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

Vol. V No. 5 SEPTEMBER, 1950 One Shilling

NATIONAL RADIO EXHIBITION

Castle Bromwich, Birmingham, September 6th to 16th

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Decca STAND No. 37

Projection television. Decola, Beau-Decca and Deccalian dual-speed (33⅓ and 78 r.p.m.) radiograms and reproducers; chair-side and portable record players.

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There is a Convette to enable every type of battery set to be operated from the mains.

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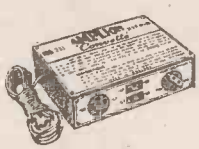

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REGD. TRADE MARK

Precision
ELECTRICAL TESTING INSTRUMENTS

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The "AVO" ELECTRONIC TESTMETER

Size : 12½ ins. × 9 ins. × 5½ ins.
Weight : 12½ lbs.

The instrument operates on A.C. mains, 100-130V. and 200-260V., 50-60 c/s.

PRICE
£35

Fully descriptive pamphlet available on application.

Sole Proprietors and Manufacturers:

This instrument, which is an up-to-date example of current instrument practice, has been developed to meet the growing demand for an instrument of laboratory sensitivity built in a robust and portable form, for use in conjunction with electronic and other apparatus where it is imperative that the instrument should present a negligible loading factor upon the circuit under test.

The instrument consists basically of a balanced bridge voltmeter. It incorporates many unique features and a wide set of ranges so that in operation it is as simple to use as a normal multi-range testmeter.

The instrument gives 56 ranges of readings as follows :—

D.C. VOLTS : 2.5mV. to 250V. (Input Resistance 11.0 megohms.)
25mV. to 10,000V. (Input Resistance 110.0 megohms.)

D.C. CURRENT : 0.25μA. to 1 Amp. (250mV. drop on all ranges).

A.C. VOLTS : 0.1V. to 2,500V. R.M.S. up to 2 Mc/s. With diode probe external 0.1V. to 250V. R.M.S. Useful measurements can be made up to 200 Mc/s, the applied voltage being limited to 100V. above 50 Mc/s.

A.C. OUTPUT POWER : 5mW. to 5 watts in 6 different load resistances from 5 to 5,000 ohms.

DECIBELS : −10db. to +20db. Zero level 50mW.

CAPACITANCE : .0001μF. to 50μF.

RESISTANCE : 0.2 ohms to 10 megohms.

INSULATION : 0.1 megohm to 1,000 megohms.

The thermionic circuit gives delicate galvanometer sensitivity to a robust moving coil movement, which it is almost impossible to damage by overload. The instrument is quickly set up for any of the various tests to be undertaken, a single range selector switch automatically removing from the circuit any voltages and controls which are not required for the test in question.

The AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD.
WINDER HOUSE • DOUGLAS STREET • LONDON • S.W.1 *Telephone: VICTORIA 3404/9*

E.T M.3

★ NEW MODEL

Model **T24DAB**
A DC/AC mains/battery portable giving good performance on two wavebands.

WELL DESIGNED AND POPULAR

Model **VT53DA** (London Frequency)
VT73DA (Midlands Frequency)
A 10" tube table receiver giving excellent reception at moderate cost.
£38.15.0 plus **£8.16.4** tax

★ NEW MODEL WITH 12" TUBE

Model **VT55A** (London Frequency)
VT75A (Midlands Frequency)
A handsome table receiver with figured walnut cabinet.

★ NEW MODEL

Model **ARG27A**
A beautiful radiogram that you'll be proud to sell.

Make a bee-line for the MARCONIPHONE

THE GREATEST *G. Marconi* NAME IN RADIO

STAND

The latest models uphold in every way the Marconiphone reputation for producing "best sellers" of Radio, Radiograms and Television.

We look forward to the pleasure of showing you the full range, some of which are illustrated here, at the Radio Exhibition.

AND SEE OUR NEW MODELS

NATIONAL RADIO SHOW BIRMINGHAM
SEPTEMBER 6th-16th

M.193

Vol. V No. 5

British RADIO AND TELEVISION

Incorporating "The British Radio Maker and Exporter"

SEPTEMBER, 1950

Editorial and Advertising Offices:

92 Fleet Street, London, E.C.4 **Telephone: CENtral 4100**

In this Issue—

Annual Subscription to any part of the World: 15s. post paid.

One thing more...

All set for the open road ahead, but one thing more will complete the luxury of a motoring holiday, their favourite radio entertainment by their side.

The end of petrol rationing means a record demand for Pye Motor Radio. Give this high performance, low cost set a prominent display position and ensure for yourself a quick, handsome turnover.

MODEL No
P23CR — 6v.
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RETAIL PRICE
17 gns.
(Tax Paid)

PYE

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PYE LIMITED · RADIO WORKS · CAMBRIDGE

Tele-opinion

For All the World to See — and Hear

ALL that is best in the radio and television industry of Great Britain—and that means all that is best in radio and television in the world—will be on display at Castle Bromwich this month. In this, our annual special show number, we take the opportunity of saluting the drive, the energy and the ingenuity of the manufacturers and all those responsible for putting the British radio and television industry on parade. We congratulate the exhibitors and the organisers. This issue describes the exhibits fully, and we shall have more to say in our next issue, which will provide a summary of the outstanding models on display.

SO much for the show—but there is another matter of importance to the Trade which is covered in this number. The quality of the current B.B.C. television programmes is something that concerns us all. How can they be improved?—For they *must* be improved. Is sponsorship the answer? BRITISH RADIO AND TELEVISION—the voice of the industry—asks its readers (see pages 12 and 13), to send a postcard with their views on this vital subject to the Editorial offices so that we may pass this information on to the Beveridge Committee. The dealer, the wholesaler, and the manufacturer are the only men who know, finally and definitely, just how much the present programmes are affecting sales—which should be climbing higher and higher at the present time.

Now let us turn to the 1951 Festival of Britain, which is going to give our Industry its next opportunity to stock a massive shop window.

This time the shop window is going to be studied by buyers from all over the world. We know that radio and television will be strongly represented at the Festival, and we know, too, that manufacturers will make the most of this opportunity. But the organisers must make crystal clear that whatever number of lines are in use, this country can make and supply better equipment than anywhere else in the world.

By 1951, too, programmes must be of such quality that they will display British equipment at its best. Television is the best and only way of really presenting the excitement of life to an audience of millions—and our Festival audiences must see the British way of life put over with all the skill and zest that such a programme demands.

RADIO AND TV HELP PRESS COVER CHANNEL RACE

AS this section of Tele-opinion is written preparations are being made for one of the most exciting sporting events ever to take place. We refer to the cross-channel swim organised by the *Daily Mail* on Tuesday, August 22. We congratulate the *Daily Mail* on this outstanding feature, in line with so many other significant displays organised by this newspaper in the past. History will be made by this race, and no small part of the credit for its success must go to the Industry. Never before have radio manufacturers, the Press and the B.B.C. so combined their technical efforts to give such a truly world-wide coverage of a sporting event of this magnitude.

BY SUBSCRIPTION ONLY

—is the rule that must be laid down for BRITISH RADIO AND TELEVISION from this issue. There will no longer be any chance of getting a copy from a bookstall or a newsagent's shop. But all you have to do to make certain of getting your copy or copies is to fill up the form on page 93 or page 96 and post as directed.

The *Rumania*, the record-holding ocean-going tug which is the "mother-craft" of the flotilla that will accompany the swimmers, is equipped with the Decca Navigational System, together with a G.E.C. v.h.f. radio telephony network, and special walkie-talkie equipment for individual communication to the smaller boats.

The B.B.C., in their turn, have provided more mobile equipment to cover the race than has ever been used before on any single series of O.B.s, while television cameras will be well to the fore.

INTERFERENCE COMMITTEE

THE Wireless Telegraphy Act of 1949 provided for the institution of a panel of experts to advise the P.M.G. on problems relating to the suppression of interference, and now the President of the Institution of Electrical Engineers has nominated 45 members to serve. From this panel an advisory committee has been appointed whose function it will be to be consulted by the G.P.O. before regulations affecting the ignition systems of internal combustion engines are drawn up.

We are pleased to be able to report that the vice-president of R.T.R.A., Mr. S. P. Burbidge, is a member of the committee, and we believe that he will see that something is done at last to solve this wearisome problem.

SERVICING AND TRAINING

BY now most of our readers will have received a copy of the questionnaire designed to assess the number of trained servicing men required by the Industry in the next six months, which has been issued by the British Radio Equipment Manufacturers' Association, hot on the heels of RTRA.

Main object of the BREMA census is to stress that with the increasing complexity of servicing, because of the comparatively rapid spread of television, all branches of the Industry must co-operate to provide the ever-increasing number of skilled technicians required.

The manufacturers will do their part by operating the training schools and colleges, and by providing refresher courses, and the dealer must see that his staff are given the opportunity to take full advantage of these facilities.

The office gremlin, however, whispers that television servicing would be greatly simplified if valves especially, and components generally (with some honourable exceptions), were one hundred per cent. reliable . . .

TEST REPORTS

THIS month are on the Cossor Model 499 Portable Radio, and the Pye Black Screen Model LV 30 and L.V. 30C.

SPONSORED TV PROGRAMMES:

How do you feel about television programmes? Do you think they should remain a B.B.C. monopoly, or do you think it would be an advantage to have programmes sponsored by national advertisers—with, of course, the accent on entertainment, not on advertising? We would like to hear the Voice of the Industry on this question. So many people seem to agree with the critic who said: "What we want is not better television sets, but better television programmes."

Lord Brabazon of Tara, who, with Lord Foley, has strongly urged, in the House of Lords, the merits of commercially sponsored television. He says: "No one would be worse off—and if you do not like the programme you can always turn it off."

THE impetus to trade which everyone confidently expected would result from the opening last December of Sutton Coldfield appears, unfortunately, to have been rather short lived. Sales of TV receivers in the last month or so have fallen far short of expectations not only in Birmingham and district, but in London, too.

To whatever extent the decline may be regarded as seasonal in London, where diversionary attractions are almost legion and where the "newness" of the television facility is measured in years rather than months, it is difficult to believe that the same argument applies to the Midlands.

Why, then, has the sales curve flattened off in such a short space of time? Why are we perilously near to being in the doldrums when, on the face of it, television has so much to offer and the potential market is so great?

Britain's two television stations together serve a population of between eighteen and twenty million people. Taking an average of three to a family, that means something like six million homes. And to date, the total number of TV licences issued barely reaches 400,000; *only one home in every fifteen.*

That, surely, is the best answer to those dismal jimmies who would try to have us believe that Exhibitions are a waste of time. Nonsense! There is no doubt whatsoever that the timely advent of the Castle Bromwich Exhibition will provide a much needed fillip to sales and it is our plain duty to approach this great National Show in a spirit of enthusiastic optimism. What hopes have we got of instilling confidence into the waverers if we ourselves display apathy and half-heartedness? Make no mistake about it, the Castle Bromwich Show is a golden opportunity that should be exploited to the full, for hesitancy on the part of the public unfortunately grows in an atmosphere of international uncertainty.

That the industry will play its part nobly we haven't the slightest doubt.

"And this, madam, is our latest model for the busy little housewife."

But does the answer rest entirely with the industry? Is it, as so many people are ready to tell us, a matter of cost?

LOWERING OF SET PRICES IS NOT ENOUGH

Much as we would all welcome a general marking down in TV receiver prices, and ready as we are to believe that money these days is not easy, we do not believe that cost is the primary reason for dwindling sales. Why should people not have money for television sets when the waiting list for new cars is something like three or four years? Undoubtedly money isn't as easy to come by as it was, and undoubtedly many more people would be tempted if prices were lowered.

It is our opinion that there are still a great number of people who can afford present prices but who are disinclined to buy, and we believe that the root cause of the trouble is that the programmes these days are insufficiently attractive.

In recent weeks, the general standard of light entertainment offered by the vision service has been painfully low. Many of the programmes have been a sheer waste of time and money and a shockingly bad advertisement for television as a whole. From inquiries that we have made, it would appear that but for the newsreels and certain of the outside broadcasts, television has been playing to "half-filled" houses for weeks. What has happened to the much flaunted viewer research department that promised us so much? Have they completely submerged themselves under their piles of pompous paperwork, or—and what a *ghastly* thought! are we now "enjoying" the results of their work?

Whatever the reason, the fact remains that the programmes taken by and large are just not good enough. If they really represent the best the B.B.C. can do with a million pounds per annum in the kitty, then for goodness sake give us sponsored programmes to save us all from Carey Street.

In 1949, the Industry was producing 17,500 TV sets per month. In the first quarter of this year, that figure had

WHAT ARE YOUR VIEWS?

"B.R.&T." enlists your co-operation in testing views of the Trade on this highly important but controversial issue.

risen to 43,000 and it is on the up and up. The way things are going, it will soon be on the down and down with your shelves cluttered up with models.

After all, when a customer has spent fifty pounds or more on a television receiver, he has a right to expect thereafter a reasonable standard of entertainment. Can it honestly be said at the present time that he is getting it ?

There is a lot to be said for sponsored programmes on a limited scale, if only to put an end to this sickening monopoly and by active competition to keep the B.B.C. on its toes.

And the idea seems to be gaining ground.

NOBLE ADVOCATES

In a recent debate in the House of Lords, Lord Brabazon of Tara said : "I make this suggestion about television. The B.B.C. are not televising the whole day—far from it. There are periods when there is no television going on and when they are not using the transmitting sets. I think it would be very interesting to see whether advertising firms could be induced to put on shows from a different studio, but radiated from the same place, so that the screen would be occupied by another producer at the time that the B.B.C. did not want it. No one would be worse off. The B.B.C. would make some more money and, if you do not like the programme, you can always turn it off."

We like the thought that you can always turn it off, for in that simple but all too obvious statement is, we suspect, the reason why the scheme does not find favour with the B.B.C. Too many people might make a habit of turning it off during B.B.C. transmission times !

In weighing up the desirability of some kind of sponsored programme scheme, it is rather important to get clearly in our minds exactly what we mean by sponsored programmes.

Lord Foley, who followed Lord Brabazon in the House of Lords debate expressed the situation admirably.

"There is", he said, "a certain confusion with regard to sponsored and commercial programmes. To my mind there is a difference. Commercial programmes are those in which a firm buy time, have control over the programme and can say what they like. If they want to advertise their goods all the time, they can do so. This is not a good thing because we are liable to get a lot of boring advertising, which is not in keeping with the requirements of the British public. It may be all right in America where people are used to it, but over here the general atmosphere is different."

"Sponsored programmes", continued Lord Foley, "are different. In a sponsored programme the firm pay for the time but have only the right to have their name appear in print at the beginning and end of the programme —'Presented by such-and-such a firm.' The programme is entirely under the control of the television authority. I feel that this is a good idea. . . . This is only a guess, but I should say that the possible revenue from this kind of programme would be between £2,000,000 and £3,000,000."

Opening ceremony at the first of the new Lime Grove Studios to come into operation. Here are the space, the facilities, and the equipment for sponsored TV, so from the technical point of view there seems no reason why the scheme cannot be started immediately.

The debate was unfortunately inconclusive because the Government indicated that a matter such as this would have to be considered by the Beveridge Committee which is now preparing a report for presentation to Parliament on the future of broadcasting in this country.

There the matter rests for the moment.

But one thing is clear. If the Industry as a whole is in favour of a restricted scheme of sponsored programmes, then no time should be lost in bringing the fact to the notice of that Committee. There is nothing to be gained by waiting to see what comes out of the hat when the Committee's recommendations are published.

Because of the dire necessity for programme improvement to turn the sales curve upwards once again and to maintain for some time to come a steadily rising characteristic, we believe that the majority of our readers would express themselves in favour of a scheme such as that put forward by Lord Brabazon.

But we cannot produce conclusive evidence from supposition !

WE NEED YOUR HELP

We ask you, therefore, to let us know what you feel about it. Send us a postcard saying either that you are or are not in favour of sponsored TV programmes and if, when all your views are known, there is overwhelming support for the scheme, we will happily communicate the information to the Beveridge Committee.

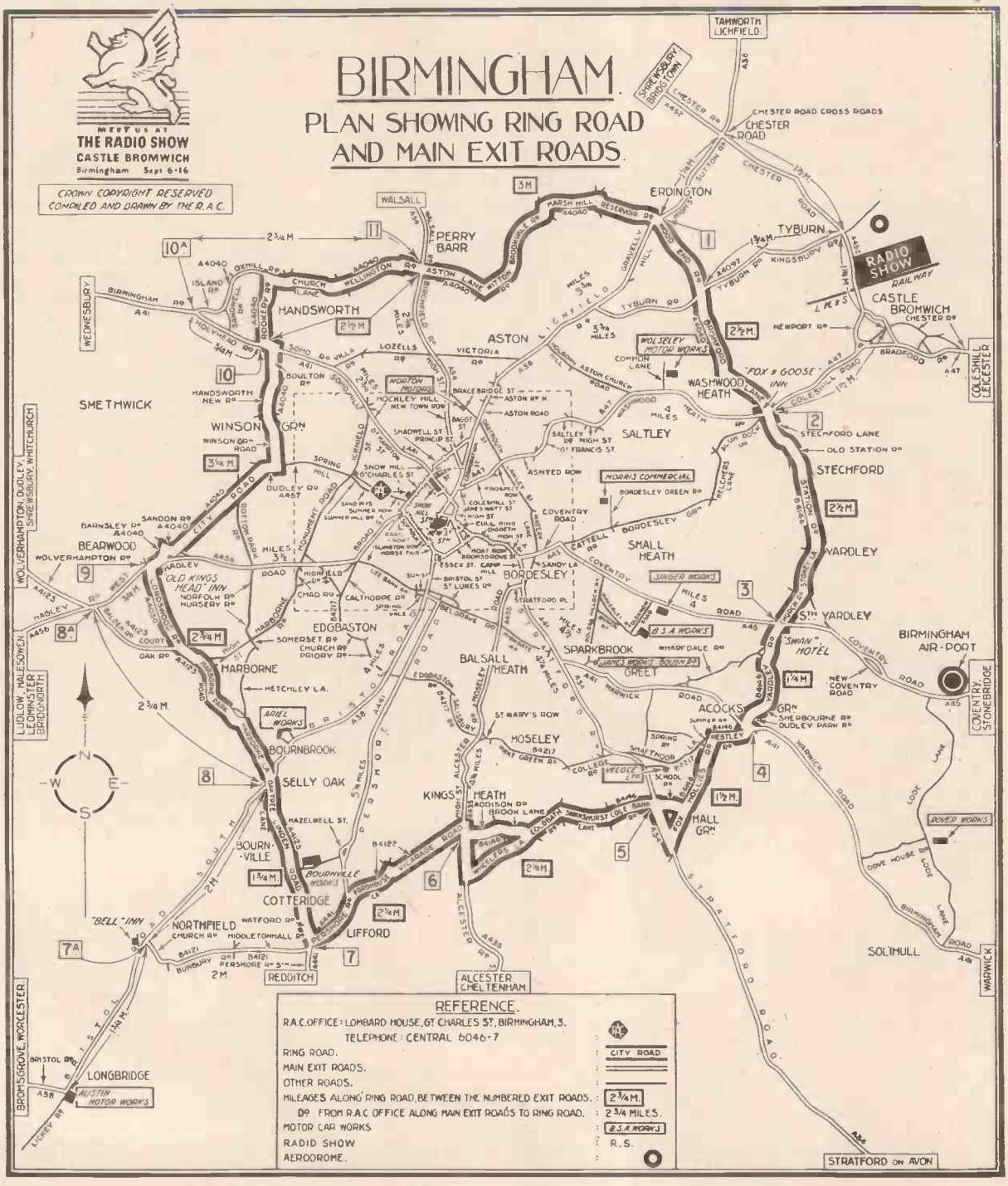
May we point out that if this attempt to convey your views to the Committee is to carry any weight at all, it is essential that everyone should co-operate. Don't leave it to the other fellow to express your views for you ! The more cards we get in, the more conclusive will be the evidence whichever way you feel about it.

Send us a postcard now while you think of it, and address it to

The Editor, BRITISH RADIO AND TELEVISION, 92 Fleet Street, London, E.C.4.

Rest assured that if the scheme does not find favour with you, we shall not hesitate to tell you so when the result of the voting is known. But if, as we suspect, you are in favour, then apart from making known your views to the Committee, we intend to examine other ways and means of furthering the cause. If the trade as a whole strongly supports some sort of sponsored programme scheme, suitable representations can be made when the Beveridge Report is ultimately debated in the House.

Your Way to the Show



Stage all set and ready

Ninety firms are exhibiting at the Show—the first National Radio Show to be held out of London—as well as the Royal Air Force, the General Post Office, and the B.B.C.

Special bus services will run from the centre of Birmingham to the exhibition. Single fare, 8d. for adults, 4d. for children. A service will also run between Castle Bromwich station and the exhibition entrance. Single fare 1½d. for adults, 1d. for children.

Every encouragement will be given to dealers arranging day excursions to the exhibition and there will be special reduced rates of admission for parties.

In this and following pages British Radio and Television presents a guide to exhibitors at the Show.

YOUR GUIDE TO THE EXHIBITORS

AERIALITE, LTD. STAND No.76 of Castle Works, Stalybridge, Cheshire, will be exhibiting a full range of the aerials and accessories and other products which they make for home radio and television and for car radio, all of which are scientifically designed to give maximum efficiency and improve reception and are simple to put into service. Aerialite R/F cables, which the company make under strict laboratory conditions and to government specification, where applicable, will also figure on the Stand. So will Ashton cables and flexibles for lighting and power.

Prices of many Aerialite products have recently been reduced. Among them are: Model 50 television aerial, reduced from £3 to £2 10s.; Model 52, from £5 to £4 10s.; Model 54, £5 5s. to £5; Model 54A, £5 9s. to £5 4s.; Model 51, £4 2s. 6d. to £4.

Among new additions to the Aerialite television aerial range is Model 63, a special folded diapole aerial which greatly increases impedance and has a wide band width. This design is unique because all parts can be moved and rearranged at will. It is equal to most four-element outdoor aerials.

AMPLION (1932) Ltd., STAND No. 82 of 230, Tottenham Court Road, London W.1, are specially featuring the P.R.I. V.P.A. Testmeter and are showing for the first time their new Convette models DB3 and BC1 (*illustrated here*). The model DB3 Convette enables all-dry battery portables to be used on A.C. mains, and is for receivers using either combined or separate H.T. and L.T. dry batteries.

Special features are: a 4-pin socket for combined H.T. and L.T. batteries; separate sockets for sets using independent H.T. and L.T. batteries. It is a complete unit which fits easily in the place of the battery and plugs into the mains circuit. It is quickly removed and the battery replaced when necessary. Price is £4 4s.

The BC1 model Convette is specially designed for use with Bush battery receiver type BP10 and all receivers using dry batteries type B104 and all-dry No. 4 or equivalent. Weight of both DB3 and BC1 models is the same—approximately 1½ lb.

