophy competed for annually between the teams of the Plessey Company and E. K. Cole, Ltd. Representing the Board of the Plessey company were **JOHN** and **MICHAEL CLARK** and **T. WHITE-WILSON,** a director of Plessey International, Ltd., who is also president of the Plessey F.C. Attending in a strictly non-political capacity was the M.P. for Ilford, Squadron Leader A. E. Cooper, M.B.E.

Ferranti, Ltd., announce that **M. H. CARR** has removed to the following address—40 Bellingham Road, Catford, London, S.E.6. Mr. Carr combines the duties of Supervisor for the Southern Region with those of representative in the Channel Islands and the London postal districts of W.C.1, W.C.2, E.C.1, E.C.2, E.C.3, E.C.4, W.1, W.2, W.8, N.W.1, S.W.1, and S.E.1.

The Institute of Electrical Engineers has nominated Sir **GEORGE H. NELSON** as president, the office becoming vacant in September. Vice-presidents nominated are **T. E. GOLDUP** and Sir **HAMISH D. MacLAREN** and co-opted to the council to fill the vacancy created by Sir Hamish MacLaren is **C. T. MELLING.**

A son has been born to Sonia, wife of **CECIL B. HARRIS,** general manager of Harris & Russell, Ltd., son of the principal, A. E. Harris. The new arrival, 7 lb. 4 oz. at birth, is to be called Russell John Harris.

At the Whiteley Electrical garden fete, Valerie Dean, a press drill operator, is proclaimed as "Miss Stentorana" for 1955 by Mrs. A. H. Whiteley.

Ferguson

PRESENTS THE FINEST RADIOGRAM VALUE IN THE INDUSTRY

Year by year Ferguson expands its range of Radiograms—and expands also its dealers' business in this big, growing and profitable market. This year Ferguson breaks all previous records with a programme of 11 fine sets—from high fidelity table model to luxury reproducer. Here is a selection of these winning sets.

326RG BUREAUGRAM 5-valve 3-wave superhet in a lovely bureau-style cabinet, with good record storage space. 3-speed auto-changer, 8" moving-coil speaker. **69 gns. tax paid.**

375RG BUREAUGRAM as above, but including VHF/FM reception. **75 gns. tax paid.**

327RG CONSOLE RADIOGRAM 5-valve 3-wave superhet in a graceful Console cabinet. 3-speed auto-changer, 8" moving-coil speaker. **49 gns. tax paid.**

401RG HIGH-FIDELITY FOUR-BAND RADIOGRAM 9-valve superhet for both AM and FM reception, with 6-watt negative feedback output and dual bass and treble speakers. **95 gns. tax paid.**

See them on Stand 14 Radio Show

...fine sets these **FERGUSON'S**

NEW MODELS

All these models are designed for reception of Band I and Band III stations. They are fitted with 12-Channel Turrets, Automatic Anti-Fade Control on vision and sound, Flywheel synchronisation. Automatic Interference Suppression. All these cabinets are beautifully finished in Highly Burnished Walnut Veneer.

Distribution through recognised Trade Channels only.

B.94 17 in. TABLE MODEL

17in. Rectangular C.R.T.
Size: Width 20in., Depth 19in., Height 20in.

B.95 14 in. TABLE MODEL

14in. Rectangular C.R.T.
Size: Width 17in., Depth 18½in., Height 17in.

Vision and Sound of Classical Quality

television

89 Reddish Lane, Gorton, Manchester, 18.

It saves to "DIKTAT"

THIS WONDERFUL NEW PORTABLE WITH BUILT-IN LOUD SPEAKER SAVES HOURS OF PRECIOUS TIME

49 GNS.

complete with tape and all attachments.

Your secretary types out dictation undisturbed. She can regulate the "DIKTAT" easily by foot control the left push button for starting and stopping, the right for repetition of text—as often as required.

The single earphone will be especially comfortable. It is light as a feather, small, almost invisible, and it clings to the ear, producing a very clear play-back.

The small and inconspicuous, but highly efficient microphone picks up clearly any sound or talk.

Your secretary will use the stethoscope earphones preferably in any case where noise is disturbing the play-back. The earphones are very light and do not disarrange the hair.

With telephone adaptor you relieve your memory, and avoid irritations and errors over telephone negotiations. Recording done through the adaptor microphone retains undisputably any conversation.

It is an attractive, handy and stylish carrying case in which "DIKTAT" accompanies you, wherever you go. The "DIKTAT" gives 1 hour's playing time.

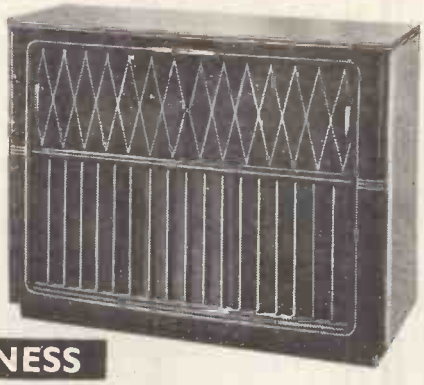
Sole Distributors to the U.K.

RADIO & TELEVISION DISTRIBUTORS LTD

91 TABERNACLE STREET LONDON EC2 **Telephone: CLErkenwell 1774/5**

COUNTESS

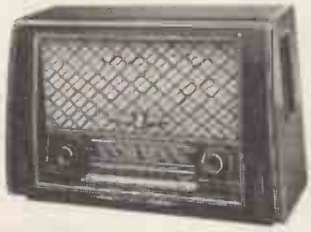
A powerful 7-valve FM/AM radio with push-button controls, FM/VHF medium and long wavebands. Separate tuning for AM and FM. Plug for pick-up and extension speaker operated by push-button control. Wonderful tone reproduction through large elliptical speaker. 200-240V AC.
Price 28 gns. (Tax Paid)



BARONESS

Eight-valve radiogram in a cocktail cabinet of high-quality wood. Usual VHF/FM Imperial advantages plus lighted storage room for records, wooden sash doors, three speakers. Bass and treble controls with magic-eye are included with built-in dipol for FM and Ferrite-rod-aerial. 200-240V AC.
Price 90 gns (Tax Paid)

IMPERIAL



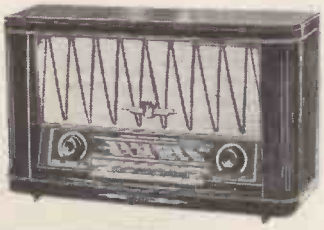
VINESSA

A high quality 8-valve radio with 3 speakers. Complete waveband coverage—Long, Medium, Short and VHF/FM. Push-button control VHF dipol for F.M. signals. Twin flywheel tuning and bass and treble controls. A set in the true IMPERIAL style. 200–240V A.C.
Price 47 gns. (Tax Paid).

OPERA

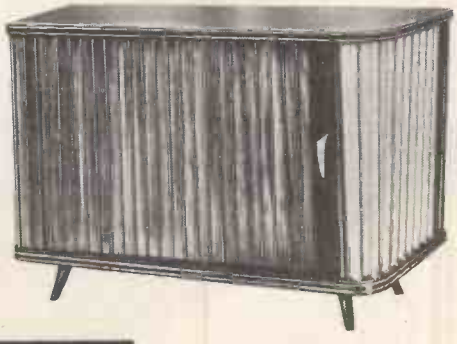
This 9-valve cocktail combination with its 5 speakers has a quality IMPERIAL reproduction. The FM/AM receiver has RF amplifier, ratio-detector, built-in VHF dipol for FM plus tunable Ferrite-rod aerial. Bass and treble controls, magic-eye, twin flywheel tuning, push-pull undistorted output. Illuminated record compartment, accommodation for tape recorder. 200–240v. A.C. **Price £155 gns. (Tax Paid).**

IMPERIAL



GRACIOSA

Modern 9-valve AM/FM radio with ingenious arrangement of 5 speakers. Built-in broad-band dipol and Ferrite-rod aerial tunable for medium and long wave. Bass and treble magic-eye controls and flywheel tuning. Undistorted push-pull output. Housed in a beautiful cabinet of top grade wood. 200–240V A.C. **Price 59 gns. (Tax Paid).**



COCKTAIL

9-valve concert radiogramophone cocktail cabinet usual IMPERIAL standards, e.g., VHF dipol for FM and tunable push-button control Ferrite-rod aerial, 5 speakers, etc., plus illuminated 3-speed autochanger and record compartment. An attactively polished wooden cabinet features a cleverly illuminated speaker-cloth. 200–240V A.C.
Price 139 gns. (Tax Paid).

HIGH FIDELITY plus HIGH VERSATILITY

Behind the new RCA High-Fidelity Amplifier stands over a quarter of a century's skill and experience in designing professional sound reproducing equipment. This Amplifier includes several exclusive features entirely new to audio engineering, thus making it many years ahead of its time both in design and construction.

The resulting performance will be found to give a new meaning to high-fidelity reception and a new realism to recorded music.

The RCA High-Fidelity Amplifier can be incorporated successfully into any existing home audio system. The versatility of its input and output facilities coupled with the wide measure of control afforded by the Pre-Amplifier means that it can be used in conjunction with most high quality audio equipment.

RCA High Fidelity

RCA PHOTOPHONE LIMITED

An Associate Company of Radio Corporation of America

LINCOLN WAY, WINDMILL ROAD,

SUNBURY-ON-THAMES, MIDDLESEX.