ANTIFERENCE, Ltd. STAND No.18 of 67, Bryanston Street, London W.1, are showing a fully comprehensive range of television aerials with models for all possible requirements. New products

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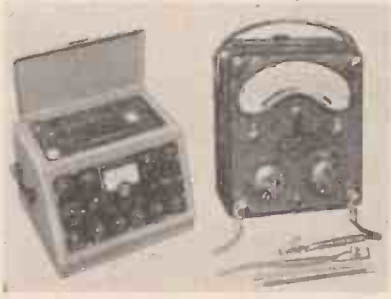
Your Guide to the Exhibitors—*continued*

will include the " Antex " which has been redesigned mechanically ; a light-weight single dipole and a flexible room aerial. Details are : " Antex " embodies a new junction unit of high-grade bakelite, reinforced by aluminium die-castings, and is a great improvement mechanically over the original " Antex " insulator. All electrical connections are fully enclosed and weatherproof. Four models are available ; two with 5ft. cranked masts for chimney or wall mounting ; one for mounting to a wooden mast of any height, and the other is complete with a 10ft.-aluminium alloy mast and chimney lashing equipment. The " 2-way " dipole aerial is a new light-weight and low-priced single dipole for wall mounting. And the room aerial is a simple flexible aerial for internal mounting in strong signal areas. These are but a few of the Antiference exhibits.

AUTOMATIC COIL WINDER AND ELECTRICAL EQUIPMENT CO., LTD., of Winder House, Douglas Street, London, S.W.1, STAND No. 26 are showing various examples of radio and television servicing equipment selected from the wide range of " Avo " products. For many years, besides its other activities, the Company has specialised in producing



instruments for testing valves, and the new " Avo " testing manual which has just been produced will be of great interest to all users of the " Avo " valve tester and " Avo " valve characteristic meter.

A new universal bridge will be on view, while it is hoped to give practical demonstrations of the use of various instruments. Attention is drawn particularly to the high sensitivity Avometer, and the extraordinary wide coverage of ranges presented by the " Avo " electronic testmeter, " Avo " wide range signal generator, and the " Avo " electronic test unit working in combination. From the large number of different types of coil winding machines also made by this Company, several have been selected for exhibition, including a working model of the Douglas fully automatic multi-winder, which is capable of producing 12 coils simultaneously at high speed. *Picture* is of high resistance Avometer Model 12.

AUTOMATIC TELEPHONE AND ELECTRIC CO., LTD., of Strowger Works, Liverpool 7, STAND No. 41 and their associates, each of which specialises in selected branches of telecommunication engineering, are

exhibiting a comprehensive range of equipment representing the most modern developments in telephonic and telegraphic communication techniques.

To-day, all long-distance telephone calls are made over carrier circuits. Several examples of the latest types of such equipment may be seen, ranging from a four-channel portable carrier equipment to a twelve-channel terminal similar to that used by the British Post Office. The " Secraphone " (*shown here*), which can be observed in full operation on the Stand, enables a conversation to be held with the certainty that it cannot be overheard.

The performance of all telecommunication equipment requires to be checked at regular intervals, and for this purpose a wide range of test and measuring equipment has been designed and is demonstrated. This portable test equipment comprises : a transmission measuring set, an impedance bridge, a working beat frequency oscillator, a cross talk measuring set, a level comparator, a disconnection locator and a telegraph distortion measuring set.

All the equipment is built with the finest components available, and a wide range of these can be inspected. They include valves, quartz crystals, transformers, capacitors and filters, many of which are extremely compact, while retaining maximum electrical efficiency.

BALCOMBE, A. J. LTD., of Tabernacle Street, London, E.C.2, STAND No. 54 have added two new models to their Alba range. (1) a 12-in. table television for London and Birmingham areas, in a new and beautifully designed bow-fronted cabinet (*see picture*). The set consists of a new circuit on which the firm have been working for some time, and which is actually an adaptation of their successful Midlands superhet. Price 50 gns., plus £11 15s. 10d. purchase tax.

The Alba range of radiograms continues, as it is felt that it is beneficial to both the firm and distributors to continue featuring models which are already so popular and for which there is a constant heavy demand. But as

and when supplies of three-speed units permit, existing radiograms will be offered with these new units fitted as an alternative to the standard unit. The present model numbers will continue, with the prefix "LP" where the three-speed unit is fitted.

(2) A new and improved " Rover " A.C./D.C. battery portable, with these new features : larger frame aerial for increased sensitivity ; improved smoothing circuit for better and hum-free mains performance ; full-size separate H.T. and L.T. for longer and economical battery life ; valves strapped in position for safe transit ; easy accessibility to chassis for dealer's convenience ; attractive cabinet in beige—with new-type plastic speaker fret. Price £12 12s., plus £2 13s. 11d. purchase tax.

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Your Guide to the Exhibitors—*continued*

BELLING & LEE, LTD., of Cambridge Arterial Road, Enfield, Middlesex, STAND No. 71 are directing their efforts towards exhibiting aerials, television aerials in particular, for the manufacture of which they have recently bought an additional factory which gives them approximately 50,000 square feet of floor space devoted to aerial manufacture. Television aerial conversion kits will be made available just as soon as the frequencies of new transmitters have been confirmed by the B.B.C. It should be remembered that the frequencies of Sutton Coldfield were changed about a fortnight before it opened. The prices of aerial conversion kits will be kept as low as possible, and Belling-Lee hope to be able to show visitors to their stand just what the kits will look like. In view of the rapid expansion in the B.B.C. building programme and the hope of two new stations within a year, many visitors will be interested in the Belling-Lee kit to enable television demonstration aerials to be put up temporarily and quickly. It is expected that many visitors will be more interested in better quality components, such as the new " Belling-Lee " universal co-axial plug L734/P. This fits all " Belling-Lee " co-axial sockets and termination boxes, and accepts co-axial cables from $\frac{3}{32}$ to $\frac{5}{16}$, covering television feeders for domestic purposes with impedances from 50 ohms and including 73-ohm semi air-spaced.

BROWN BROTHERS, LTD., of Great Eastern Street, London, E.C.2, STAND No. 72 will, as usual, be staging a most comprehensive display, and all traders are invited to inspect and compare the many items displayed. These will include televisors by prominent manufacturers; a representative display of table, portable and personal radio receivers, also radiograms; battery charging equipment; radio and television service equipment; representative range of components, valves and batteries.

BULGIN, A. F. & CO., LTD., of the Bypass Road, Barking, Essex, STAND No. 3 once again will show the largest range of components in Britain, if not in the whole world, along with many new and original items. Their whole range of products has been greatly increased. Many new connectors and plugs-and-sockets will be on view, covering general-purpose and special requirements. New and additional E.S. holders cover lamp and fuse-holding requirements, and three or four new types of cartridge fuse will be shown. New fuseholders are also to be exhibited and released, including unbreakable types.

Key switches have been extended in range to cover m.-b and c.-o types in S.P. and D.P. and many new knobs are becoming available for all classes of apparatus and different components. New lampholders are also making their first appearances, giving improved types to existing specifications, and new types as well. The items mentioned are but a few of what there will be on view on the Bulgin Stand.

BURNDEPT-VIDOR, LTD., of Erith, Kent, STAND No. 47 are showing a comprehensive range of

television and radio receivers as well as radio batteries to fit every make of battery receiver on the market. The main attraction in the field of television are the new 1951 models. One is a 12-in. console receiver housed in a walnut veneer cabinet. The design permits a larger picture than up to now achieved with tubes of a similar size. The hermetic sealing of the view-face of the cathode-ray tube prevents the collection of dust on the screen, thereby reducing service charges to an absolute minimum. To allow for ease of movement, concealed castors are fitted to the cabinet. This receiver is made in four models to cover all existing television stations. CN4206 for reception in the London service area, CN4207 for the Sutton Coldfield area, CN4208 for the London transmission at long range, CN4209 for the Sutton Coldfield transmission at long range. The other new television receiver is Model CN4210 a console two-station receiver covering transmission from Sutton Coldfield and Holme Moss, the nearly completed station in Yorkshire. Its handsome walnut cabinet is fitted with two full-length doors to conceal the screen, thereby making the set a decorative addition to any room.

A new venture in the line of Vidor battery receivers is Model CN408/409, a popular-priced battery table model. This 4-valve three-wave-band superhet has a circuit of very high sensitivity to ensure first-class reproduction. The source of power are all-dry or H.T. and accumulator. *Illustrations* show the new battery receiver and the Vidor Lido Model CN411, an addition to the Vidor range which is on show to the public for the first time.

CHAMPION ELECTRIC CORPORATION, of Seaford, Sussex, STAND No. 73 will be showing these new models: TV Luxor—a console receiver in choice of luxury-styled cabinets, embodying 12in. C.R. Tube, all-wave radio and cocktail cabinet. An optional fitting is an automatic record-changer unit, which fits in place of the cocktail glasses drawer. The bottle

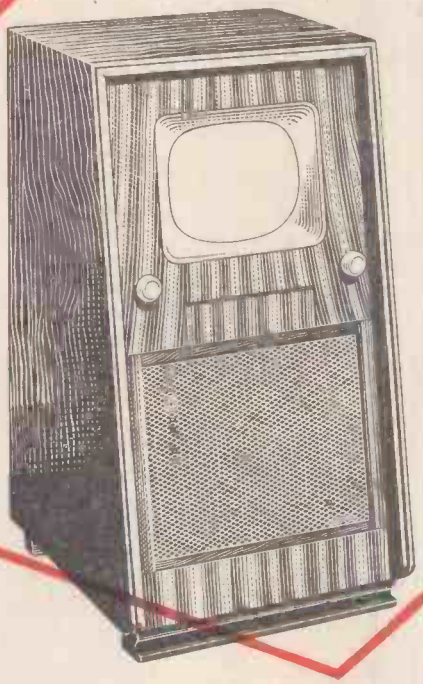
compartment may then be used for record storage. Available now for London and Birmingham frequencies.

continued on page 26

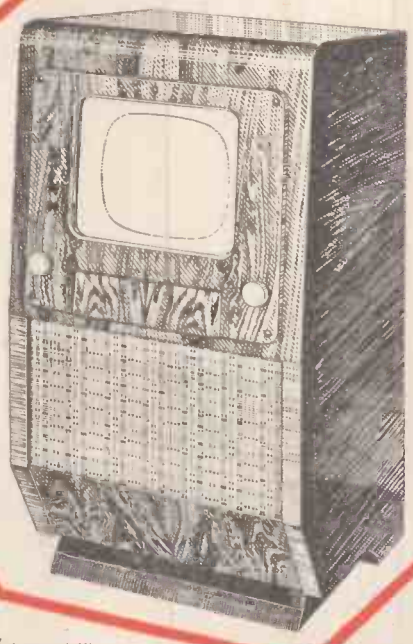
ETRONIC TELEVISION

the best in sight

People are finding out by comparison that Etronic pictures are remarkably clear, and life-like in their reproduction of movement. Etronic sets last a long time with very little maintenance and the standard of cabinet-work is exceptionally high. Stock Etronic and cash in on their growing popularity.



10" model



12" model

ETRONIC 10" T.V. RECEIVER 56½ GNS *Tax paid*

Model ECV 1523 London Frequency
Model ECV 1523 B Midland Frequency

ETRONIC 12" T.V. RECEIVER 72 GNS *Tax Paid*

Model ECV 1527 London Frequency
Model ECV 1527 B Midland Frequency

For long range and maximum sensitivity superhet Television is the answer.

Manufactured by HALE ELECTRIC COMPANY LTD
Talbot Rd., West Ealing, London, W.13

Your Guide to the Exhibitors—*continued*

Price £180 0s. 4d. (including purchase tax), with cocktail fitting; record player £10 10s. extra, plus £4 9s. 10d., tax extra.

Adelphi.—This receiver is for TV only, and is housed in a most attractive walnut veneer cabinet; 12in. C.R. Tube, 14 valves plus metal rectifier. Available for London or Birmingham frequencies. Price £98 4s. (including p. tax).

739.—A 4-valve battery receiver for medium and long waves. Grey leather-cloth covering. Price £11, plus £2 7s. 1d. p. tax.

740.—A mains/battery portable for S/M/L waves, 4-valve plus metal rectifier, built-in frame aerial. Covering as for 739. Price £13 15s., plus £2 18s. 10d. p. tax.

741.—A 6-valve A.C./D.C. battery portable of outstanding performance, covering S/M/L waves. Built-in frame aerial for medium and long waves, and telescopic aerial for short waves. Price £18 7s. 6d., plus £3 18s. 7d. p. tax.

750.—A new 5-valve A.C./D.C. plastic cased receiver with horizontal dial. Price not yet fixed. *Illustrated* are TV Luxor and 741.

COLE, E. K., LTD., of Southend-on-Sea, **STANDS Nos. 53, 11, 92** Essex, are exhibiting a full and well-balanced range of attractively styled EKCO radio receivers, catering for a wide variety of listening habits. There are all-wave models for world-wide listening, models with pre-set station selectors for easy tuning, and high-quality reproduction, room-to-room transportables, stylish portables, including one which works on A.C./D.C. mains or batteries and a fully automatic three-speed radiogram. Full prominence is given to Ekcovision and a

choice of 12in. tube models, both table and console types, with or without radio, will be on show. An innovation range is a 12in. console model in an attractive cabinet fitted with doors and

an aluminised tube giving increased brilliance and contrast. The 15in. tube model designed by Wells Coates R.D.I., is worthy of special attention. All this year's Ekcovision models are superhets designed for 5-channel TV reception, making them adjustable for London, Birmingham, or any of the TV areas now planned. Extension speakers TV pre-amplifiers, attenuators, indoor aerials, and other accessories will also be on view.

Among the many models showing these three are *illustrated*: TRC139.—A 12in. tube console vision receiver combined with pre-set radio; 72 gns. inc. TC140.—A console receiver with 12in. aluminised tube in well-styled cabinet with doors; 80 gns. inc. MBP99.—The "Stroller" A.C./D.C. mains/battery portable with three wavebands; price 19 gns. inc.

On the second Ekco No. 11 Stand, the company are exhibiting a full range of car radio and school radio equipment, along with some products of their electronics division. Stand No. 92 is being used as an office.

CO-OPERATIVE WHOLESALE SOCIETY, LTD., **STAND No. 61** cater for the customer who seeks a handsome radio set, a beautifully designed television receiver, or a model combining the two in their "Defiant" range. And the customer who does not have electricity in his home, is catered for with the "Defiant" Model BSH348, a 4-valve, three-waveband superhet battery receiver whose performance is every bit as good as that from an all-mains set. Illustrated is the TR1250 console model television receiver. This model is also available as a table model, and both console and table models can be supplied with radio.

COSSOR, A.C. LTD., of Highbury Grove, London, **STANDS 7 and 52** N.5, show a comprehensive range of radio and television receivers, combined tele-radio consoles, radiograms, valves, cathode ray tubes, and electronic instruments. One item which will undoubtedly be of great interest to service engineers and other technical men is the Cossor "tele-check" television alignment and pattern generator, Model 1320 (*see picture*). This is a lightweight instrument which has been designed to enable service engineers to align the R.F. and I.F. circuits and to check the timebases of

Your Guide to the Exhibitors—*continued*

commercial television receivers. Alignment is carried out by using the instrument in conjunction with a cathode ray oscilloscope. A feature of the instrument is that the frequency modulation of the carrier injected into the television receiver is carried out electronically, the X-sweep voltage of the oscilloscope being used to control the modulation. This arrangement results in the instrument being substantially lighter than similar instruments using mechanical frequency modulation methods.

A family favourite since its introduction in 1927 (an original model of that year will be displayed) the Cossor "Melody Maker" is now shown in two modern versions—Model 501 in graceful moulded cabinet at £15 15s., tax paid, and a de luxe Model 500 in

polished walnut cabinet at £17 17s. 6d., tax paid. Both models are for use on A.C. mains and incorporate an improved all-wave superhet circuit with five Cossor lock-in valves, and are equipped with super-sensitive 8in. moving coil speaker, negative feedback for extra quality, built-in aerial, external speaker and pick-up sockets. Undistorted output 3 watts. Universal model of both types are available for use on D.C./A.C. mains.

The full-size all-dry battery portable Model 499 in attractive streamlined cabinet is equipped with a very sensitive 4-valve superhet circuit using the latest Cossor low-consumption valves and 6½in. moving coil speaker. Price £15 15s., tax paid, including batteries. An alternative version is Model 499UB designed for operation from A.C. or D.C. mains as well as from all-dry batteries. Outstanding radiograms include Model 497 (65 gns., tax paid), with five-valve all-wave radio chassis and record-player with automatic charger, with Sapele mahogany cabinet designed to accommodate more than 200 records behind flush-fitting doors. Other Cossor floor consoles are Model 502, which offers maximum value at a moderate price; and a de luxe auto-gram Model 503, specially designed to provide high-fidelity reproduction.

Television receivers giving brilliant pictures of the utmost detail are demonstrated in a variety of models, including console instruments with radio combined. All are fitted with Cossor cathode ray tubes with a unique electronic filter—the Cossor patented "ion trap" which protects the fluorescent screen from heavy ion bombardment. A full complement of valves in the high-gain superhet circuit ensures really effective interference suppression and maintains a remarkably good performance even in remote fringe areas. Table Model 916, at 49 gns., tax paid, in Sapele mahogany cabinet, gives the largest possible direct-viewing pictures on a 10in. tube and will be found ideal for comfortable family viewing under normal room lighting. Model 917, a console version at 60 gns., tax paid, is housed in a two-tone walnut cabinet with concealed castors. To provide for people who seek a combination of radio and television in one cabinet, Model 918, a console of very similar general appearance is shown, but by raising a section of the lid an all-wave radio receiver is brought into view.

DECCA RECORD STANDS 37 & 40 CO., LTD., of Brixton Road, London, S.W.9, are showing these outstanding items: Knightsbridge projection TV receiver with eight wave-band radio. Price just under £600. (New). A projection TV corner unit for standing

behind a Decola. Price not yet fixed. (New). The Model 131 projection TV (*see illustration*), Decola projection TV

Various forms of chair-side dual-speed 33⅓ and 78 r.p.m. record players. Decola with rearranged dual-speed record-playing equipment to replace the one recently listed with a transcription quality dual-speed player and radio in top compartment, and 78 auto-changer in part of the record storage space in base. Decca Model 95, all-wave radiogram. Two types: (*a*) with transcription quality dual-speed record player; (*b*) with dual-speed automatic record changer.

Amplifiers (*both illustrated*), PA/VI, output 4.5 watts. Frequency response 30=16,000 c/s. For high fidelity magnetic pick-ups and microphones. Valves: two EF37's, L63, two PX4's, 5U4G. PA/IX, three push-pull stages of matched L63's. Push-pull matched PX25's, 5U4G. Output 6.5 watts. Frequency response 20=20,000 c/s. Stepped brilliance and bass controls giving correct compensations for ffrr, E.M.I. and N.A.B. recording characteristics. Bass compensated volume control. For 20–30 ohm pick-ups and microphones. A.C. power unit.

On Stand 37, Decca show complete instruments of all kinds. On Stand 40, motors, pick-ups, speakers, amplifiers and portable players.

DYNATRON RADIO LTD., of Maldenhead, Berkshire, STAND No. 69 present a completely new low-priced quality radiogram and facilities for playing the new slow-playing records in all models. The existing range of radiogramophones and television has been extended with still further improvements in sound reproduction.

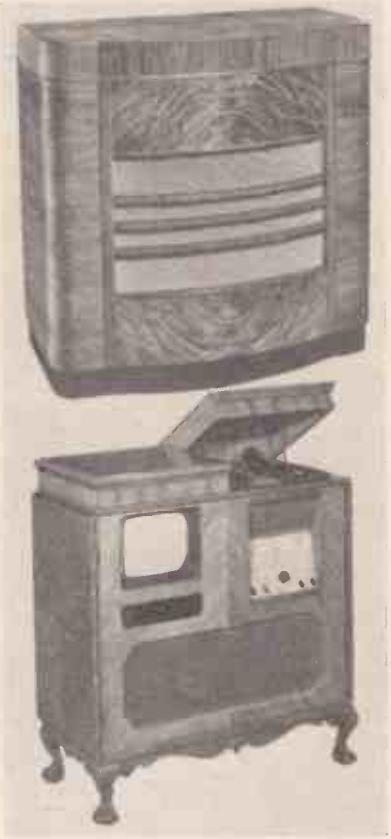
New: "Ether Princess" radiogram, Model P.84. A radiogram designed solely for high quality reproduction; eight valves, three wavebands, large dial and spin tuning for easy operation, variable selectivity, treble and bass controls, push-pull triode output valves, two-speed automatic record-changer for either 33⅓ or 78 r.p.m.—superb 12in. P.M. loudspeaker. Walnut cabinet with separate lids for radio and gramophone. Prices (including tax) £157 4s. 2d., with dual-speed changer 78 and 33⅓ r.p.m.; £150 3s., with single-speed changer 78 r.p.m.; £148 15s. 7d., with dual-speed motor, single turntable, 78 and 33⅓ r.p.m.

Improved: the "Ether Conqueror" series of radiograms have many improvements, including better loudspeakers, extended tone controls, extra signal-tuned circuit for better fidelity and selectivity, indicator lights, facilities for playing the new long-playing slow speed records, extended wavelengths and plug-in pickups.

The television and radio receivers have been combined in these combina-

Your Guide to the Exhibitors—*continued*

tion radiogram and television models. New: "Ether Consort" combined television radiogram, Model B314. Using the new radio chassis from the "Ether Princess" comprising tuner T49 and amplifier LF44, television



chassis TV24A and record changer in a handsome walnut cabinet with sliding doors. Prices (all including tax): Delivery October—£398 13s. 4d., with 78 r.p.m. changer; £405 14s. 6d., with dual speed changer; £397 4s. 5d., with dual speed motor, single turntable. "Ether Sovereign" combined television radiogram in Queen Anne style cabinet, Model K349QD. The firm's finest radio and television chassis, which installed together makes the finest piece of furniture yet exhibited. The cabinet is truly magnificent. Facilities for long-playing records at small extra charge, depending on requirements. Price £574 17s. 8d., including tax. *Illustrated* are the "Ether Sovereign" (top) and the "Ether Conqueror."

ECONASIGN CO., LTD., STAND No. 13 of 98 Victoria Street, London, S.W.1, are displaying printing outfits and stencils with which traders can make their own showcards, price tickets, and such things. Slogan for these outfits is: "They make running costs walk," and more than 200,000 of them are in use in all parts of the world. Price of outfits ranges from £1 10s. to £6 15s. The outfits contain stencils with complete alphabets, numerals, punctuation marks, etc., in various styles and sizes which are cut from dies in transparent celluloid, and not only ensure accuracy in spacing, but give results that are particularly clean and sharp. The various sizes of type in each outfit are accurately aligned with each other and the alignment is controlled very simply by the gauge provided, while the colours are so quick drying—when used as directed—that the stencils may be moved across the work immediately without smearing.

EDISON SWAN ELECTRIC CO., LTD., STAND No. 33 of 155 Charing Cross Road, London, W.C.2, are giving prominence to a new animated display unit designed to give the non-technical man some knowledge of the inner workings of a television cathode ray tube. A selection is shown from the well-known range of Ediswan Mazda valves and cathode ray tubes, also examples of the range of Ediswan special plug-in replacements for American-type industrial valves.

The engineer and technician will be interested in the display of the Ediswan low-frequency oscillator (*illustrated here*) unique in frequency range for a low-priced instrument. Also a new-type pen recorder which was originally developed for use in the Ediswan electro-encophalograph and will soon be available as a separate item.

Of interest to the retailer and serviceman are the famous range of Ediswan radio products, including the B.T.H.

magnetic pick-up, the B.T.H. rezolectric pick-up, the B.T.H. senior R.K. loudspeaker and the new Ediswan loudspeakerphone equipment which will be available for delivery soon.

ELECTRICAL MUSICAL INDUSTRIES, LTD., STAND No. 51 of Hayes, Middlesex, are showing these new Marconiphone models: Model ARG27.—A 5-valve all-wave auto-radiogram for A.C. mains. Special features include pre-selected tuning on three stations; 10in. loudspeaker; efficient autochanger for ten 10in. or 12in. records; latest type lightweight pick-up. Cabinet finished in contrasting shades of walnut. Model T24DAB.—A 4-valve two waveband portable receiver for A.C./D.C. mains or dry battery operation. Attache case style finished in grey imitation lizard skin. Also available in red-green or blue leather cloth. Model VC75.—A console television receiver with 12in. cathode-ray tube presenting a brilliant clear picture of generous size. Features include permanent magnet focusing; efficient interference, suppression on

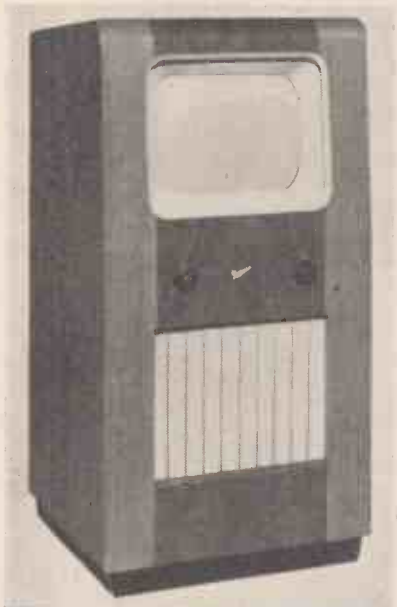
sound and vision and a 10in. loudspeaker. London frequency version Model VC55A also available. Model VT75A.—A table television receiver for A.C. mains. Incorporates 12in. cathode-ray tube, providing (of course) brilliant clear picture of generous dimensions; permanent magnet focusing and full interference suppression on sound and vision. London frequency version, Model VT55A also available.

(*Illustrations* show Models T24DAB, VC55A, and VT75A).

E.M.I. are also showing a full range of His Master's Voice radio, television and radiograms. Model 1807A for London area (2807 Midlands area) is a television receiver with these "star" points at the price of 39 gns. (plus £9 6s. 4d. purchase tax): High performance receiver giving a large picture (9in. × 7in. approx.) Special aluminised Emiscope standard 10in. tube, introducing a new standard of brilliance in viewing in daylight or with normal room lighting; a particularly clear and steady picture, which ensures comfortable viewing for the whole family; permanent magnet focusing providing a high degree of stability, thus reducing the necessity for frequent readjustment;

Your Guide to the Exhibitors—*continued*

automatic sound interference suppressor ; adjustable feedback picture interference limiter ; operates on D.C. or A.C. mains ; handsomely styled and superbly finished walnut cabinet of exceptionally compact and convenient dimensions. Model 2500 is a radio unit intended primarily to provide high quality reproduction of radio programmes, when used in conjunction with the " His Master's Voice " Reproducers Nos. 2000 and 3000. The Model 2500 is not, however, limited to use with the above models only. The output from the unit can be fed into almost any high quality



A.F. amplifier having a suitable input impedance, or alternatively it can be utilised to operate a sensitive high fidelity loudspeaker, when a large output is not the prime consideration. New models *illustrated* are W74 and W652. (Details of these will be given in next month's BRITISH RADIO AND TELEVISION.)

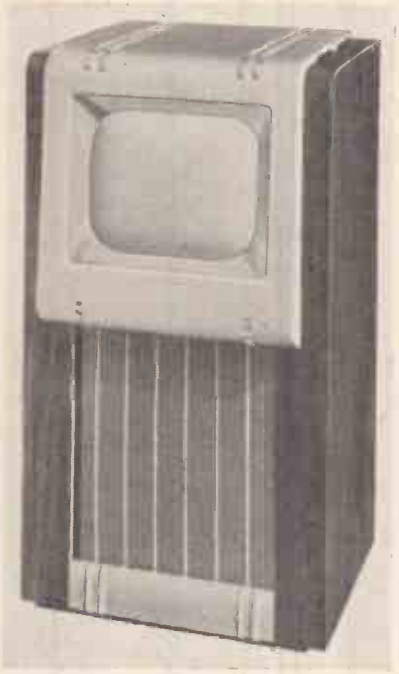
Besides their Stands at the Show, E.M.I. are organising an exhibition at their Birmingham depot for dealers at which items from their dealers' service development, sound amplification and relay division will be shown.

ELECTRO DYNAMIC CONSTRUCTION CO., LTD., of St. Mary Cray, Kent, are STAND No. 9 making a special feature of a new range of high frequency motor alternators which are primarily for use with radar and allied navigational gear and other electronic apparatus ; a new type of small rotary transformers and their well-known range of rotary converters, etc. They are also incorporating on their stand the products of an associate company, the Battery Construction Limited.

For many years before the war the Electro Dynamic Construction Company was recognised as an authority on the power equipment for radio transmission and reception, both in England and abroad. Their pre-war experience has been very much extended as a result of accelerated production and research during the war period, and this experience was fully drawn on by all the service departments in designing power equipment for portable and automatic radio, and other specialised applications.

ENGLISH ELECTRIC CO., LTD., of Queen's House, Kingsway, London, W.C.2, are STAND No. 35 showing their Model 1550 television console (*see illustration*), and a dealers' service test rig in a special fixture supplied and equipped by Marconi Instruments Ltd., St. Albans, Herts (one of their subsidiary companies). The rig consists of a receiver tester TF888, valve voltohmeter TF887A, pattern modulation unit TF954, timing unit TF965, oscilloscope TF966, and sweep generator TF923.

Here are details of Model 1550 TV receiver : cabinet, walnut with cream escutcheon, 43in. × 22in. × 18in. plus 8in. projection. Weight 117lb. Combined television and frequency modulation receiver. Valves, 22 valves plus two additional valves for synchrophase unit. Power supply, 200–250 volts A.C. 50 c/s ; consumption approximately 180 watts. Picture, 12in. × 10in. = 120 sq. in. Output, 3 watts ; negative feedback pentode output. Speaker, 10in. high flux density moving coil permanent magnet. Cathode ray tube, 15in. diameter, white screen, electromagnetic deflection permanent magnet focusing. Ion trap, permanent magnet ion trap, eliminates ion burn, augments brightness and contrast. Synchrophase, optional additional plug-in unit. Improves synchronising on poor signal and increases definition. Interlace adjustment, ensures accurate interlace ; improves overall definition and minimises the gaps between lines in the picture. H.T. unit, no H.T. transformer, selenium metal rectifier ; valve filaments supplied by small transformer. E.H.T. unit, line fly-back E.H.T. generator of " ringing choke " type with separate



amplifying valve. Operating controls, edgewise drums mounted above the screen for volume and on/off switch, focus, brightness and picture on/off and contrast ; below the screen two controls for FM/TV selector and tuning ; pre-set controls concealed behind removable panel below the screen for width, vertical hold and height. Aerials, a normal television aerial is required and in addition an F.M. aerial ; normally an ordinary wire aerial will suffice for F.M., but a special F.M. aerial may be required on a weak signal. Price, £115 19s. 11d., including purchase tax.

FERRANTI, LTD., of Hollinwood, Lancashire, are STAND No. 55 represented by a comprehensive range of radio, television and combined radio-television models. The radio receivers are battery and mains operated types (A.C. and A.C./D.C.) in walnut wooden cabinets and plastic moulded cabinets. Most models contain built-in aerials which are extremely useful where it is inconvenient or impractical to use an external aerial, but provision has also been made for the connection of an external aerial if required. A useful

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Your Guide to the Exhibitors—*continued*

addition to the receiver range is the Model 505 for A.C. or D.C. operation. In a handsome plastic cabinet, this receiver has its own aerials and with its smaller size and low weight is readily transportable, as well as giving a

performance better than many larger sets.

A fine radiogram, Model 405, can also be seen in an attractive substantial walnut cabinet. It consists of a 5-valve superhet receiver with a 10in. P.M. speaker and built-in aerials. Ten 10in. or ten 12in. records can be automatically played and low note uplift circuits are included to improve record response. The television range gives a choice of table and console receivers for the Midlands and London areas, and includes models incorporating a radio receiver with built-in aerials. A projection television receiver, Model T.1605, is also on view which gives a large flat brilliant picture 14in. × 10½in.

With the exception of the projection television receiver, all models have the 12in. Ferranti cathode ray tube which is free from ion spot burn and, because of its moulded construction, gives a substantially flat brilliant picture approximately 10½in × 8in. The models are highly sensitive and suitable for use at any part of the television service areas, making the use of an external aerial amplifier unnecessary. All controls are conveniently placed at the cabinet front, considerably simplifying operation. Export versions of the radio models are available. *Illustrated* are Ferranti Model 105 table radio; Model T1405 table radio-television, and Model T1505 console.

FITTON, F. N., LTD., of Brighouse, Yorkshire, are exhibiting their TV2 television receivers and "Six-Fifty" broadcast receiver range (*both illustrated*). The TV2 is shown in two styles—the corner console style and a new release of the same receiver in a table cabinet.

The table receiver uses exactly the same chassis as the console and is unique in style. It has a curved front following the contour of the tube face and the back is circular. The whole is mounted on to a turntable, making it possible to rotate the instrument to suit the best possible viewing angle. Price £59 17s. 6d.

The "Six-Fifty" receivers were released earlier this year and have

proved themselves extremely popular. Now they are being offered fitted with a dual speed automatic record changer

GARRARD ENGINEERING AND MANUFACTURING CO., LTD., of Swindon, Wilts, will be showing these automatic record-changers, radiogram units, gramophone motors and pick-ups.

New models: 3-speed units, Models R.C.80 and R.C.72 record changers, Models M and SM radiogram units. Pick-ups for 3-speed units: Turnover magnetic and turnover crystal.

Present models: Model R.C.70A record changers; Models E, S and SP radiogram units; 201B, AC6 and U5 electric gramophone motors; Models 20, 30 and 10B spring gramophone motors.

Pick-ups.—Plug-in magnetic, high fidelity and miniature and pick-up arm unit to take the above plug-in heads.

The Model R.C.80 record changer is principally for export market and the Model R.C.72 for the home market. The turnover pick-ups are housed in a bakelite moulding, the pick-up itself being turned through 180 degrees by means of a knob on the front. The needle on one side has a .001in. radius point for playing L.P. records, and a .0025in. radius needle on the other side for playing 78 r.p.m. records.

To deal more fully with one typical Garrard production, here are details of the Model R.C.72 record-changer. It is a masterpiece of precision engineering. Plays six types of records, three speeds—78, 45, 33⅓ r.p.m. Easy to set for different records and speeds. Pick-up arm will take the range of Garrard plug-in pick-ups—a new Garrard feature. A wide range of plug-in pick-ups is available, including a multi-purpose plug-in pick-up case to take practically all the popular types of single and dual needle pick-up cartridges. Powered by the well-tried Garrard drum drive motor. Heavily loaded turntable for steady running, specially designed trip mechanism. Special release mechanism for interwheel when unit is stationary. Automatically stops when last record has played. The whole unit is mounted on a robust mounting plate tastefully finished in brown enamel and is supplied with patented spring suspension and all necessary fixing screws, nuts and washers.

Supplied in the following types:—R.C.72/A.C. only, dual voltage range, 100/130 and 200/250 volts 50 cycles. A motor pulley for 40 and 60 cycles can be supplied if required. Special motor available for 25 cycles. R.C.72/6V.—D.C. only, 6 volts, current consumption 2 amps. R.C.72/12V.—D.C. only, 12

STAND No. 32

STAND No. 68

to accommodate both the ordinary and microgroove recordings. Additional price is expected to be approximately £6.

Your Guide to the Exhibitors—*continued*

volts, current consumption 1 amp. R.C.72/D.C.—D.C. only, dual voltage range 100/130 and 200/250 volts.

GENERAL ELECTRIC CO., LTD., of Magnet House, Kingsway, London W.C.2, are devoting Stand 58 to radio and Stand 77 to electronics. The radio section Stand

will carry a full range of the company's domestic radio and television receivers, also a small display of the Osram valves which are used in them.

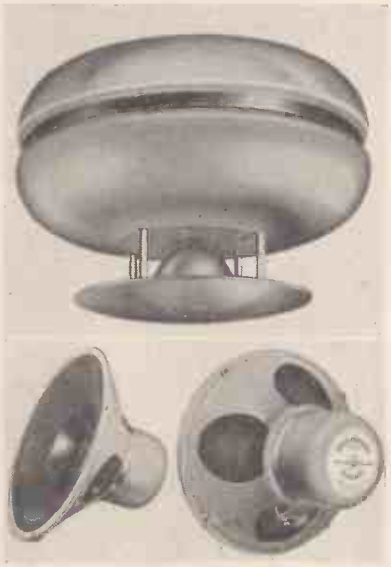
Three of the new broadcast receivers and one television receiver are considered to be outstanding. BC5243 is a table model with a plastic cabinet and is the lowest-priced set (£13 19s. 6d., including purchase tax), of its kind on the market. It covers the medium and long wavebands and uses a well-proved superheterodyne circuit centred round a triodehexode frequency changer, pentode I.F. stage and a high-slope tetrode output stage. For those who prefer a similar circuit but wish for short-wave reception there is the Model BC5441, which incorporates more technical refinements than one might expect at the price (£18 18s., including p.t.).

Another popular receiver is the all-wave table Model BC5639. This set has a special waveband indicating system, with all station names spread out prominently before the user, and with the chosen wave-range illuminated. Price, 21 gns. (including P.T.). In the field of television the newly introduced Model BT2147 is a good example of a low-priced receiver (£43 3s., including P.T.), which embodies all important technical features. *Illustration* shows Models BT2147 and BC5639.

GOODMANS INDUSTRIES, LTD., of Lancelot Road, Wembley, Middlesex, are showing STAND No. 85 three of their principal products—the Goodmans concentric diffuser, Model CD/77; the "Axiom 150" high-fidelity P.M. loudspeaker, and the "Audiom 60" 12in. P.M. loudspeaker, all three of which are illustrated.

The "concentric diffuser" has been introduced to meet the demand for an omni-directional public address reproducer. This 10-watt diffuser type loudspeaker sets a new standard in industrial sound reproduction, and undoubtedly offers the most economical method of providing either speech or music over a wide area. The pleasant design readily lends itself to all types of interior and exterior decorative schemes.

The "Axiom 150" high-fidelity loudspeaker has a twin-curvilinear diaphragm (Patent No. 451754). A carefully designed magnet assembly using anisotropic material provides a total flux of 158,000 maxwells on 1



1¾in. pole. The back centring device is a dustproof bakelised linen disc with concentric corrugations. It is an ideal reproducer for the record enthusiast and connoisseur of wide-range musical reproduction. Exceptionally fine transient and frequency response.

The "Audiom 60" is a single-cone medium heavy duty reproducer with outstanding smoothness in response and performance. Functional in design and of robust precision construction, this 12in. unit meets the most modern needs in the field of public address installations, small cinemas, high-power radiograms, etc.

GUEST, KEEN & NETTLEFOLDS (MIDLANDS), LTD., Box 24, Heath Street, Birmingham 18, are showing STAND No. 29 wood screws of all descriptions in steel, brass, copper and stainless steel; bolts and nuts of all descriptions, rivets, washers, wire nails, staples, Nettlefolds Parker Kalon hardened self-tapping screws, hammer-drive screws, screw-nails, Nettlefolds Phillips patent recessed head-wood and metal-thread screws.

HALE ELECTRIC CO., LTD., of Talbot Road, West Ealing, London W.13, are showing STAND No. 60 a full range of television receivers, radio-

grams and radio receivers under the "Etronic" trade mark. This year's models have again been carefully designed to give a range of instruments available at competitive prices which amply fulfil all requirements on performance and reliability, of which this company is justly proud. Also the company's reputation for pleasing and attractive cabinets has been fully maintained. In television receivers there is a wide choice, including the "Etronic" projection televisor in a handsome console cabinet, which gives all the advantages of large screen viewing at a reasonable cost. Many recent developments in this type of television equipment are incorporated.

The "Rambler" all-dry battery portable model EPB/4211, is compact for carrying and is available in an attractive moulded cabinet in various colours. Model EPZ4213 is an A.C./D.C. battery version of this receiver and has all the advantages of a portable and

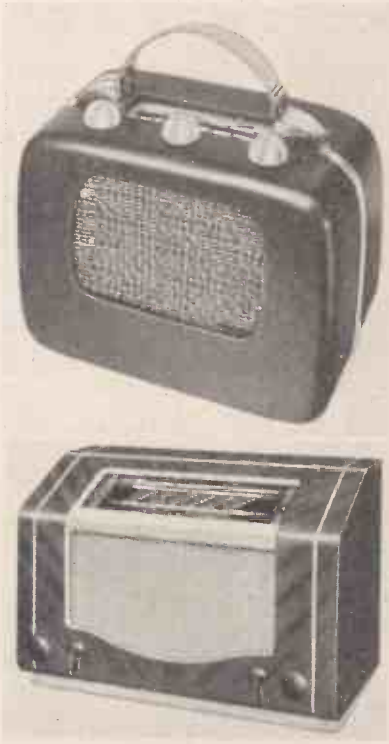
Your Guide to the Exhibitors—*continued*

can also be used as a " second set " operated from the mains in the home. EPB/4211 is 13 gns.; EPZ/4213 is 16 gns.

The latest development of projection television by Etronic consists of a projection televisor employing a superhetrodyne circuit with a total of 23 Mullard valves. It is available for both London and Midland reception areas, and is housed in a handsome console cabinet, fitted with doors which, when opened, disclose a screen giving a picture measuring 18in. × 13 7/16 in.

Models illustrated are EPB/4211, the projection televisor, and Model EGA/5317, a 5-valve console radiogram. They are but a few of the many products to be seen on the Hale Stand.

INVICTA RADIO, LTD., of Parkhurst Road, London N.7, STAND No. 46 are showing a range of television models designed to appeal to all pockets.



T105 is a 9in. table model of the popular type in a piano-finish walnut cabinet. Models T108 and T111 are also table models, but fitted with 12in. cathode ray tubes. There will also be the T107 and T110 console models, both of which are fitted with 12in. cathode ray tubes. All these receivers are supplied in walnut cabinets, and are suitable for use on A.C. or D.C. mains. Separate models are available for Alexandra Palace and Sutton Coldfield transmitters. The radio receivers available cover an extremely wide range, but fall under three main headings: portables, standard domestic receivers, export models.

In the portables, interest will probably centre round the Twinvicta mains/battery receiver (*illustrated*), which is completely self-contained, and may be used with batteries or on A.C. or D.C. mains. Standard domestic receivers include: Model 12, 3-waveband A.C. mains receiver; Model 73, 5-valve A.C./D.C. receiver fitted with Invicta bandspread tuning (*illustrated*); Model 32, 8-waveband receiver with bandspread tuning on short wavebands and including the trawler band; Model 42, similar to Model 32, but designed for use from batteries. Models 32 and 42 will be of special interest to listeners living in the " fishing " areas, where the trawler waveband is appreciated. All these standard models are supplied in walnut cabinets with illuminated glass tuning dials.

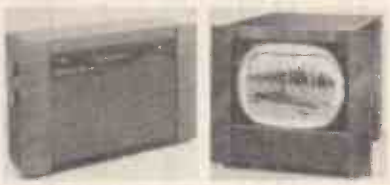
KERRY'S (GREAT BRITAIN) LTD., of Warton Road, Stratford, London E.15, STAND No. 95 are displaying a wide range of television sets, radio receivers, radiograms, and a comprehensive range of components and accessories. Included in the display are the L.S.L. circuit analyser and the Val Radio vibrator converter, for both of which Kerry's are sole distributors. Kerry's branch nearest to the Exhibition is 25–27, Highcross Street, Leicester.

KIMBER, ALLEN & CO., of Myron Works, Lewisham, London S.E., STAND No. 99 will have a full range of

television aerials on show, from the flexible dipole (*illustrated here*), to the multi-array. Prices from 12s. 6d. to 182s. 6d. While every consideration has been given to ensure maximum technical efficiency, the riggers' problems have received particular attention, and special care has been given to ease of assembly and erection. Several new and interesting improvements are incorporated, including the push-lock element and the new chimney fixing, which does away with lashings and can be fixed permanently in a few minutes.

It is felt that the patented push lock principle for elements and reflectors and the new chimney fixing, which employs their patented shear strain bracket, should be of interest to all television retailers who carry out their own installations.

KOLSTER-BRANDES, LTD., of Footscray, Sidcup, Kent, STAND No. 36 are showing, among other products: Table Model FR10, a 5-valve A.C. superhet; three wavebands, spin-wheel tuning; sockets for gramophone pick-up with switch and visual indicator on scale; sockets for



external speaker with switch to mute internal speaker; 8in. P.M. loudspeaker; shallow large area cabinet in high gloss walnut veneer. Table Model FR11, a battery version of Model FR10. Table Model FR15, a 5-valve A.C./D.C. superhet; specification similar in all main essentials to Model FR10. Table Model ER30, a 5-valve A.C. superhet with magic eye; 10in. P.M. speaker, spinwheel tuning, gramophone pick-up sockets and switch with scale indicator; external speaker sockets with switch to mute internal speaker; balanced positive and negative feedback circuit; large area high-gloss walnut cabinet. Automatic radiogram, Model FG50, a 10-valve three-waveband A.C. superhet for ordinary or long-playing records; push-pull output and R.F. stage on all bands, pneumatic lid closing device, ample record cupboard; lush high-gloss walnut cabinet with sycamore interior. Table wire recorder, Model EWR60, records one hour's programme on microphone provided, gramophone records or direct from radio; immediate playback, instant erasing of previous recording. In roll-top high-gloss walnut cabinet.

Television models—Table Model EV30, a 21-valve A.C. sound and

Your Guide to the Exhibitors—*continued*

vision receiver ; 12in. Brimar C.R. tube; high-gloss mahogany or walnut cabinet ; Birmingham or London frequencies. Table Model FV30, 12in. de luxe edition of EV30, similar in all main essentials, but with highly efficient variable picture definition control and new design high-gloss walnut cabinet ; London, Birmingham and Holme Moss frequencies. Console Model EV40, a 12in. console edition of Model EV30, sound and vision only, with large speaker and high-gloss walnut cabinet on castors ; London and Birmingham frequencies. Console Model FV40, 12 in. sound and vision receiver ; console version of Model FV30, including variable definition control ; high-gloss walnut cabinet with doors and castors ; London, Birmingham and Holme Moss frequencies. Console Model FT50, radio and television receiver, 12in. tube, chassis similar to Model FV40, with variable definition control ; three wave-

band, 5-valve radio superhet, lush high-gloss walnut cabinet with large doors and castors ; London, Birmingham and Holme Moss frequencies. (Models *illustrated* are FR10, FG50, EWR60 and FT50).

MASTERADIO, LTD., of Fitzroy Place, London N.W.1, STAND No. 28 are showing several new models, among which are : Model T851, a 12in. table model television receiver, incorporating a two-waveband 4-valve radio set which uses the TV aerial. Model T852, a 12in. table model television receiver without radio. Both these models use a superhet circuit, and are designed to receive all the five B.B.C. TV channels by a simple screw adjustment. Also incorporated is a picture enlarger improving central detail. Model PT50, a projection television set with a screen size of 16in. × 12in. Model RG650, a console radiogram made to match, and in exactly the same cabinet

as the T612 TV. It incorporates a record changer. " The Carholme," a car radio receiver worked from a car battery which can also be used on A.C. mains voltage.