PRE-AMPLIFIER

Inputs—*Magnetic Pick-up.* **B.78.** 16 mv input for rated output. 300 c/s Turnover 6 DB Roll-off at 10 kc/s. **A.78.** 14 mv input for rated output. 500 c/s Turnover. 16 DB Roll-off at 10 K c/s. **L.P.** 13.5 mv input for rated output. 500 c/s Turnover. 12 DB Roll-off at 10 K c/s. Flattened LF at 50 c/s to + 13 DB. **R.I.A.A.** 11.5 mv input for rated output. 500 c/s Turnover. 14 DB Roll-off at 10 Kc/s. 3 DB Flattening at 50 c/s. *Crystal Pick-up* .35 volt with inbuilt equalisation from constant amplitude to constant velocity output enabling switched replaying characteristics to be accurately employed. *Radio/Tape* High Level 200 mv. Flat characteristic. Low Level 50 mv. Flat characteristic. *Microphone* 6.5 mv for rated output. Flat characteristic. *Mixer* Facilities for microphone input with radio/tape/gramo inputs. **Output.** 1.2 volts from cathode follower stage. **Tape Recording Output.** 1.2 volts cathode follower independent of monitoring. **Bass & Treble.** Plus and minus 14 DB at 50 c/s and 10,000 c/s. **Volume.** Twin ganged control giving correct gradation. **Low-Pass Filter.** Switched 10 K c/s, 7 K c/s, 5 K c/s and Flat. **High-Pass Filter.** Inbuilt attenuating below 20 c/s. **Filter Slope.** Variable to 35 DB per octave. **Power Requirements.** 375 v/7 ma. 6.3 v. 1 amp.

MAIN AMPLIFIER

Output. 12 watts rated. Peak in excess of 20 watts over 25-20,000 c/s. **Distortion.** Total harmonic less than .1% at 10 watts—700 cycles. **Noise Level.** 85 DB below rated output. **Damping Factor.** Variable from positive to negative values. **Frequency Response.** Within 0.2 DB 20—25,000 c/s. ±0.5 DB 10—60,000 c/s. **Feedback.** 40 DB total. **Output Impedances.** 4 ohms, 7 ohms. 15 ohms. **Input Voltage.** 1.2 v for rated output. **Ancillary Power Supplies.** 375 volts 45 milliamps, 6.3 volts 2.5 amps available for VHF Tuner, Pre-amplifier and Tape Reproducer amplifier. **Power Consumption.** 130 VA at full load. AC input 100/150 and 200/250 volts.

Price £48 0 0 complete

CLASSIFIED ADVERTISEMENTS

Rates: 4d. per word (Minimum 18 words) per insertion. Box Numbers 6d. extra. Series rate on application. Copy and remittance should be sent to the Classified Advertisement Manager, British Radio and Television, 46 Chancery Lane, W.C.2, before the 10th of each month preceding publication. Classified advertisements must be prepaid.

SITUATIONS VACANT

Engagement of persons answering these advertisements must be made through the local office of the Ministry of Labour or Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless otherwise excepted from the provisions of the Notification of Vacancies Order 1952.

DUE to continuous expansion, DERWENT TELEVISION have a number of vacancies for experienced Television Engineers and Testers, particularly those interested in Band III. The positions are interesting, progressive, well paid and permanent. Apply: Wadsworth Road, Perivale, Greenford. Tel.: PERivale 6488.

FIRST-CLASS field engineers, fully experienced on all the popular current models, required in the following areas: Berkshire, Buckinghamshire, Coventry, Shrewsbury, Stoke-on-Trent, Surrey, West London. Attractive salary and congenial working conditions are offered to top-grade men. Apply to Personnel Manager, Belcher (Radio Services), Ltd., 59 Windsor Road, Slough, Bucks.

TELEVISION Part-time skilled and semi-skilled engineers for aerial rigging (80% loft) and complete BIII installations. Wanted immediately. Own transport. Contact us now. There's big money in the air. Box 243.

TELEVISION SERVICE ENGINEER required for well equipped service department. Pleasant working conditions and excellent salary. Managerial prospects. W. J. Marshall, 76 High Street, Witham, Essex.

TELEVISION SERVICE ENGINEER (additional) required by progressive concern handling TV Sales, rental and wire-broadcasting. Good salary and family size flat available to suitable man. Full details of experience (in confidence) to Macclesfield Radio Relay Co., Ltd., 85 Chestergate, Macclesfield, Ches.

AUCTIONS

EVERY THURSDAY AT 11 a.m.
TELEVISIONS, radios, washing-machines, fridges, heaters, etc. We can clear your surplus quickly and obtain the highest price for you. Eastern Auction Mart, Whitehorse Lane, Mile End Road. Opposite Stepney Green Station. STE 3993/3296.