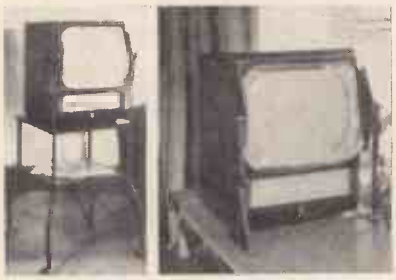
These models are in addition to Masteradio's usual range of car radio receivers, Model RG350 radiogram (*illustrated*), and Model T612 television receiver.

McMICHAEL RADIO, LTD., of 190 Strand, London W.C.2, STAND No. 57 are featuring their table Model 501 (*illustrated here*), among other of their products. The main things which made the Model 491 receiver so popular, have been retained in the 501, and new features have been added, including push-pull output. Specification : The 501 is a powerful 7-valve all-wave superhet working from A.C. mains. It has an 8in. extra high flux moving-coil loudspeaker and all these features for your convenience : " Home " and " Light " indicated at a glance by automatically illuminated panels ; extra speaker fitment—and what is more, you can use an extra speaker and switch off the internal set speaker, or have both on at the same time, as you wish. Gramophone pick-up : you can connect your gramophone pick-up unit to the set and obtain

similar whole tone range reproduction from your records. Piano-finished cabinet : the 501 A.C. set is housed in a handsomely styled walnut cabinet made and piano-finished by craftsmen.

METRO PEX, LTD., of 38 Great Portland Street, London W.1, STAND No. 78 are showing many new and attractive models which have been added to their range of " Magnavista " television lenses since last year's Radiolympia. This high quality lens, when fitted over the receiver screen, gives high magnification to the picture, outstanding clarity and a wide angle of view. Exhibits include specially designed lenses and accessories for radar development, lenses for incorporation into television receivers (export), industrial lenses and full ranges of standard and filter type lenses for current receivers. Separate filters for use on 9in., 10in., 12in., and 15in. receivers.

Noteworthy additions to the range are the console and table stand models,



type Nos. C1X, C2, A3, incorporating the latest developments in stand design. They are hand forged in wrought iron, finished in polychromatic bronze, which, although unobtrusive, enhance the finest cabinet ; they are available for 9in.,

Your Guide to the Exhibitors—*continued*

10in., and 12in. receivers. Also on show will be the new trolley table models introduced to solve the problem of where to put the television set. They are simply designed tubular steel tables with telescopic and swivel lens adjustment, fitted with large wheels for easy movement; available for 9in., 10in. and 12in. table receivers. (*Illustrations* show trolley table model and table stand Model A3.)

MIDLAND AUTO COMPONENTS, STAND No. 24 of Cambridge Street, Birmingham 1 (and at Gloucester and Willesden), are sole distributors of "Televoice" television, which will be displayed and will also be working in the communal television demonstration section. They are also sole Midland area distributors of advance signal generators and other test equipment; factors for Marconi, Philips, Alba, Beethoven, Etronic, Ever-Ready, G.E.C. etc.; distributors of Plus-a-Grams, public address equipment, B.V.A. valves and cathode ray tubes, television and radio aerials, speakers, batteries, cables, etc., and all types of radio and electronic components. A varied selection of all these products will be on show.

MOTOR & AIR PRODUCTS, STAND No. 14 LTD., of Bridge Street, Leatherhead, Surrey, are showing a full range of Acrylite lenses. New models since the last Radiolympia include four stand models, ranging from the 12in. console to the small 9in. table model. There will also be some 30 different strap-on and screw-on models.

The Acrylite television filter, an entirely new product, will also be on show. This enables pictures to be enjoyed under normal lighting conditions. It increases contrast, improves definition and reduces eye-strain. It is made from tinted perspex specially produced for the television industry and soon to be incorporated in many new receivers.

MULLARD, STANDS Nos. 64 and 74 LTD., of Century House, Shaftesbury Avenue, London W.C.2, will present on Stand No. 64, their latest range of radio and television receivers. A section of this stand will also be devoted to a comprehensive display of radio valves and television tubes suitable for all types of receivers. Important among the radio and television exhibits will be two new radio receivers, Models MAS274 and MAS277, and a new television receiver, Model MTS501. MAS274 is a 5-valve, all-wave superhetrodyne for A.C. mains. It is noted for its high sensitivity and good quality of reproduction. MAS277 is a de luxe, 5-valve A.C. superhet, giving excellent performance on three wavelengths. The quality of reproduction of this set is excellent and a "magic eye" tuning indicator ensures accurate and easy tuning. Model MTS501 is a television console with a 12in. cathode-ray tube. The picture produced on the

screen is so bright, sharply defined and steady that it can be viewed comfortably in normal room lighting. The quality of sound reproduction is excellent. The selected walnut cabinet is well-designed on modern and attractive lines. Another interesting feature on Stand No. 64 is a giant model of a modern valve cut away to show the complex multi-electrode system inside.

On Stand No. 74, Mullard projection television components will be demonstrated. These components comprise an optical system, deflection and focusing coils, and compact E.H.T. unit and the Mullard MW6-2 projection tube. (*Illustrations* show MAS274, MTS501, and MA7 277).

MULTICORE SOLDERS, STAND No. 86 LTD., of Mellier House, Albemarle Street, London W.1, will be specialising in practical soldering demonstrations and the special manufacturing feature will be undertaken by factory operatives from the works of the General Electric Company. The complete centre section of Multicore's large island stand has been laid out to represent an interesting cross-section of a typical television assembly line, along with an ingenious floor design enabling people to view the assembly operations closely. The G.E.C.'s works staff, who come from Coventry daily, will assemble R.F. units here, for the G.E.C. television Model No. BT.2147, each unit involving the assembly of approximately 60 parts. The complete operation, including 130 Ersin Multicore solder joints, takes more than an hour, and the completed units are sent to Coventry for testing and incorporation. A special collection and delivery service between the Multicore Stand and the G.E.C. works enables the daily supply of parts and completed units to be exchanged.

MURPHY RADIO, STAND No. 44 LTD., of Welwyn Garden City, Herts, are showing the following models. All incorporating "A" in the type number are suitable for operation on A.C. mains, 200–250 volts, 50–100 cycles, unless otherwise stated. "U" models are suitable for 200–250 volts D.C. or A.C., 25–100 cycles.

B.143: portable 5-valve all-dry battery receiver incorporating tuned R.F. stage giving exceptional sensitivity and range. Long and medium wavebands. Built-in frame aerial with socket for external aerial. B.165: four-valve battery receiver operated from 2-volt accumulator and H.T. battery. Long and medium wavebands. QPP output stage. Cabinet in Sapele mahogany. U.144: compact transportable A.C./D.C. 5-valve superhet of unique appearance. Built-in frame aerial. Long and

medium wavebands. Well balanced reproduction from large loudspeaker. A.168: 5-valve superhet retaining the

continued on page 37

COSSOR *announce . . .*

THE FIRST ENTIRELY ELECTRONIC INSTRUMENT FOR TELEVISION ALIGNMENT AND LINEARITY CHECKS

COSSOR *Tele-Check*

LIST PRICE £27

The Television Alignment and Pattern Generator is an inexpensive instrument designed by Cossor to provide a simple, efficient and much needed aid to television receiver alignment. The tuning sweep of the alignment oscillator is achieved by frequency modulation of its carrier which can be set to any frequency between 7 and 70 mc/s. A response curve of 7 mc/s. bandwidth is presented on the tube of any standard oscillograph, the time base voltage providing the frequency modulation. The instrument also incorporates a Pattern Generator which enables frame and line Time Base linearity checks to be carried out in the absence of Television transmission. Compact, easily portable—weight under 14 lbs.

★ *Carrier frequency 7-70 mc/s. (on fundamental). Continuously variable.*

★ *Frequency modulation up to 7 mc/s. bandwidth.*

★ *Square Wave Modulation for linearity check of Time Bases. Frequency 400 c.p.s. (Horizontal); 80 Kc/s. (Vertical).*

★ *Maximum output 50 mV. Minimum 25 microvolts. Standard 80 ohm output impedance.*

See it demonstrated at Stand 52,
NATIONAL RADIO SHOW

★ *Write for fully descriptive leaflet to:—*

A. C. COSSOR LTD., INSTRUMENT DIVISION, COSSOR HOUSE, HIGHBURY, LONDON, N.5.

C.I. 20

Your Guide to the Exhibitors—*continued*

advantages of the baffle principle in a walnut cabinet of popular appeal. Long, medium and short wavebands. Delayed A.G.C. Pick-up and extension speaker sockets. Tone control. U.168 : A.C./D.C. version. A.170 : luxury table model 5-valve superhet giving excellent quality of reproduction. Long, medium and short wavebands. Magic eye tuning indicator. Variable selectivity. Two-tone walnut cabinet. Pick-up and extension speaker sockets. A146CM : the first commercial floor type " baffle " receiver. 7-valve superhet. Long and medium wavebands. Walnut cabinet. External edge-lit scale. Push-pull output. Delayed A.V.C. negative feedback ; pick-up and extension speaker sockets. A172R : 8-valve radiogram for 78 r.p.m. and long-playing records. Gives an extremely high standard of gramophone reproduction. Murphy lightweight pick-up ; moving coil for 78 r.p.m., moving iron for L.P. records. Long, medium and short wavebands. Flywheel tuning. Delayed A.G.C. negative feedback. High-power push-pull output. Two loudspeakers. Handsome walnut cabinet. A.C. operation, 50–60 cycles.

Television : all Murphy television models are of the superhet type and can be adapted to work off either London, Sutton Coldfield or Holme Moss frequencies.

V150 table model television receiver with 12in. tube. Two R.F. stages. Interference limiters for sound and picture. Walnut cabinet. VU150, A.C./D.C. version. V180C, console television receiver with 12in. tube. Two R.F. stages. Interference limiters for sound and picture. Focus adjustment compensated for mains voltage fluctuations. Figured walnut cabinet on castors. V178C (*see picture*) a luxury model console for those who want the best in 12in. tube pictures. Aluminised tube giving very high brightness with excellent contrast. High definition picture. Adjustable sound and vision limiters. V176C, television at its best. 15in. aluminised tube. Good regulation high E.H.T. supply gives very bright picture with excellent contrast. Wide band amplifier for the best possible definition, Compensated focus and many other refinements.

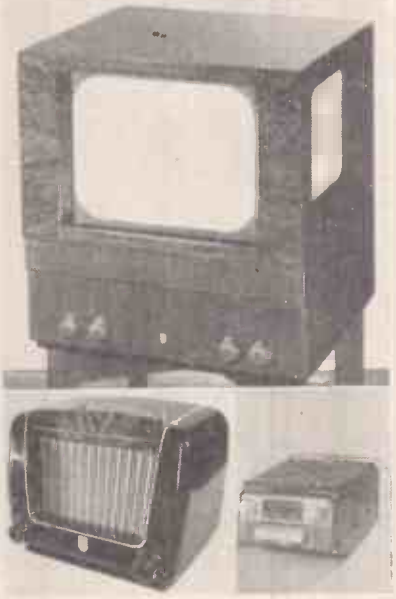
PETO SCOTT ELECTRICAL INSTRUMENTS, LTD., of Addlestone Road, Weybridge, Surrey, STAND No. 84 are showing the new console television TV124, new radiogram ARG62 fitted with 3-speed motor for the new long-playing records, new battery portable BP50, and a projection television model. *Photographs* show TV124 and ARG62.

Many other products of interest will be on show on the Peto Scott Stand.

Peto Scott TV124 has been designed with the aim of giving the best value for money in television. The engineers were determined that the quality of the receiver, both in performance and workmanship, should be of the best commercial standards. A picture of exceptional quality, brilliance and stability is obtained from the 16-valve chassis which includes several special circuits using the latest techniques. The input is designed for an 80 ohm unbalanced coaxial cable feeding into a band-passed R.F. transformer. A single R.F. stage precedes a triode-pentode valve used as a high stability oscillator and mixer respectively. A vision I.F. frequency of 13.4 mc/s is used in the two-stage band-pass coupled amplifier. The R.F. amplifier is controlled to give a preset gain adjustment at the rear of

the receiver and one I.F. stage is controlled, giving a contrast adjustment, which, with brightness and volume control on/off switch, forms the three main controls at the front of the console cabinet.

PHILIPS ELECTRICAL, LTD., of Century House, Shaftesbury Avenue, London W.C.2, STANDS 42 and 45 are devoting Stand No. 45 to the reception of visitors, and a display of



television sets and the complete Philips 1950 range of radio receivers. On Stand No. 42, projection television will be demonstrated. The radio range will comprise the inexpensive 5-valve, all-mains superhet 290U ; the " all-in-one portable " 401UB, and the two new de-luxe Models 400A and 500A. The popular battery set with mains performance—Model 474B, will also be displayed. Of special interest will be the radiogram 603A, which is provided with a three-speed turn-table, thus enabling it to accommodate the latest long-playing records. The new Philips motoradio Model 574V, will also be shown. This receiver comprises a 5-valve superhet with both manual and mechanical push-button tuning, and a separate high-fidelity loudspeaker contained in an 8-in. diameter metal case. The radio unit is designed to fit on the underlip of the " car's " instrument panel ; it can alternatively be inserted in the special compartment provided in many cars.

The full range of Philips television receivers will be exhibited, comprising direct viewing and projection models. The direct viewing receivers will include

Your Guide to the Exhibitors—*continued*

two table models, the 385U with the 9in. tube, the 492U with the 12in. tube, and a 12in. console Model 485U. Two of these receivers will be demonstrated in the Television Avenue. Of particular interest will be the demonstration on Stand No. 42 of Philips projection television. Two models will be exhibited, the table receiver 600A—which is supplied with or without stand—and the new console model, 704A. (Models 290U, 574V, and 600A are *illustrated*).

PILOT RADIO, STAND No. 56 of Park Royal Road, London N.W.10, show a comprehensive range of television and radio receivers, including a new 12in. table television receiver. Among models on show, both for home and export, are these :

Television.—Model TM54. A new table receiver with a 12in. cathode ray tube. Chassis carries a 14-valve circuit and interference suppressors are fitted on vision and sound. This model is a 5-channel receiver and can be installed in either of the existing television areas or in the proposed new television areas, where it can be immediately adjusted for reception in the appropriate locality.

Model CV35. Television console with 12in. tube, specially designed for the Midlands area. The 19-valve circuit has interference suppressors for vision and sound. Model CV34. Television console, similar in appearance to Model CV35, but specially designed for London transmissions.

Radio (home market). Little Maestro (Model 10) 5-valve transportable superhet, compact, needs no earth, fitted with self-contained aerial. Output 2 watts. Twin scales are fitted and this model covers medium and long waves. The " Blue Peter." A highly sensitive and selective table receiver, 5-valve superhet circuit incorporates " optional negative feed-back "—an exclusive " Blue Peter " feature. Model covers four wavebands—two short, one medium, one long (including trawler band). Spinwheel tuning is fitted and illuminated scale is in four colours. The " Pilot Jack." A 5-valve superhet table model covering short, medium and long waves. A sensitive and selective receiver containing an inbuilt frame aerial with a special external aerial point for short wave reception.

Export models : Pilot's export receivers include the recently-introduced

Your Guide to the Exhibitors—*continued*

" Pilot Navigator." This is a bandspread receiver made in two models. Model BV650 vibrator receiver is for 6-volt (car-type) battery operation. Model AC651 is a mains receiver, the voltage tappings ranging from 110 to 250 volts A.C. These models are mainly exported to Europe and Near East. Little Maestro (Model 10). The export receiver is similar to home version, but waveband coverages are short and medium waves. A.C. mains operation, 110/240 volts. Special models are made for the South African markets with varying voltage tappings. The " Pilot Jack." This model is similar to home version, but incorporates a magic eye and operates from external aerial only. This is exported to world markets. (Models *illustrated* are CV34/35 and Little Maestro.)

PYE, LTD., STANDS Nos. 8 and 49 of Radio Works, Cambridge, are showing television sets, a full range of domestic and car radio receivers, radiotelephone equipment, plugs and sockets, pamphonic amplifying equipment and relays.

Brief details of new models are: Model P35.—A 5-valve, eight-waveband bandspread superhet for A.C. mains operation; includes trawler waveband. It incorporates 8in. P.M. moving coil loudspeaker, Pye " Tonemaster," flywheel tuning and sockets for P.U. and extension loudspeaker. Model P47B.—A 4-valve, eight-waveband bandspread superhet for battery operation; includes trawler waveband. It incorporates a battery economy plug, 8in. P.M. moving coil loudspeaker, Pye " Tonemaster " and flywheel tuning. Power supply: H.T. 126v., L.T. 2v. accumulator. Model P33TQ. —A 6-valve, three-waveband transportable with built-in aerials for A.C. mains operation. Incorporates 10in. P.M. moving coil loudspeaker. Pye " Tonemaster " and flywheel tuning. Model A39J/H.—An 8-valve, eleven-waveband bandspread superhet for A.C. mains operation; includes trawler waveband, incorporates an R.F. stage push-pull output (output approx. 9 watts), 10in. P.M. moving coil loudspeaker, P.U. and extension loudspeaker sockets. Black screen TV Model BV51.—A 12in. TV table model for operation from A.C. or D.C. mains. TV sound only. (*Illustrations* show BV30C, a television receiver for Birmingham, P33TQ, and P47B).

RADIOMOBILE, LTD., of 179-185 Great Portland Street, London W.1, STAND No. 70 bear out their claim to market radios for all automobiles in all countries by the range of " H.M.V." receiving sets which they will have on show. The requirements of most car owners in this country and of many abroad are catered for by Model 100 (*illustrated*). This is available for either 6- or 12-volt operation; has a 6-valve superheterodyne circuit and long and medium waveband coverage. As well as manual tuning, there are four tuning push-buttons, each of which can be easily pre-set by the listener to any required station. Push-buttons are also incorporated for tone control and waveband change. Power output is ample and allows for an additional loudspeaker which can be acoustically sited behind the back seat squab, etc. On the commercial vehicle side the Company announce a completely new installation for passenger coaches. The control and amplifier units are Model 4030A (for 12 volt) and Model 4032A (for 24 volt), but the loudspeaker installation relies on a series of small " personal " speakers built into the headroll of every seat, each with its own combined on/off switch and volume control. This means that every pair of passengers can listen at will as they hear only their own " personal " speaker; any others which may be switched on are audible only to the two occupants of the actual seat. A microphone attachment enables the driver or guide to cut in to all loudspeakers by means of an " overrider " switch for making announcements.

REGENTONE PRODUCTS, LTD., of Eastern Avenue, Romford, Essex, STAND No. 66 again bring home to the public the dignity of beautiful walnut cabinets, always an attraction of Regentone receivers in the past. By the thoughtful combination of a spacious open stand and a background of white pillars and tasteful wine-red curtains and carpets, Regentone are demonstrating the true harmony their radio, radiogram and television models can achieve in any home.

The Auto 99, Britain's most popular table radiogram, with its automatic record-changer enabling records to be played for 35 minutes without attention, and a 5-valve all-wave superhet (for A.C. mains), plays a prominent part in the exhibit, and is sure to get a lot of attention. So, too, will the Regentone 121. This 5-valve superhet all-wave table receiver is yet another Regentone success, proved and acclaimed by the public. This model has tone control, facilities for pick-up and extension speaker, and is available in A.C. and A.C./D.C. versions.

Regentone television receivers are playing their part, too. The " Big 12 "

continued on page 41

Peto Scott

PRESENT

3 NEW STAR PERFORMERS in Radio and Television

★ **The Glamour-Styled Portable**

with the Peto Scott Performance. Lightweight, stream-lined, just the job for gay cavaliers — and their girl-friends!

£14-19-6

Complete

Here are three up-to-the-minute Peto-Scott sets — incorporating fresh features, new ideas and with the mid-twentieth century look. Once again Peto Scott answer the dealer's need—with sets that capture the public's imagination.

★ **LONG PLAYING**

Records—This is the RADIOGRAM to meet the latest demand. Here is the radiogram for the microgroove record enthusiast. 3-speed motor giving a choice of 33.1/3, 45 and 78 revs. per minute with fine adjustment for absolute accuracy, incorporating a new high fidelity pick-up suitable for *all* types of records.

68 GNS

Also available for 78 r.p.m. with Garrard automatic record changer R.C.70. **65 Gns.**

★ **First Appearance Anywhere!**

A TELEVISION SET WHERE RELIABILITY & PERFORMANCE ARE A FIRST PRIORITY

In their new T.V. 124 Peto Scott offer a set as technically perfect as their long experience assures plus a cabinet of exceptional beauty. Note cupboard length doors.

83 GNS

BIRMINGHAM RADIO SHOW 1950 STAND 84

PETO SCOTT Electrical Instruments Ltd., Addlestone Road, Weybridge, Surrey

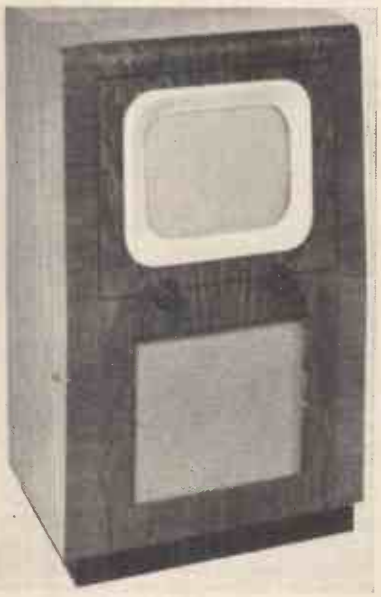
Phone: Weybridge 4271 (5 lines)
Cables: Megacycle, Weybridge

Your Guide to the Exhibitors—*continued*

table television, TR20 and T15 are being shown in action to the public in a separate television booth, and models can be examined closely on the stand itself. All three receivers are available for London and Birmingham service frequencies and each contain a 12in. cathode-ray tube. (The "Big 12," TR20, and 35G are *illustrated*).

R.G.D., LTD., of Bridgnorth, Shropshire, will be exhibiting and demonstrating television and radio receivers, radiograms, record players, loudspeakers and tape recorders, also a selection of public address equipment and a two-stage pre-amplifier will be on view. All R.G.D. radiograms are now equipped with three-speed record changers for playing 78, 45 and 33⅓ r.p.m. records, and with high-fidelity sapphire-point pick-ups which provide optimum response over the entire recorded frequency range. STAND No. 50

Model 1700 (*illustrated*) is a new television receiver with a 17-valve circuit and the special feature of a 12in. cathode-ray tube which gives crisp,



bright pictures, completely free of curvature distortion. It has only two main controls, the sound volume control being combined with the mains switch and contrast. A 10in. permanent magnet loudspeaker of low external field is used, and to prevent distortion caused by outside interference built-in suppressors are fitted for both sound and vision. The cabinet is of selected figured walnut, and is fitted with concealed castors. A front panel is easily removed for cleaning the face of the tube. An expanded metal grill conceals the loudspeaker.

ROMAC RADIO CORPORATION, LTD., of The Hyde, London N.W.9, will have six models of radio receivers on show, all available for immediate delivery. They are: three versions of Model 189—a 12in. table set, a 12in. console set, and a 12in. cocktail console, all for London and Birmingham (normal transmission area), and three versions of Model 190 a 12in. table set, London and Birmingham (fringe area and beyond) featuring built-in pre-amplifier, a 12in. console, London and Birmingham (normal transmission area); a 12in. cocktail console, incorporating cocktail cabinet, London and Birmingham (fringe area and beyond). All receivers utilise the latest type of aluminised 12in. tube, thus giving adequate brilliance for daylight viewing. They can be converted for reception of any B.B.C. television station by exchanging three plug-in type of RF coils on Model 180 and four on Model 190. Receivers now supplied to fringe areas which will eventually come within the service area of a new station will be supplied with a second set of RF coils tuned to the new station. STAND No. 88

Romac are also showing several types of car receiver and a full range of aircraft radio equipment.

SCOPHONY-BAIRD, LTD., of Lancelot Road, Wembley, Middlesex, are showing these models: Townsman, no-aerial television console; 12in. cathode-ray tube; A.C. mains. In walnut cabinet, 40in. high, 24¾in. wide, 20¾in. deep, mounted on rubber castors. Townsman with radio, no-aerial television-radio console; 12in. cathode-ray tube; 3-station radio, pre-selector tuned; A.C. mains. In walnut cabinet, mounted on rubber castors. Countryman, long-range television console for use in fringe areas. 12in. cathode-ray tube; A.C. mains. Mahogany cabinet, fitted with rubber castors. Everyman, table model; 9in. cathode-ray tube; A.C. mains. Walnut STAND No. 39

cabinet. T165 portable, no-aerial table model portable, 50 square-inch picture. Figured walnut cabinet with plastic

Your Guide to the Exhibitors—*continued*

insert front. Home Recorder, self-contained portable, magnetic type recorder; 10 watts output, giving 30 minutes playing time; frequency response, 50–8,000 cps. at 7½in. per sec. Complete with microphone (*illustrations* show these last two models).

SOBELL INDUSTRIES, LTD., of Langley Park, Slough, Bucks, STAND No. 63 are showing a full range of radio receivers, television receivers and radiograms. Among them are:

Table receivers—Model 439, a 4-valve set for A.C./D.C. mains, two wave-bands; Model 511P, a 5-valve set for A.C. mains; three wavebands; Model 511W, also a 5-valve set for A.C. mains, three wavebands, but priced at £21, tax paid, whereas Model 511P is priced at £16 16s., tax paid; Model 531W, a 5-valve set for A.C./D.C. mains, three wavebands; and Model 610, a 6-valve set for A.C. mains, three wavebands,.

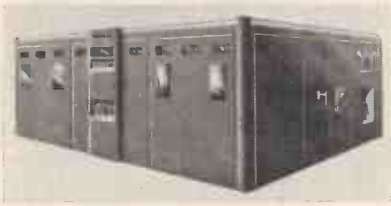
Table auto-radiogram—Model 511 TAG, a 5-valve set for A.C. mains, three

wavebands. Console auto-radiogram—Model 511AG, a 5-valve set for A.C. mains, three wavebands.

Televisors (all for A.C. mains). Model T90—9in. tube, table; Model T89—9in. tube, console; Model T120—12in. tube, console; Model T107—12in. tube, console. This model is combined with 6-valve all-wave radio and gramophone input.

All models are housed in walnut veneered cabinets except 511P, which is walnut-finished plastic, and 439, which is produced in plastic cabinets, finished walnut, peach, pastel green, aero green, magenta, ivory and ice blue. (*Illustrated* are 511W, and 511TAG.

STANDARD TELEPHONES & CABLES, LTD., of 10 Essex Street, London W.C.2, STAND No. 43



display the "Standard" type DS15 radio transmitter (*illustrated*), a 20-kW short-wave equipment, which may be employed in conjunction with the appropriate external drive unit for a number of services such as: broadcasting and telephone transmissions (A3); high-speed telegraph transmissions with either frequency-shift (F1) or "on/off" keying (A1). In the second case, facilities exist for the carrier signal to be either steady for straight CW telegraphy, or "wobbled" about the mean value to correspond to MCW telegraphy; reduced carrier single or independent sideband transmission (A3a or A3b). The transmitter may also be used for frequency modulated "facsimile" transmissions (F4).

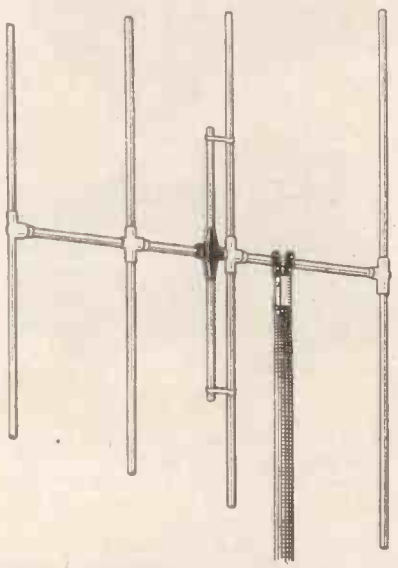
The range of "Standard" valves includes a series of air blast cooled (thoriated tungsten) transmitting valves with anode dissipations from 1 to 20kW. Of particular interest is the 3J/210E 10 kW. triode, which is suitable for operation at full ratings up to 120 Mc/s. Among the smaller valves shown are a number designed for special purposes such as the W7/2D travelling wave amplifier, operating in the region of 4,000 Mc/s.

On display to the public for the first time is the "Brimar" projection tube and recommended optical unit showing the layout employed in domestic television receivers.

"Brimar" aluminised teletubes for direct viewing are also prominently displayed, with the complete range of television valves. The general trend towards miniaturisation is evident in the range of new types of valves available for all kinds of radio equipment.

TELEGRAPH CONSTRUCTION AND MAINTENANCE CO., LTD., of Telcon Works, Greenwich S.E.10, STAND No. 79 will be exhibiting, besides the present-day range of television down-lead cables, both solid and air-spaced low-loss cables and accessories suitable for operation at frequencies as high as 10,000 Mc/s per second. A new type of air-spaced coaxial cable having as a spacer a helical membrane of Telcothene applied edge-on around the inner conductor will also be displayed. The outer conductor is a seamless aluminium tube cold drawn down on to the helix and provides very adequate screening and waterproof protection. An effective dielectric constant of 1.08 is thus obtained in a robust and special construction with a very high degree of uniformity. This cable is eminently suitable for such broadband applications as super-group telephony and television.

TELERECTION LTD., of 12 Suffolk Parade, Cheltenham, STAND No. 100 show two entirely new products. (1) The "Maximus" 4-element TV



aerial (*illustrated*), a new design embodying an adjustable matching device, enabling the impedance of the aerial to be adjusted to any receiver input; (2) the "8 DB," 3-element type, designed in the same manner, with an adjustable T match. They are also showing other types of aerial which are among their "leading lines."

Your Guide to the Exhibitors—*continued*

The " Maximus," first aerial of its type to be seen in this country, is the solution to all the difficulties hitherto inherent in the fringe or long-range type of aerial. Besides giving a performance equalled by none, it can, by a simple mechanical adjustment, be perfectly matched to 50-ohm co-axial input, 80 ohm balanced feeder, to Philips, G.E.C., Vidor or any other TV receiver, irrespective of feeder and input impedance. The tremendous advantages of such an aerial have long been appreciated and can be seen in the high forward gain, signal to noise radio, front/back ratio, and the high degree of interference suppression.

THORN ELECTRICAL INDUSTRIES, LTD., of 105-109 Judd Street, London W.C.1, present in the Ferguson range the Ferguson 12in. television table model (968T, Southern area, 978T, Midlands). This receiver uses 14 Mullard valves of the latest types and incorporates the most recent developments in television technique. 12in. cathode-ray tube with neutral-tinted colour filter for viewing in strong light. Stable picture with full definition and brilliance. Polished walnut cabinet with ivory coloured plastic escutcheon and mask. Two main controls only, recessed into right-hand side of cabinet. 6½in. loudspeaker giving ample volume and excellent quality. Adequate sensitivity built-in aerial attenuator. For 200–250 volts A.C. or D.C. (50–100 cycles A.C.). Full interference suppression is fitted on both sound and vision. Three new models just released (*illustrated here*) are: Model 947T projection television, Model 945TRG, radio, television and console radiogram, and Model 269RG, a console radiogram. Full details of these models will be printed in the next issue.

TRIX ELECTRICAL CO. LTD., of Maple Place, Tottenham Court Road, London W.1, are including among their well-known range of amplifiers, microphones, loudspeakers and accessory equipment, a new miniature pre-amplifier and mixer unit for attachment to any of the standard range of amplifiers. Also on show will be newly-developed and simplified intercommunication equipments and amplifiers incorporating the new miniature valves, thus leading to a considerable overall reduction in dimensions. On the domestic side will be shown a new range of Trixette record reproducers, including the new Model P358 three-speed unit for 78, 45 and 33⅓ r.p.m. records. Of particular interest is Model B65, a self-contained portable outfit which is becoming increasingly popular and well-known throughout the trade as a most useful stock line because of its considerable applications for the small amplifier requirements of the man in the street. (*Illustration* shows P358 and B65.)

ULTRA ELECTRIC LTD., of Western Avenue, Acton, London W.3, present two new models—the Ultra-Leader (*illustrated here*), and the Ultragram. The Leader is a 5-valve A.C. mains superhet table receiver in a beautifully-styled walnut cabinet with contrasting veneers. 15½in. high, 18in. wide, 8in. deep. The chassis can easily be removed from the cabinet without using a soldering-iron. The oscillator and aerial coils and the wave-change mechanism are mounted in a compact coil unit which can be detached from the chassis by undoing two screws.

The Ultragram is a beautiful radiogram, the technical specification of which is the same as the Leader, except for the gramophone arrangements and dimensions—32in. high, 34in. wide, 17in. deep. Particular attention is drawn to the autochanger, which is of

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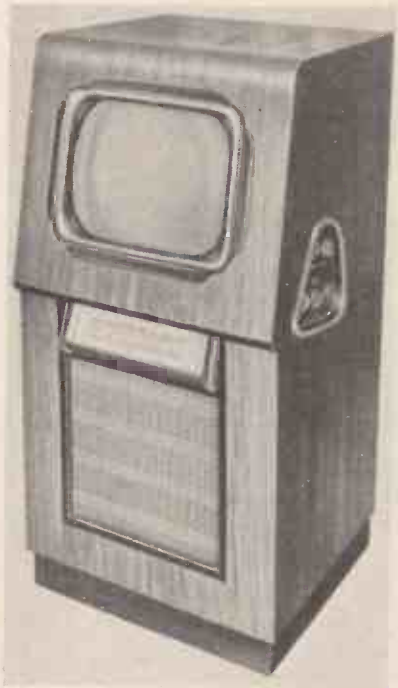
Your Guide to the Exhibitors—*continued*

the new three-speed type and will handle the new 33⅓ r.p.m. 10in. or 12in. records and 78 r.p.m. 10in. or 12in. records. It will also play singly 33⅓ r.p.m. and 45 r.p.m. 7in. records. Price, £84, tax paid.

In television the firm are exhibiting 16 different models (two of which are *illustrated*). There is a 12in. table model, a console model with 12in. aluminised tube, a 12in. console with aluminised tube and radio, and a de luxe console with 15in. aluminised tube and radio.



WESTERMAN, F. (WHOLESALE), LTD., of 94 Dale End, Birmingham 4, are showing Sobell, Regentone and Alba 1950/51 television radiograms and radio sets and Ever-Ready portables, also a range of Trix and B.S.R. playing-desks and amplifiers. Weda hearing aids, listed

complete with three valves, headphone, earpiece and batteries at 12½ gns. are also displayed. These instruments are supplied through retail radio dealers. A range of radio and television accessories including Belling Lee and Aerialite TV aerials, TV lenses, W.B. speakers, popular makes of A.R.B.M. batteries, L.T. accumulators, co-axial cables and flexibles can be seen too, as well as TV service equipment with well-known makes of radio components and service instruments. (*Picture* shows the Weda hearing aid, which is made by S. G. Browne, Ltd.).

WESTINGHOUSE BRAKE & SIGNAL CO., LTD., of 82 York Way, King's Cross, London N.1, are demonstrating a "Viewmaster" television receiver in which a 36EHT100, one of a range of "Westalite" miniature high-voltage rectifiers, provides an E.H.T. supply of 6kV. from the line flyback. Other "Westalite" rectifiers used in this receiver are the 14A86 for H.T. supply and 14D36 for H.T. boost and line flyback damping. Copper-oxide "Westectors" WX3 and WX6 are incorporated for vision and sound interference suppression. A number of television chassis of well-known makes incorporating the firm's metal rectifiers will also be on view, so will ranges of H.T., L.T., 36EHT rectifiers, "Westectors" and rectifiers for measuring instruments, and a range of the well-known "Westalite" single-circuit battery chargers, along with a three-circuit charger, the RGC18, which will be giving an actual demonstration of battery charging.

WHITELEY ELECTRICAL RADIO CO. LTD., Victoria Street, Mansfield, Notts, will feature the complete new range of stentorian "Baffle" extension loudspeakers, including an important addition the Bude or Braemar, which are identical speakers, named and labelled differently to appeal to customers north and south of the Border. This speaker retails at the extremely attractive price of 35s. 6d. Other popular priced models are the Bedford (42s. 6d.), Bristol (59s. 6d.), and the Beaufort (77s. 6d.). Also available at slightly extra cost with multi-tapped transformer (the method pioneered by this firm).

These speakers have Alcomax magnets and a new type of cone perfected and manufactured in the firm's works. All models are complete with volume control. Each is housed in an attractive modern-styled cabinet of highly polished walnut. The Bristol and Beaufort models are fitted with a push button for use with the "long arm" remote control. Cabinet models include the Stentorian Senior, Junior Cadet, Baby and Minor extension speakers. All with the exception of the Baby and Minor may be used in conjunction with the "long arm" remote control. This unit enables the receiver to be switched on and off by pressing a button at the loudspeaker extension point.

Also shown are a wide range of domestic high quality reproducers and public address and industrial models—diffuser, pendant, corner cabinet and projector types. Prominently displayed will be the 10in. and 12in. concentric duplex loudspeakers in chassis, cabinet and corner console form. These units have been developed on the latest application of the well-known series gap magnet system (originated by the firm in 1935) and give outstanding quality of reproduction. Radio relay cabinet loudspeakers of over 30 types and a relaygram, recently developed by Whiteley organisation. Chassis loudspeakers with cones ranging from 2½in. to 18in. in diameter, and permanent magnet flux strength up to 14,000 lines per sq. cm. on a 1½in. pole piece. Of particular interest to amateurs and home constructors is the View Master television receiver, constructional details of which are available on the stand.

WINTER TRADING CO., LTD., of 6 Harrow Road, London W.2, are wholesalers covering Southern England, Wales and Midlands. Distributors for A.R.B.M. batteries, Tungsram valves, Winrad radio and television components and the following manufacturers and their products: Aerialite: TV and car aerials, aerial wire. Amplion:

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Your Guide to the Exhibitors—*continued*

Volume controls, convettes, meters. Richard Allan: Extension speakers. Automatic Coil Winders: Avo testers. Beethoven: Radio, television receivers. Belling Lee: "Viewrods," "Veerods," "Doorods," suppressors, radio, television components. B. I. Callenders: Capacitors. Bulgin: Radio, television components. Collaro: Gramophone motors, changers, microgrammes. Cosmocord: Motors, pick-ups, particularly GP20. Dubilier: Capacitors. Edison Swan: Capacitors, volume controls, TV components, record changers. Ever Ready: Batteries and receivers. Goodman: Loudspeakers. Grampian: Public address equipment. Long & Hambley: TV rubber masks, including "New Aspect." Masteradio: Radio, television, car radio receivers. Multicore: Solder. Portogram: Conversiongrams with three-speed motors for microgroove recordings. Taylor: Montrose, Windsor meters.: T.C.C.: Capacitors, "Viewmaster" condensers. Trix: "Trixette" portable electric, single players and automatic changers, amplifiers. Varley: Radio, TV transformers, chokes, accumulators. Westinghouse: Rectifiers, "Viewmaster" components. Whiteley: W.B. speakers, chassis, television "Viewmaster" components. Wolsey: Television aerials.

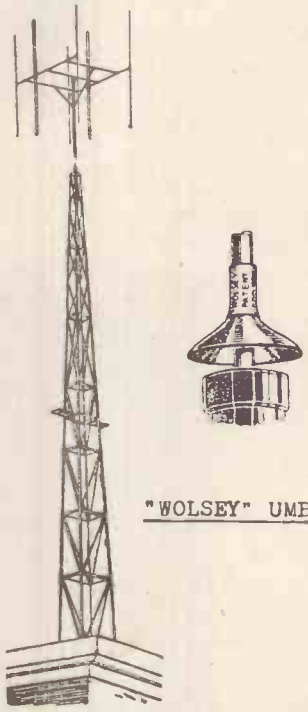
WOLSEY TELEVISION, LTD., STAND No. 102 of 75 Gresham Road, Brixton, London S.W.9, are exhibiting in addition to their normal range of television aerials and fittings: (1) their new type of junction box, constructed of extremely durable bakelite and fitted with tight-sealing outer rubber washers and special inner gland washers, that expand as the cover plate is screwed down. These ensure an absolutely moisture-proof joint, while deep-seating rubber bushes at each end of the box damp down any tendency to resonance and howling.

(2) The "Wolsey Junction Box Umbrella" of long-standing polythene. Fitted to the dipole immediately above the junction box, the umbrella deflects all rain and moisture, no matter how great the whip on the dipoles, and thus further protects the box. The "Wolsey Umbrella" can also be fitted to other makes of TV aerials.

(3) The "Wolsey Broadside Array," consisting of two folded dipole three-element beam aerials mounted side by side. Highly directional and the first commercial television aerial to give more than 10dBs forward gain. Two matching lines provide the correct terminating impedance for normal 70 ohms coaxial cable. Galvanised steel lattice masts 32ft. and 46ft. high, with or without ladders, are also supplied.

(4) The Hudson radio telephone for which Wolsey Television are the sole agents. Designed mainly for the car hire and taxi market, the 5-watt mobile unit is all housed in one case mounted usually underneath the dash-board of

the car. The equipment is fully approved by the Post Office. (*Illustrated* are the "Broadside Array" on steel lattice mast, the "Junction" Box Umbrella, and the Hudson radio-telephone.)



"WOLSEY" UMBRELLA

WOOD, E. A., LTD., STAND No. 90 of 100 Ashton Road, Birmingham 6, exhibit radio receivers by Marconiphone, Philips, R.G.D., G.E.C., Invicta, Etronic, Alba, Ever Ready, Portadyne, Champion. Television receivers by Marconiphone, English Electric, R.G.D., G.E.C., Invicta, Alba, Masterradio. This firm are distributors of B.V.A. valves, A.R.B.M. batteries, all well-known makes of loud-speakers, components and spares, public address equipment and test gear, aerials and aerial equipment, servicing apparatus, battery charging equipment. A representative range of radio and television products by leading manufacturers is on display for the convenience of trade buyers.

Hush-hush Station

RESEARCH AND THE B.B.C.

ONE of the most important but least publicised departments of the B.B.C. is at Kingswood Warren, Banstead, Surrey. In fact so little has been said of this department, the Engineering Research Department, that it is more silent than the silent service.

Yet the decisions made at this research station have more effect on our radio and television receivers than even the decisions of most of the heads at B.B.C. headquarters in Gt. Portland Street as most of the decisions are based on the answers found at Kingswood Warren.

Briefly the work carried out there covers every aspect of broadcasting and its subsidiary branches. The problems of studio acoustics, microphones, aerials, loudspeakers and transmitters are gone into fully and the results of the researches passed on to the B.B.C., so that there is a continual flow of new devices which in effect mean better listening and viewing for the public.

The television section are giving their full attention to research in the field of colour television and higher definition systems, and for this purpose have evolved a vision channel which can produce 405, 525, 625 or 819 line pictures and the results of these experiments may well be the deciding factor as to the future of television standards in this country.

Frequency modulation as a broadcasting medium is already well under way and an experimental station to determine the possibilities of F.M. and high frequency broadcasting has been built at Wrotham.

A four-hour test programme from this experimental transmitter was heard recently by a group of short-wave enthusiasts in Hall Green, Birmingham, at good and enjoyable programme strength.

The new station, operating on a wavelength of about three metres, was expected to have a service radius of 50 miles or 80, but reception at a distance of approximately 140 miles showed that, as with Sutton Coldfield, the B.B.C. engineers were cautious in their estimate.

ALBA programme for

5561 AC. 5-valve all-wave superhet with Garrard Gram unit. 33 gns. Plus P.T. £14 16 6.
5562 AC/DC. The Universal version. 37 gns. Plus P.T. £16 12 6.
6561 AC Auto unit. As 5561 but with Garrard Auto-change 37 gns. Plus P.T. £16 12 6.

6581 AC. 5-valve all-wave superhet with Garrard Auto mixed-record-changer. Two-toned walnut cabinet with ample record storage. 55 gns. Plus P.T. £24 14 10.
6582 AC/DC. The Universal version. 57 gns. plus P.T. £25 12 2.

6571 AC. 5-valve all-wave superhet, with Garrard Auto-change unit, concealed-in front pull-out drawer. Two-tone walnut cabinet.

44 gns. Plus P.T. £19 15 4.

3 SPEED RADIOGRAM UNITS

We shall cater for the new long-playing records by fitting our existing radiograms, as and when supplies permit, with a 3-speed unit as an alternative to the standard unit. The prefix 'LP' in front of a model number will indicate that a 3-speed unit is fitted.
Prices will be announced shortly.

D611 AC. 9-waveband superhet, with band-spread tuning. Garrard Auto mixed-record-changer. "Sideboard" cabinet with all controls and record storage concealed. 66 gns. Plus P.T. £29 12 10.
D612 AC/DC. The Universal version. 68 gns. Plus P.T. £30 10 10.

1950/51

There are some changes—but not many—in the Alba range for the coming season.
The Radiograms continue, because it must be to our mutual benefit to feature models which are already so popular and for which there is such a heavy demand.
Now that you know the programme—ORDER EARLY!
This year, make sure of your supplies.

3811 AC. NEW 5-valve all-wave superhet. Highly efficient receiver offering excellent value
14 gns. Plus P.T. £3 2 11.
3812 AC/DC. The Universal version.
15 gns. Plus P.T. £3 7 4.

3613 ALL DRY BATTERY Receiver 4-valve, 3-waveband superhet. P.M. moving coil speaker. Excellent performance.
£11 10 0. Plus P.T. £2 9 2 (ex. batteries)

THE NEW AND IMPROVED "ROVER"

Model **2725** AC/DC/Battery Portable. Packed with new features, including ● Larger frame aerial, for increased sensitivity. ● Improved smoothing circuit—for better and hum-free mains performance. ● Full size separate HT and LT—

for longer and economical battery life. ● Valves strapped in position—for safe transit. ● Easy accessibility to chassis—for Dealer's convenience. ● Attractive cabinet in beige—with new type plastic speaker fret.