FINANCE

INSTALMENT SALES, any lines, any prices. For details of Easy Payments Plan and full finance available to dealers apply Ladbrook Discount Company, Ltd., 101 Leadenhall Street, London, E.C.3.

DEALERS wishing to develop Hire Purchase and Credit Sales business apply for facilities and advice to British & F. E. Co., Ltd., 37-40 Cheapside, London, E.C.2.

WELL established East Midlands Company, 3 Branches retailing Radio, Television, Electrical goods with present turnover approx. £30,000 p.a., offers Directorship to suitable person prepared to invest £4,500 or alternatively would consider merger with larger organisation. All replies answered in strictest confidence. Box 244.

FOR SALE

TV TUBES, cheap, guaranteed, reconditioned and surplus; from £3. Also cheap valves, speakers and components used and new at "silly" clearance prices, send for our bargain list now! Video Electronics, 16/22 Bacon Street, London, E.1.

BUSINESS FOR SALE

RADIO, TV, Records, Electrical Appliances and contracting business. Limited Company in Manchester suburb. Main Road Frontage. Turnover £15,000, Stock £4,000, also Property, including every accommodation, stock rooms and workshops for sale or rent. Enquiries from principals only will be considered. Box 245.

SERVICE

ARMATURE Rewinding service to the trade. Vacuums, Drills, Grinders, Hood Dryers, Dental Motors, Vacuum cleaner Armatures replaced from stock; 24-hour service. Every job guaranteed. All Vacuum cleaner parts, hoses, etc., in stock for any make.—REGAM ELECTRIC, 95-7 PARK LANE, LEEDS 1.

A SECOND - TO - NONE rewind service—neat, clean, reliable. New Transformers, standard or to specification. Tube Heater low-loss Isolation Transformers. Radio & Electric Facilities, 137a Ashton Road, Oldham, MAIn 4141.

ETRONIC TV REPAIRS, replacements, parts, some manuals. Send S.A.E. for reply to enquiries, R. Pearson, 156 South Ealing Road, W.5. Phone: EALing 2087.

TELEVISION TIME - BASE AND EHT TRANSFORMERS require specialised handling. Our factory is equipped with modern winding, impregnation and test equipment for speedy rewinds. We are winding transformers for leading manufacturers. 2,000 DIFFERENT TYPES IN STOCK. Handbook 1s. Direct TV Replacements, 134-136 Lewisham Way, S.E.14. TIDeway 3696-2330.

TECHNICAL TRAINING

I.P.R.E. TECHNICAL PUBLICATIONS.—5,500 Alignment Peaks for Superhets, 5s. 9d. The Practical Radio Engineer, sample copy, 2s. Constructional data for TV aerial strength meter, 7s. 6d. Membership and examination data, 1s. Syllabus of postal courses free and post free.—Secretary, I.P.R.E., 20 Fairfield Road, London N.8.

FREE! Brochure giving details of Home Study Training in Radio, Television, and all branches of Electronics. Courses for the Hobby Enthusiast or for those aiming at the A.M.Brit.I.R.E., City and Guilds, R.T.E.B., and other Professional examinations. Train with the college operated by Britain's largest Electronics organisation. Moderate fees. Write to E.M.I. INSTITUTES, Dept. BRT28, London, W.4.

WANTED

OLD TV's, Radios, Meters, C.R.T's., in any condition bought for cash, turn your junk into cash, collections anywhere. Mr. Berne, 335 Rugby Road, Dagenham, Essex.

VALVES WANTED—All types of valves required for cash. State quantity and condition. Radio Facilities, Ltd., 38 Chalcot Road, N.W.1. PRImrose 9090.

WANTED
150
RADIO, TELEVISION, ELECTRICAL RETAIL SHOPS

(Singles or Chains Considered)

£350,000 AVAILABLE

Full details in confidence to :

Abcross Business Agents Ltd.,
46 St. James's Place, London, S.W.1

Telephone : HYDE PARK 1678

CATHODE RAY TUBE REPAIRS

To the **TRADE** only — *All faults dealt with*

- *low emission*
- *inter-electrode shorts*
- *ion burns etc.,*

13 months guarantee on a sliding scale. Send today for prices and details and **OFFICIAL** forms.

No new customers for winter season after September.

BRITISH NEON MFG. CO., LTD.
COTTENHAM Phone: 246 CAMBRIDGE

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BRITISH RADIO AND TELEVISION
46 CHANCERY LANE, LONDON, W.C.2

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Published by British Radio and Television (Publishers) Ltd., 46 Chancery Lane, London, W.C.2, and Printed by Patina Press Ltd., 144c Offord Rd., N.1