THERE IS NOW NO BETTER PORTABLE.
TEST THIS CLAIM FOR YOURSELVES
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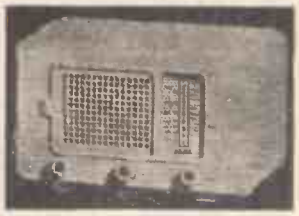

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RADIO AND TELEVISION OF QUALITY

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Radio and TV Installations in Hotels

By K. A. RUSSELL, B.Sc., A.M.I.E.E., and J. E. GOODWIN, B.A., M.I.R.E.

PROBABLY one of the things that hotel guests miss most when they are away from home are the two forms of radio entertainment —radio and television. The experience of feeling completely out of touch is one with which we are all familiar when our own sets break down.

This is particularly true of visitors from overseas, and more particularly from America. There, radio means much more to them than it does here, and the popularity of television is increasing at an amazing rate. They are going to base their ideas of prevailing conditions in this country, to some extent at any rate, on the experience gained at their own particular hotel. This may be quite wrong, but it is, nevertheless, quite human.

The decision of the Lyons group of hotels to equip at least one, and very likely all of their hotels with a Room Television Service as well as a Room Radio Service, will come as a refreshing and welcome step towards encouraging visitors.

By the time this article appears, the Cumberland Hotel, Marble Arch, London, will be providing the occupants of all its 940 bedrooms with both a four-programme Room Radio Service comprising the B.B.C. Home, Light and Third programmes, plus a selection of foreign programmes—and Television !

The Room Radio Service was installed by March, 1948, and a communal Television Aerial system was introduced in the same year to feed twelve suites on the fifth floor. So popular and so successful did the service prove in operation, that further experiments were carried out, culminating last September in the installation of a successful prototype television signal distribution sytem to sixteen rooms in that part of the hotel most liable to be troubled with electrical interference. This was put into service and it, too, has been working successfully to judge by its popularity, ever since.

The introduction of television to all the rooms in the hotel, providing a Room Television Service in addition to the existing four-programme Room Radio Service, has been proceeding since early this year.

An installation of this magnitude is fraught with difficulties, particularly bearing in mind the type and position of the building involved. Wherever large numbers of people are living in very close proximity to each other, man-made electrical interference must perforce be high. A hotel, by its very nature, must contain masses of machinery and electrical contrivances, and the problems involved in installing a complete radio and television system are not always easy to solve. The following description of the evolution of the entertainment system now installed, will illustrate this fact.

The main snag with ordinary radio, and to an even greater extent with television, in a modern hotel, is the large interference level throughout the building, coupled with the screening caused by the steel framework and other metal sections of the structure. This prohibits the satisfactory use of individual aerials.

In the case of sound radio, the technical solution was relatively easy, since British Relay Wireless, Ltd., the company who installed and maintain the equipment and wiring, already had a four-programme network of landlines and repeating stations in London. This network is fed from their Central Control desk, which in turn derives its programme sources from direct landlines to the B.B.C., and also a landline to the B.R.W. Receiving Station out in the country in Suffolk, where interference is negligible.

Four landlines were extended from the nearest convenient repeating station —in Victoria, S.W.—to a special Control Room in the Cumberland Hotel itself. In this Control Room are installed the four main audio amplifiers for the four programmes plus a spare in case of breakdown. It also contains the necessary output circuits, time-switching circuits, Post Office landline inputs, equalisers, repeaters and so on. Sufficient audio power, therefore, was made available to supply the whole hotel via special star quad cables laid in existing ducts, and buried under the plaster and through the room walls.

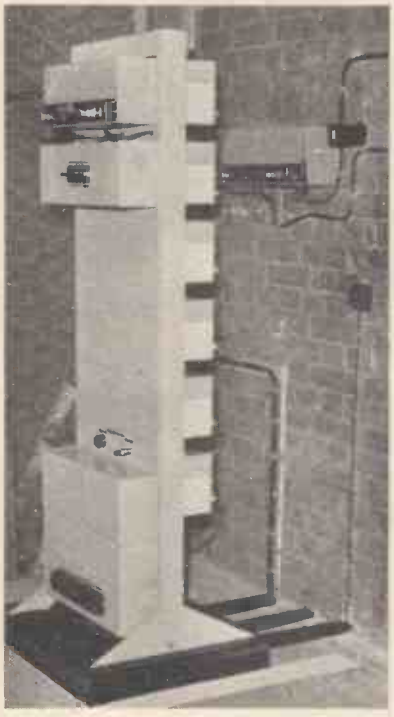
Each bedroom was fitted with its own loudspeaker, which has mounted on it a four-programme selector switch, and volume control, and a special key switch, enabling the maid to turn on any installation at the request of the guest. In case you are visualising a modern Tower of Babel by such a system, it seems a good point at which to stress that there is no overhearing between one room and another. One

Joan Gilbert, Alexandra Palace TV announcer, enjoying a " busman's holiday " after performing the opening ceremony for the initial 16-room installation

of the main advantages of a self-contained installation such as this, is the fact that *maximum* volume can be pre-set by the hotel, and although volume can be varied by the guest to suit individual requirements, it can only be varied *below* a given maximum.

The installation cost for putting in this special wiring system amounted to a large proportion of the whole capital cost, and although there was little or no dislocation in the running of the normal hotel business, what little inconvenience was caused, made a similar operation undesirable when considering the installation of television.

It so happened that the B.R.W. Company was, at the same time, busy considering the problem of television as it affected their radio relay business, and they hoped somehow to improve and lessen the cost of television in the same way that radio relay has improved and lessened the cost of sound broadcast reception in built-up areas. But progress in this field is slow : it is much the same as it was in the earlyish days of radio. Then, it was felt that having overcome the difficulties of sending sound by radio, it would be only a very short step to sending vision. In the event, of course, it took quite a long time.



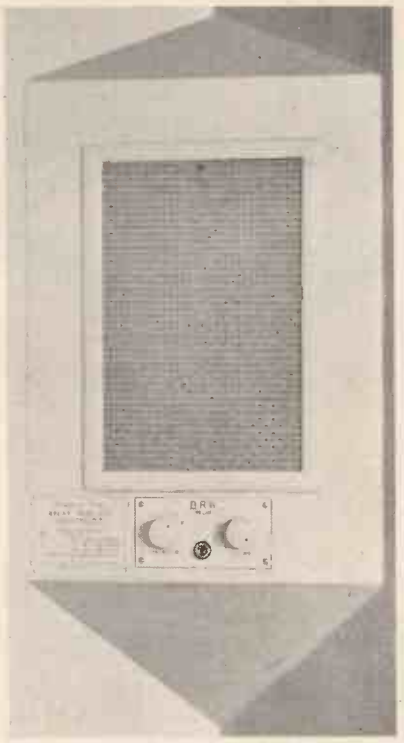
The main television amplifier and distribution rack at the Cumberland Hotel. Six operational amplifiers are shown at back of rack. Provision is made for a TV set to be plugged in direct to aerial for isolation test

The ideal technical method of television distribution would be to reduce the viewing units to cabinets containing only cathode ray tubes and loudspeakers, but design studies and laboratory experiments soon proved this system to be impossible to achieve at present. The nearest approach to it required such a complex system of cables that it was economically out of the question, except for systems of very high subscriber density in compact volumes, such as hotels. However, even then the economic advantage was shown to be exceedingly small as compared with more orthodox forms of signal distribution, employing normal, or only slightly modified television receivers for viewing.

Whilst these experiments were continuing, means were found of using the star quad audio distribution cables to distribute also the radio frequency television signal, in a similar fashion to the way it is done on a normal television communal aerial system. This is possible because the cable is made up of four plain copper conductors, each insulated with polythene and sheathed overall with more polythene. Electrically, it is as good as, if not better than, special twin balanced television feeder. By paying particular attention to the maintenance of good electrical balance, interference picked up can be kept down to very reasonable proportions. To revert for a moment to the Room Radio relay service, it should be understood that a pair of wires is required for each programme relayed. Thus to carry a four-programme service, four pairs are employed, housed in two star quad cables. Since the pads and junctions necessary for the proper transmission of the 41–46 Mc/s. television band involve the use of resistors in series with the audio network, the pair used for television signal transmission is the one used also for the B.B.C. Third Programme. This is usually only lightly loaded, and consequently the voltage drop is kept within reasonable limits.

Here, then, were all the ingredients for installing a television system which would prove efficient and economical to install, and the method finally adopted did, in fact, make use of the existing audio distribution system to carry the television radio frequency signal. In conjunction with it, ordinary Phillips 683U 9in. console television receivers were used for viewing, and the complete installation gave these advantages :

1. A good signal with negligible interference could be picked up on a special aerial on the roof and distributed to all rooms in the hotel where standard television receivers could be relied upon to give a good picture.

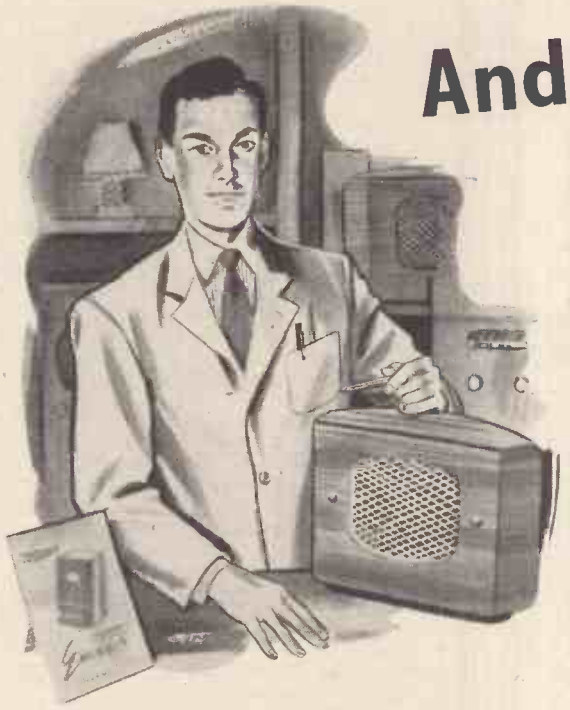


An example of the neat corner-style loudspeakers installed in each room—volume and on/off controlled by the occupant

2. The installation costs could be kept to reasonable proportions by utilising, in the main, existing audio cables.
3. The reliability of the system should be high, being mainly dependent on the television receiver reliability, which is a known factor.

It should be noted that with the original four-programme distribution scheme, each room has its own permanently fixed loudspeaker since, in the first place, the majority of guests require radio, and secondly, a loudspeaker is a comparatively cheap piece of equipment. For television, however, most of the capital expenditure is in the receivers, and not in the wiring, since that is already installed, so it is convenient to have only sufficient television receivers to satisfy the day to day requirements of the guests, plus a small reserve for maintenance purposes. Such an arrangement is patently better than having a combined radio relay and television receiver necessitating one in each room, whether or not the guest desired to use the television component.

In the prototype installation, the above advantages have been borne out to the full, and it can be said that technically the picture is as good, if not better, than the average domestic



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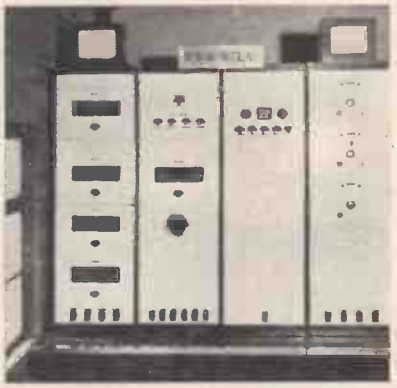
installation in an urban area, with a normal outdoor aerial, despite the colossal interference level in the rooms in which the sets are used.

To cut out diathermy and other interference radiated in the neighbourhood, the final installation is fed from a single directional aerial on the roof via six television radio frequency amplifiers, plus one spare for standby purposes, all of them mounted in the Control Room.

The amplifiers themselves have three stages giving a maximum gain of 55 dB and a maximum output of 2 volts R.M.S. into a balanced 75-ohm load. The limit on output is set by cross modulation between the sound and vision channels.

Each amplifier output, therefore, feeds via normal television feeder to between nine and twelve " injection " points on the audio wiring system, which in turn each feed approximately 16 rooms.

By suitable modifications to junctions, etc., the television signal is made to appear at the loudspeaker units in each bedroom, whence it is extracted and taken to a three-pin aerial socket on the skirting alongside a mains socket suitably positioned in the bedroom. The television receiver itself is a console model on specially large castors capable of being wheeled into the rooms by the hotel staff as and when required.



The Control Room. Note the two monitor speakers, one for reproduction by land line directly, the other for room programme reproduction

Maintenance of the prototype installation has been almost entirely confined to the television receivers. These have behaved like most other television sets, giving some trouble early on. Now after eight months' continuous service, and being handled by inexperienced viewers, they have settled down to an almost trouble-free existence. The full installation will start off with 120 television receivers; this number can, of course, be added to if and when the need arises.

The authors wish to express their thanks to the Directors of British Relay Wireless, Ltd., and the directors of the Lyons group of hotels for their permission to use the information contained in this article.

Better Books

reviewed by the Technical Editor

QUESTIONS AND ANSWERS ON RADIO AND TELEVISION. E. Molloy.

George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2.

THE fourth edition of E. Molloy's popular book has a considerably enlarged television section to incorporate the latest developments in this field.

Essentially a book for the layman, it will nevertheless prove invaluable to the qualified service engineer as a handy reference guide on radio and television principles and practice. The book is published in a form which allows it to be readily slipped into the pocket to while away the usually profitless hours spent travelling between service calls.

154 *pp.* *Price* 5*s.*

AN INTRODUCTION TO ELECTRONICS. J. Yarwood.

Chapman & Hall, 37 Essex Street, London, W.C.2.

AS the author of this admirable work on basic electronics says: " There is yet a place for an English text-book on the subject " (electronics). We heartily agree with him.

Certainly there are some excellent books on the market dealing with the ever-important subject of electronics, but most of them refer to the results of our transatlantic counterparts, and as such are primarily written for American engineers.

Perhaps now that J. Yarwood has pointed the way, we shall see an ever-increasing number of books devoted to electronics and its subsidiary branches, with a corresponding standard of presentation.

The author deals with the basic fundamentals and gradually leads, in a most interesting manner, to the concluding chapters, which cover ultra-high frequency thermionic tubes.

Fully illustrated and mathematically sound, this book should prove immensely popular with students and all interested in the field of electronics.

329 *pp.* *Price* 28*s.*

SOUND REPRODUCTION. G. A. Briggs.

Wharfedale Wireless Works, Bradford Road, Idle, Bradford, Yorks.

FOR those readers who are considering augmenting their incomes by entering the P.A. field, we can heartily recommend G. A. Briggs' book on Sound Reproduction.

The author is exceptionally qualified to write on this subject, and his other book, *Loudspeakers: The Why and How of Good Reproduction*, has been widely acclaimed in America as one of the most comprehensive ever written on the subject of sound reproduction.

The book is divided into two parts, the first dealing with loudspeakers and their relative merits and demerits, directional effects, etc., and the second devoted to records and recording systems, and in itself a worthwhile reason for the investment of 10s. 6d.

The book is fully illustrated and contains a chapter on questions and answers which, as the author says, will be found very interesting by all enthusiasts in radio and record reproduction.

246 *pp.* *Price* 10s. 6*d.*

RADIO ENGINEERING HANDBOOK. Keith Henney.

McGraw-Hill Publishing Co., Ltd., Aldwych House, London, W.C.2.

THE fourth edition of this momentous work was prepared by twenty-five specialists in the field of radio engineering. Carefully selected design data-charts, tables, circuits, diagrams and formulae—are incorporated to make this book as comprehensive as possible and yet written in a simple style which makes it easily understandable to the more advanced layman.

It covers almost every aspect of radio and television engineering. Completely new chapters have been added and others have been revised to ensure that it is right up-to-the-minute in dealing with advances made since the last edition was published.

The text is essentially American in context, but can readily be understood by anyone familiar with radio terminology, and altogether the book is one which would be a most useful addition to the engineer's bookshelf.

1197 *pp.* *Price* 85*s.*

Servicing TV Projection Receivers

A Guide to Fault-curing

By Frank Celeste

THERE can be no doubt that projection television has come to stay ; even if only as a big brother to the smaller screen, direct-viewing models. Service engineers will be under no illusion about the complexity of some of the problems that will be certain to arise regarding the field servicing of projection receivers, and not the least of the new difficulties that will be met with will be in connection with the " safety circuits " that are of necessity incorporated to safeguard the C.R.T. in event of timebase failure.

Engineers will need no reminder that the reduction of the raster to a single line or even single spot will score a line or a sharply defined spot on the inside coating of the tube, therefore it becomes imperative to devise some means of preventing this.

GENERAL PRINCIPLES

Most servicemen will doubtless already be sufficiently familiar with the general principles of safety circuits already in use, and although these vary according to the individual manufacturers' ideas, it does not require much effort to assimilate the necessary knowledge.

SAFETY CIRCUITS

What may be a stumbling block to engineers when meeting projection sets for the first time is the question of deciding whether or not a safety circuit is actually in operation when a fault occurs causing conditions of " no vision." Quite obviously, when called to examine a receiver that fails to produce a raster, this may be due to a normal kind of fault, such as absence of E.H.T., or some other similar defect. But, as will be realised, it could just as well be that the raster is not showing because the tube has been " blacked out " by the safety circuit coming into action upon the failure of one or other of the timebases.

BE CAREFUL!

It is this question of whether or not the safety circuit is actually in operation that must be the first consideration of the engineer when called upon to deal with such a fault. Despite the precautions taken by the designers to ensure that the circuit is as fool-proof as possible, *when a failure of line or frame scan has rendered the protective arrangements operative, one cannot be too careful in handling the breakdown, and in dealing with the tracing of the defect.*

There might be, for example, a combination of faults which could make useless the good work of the safety device ; and in some cases the thoughtless removal of a valve might well allow the passage of current through the tube, with dire results to the coating, should at the same time the timebase be partly or wholly inoperative.

TWO RECEIVERS

It is not here proposed to give complete details of all safety circuits now in use ; in fact, this would not serve any great purpose, for it would quite possibly be rendered incomplete by the arrival of something new before it even reached print, such is the speed of progress in the field of television today !

It is, however, thought helpful to give some details of two projection receivers now being produced in fairly large numbers, and with which most servicemen can hope (or fear, as the case may be !) to become familiar in the near future. These are—the Philips Model 600A, and the Decca Model 131, both of which employ the same optical system, although the design of the receiver and of the safety circuit differ greatly.

PHILIPS SAFETY DEVICE

The safety device incorporated in the Philips receiver is simple, but nonetheless, effective. It, to describe it as briefly as possible, consists basically of one valve—a double diode. Without either of the time-base circuits working, a high negative voltage is applied to the grid of the C.R.T. and also to the grid of the line oscillator, this being sufficient to stop the line oscillator functioning, and to cut off the electron beam in the tube. The circuit is so arranged that this paralysing voltage is only removed when both the line and frame generators are working correctly : the cessation of both, or either, causes the high negative potential mentioned to appear both on the grid of the C.R.T. and of the line oscillator, thus providing ample protection to the tube.

TUBE PROTECTION

Furthermore, any defect in the actual " safety " valve itself, or its associated components, will have the same effect, so it can be seen that very little has been left to chance in this set, as far as tube protection is concerned.

Even so, certain faults can occur that would be likely to cause a permanent marking of the screen, and although the mischief would have already been done by the time the job is in the hands of the service engineer, he will still have to prevent a reoccurrence to the new tube when fitted, and this behoves him to rectify the fault before this is in fact placed into position.

He will, no doubt, have no difficulty in tackling this when armed with the necessary service manual, and it can be assumed that the tracking down of the fault follows standard procedure. But, before anything is attempted on these lines, it is essential to find out if the safety circuit is in operation, and if the timebases are functioning correctly.

SIMPLE TEST

This can be ascertained quite easily by making the following test.

Remove one lead from C.1. This is a can condenser of 100 mfd. to be found on the upper side of the chassis, and is the right-hand one of two identical cans in the chassis centre (viewed from the rear). Then, with the set switched on, measure the voltage on the grid of the C.R.T. This should be variable between 150 volts positive and 40 volts negative, with respect to chassis, depending on the position of the brightness control. A steady reading of around 125 volts negative, however, indicates that the safety circuit is operative, due to a fault in the timebases, safety valve, or some associated component. This test can be quite easily carried out, and if done whenever a vision failure is experienced on these sets, will save time and trouble in diagnosis, as well as preventing any possible further damage to a new tube, should one have to be fitted.

DECCA 2-VALVE CIRCUIT

The Decca receiver mentioned uses rather a different circuit, and in this

case two valves are employed. Greater care still is needed with this model, for, should the timebase be faulty, and the tube duly blacked out, the removal of one or other of the safety valves will allow the beam current to flow, and the tube thus to be ruined, so it is therefore absolutely imperative to ensure that the safety device is functioning before any attempt is made at servicing the receiver.

The test on this set can be even more simply carried out, and no wires need be disconnected. All that is required is to measure the voltage on the cathode of the tube, again to chassis. Under normal conditions, this should be 50 volts positive. If, however, the test reveals a voltage of the order of 120-150, then it can be taken that the safety circuit has come into operation due to a defect in one or other of the timebases, and with this knowledge it should be easy to deal with the trouble.

These figures apply to a receiver set up to receive in the normal way, but with the brilliance control set to maximum (fully clockwise). As a precaution against a sudden return of the raster while the test is being carried out, it is advisable to disconnect the E.H.T. circuit: this can be done quite easily by removing the top cap of the EBC33 valve in the E.H.T. power unit. If this precaution is not taken, care should be exercised in measuring the voltage on the cathode, and this should not be attempted except with a meter range of high resistance. The reason for this is that, if the meter resistance be too low, it will provide a cathode return of low enough resistance to reduce the standing bias, and thus to cancel out the negative grid voltage being supplied by the safety circuit if in operation. The results of this would be dire, and may mean the destruction of the tube surface. As an instance, the lowest suitable range on an AVO Model 40, proved to be the 1,200-volt range: the lower ranges caused sufficient reduction of cathode voltage to allow some beam current to flow.

TIME BASE FAULTS

While this is not intended to be a complete treatise to the servicing of projection receivers, but rather just a guide to some of the problems to be met with concerning them, it would not be out of place to point out that bench servicing on these instruments is made extremely difficult due to the danger to the tube should timebase faults occur. Most of the work necessary, in fact, is best carried out by using an oscilloscope in place of the tube, and wave forms instead of a picture.

REFITTING TUBE BASE

Lastly, and in particular reference to the Decca model, extreme caution should be taken when refitting the tube base, especially when the set has been in use shortly beforehand. The coated tube, using the glass as the dialectric in the now commonplace manner, forms a condenser of some 450 pf., and this stores up quite a surprise packet for the unwary. At 27,000 volts, as is used in the Decca 131, this can leap out at you from the end of the tube in a most disconcerting manner once you get the tube base connector within about three inches of it, so remember—forewarned is forearmed—be careful!

TRADITION KEPT UP

Again this year, as for the past five years, the public address installation at the four car parks for the lawn tennis championships at Wimbledon were arranged by the Trix Electrical Co., Ltd., of Tottenham Court Road, London, W.1, in conjunction with the Automobile Association.

TV Is Booming in Canada

AN annual production of 200,000 television sets and the growth of a new industry is foreseen as Canada prepares to meet U.S. competition with TV transmitters at Toronto and Montreal. Aerials are sprouting from more and more rooftops in the border areas, where United States stations can be picked up.

More than two million people in Southern Ontario are within range of stations at Buffalo, Rochester, Syracuse, Erie, Cleveland, Toledo, Detroit and about 100,000 in the Vancouver area can get Seattle. Sales of TV sets are climbing steadily.

This fast-growing industry offers an excellent opportunity for British emigrants. A number of experienced television servicing and maintenance men are wanted immediately in Ontario, Canada. Men with R.A.F. radar maintenance experience, who, since demobilisation, have been employed in the television industry are acceptable. The Ontario Immigration Department, Ontario House, London, is seeking to fill these vacancies.

Many large electrical companies are willing to train adaptable men who have some knowledge of routine radio receiving set repair work. Companies are experiencing a shortage of maintenance men for their various dealers throughout the province, as well as in the Toronto area.

Outside television broadcasts from places not served by the special television cable will be considerably facilitated when this new transportable television transmitter, designed and produced by Marconi's Wireless Telegraph Co., Ltd., is brought into service by the B.B.C., as its small size and modest power requirements make it possible to install it in a single vehicle, which will carry also the fire-escape type extensible ladder for supporting the aerial. The new Marconi double-sideband transmitter is designed to radiate 350 *watts within the frequency range* 174 *to* 216 *Mc/s.*

North of The Border

AN encouraging report on replies he has already received to the television questionnaire was presented by Mr. Robert Burnett, secretary, to a meeting of the Council of the Scottish Radio Retailers' Association in the Royal British Hotel, Edinburgh. Mr. J. C. Miller was in the chair.

It was decided to prepare a leaflet to inform the Scottish public, through S.R.R.A. dealers, of the need for radio sets when television is established in Scotland.

SHOW PROBLEM

At a meeting of the executive committee of the Aberdeen and District Branch of the Scottish Radio Retailers Association held in Aberdeen, the chairman, Mr. Buchan, intimated that efforts had been made to book the music hall for the proposed Radio Exhibition, but as there were no vacant dates available, it was necessary to find alternative accommodation. Suggestions were invited, and it was agreed that inquiries be made regarding the possible booking of the Drill Hall, Woolmanhill, or alternatively to hold the Exhibition in marquees in Union Terrace, Aberdeen.

Mr. Buchan next reported that progress was being made regarding block advertising, and he had high hopes that this service would be in operation on an early date.

RELAY COMPANY

Also Mr. Buchan reported that he had been elected a director of the Relay Company, and had attended the last meeting.

Giving a brief report of the meeting, Mr. Buchan outlined as far as he knew the financial and general state of affairs of the company, after which, a lively discussion followed. It was finally agreed that further questions should be addressed to Mr. Buchan, who would be pleased to bring all matters to the notice of the directors at the next meeting.

An application for membership was received from Mr. D. C. Cruickshank, Union Street, Aberdeen. He was unanimously recommended to full and immediate membership.

MORE ON THE TIMEBASE

BY JOHN ARMSTRONG, A.M.I.E.E.

THIS is No. 2 of the Series on the Subject of the TIMEBASE, its theory and operation, written to help dealers and servicing men faced with problems arising from the timebase.

RECAPPING is a household word nowadays, and in opening this second article, I need not apologise for repeating one or two of the essential points from the first one, which was published in our last month's issue.

You will remember that both the ordinary oscillograph and B.B.C. television use the saw tooth scan, so-called because the spot slowly and uniformly moves over the tube face in a straight line, and then very rapidly retraces its path, usually either reduced in brilliance or extinguished, back to the point of origin. If you plot a graph showing how its distance from the origin varies with time, you get the well-known shape of Fig. 1; do not be confused into

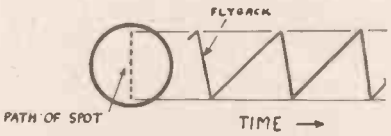


Fig. 1 shows how the movement of the spot varies with time when driven by a sawtooth waveform timebase.

thinking that the actual path of the spot is sloping—the slope of the sawtooth graph refers to its rate of travel and not to its actual position.

In television, of course, the process is a bit complicated because the spot is driven by two sawtooth scans simultaneously, one drawing it across the picture with every line, and the other slowly drawing it down the frame, so that each line is staggered to be a little distance below its predecessor. But the operation of each timebase can be separated from the other, and essentially each is similar to that of the simple oscillograph.

CURRENT AND CHARGE

Last month we illustrated the basic timebase circuit, which consists of a condenser slowly charged from a high voltage supply, in series with which is a high resistance or some other current-limiting device. The resultant small current builds up a charge in the condenser, and therefore builds up an increasing D.C. voltage across it; this is the rising voltage which, usually via an amplifier valve, is used to move the spot across the screen.

Across the condenser is a thyratron or gas-filled relay valve which acts like an automatic short-circuit; when the voltage across the condenser reaches some previously determined value corresponding to the end of the spot path, the thyratron fires, shorts the condenser and therefore the voltage across it, and rushes the spot back to the beginning of its path. Then the thyratron goes out since, with no charge left in the condenser, there is no source of current to keep it alight. And then the whole process starts over again.

This is not quite a complete explanation. It would still go out even if there actually *was* sufficient current to keep the thyratron burning. This is because the unavoidable wiring inductance, together with the high value of the short-circuit current, can force the final condenser voltage to a value a little below that to which it would otherwise go—the thyratron threshold level. The same effect can also be artificially simulated by a large synchronising pulse on the grid, which can do the same trick whatever elementary theory may say.

FREQUENCY CONTROL

Such a simple little circuit is very reliable; frequency is controlled by the size of the condenser and the value of the charging current, and amplitude (length of sweep) by thyratron grid bias, because this sets the anode voltage at which the valve breaks down, and hence the maximum signal applied to the C.R. tube. But one major disadvantage is that the trace is not of uniform speed; it is exponential, which means that the spot slows down as it moves along and this cramps the right-hand side of the picture, because a slower speed means that in any given time it travels a shorter distance across the tube face.

This very important effect is easily understood if you look at Fig. 2. This

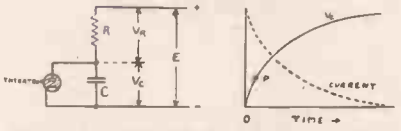


Fig. 2 shows how the charging current and the condenser voltage of a simple RC timebase vary exponentially with time

shows the timebase condenser C and the high resistance R through which the charging current flows and which, therefore, determines its actual value.

From Ohm's Law, the value of the current through R is given as V_r/R where V_r is the voltage across it. This voltage is the *difference* between the total supply voltage E and V_c the voltage existing at any moment across the condenser C. In other words, $V_r = E - V_c$ and the bigger V_c grows the less is V_r, the less the charging current, and the slower the rate at which the spot moves over the screen. In practice it follows the well-known exponential curve also shown in Fig. 2.

LONG WORD, BUT . . . !

There is nothing difficult about this long word "exponential." It simply means that the rate of growth (or decay) of a thing depends, at any moment, upon its actual value. If you hold any Savings Certificates, their rate of growth *in pounds a year* depends upon how many you hold; when the number is doubled the rate of growth is doubled. In our case it is an inverse law; when the condenser is charged to half the total voltage, only the other half is left across the series resistor; this means that the current drops to half its original value, and this is the same thing as saying that the condenser voltage is now rising at half the rate, in volts per second, as that at which it started off its run. At three-quarters full charge, current drops to one-quarter, and so on; it is interesting to note that in theory the condenser is never absolutely fully charged because, when it is nearly so, there is no voltage left across the series resistor to drive the last little bit of charge through it. Actually this odd little point doesn't worry you much in practice, but it can do so in some more complicated applications of electronics.

IS IT CLEAR?

I hope these last two paragraphs are clear to you; they don't look too good to me when I read them over. Infinite

HEART OF THE C.R. TUBE

time is a difficult concept to grasp. However, the falling value of the rate of travel is very important in practice, and perhaps the really vital point is that, with a simple condenser-resistance circuit, you cannot avoid it, and unless it is either corrected or minimised, it will produce intolerable cramping distortion of either the oscillograph trace or the television picture. The slowing down of the spot causes everything on the right-hand side of the picture to be absurdly foreshortened, just as if you were looking through a distorting mirror from the fun fair.

One way of overcoming the difficulty is to work over only a small part of the exponential, perhaps up to point P in Fig. 2. Over this short rise, the current falls very slightly, producing some distortion, but not enough to be really serious. The obvious snag is that if the working voltage is small compared to the supply voltage, either the former is so small that it must be followed by a high gain amplifier, or the latter is so high that it becomes inconvenient, dangerous and expensive.

ANOTHER WAY

Another method is to follow the timebase with a valve amplifier stage, which is necessary in any case with a magnetically deflected tube, and arrange it to distort to the same extent, but in an opposite direction to that of the timebase. Television timebases are not being specifically dealt with, but it is interesting to note that most of the cheaper sets adopt a system which is a very satisfactory combination of both the above two methods. The timebase valve is a kind of Reinartz oscillator with a grid leak and condenser system so arranged that the furious burst of initial oscillation chokes the grid circuit during the first oscillation cycle. This drives the grid highly negative, of necessity stopping the oscillation. The grid condenser then discharges through its high resistance leak and as it becomes steadily less negative anode current rises, at an increasingly rapid rate because of the curvature of the valve, which cancels out the exponential slowing-down of the grid condenser-resistance circuit. And when this circuit is completely discharged, there is sufficient anode current to let oscillation start again, usually helped by a sharp kick forwards from the transmitter synchronising pulse.

Such simple circuits are very suitable for television with its two fixed timebase frequencies of 50 c/s and 10 125 c/s, but less so for commercial oscillographs where very wide frequency ranges must be covered and where strict linearity is more important. The timebase circuit in the widest use is that originated by Puckle. at that time with Cossor, and this most ingenious and satisfactory system is shown in Fig. 3. It operates

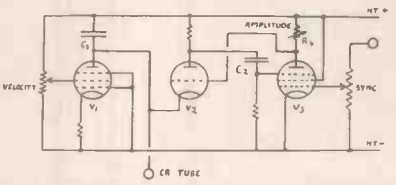


Fig. 3 Shows the Puckle timebase using an RF pentode for current control, a triode as a short-circuiting valve, and another pentode as the trigger circuit accelerator

very well over a very wide frequency range from a few cycles per second up to radio-frequencies, and forms the " heart " of what is perhaps the best known commercial oscilloscope.

The timing condenser is C_1 and when the cycle starts there is no voltage across this condenser, valve V_3 is passing current, and valve V_2 is cut right off because its cathode is at the full H.T. positive potential, and its grid is relatively very negative because of the large voltage drop across R_4 resulting from the anode current through V_3. All this you can see from the circuit.

ANODE CURRENT

Now the timing condenser C_1 is charged by the anode current through the RF pentode V_1, and a peculiar property of such valves is that the anode current is almost entirely controlled by its screen and grid voltages, and hardly at all by the anode voltage. This means that when the voltage across C_1 rises and hence the anode voltage of V_1 drops, in spite of this the anode current into C_1 remains unaltered, and there is none of the exponential effect which you would get if V_1 had been an ordinary resistance. Putting it another way, an RF pentode works in such a manner that as the anode voltage falls, its effective resistance falls with it, and the resulting anode current is constant all the time.

You can see the effect if you look at the published anode current versus anode voltage curves for valves such as the EF37 or the 6J7-G ; their flat " roof " means that, so long as the voltage is above a minimum value of about 50, current is nearly independent of any further increase. This method of linearising the trace is used in most high performance timebases.

UNIFORMITY

Coming back to the Puckle circuit of Fig. 3, the condenser C_1 is slowly and uniformly charged through pentode valve V_1 ; in time, it reaches a value at which the anode voltage and therefore the cathode voltage of the triode V_2 falls below that of the anode of V_3, and therefore below that of the grid of V_2. The latter is now conductive and, because of the voltage drop which accompanies this conduction, a negative pulse is given to the suppressor grid of V_3 through the coupling condenser C_2. This pulse reduces the anode current of V_3 and increases the positive potential of the V_2 grid, to which the anode of V_3 is directly coupled.

So you now have the cathode of triode V_2 coming down in voltage as C_1 is charged, and the grid of V_2 going up towards the positive end as the anode current in V_3 is reduced by a pulse from the anode of V_2. The result of this double action is that V_2 becomes conductive very rapidly indeed, and, as you can see, it acts as a short-circuit across C_1 just as the thyratron did in our earlier example. When C_1 is fully discharged, the whole process reverses and the cycle starts all over again.

Valve V_1 is the charging current control valve, V_2 is the automatic short-circuit to provide flyback, and V_3 might be called a flyback accelerator. A fuller description of this interesting circuit and many others is given in Mr. Puckle's book, *Time Bases*, published by Chapman and Hall ; generally speaking, this work is concerned with oscillograph applications rather than television.

THE WOBBULATOR

In the special case of the wobbulator, the output from the internal timebase of the oscillograph is used to vary the frequency of the applied test signal from a signal generator, usually by beating it against a local oscillator controlled by the timebase, and applying the difference or beat frequency to the receiver under test. As you sweep from one side of the resonance frequency to the other, the vertical deflection indicates the relative gain at each injection frequency. Since the same timebase voltage is applied to both the tube and the frequency control circuits, neither its waveform nor even its repetition frequency is particularly important.

The Pye R.T. Fixed Station Equipment PTC 703/4 used by the author's organisation.

Radio - Telephony for Speed

A. GODFREY IMHOF

Tells here how radio-telephony helps his organisation to give added speed in servicing radio and television sets and explains how you can adapt the idea to your own requirements.

ONCE upon a time there was a man called " Mr. Dealer," who had so many radios he didn't know what to do. So he advertised. Then he sold his radios, and kept on selling them, until all his competitors started advertising too. After that he didn't sell so many, and he still didn't know what to do.

As this article is concerned with the servicing of domestic radio and television apparatus, this introduction may seem surprising. But a moment's thought will show that a service department is in itself a source of considerable advertisement, and so it will perhaps be instructive to examine the nature of the unfortunate Mr. Dealer's dilemma.

'NAME VALUES'

All other things being equal, the prospective customer will buy from the dealer who advertises, not necessarily because this dealer has anything better to offer, but because the customer through the medium of advertisement, feels that he knows this dealer better.

But when all dealers in the neighbourhood are advertising in one way or another, the problem becomes somewhat more complex.

It is now necessary to advertise that one has something more to offer than one's competitors, and in the long run this something must be of a definite character and capable of ready appreciation. In general, the " name values " of the various receivers for which the dealer holds agencies are used as a sales lever. Nowadays, however, an impression exists that there is little to choose between the products of the leading manufacturers, and so other methods of fostering goodwill are being encouraged.

GOODWILL H.Q.

Probably the greatest scope for earning goodwill—and for discouraging it—exists in the service department. Here resides the personality of the firm, and here the general mood, efficiency and tempo of the organisation are passed on, via the mobile units, to the customer—and from the customer to his friends and acquaintances; to the people one hopes to meet as future customers. It is here that the roots of lasting goodwill can be firmly planted, and where more sales can originate than considerable sums spent in direct advertising could possibly achieve. It is here, also, that an otherwise wholesome business may be undermined.

If " Mr. Dealer " had realised this, he would have been spared his dilemma.

The customer's principal requirements are (*a*) good reliable service, (*b*) fair price, (*c*) speed. We may presuppose the first two considerations to be happily satisfied—indeed, if there are not improvements effected in other directions are likely to be of little practical value. The third of these requirements—speed—can be greatly aided by the use of radio-telephony, and I will try to explain precisely how.

PHONE CALL, THEN . . . !

A fault in a television receiver is reported by telephone to the shop of the dealer in question. The R.T. system is then used to communicate with a mobile unit in the area concerned, and a service call can be made within the hour. In many cases, of course, the faulty instrument may have to be taken back to the workshop, but the promptness of the original call will nevertheless leave its decided impression of efficiency. Furthermore, as every dealer knows, there are many times when faults can be cleared on the spot in a matter of ten minutes or so. In such cases the time lapse between the request for service and the completion of the repair can be remarkably small.

The first objection that will be raised by almost all service managers is that vans are sent out in the morning briefed with sufficient work to occupy their full day. Attention will also be drawn to the difficulty of keeping abreast of existing commitments, without complicating matters by patrolling the

The Servicing Engineer, whatever his location, can be instantly communicated with.

streets and waiting for instructions by radio. It will be well, therefore, to stress immediately that little will be achieved in the use of R.T. unless the service department is reorganised to take full advantage of it. Consider the objects to be achieved and work back from the results required to the means of obtaining them.

'IN THE FIELD'

Each van should receive its instructions while actually " in the field," so

that calls shall be made more or less within the hour. Engineers are therefore briefed at the outset for not more than two calls each—just sufficient to keep them going until the radio-telephone takes over control. When the new system is introduced, it will be necessary to clear up the majority of outstanding work first, so that the new and much quicker turnover will not be impeded from the start.

The question of a van patrolling a given area waiting for instructions does not arise, since if continuous radio contact is maintained instructions for a particular call can be transmitted while the engineer is on the way to or from a previous one. It will be appreciated at the outset that the most effective means of deploying available transport will be by zoning, so that travel time between one address and another is kept to a minimum. The result can then represent the ultimate in speed of service, and at the same time reduce wastage of man hours and fuel to a very low level.

A, B, AND C

Categorising of service requirements is often extremely helpful, because while there are many people who demand immediate attention, there are others who may be equally happy to fix an appointment for the next day, and indeed some who are not in any particular hurry at all. An " A," " B " and " C " coding can therefore be used to ensure that lightning service is provided just where it is wanted, as well as to show where latitude is available when pressure of work is heavy.

So far I have shown that with an intelligently used R.T. system the same organisation with the same number of vehicles can cope with more work, using less fuel and at an impressively increased speed. These important advantages involve no sacrifice whatsoever, yet their value is such that the continued prosperity of a business may well be allowed to depend on them.

WHY WE DID IT

Our reasons for introducing R.T. to our own service department will now be clear. Our problems were much the same as any dealer's problems. Pressure of work has always been such that in the beginning it was difficult to see how a speed-up was possible. Furthermore, the introduction of radio-telephony involved switching from time-honoured methods to a comparatively new and by no means universally accepted expedient, at a time when the prospect of failure would have been disastrous. The keen desire to exploit the advantages of the system triumphed, however, and though our decision was by no means a " snap " one, we did in fact venture. Only half-way at first, for with some two dozen engineers and eight vehicles available, we were able to divide the department into two substantially independent sections and equip one with R.T. leaving the other section to function exactly as before.

We used a map to indicate where vans were at any time, so that an incoming call could be correctly and speedily placed.

It was not long, however, before our radio network embraced the whole department. The effect on our goodwill was quite impressive and soon we were able to weigh definite equivalent advertising value against the initial cost of the scheme.

The next stage was to exploit the natural publicity afforded by advertising, wherever economically possible, that we had a one-hour radio and television service. This we did and are doing today, and results have been such that we shall continue to boast our one-hour service. He who can use and publicise his R.T. system to greater advantage than we have done will enjoy greater benefits accordingly. But he will need to be an extremely early riser !

Car hire firms and the police have used two-way radio extensively since its inception, but it is only in the last couple of years that the business world in general has come to recognise the potentialities of this form of communication.

POLICE LEAD

Civil engineers and scaffolders were quick to use it in their area supervisors' cars, while numerous refrigeration engineers eventually came to regard their radio-telephony as practically indispensable. Then followed estate agents, film companies, airways, pest control, ambulance and fire services; and a host of other concerns. Strange that the radio trade itself should be reluctant to avail itself of a development for which it is itself responsible.

While admittedly there are some businesses in which the case for radio may not be readily obvious, the decision should not really hinge on whether a concern is a large or small one. Whatever the size of the business, R.T. may prove to be worth a place in its administration. We have tried and proved our own application, and numerous others, too. The conclusion is that radio-telephony is coming to be regarded as a natural " bread and butter " service.

FACTORS TO NOTE

One or two important factors relating to the installation of R.T. are these :

The siting of the master aerial is more important than any other single item, and if due attention is not paid to this, all other work on the installation may be largely abortive. The aerial must

Movements of all vans are plotted on a large scale map.

be high and in general must " see " the point with which communication is desired. A mast which provides a coverage of only 10 miles radius may, if extended 15ft., double this range. It is almost impossible to overstate the need for maximum mast height; indeed, in the case of very low-lying premises, the use of a remotely controlled aerial site is much to be preferred. In the London area, for example, Hampstead Heath. Highgate and Crystal Palace are favoured, and at one of these places a chimney-top site may be rented for the aerial, and nearby accommodation (say a corner in an attic or a cupboard) for the master transceiver. Remote control is then arranged over Post Office telephone lines.

The G.P.O. is extremely co-operative and can be relied on to take a real interest in each R.T. user's problems.

FIXED FREQUENCIES

To clear up one small but important misconception that persists, it should be known that business radio systems work on fixed frequencies, to which each unit is adjusted before leaving the manufacturers. The user is therefore relieved of the " knob twiddling " normally associated with the operation of radio transmitters and receivers, and the master station and its satellites are mutually linked for all time. Communication is therefore as easily established as by an ordinary inter-office telephone.

Perhaps appreciation of this fact has encouraged other industries to employ radio-telephony while the radio trade itself has been content to sit on the fence.

ADDRESSING THE PUBLIC

BY

P. J. WALKER

Continuing the series giving helpful counsel on how to arrange a hall or other building for public speaking. Mr. Walker is an authority on the subject; his firm is Acoustical Manufacturing Co. Ltd.

IF the hall is lofty and inclined to echo, a hood or mask over the top of the loudspeakers will minimise the upwards radiation and will considerably assist in the reduction of the echo. If echo is still noticeable, it is permissible to employ small horn loudspeakers mounted in conjunction with the cabinet speakers and so arranged that they act as tweeters by the inclusion of electrical filters. Short horns will have the effect of directing the high frequencies towards the back of the hall.

If the hall is lofty . . .

The central diffusion type of loudspeaker is capable of very good performance for such purposes as relaying music and for announcements. If a high gain is required from the microphone in the same room, this type of loudspeaker is not so adaptable, as the object will of course be to produce a "dead spot" near the microphone. This type, therefore, is not suitable for use with microphones on a stage for general boosting purposes.

Where the microphone has to be situated in the centre of the room, such as at a boxing contest, the loudspeakers should be mounted fairly high on stands at the corners of the ring, facing the audience, or hung from the ceiling in a similar position. This is one instance where horn loudspeakers are most suitable.

Where the audience is making considerable noise and background music is to be provided, loudspeakers may be distributed round the room. This system is used in noisy machine shops for factory "Music While You Work" purposes. Great care must be taken, however, if muddle is to be avoided.

. . . where the audience is making considerable noise.

The dealer is often called upon to relay a band or orchestral performance from one room to another, and in such a case it is always advisable to use at least two microphones. If there are vocal items it is essential, in order that reasonable balance between voice and accompaniment may be obtained.

When the loudspeakers form the only source of sound in the room, such as orchestral relay or recital of gramophone records, the loudspeakers should be grouped together on the stage or similar suitable position. Even distribution can be obtained by mounting the speakers above the audience level and directing them towards the back seating in the room.

The diagrams on these pages show suggested layouts for various indoor functions, showing how the main points (Feedback —Echo—Even distribution — Time delay — Natural source of sound) have been treated.

HALL WITH STAGE, THEATRE, ETC. (Right)

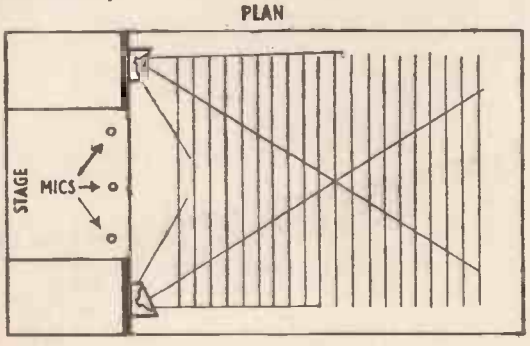
Feedback. — Microphones 90 degrees from axis of loudspeakers. Direct feedback minimised by proscenium and side curtains. Loudspeakers directed towards audience (good absorption) and not towards back wall.

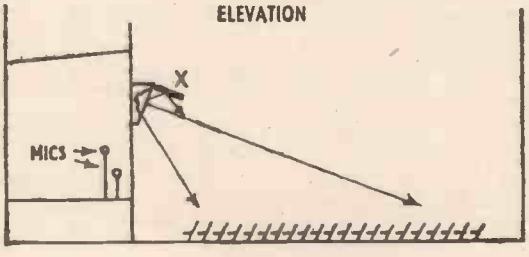
Echo. — Not usually troublesome, but if bad reflection from ceiling, masks may be added as shown (×).

Even distribution.—Front rows are off axis and near speakers. Back rows are on axis but greater distance.

Time delay.—Both speakers are at an equal distance from audience.

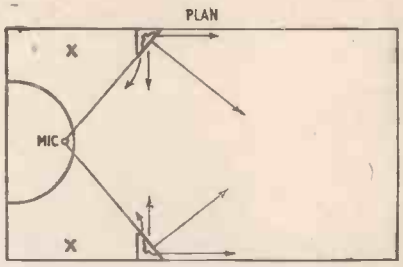
Natural direction of sound.—Reinforced sound comes from direction expected, i.e., stage.





HALL WITH STAGE—NO PROSCENIUM

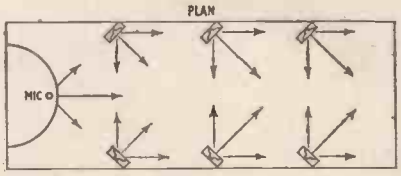
Similar positioning as used for previous diagram, but speakers mounted further from stage, due to the absence



of proscenium to minimise feedback. Speakers arranged with backs enclosed with material.

In most cases audience at × would hear direct sound from stage. Additional speakers—at low power—could be added here if necessary.

LONG HALL WITH LONG REVERBERATION TIME



A number of speakers, each at low volume. Each loudspeaker masked to minimise direct sound to ceiling. For use at low volume only as reinforcement.

Feedback.—Speakers nearest the microphone may be reduced in power in relation to other speakers.

Echo.—Masks above speakers. Speakers directed downwards to audience.

Even distribution.—Speakers evenly distributed.

Time delay.—Each loudspeaker diffuses over local area only and only low volume must be used if muddle due to delay is to be avoided.

Natural direction of sound.—Main sound will come from stage—speakers being used for reinforcement only. Good high note response is essential to avoid frequency discrimination as direct and amplified sound will both be heard.

MOBILE MICROPHONE—DINNER SPEECHES, ETC.

Each loudspeaker connected to amplifier via matching unit.

Sound allocated to loudspeakers as follows :—

Position of Microphone	*Loudspeakers* 1.	2.	3.	4.	5.	6.
A	Off	On	On	Low	Off	Off
B	Off	Off	Off	On	Off	On
C	Off	Off	Low	On	On	Off
D	On	Low	Low	On	Low	Low

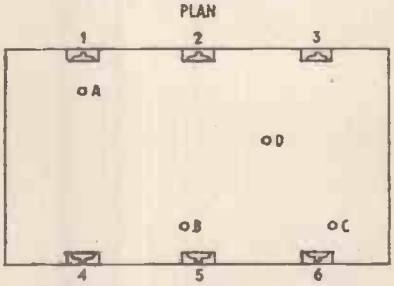
Feedback.—Speakers near the microphone are off or at low level.

Echo.—Not usually troublesome. Bass response cut.

Even distribution.—Adjustable by matching unit.

Time delay.—Taken into account when adjusting speakers — audience should hear local loudspeaker only.

Natural source of sound.—System used for reinforcement only and the original speech will provide the main direction. Good high note response essential.



MICROPHONE IN ROOM CENTRE —BOXING MATCH (See below)

Eight small projector speakers mounted as shown, pointing downwards to audience at the back.

Feedback. — Not troublesome, as microphone will be used for announcements only.

Echo.—Projection loudspeakers will concentrate sound towards audience. Bass response should be cut.

Time delay.—Audience will hear one or two loudspeakers only.

Natural direction of sound.—Not important for announcements.

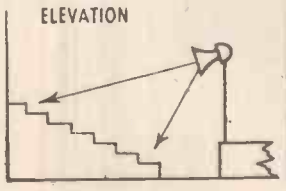
HIGH NOISE LEVEL—BAD ROOF REFLECTION—SKATING RINK (Top Right)

Projection speakers mounted in single group pointing downwards. No speakers should be pointed directly towards the floor because of reflection to ceiling.

Feedback.—Not troublesome — announcements only.

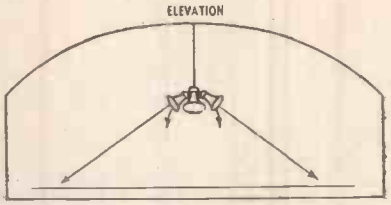
Echo.—No direct or first reflected sounds project to ceiling.

Distribution. — Audience at sides of hall are on axis of loudspeakers. Audience in centre are off axis, but nearer loudspeakers.



Time delay.—Not troublesome, as loudspeakers are in single group.

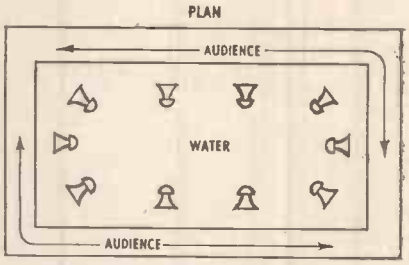
Natural direction of sound.—Unimportant.



SWIMMING BATH — CONSIDERABLE REFLECTION FROM CEILING AND WATER (Below)

Small projection loudspeakers suspended from ceiling to cover audience only, each speaker operating at low volume.

Feedback.—Not troublesome — announcements only.

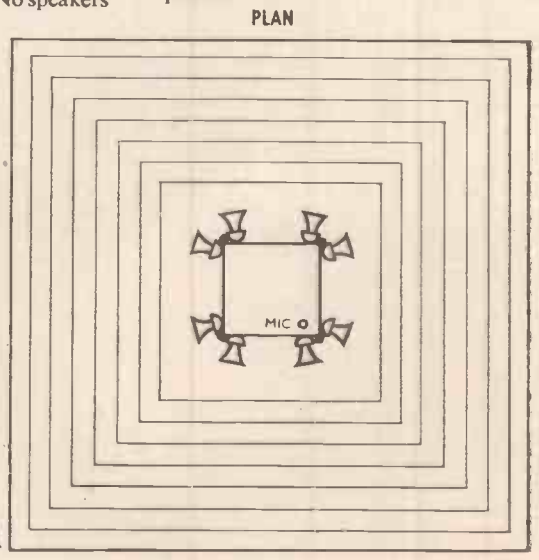


Echo.—The minimum of direct sound reaches the water and the ceiling. Loudspeakers should be as close to audience as possible, consistent with even sound distribution.

Even distribution.—Good.

Time delay.—System will be operated at low volume to avoid muddle.

Natural direction of sound.—Unimportant.



END OF PETROL RATIONING MEANS MORE MOTORISTS

Now is the Time for

By CAPT. A. LANE

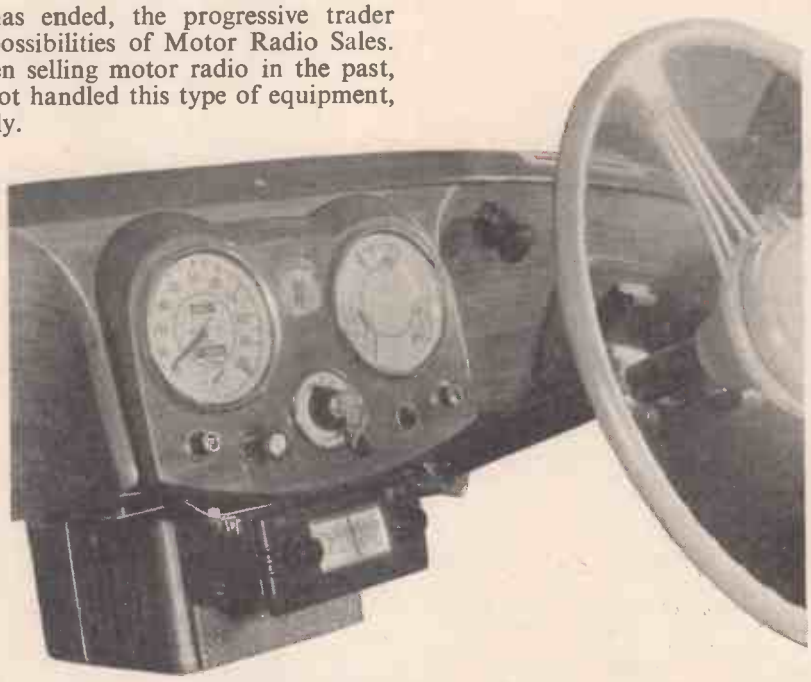
NOW that petrol rationing has ended, the progressive trader should give thought to the possibilities of Motor Radio Sales. While many traders have been selling motor radio in the past, there are a great many who have not handled this type of equipment, and the demand is increasing rapidly.

The installation may appear at first to be an obstacle, but this could be made to apply to television sales if one considers the necessity for installing aerials together with the technical knowledge which is necessary for After Sales Service.

The restriction of new cars for the home market in view of the export drive has not reduced the flow of many hundreds of cars on the coastal roads each week-end, and although many cars now have a radio fitted, there is a very much larger number which do not.

One big asset is that the present day car owner is radio minded and expects to have an aerial fitted either on the roof or at the side of the vehicle. Prior to 1939, however, the majority of car owners insisted that no aerial should be visible, or at least that no holes should be drilled into the bodywork of the vehicle.

The Motor Radio Manufacturer has also simplified the matter by improved designs which are smaller in size, easier to install, and are economical on current consumption.



MASTERADIO MODEL 701 in 1948 Triumph Saloon

EASY INSTALLATION FACILITIES

Several well-known motor radio manufacturers are able to offer very attractive installation facilities which relieve the trader of all installation and servicing troubles. This should interest the trader who is not able to undertake installation. After selling the radio, the trader arranges an appointment with the Manufacturer's Installation Depot, and the customer delivers his car to the Radio Manufacturer who installs the radio, the charge for which is also subject to a trader's discount.

The installation is " Works Tested " and the trader need have no further responsibility, as in the event of service being required, the manufacturer undertakes to do this under the terms of the guarantee. The car owner going direct to the Radio Manufacturer.

Many traders will, however, prefer to undertake the installation in their own service department, and, indeed, to develop further this side of their business.

The large number of motor radios already in use will eventually require attention, and the trader who has made known his facilities and experience for undertaking repairs to this type of equipment will be able to gain the extra business.

Little difficulty should arise in servicing the radio receiver itself, but the suppression of interference from the ignition and electrical system of the vehicle may present problems unless the service engineer is conversant with present-day installation technique.

Interference can be radiated by the electrical wiring of the car, and re-radiated by metal parts which are in close proximity to the source, although in no way connected. This often causes confusion and diagnosis becomes difficult. The engineer is therefore advised to observe the following procedure for installing sets and tracing interference. This can be compared with the usual method of fault finding when repairing a radio receiver by tracing back through the circuit from the loudspeaker.

Check that the radio receiver is suitable for the car—whether it is for 6- or 12-volt operation, and whether the input polarity is the same (i.e., whether the positive or negative side of the car battery is connected to chassis). All post-war cars have the positive side of the battery connected to chassis and for this reason Motor Radio Manufacturers supply instruments adjusted this way. If the radio is required for negative to chassis operation, the makers' instructions should be observed.

PREVENTING LOSS OF VOLTAGE

The receiver should be fixed into position and for this purpose most manufacturers supply the necessary brackets and the instructions enclosed with the instrument should be carefully noted.

ON THE ROAD AND CREATES A NEW MARKET

You to Sell Car Radio

Good electrical contact must be made between the metal housing of the radio receiver and the metal-work of the vehicle. This prevents the possibility of voltage loss in the supply to the instrument and eliminates any static voltage difference which might exist and which would cause interference radiation.

A suppressor condenser (capacity 1 mfd.) should be fitted to the dynamo and the lead of the condenser connected to the terminal of the dynamo marked " D." This will prevent L.T. interference should there be sparking between the commutator and the brushes and even if it is not essential at the time, it will eliminate the possibility of trouble from this source at a later date when brushes and commutator are worn.

IMPORTANCE OF FITTING

The dynamo condenser is usually supplied by the manufacturers together with a high tension resistor suppressor. The latter item is fitted in the main H.T. lead which connects the output of the ignition coil to the distributor head, and should be fitted as near to the distributor head as possible.

Having a resistance of 15,000 ohms, the voltage loss across the resistor is extremely low, as the actual H.T. current is minute. The resistor acts as a filter which prevents the R.F. effect of the H.T. spark between the rotor arm and the plug lead contacts from being fed back into the wiring of the vehicle. Here again the resistor should be fitted before testing, as it will almost certainly be necessary and even if it were not, its presence is highly desirable and it will prevent interference to television reception.

TEST THAT MUST BE MADE

With the battery lead of the radio connected to the car ammeter, or alternatively to the junction box, switch on and start the engine. No radio reception will be possible, but a test must be made to determine whether any interference is present without an aerial. If the test is not satisfactory a large capacity suppressor condenser should be fitted to the ignition coil and connected to the L.T. terminal marked "S.W." which connects to the ignition switch. This will by-pass to earth any R.F. interference being fed back from the ignition circuit into the wiring of the car and for this purpose 50 mfd. suppressor condensers are available. As these are of the reversible electrolytic type, they should not be used where excessive heat from the engine will affect the reliability.

Installing a set in a car is quite easy if you take a few simple precautions.

Switch on engine and test, again without aerial. Some cars have the connecting link between the contact-breaker of the ignition circuit and the L.T. terminal of the ignition coil running through, and forming part of the car's wiring loom. This lead can radiate considerable interference. A cure can often be effected by disconnecting the lead, and replacing it by a separate cable, which should be " dressed " clear of any other wiring. *On no account should a suppressor condenser be fitted at this point.* The condenser which is already housed in the contact-breaker unit is of the correct capacity for the efficient working of the engine and any more capacity across the contact-breaker gap will adversely affect the firing of the engine.

CHECK THIS PIECE OF WIRING

If a secret ignition switch is fitted in this section of the circuit, check that its wiring is not acting as a radiator of ignition interference by disconnecting it.

When interference has been eliminated or reduced to an insignificant level, the aerial can be connected. Any increase in interference can now be attributed to aerial " pick-up " and investigated quite separately.

If a roof type aerial is fitted its position is usually in the centre and as results with this type are less likely to be affected by interference, it can be fitted without previous tests.

The aerial lead in should be of the correct low capacity screened cable, the screening of which must be bonded to the metalwork of the car at either end. Special cable is available for this purpose, which should not be confused with 80 ohms television feeder, as this would result in signal loss. The car radio aerial input circuit is of high impedance and should not be shunted by 80 ohms co-axial cable. The correct type of cable has a very small diameter conductor and the internal capacity is very low, approximately 9 P.F. per foot.

Before fitting any other type of aerial a test should be made to determine the best position for interference free reception. During these tests the outer screening of the aerial lead must be in good contact with the metalwork of the car, otherwise the results will be misleading.

HOW TO CUT OUT INTERFERENCE

Avoid routing the lead-in near the gearbox or through the engine compartment, and see that the engine cover is closed and making good contact with the surrounding metal work.

After completing the installation adjust the aerial trimmers to match the actual aerial conditions for maximum results.

When tracing interference first test without aerial, then with lead-in only connected, and finally with aerial connected. This will simplify diagnosis, and so avoid confusing results.

Interference from petrol pumps, clocks, fuel gauges, etc., can be eliminated by fitting 1 mfd. condensers to the offending component.

Several manufacturers are also producing Motor Coach Radios. These are basically similar to ordinary motor radios, except that microphone facilities are incorporated together with provision for several loudspeakers. Installation is in some cases simplified, as diesel-engined vehicles have no H.T. ignition system, and any interference would be due to either the dynamo, fuel pump, or other electrically operated device and suppression is easily effected.

THE FINISHING TOUCH

As the majority of passenger vehicles have 2-pole electrical systems, the chassis is not used as an earth return. It may be necessary therefore to fit several R.F. by-pass condensers (1 mfd.) between the metal work of the vehicle and the electrical wiring at various points to prevent interference radiation.

L. A. WOODHEAD has been associated with A. C. Cossor Ltd. since 1940, when he joined as a Sales Representative. He subsequently went to S. Africa for three years to work with Cossor agents there, and returned a few months ago. He has now been appointed Manager of the Cossor Instrument Division, a notable promotion.

W. PROCTOR WILSON, C.B.E., B.Sc., M.I.E.E., the new head of the B.B.C.'s Research Department, first joined the B.B.C. in 1927—in the Savoy Hill days. His chief assistant in the department is now E. C. Drewe, M.I.E.E., who joined the B.B.C. Research Department in 1930.

A. MARKS, A.M.I.P.E., recently appointed Managing Director of A.B. Metal Products Ltd., says that the new factory at Ynysboeth, Abercynon, Glam., S. Wales, with its extra space and the good supply of labour, will enable them to cater more efficiently with the demands for their components. The firm's London Office, at Ludgate House, 107 Fleet Street, London, E.C.4 has been enlarged to give its usual " on the spot " service.

PETER D. BISHOP, after having been assistant for two years to Andrew Reid, P.R.O. for the Radio Industries Council, has joined the P.R. Staff of A. E. L. Mash and Associates. Before joining Andrew Reid, Peter Bishop was assistant P.R.O. to the Copper Development Association.

H. L. KIRKE, C.B.E., M.I.E.E., has moved from the B.B.C.'s Research Department, of which he was the head, to the post of Assistant Chief Engineer, with responsibility for the co-ordination and direction of the technical work of the Research, Planning and Installation, Designs, and Equipment Departments. Mr. Kirke's association with radio and broadcasting goes back to 1920—soon after he was demobilised from the Army, in which he was a Signals Officer.

B. WILKINSON, Director of E.M.I. Factories Ltd., who, his many friends will be glad to hear, has now fully recovered from his recent serious illness and is now well on the way to being " his old self."

R. C. FORD, until recently with the Blackburn and General Aircraft Company at Feltham, Middlesex, has now joined Multicore Solders Ltd., as Assistant Works Manager at their Slough factory.

S. KENDALL, after twenty years of service with the Radio Gramophone Development Co. Ltd., has resigned his position to join " Etronic " Radio and Television in the capacity of Personal Assistant to Mr. Eric Barker, Managing Director. His new appointment started on September 1, 1950, and his many trade friends will wish him every success in his new position.

N. GUNN, Director and Secretary of Mullard Electronic Products, died suddenly recently, we regret to announce.

Mr. Gunn joined Mullard as assistant to the Managing Director in September, 1924. He had, however, been connected with the company since 1920, when he conducted the legal work involved in its incorporation. He was secretary to Mullard for 26 years, besides being its legal adviser, during which time he was one of the " stalwarts " of the organisation. He will be missed by the trade.

R. T. B. WYNN, C.B.E., M.A., M.I.E.E., has been appointed Deputy Chief Engineer of the B.B.C., with responsbility under the Chief Engineer (H. Bishop), for the general control and direction of all engineering departments. Mr. Wynn served with the R.A.F. in the 1914–18 war, and has been associated with broadcasting since the earliest days.

A. STANLEY SHIER, a director of Thorn Electrical Industries Ltd., was chairman of an acting committee which formed a new trade association of makers of electric lighting and allied equipment. The new association will not undertake the function of price fixing, but will encourage the maintenance of approved trading terms to contractors and traders while permitting them full freedom to buy where they like. It will promote high standards of quality, workmanship and design, and will discourage unfair trading and misleading advertising. Its title is the National Association of Manufacturers of Electric Lighting and Allied Equipment.

G. W. GODFREY, E. K. Cole Ltd., Chairman of the B.R.E.M.A. Television Promotion Committee, was a member of the R.I.C. Exhibition Organising Committee which has done so much to ensure the success of the Show.

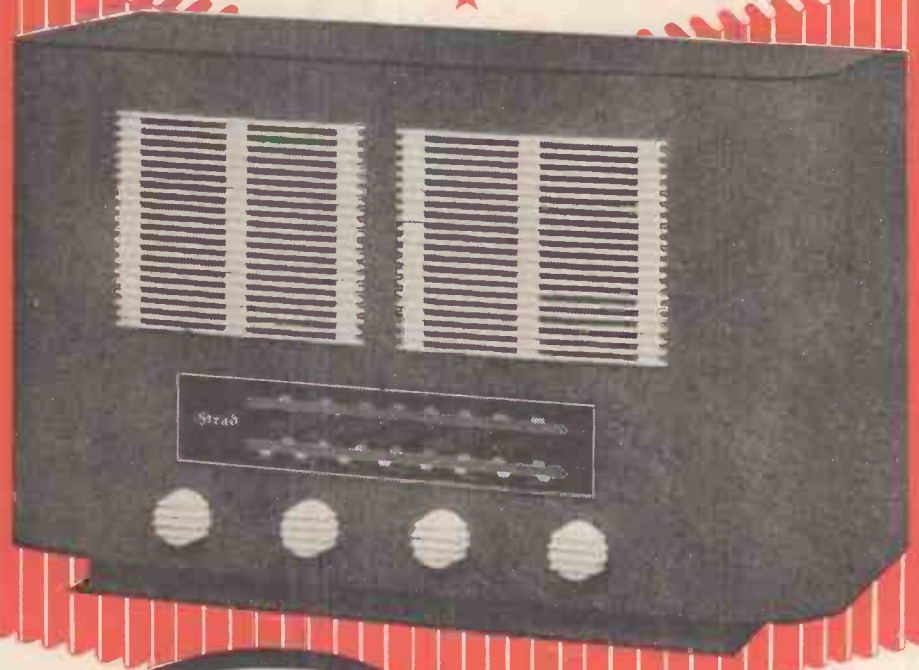
JOHN OLDHAM, O.B.E., J.P., Chairman and Joint Managing Director of Oldham & Son Ltd., recently allowed the garden of his home in Tytherington, Cheshire, to be used for a " Savings Party," attended by 600 savings workers and supporters, and opened by Lord Mackintosh of Halifax, Chairman of the National Savings Committee.

DR. J. E. I. CAIRNS, E.M.I. Research Laboratories Ltd. One of the " back-room boys " of E.M.I., " Doc " Cairns rarely receives public mention, yet without the " know-how " of him and his team the Emitron camera, on which television in this country is based, would not have been produced.

1951

NEW LOOK STRAD

MODEL 510



5 Valves. AC 200/250 volts. 40/100 c.p.s. Output 4 watts. Speaker 11½" elliptical. Cabinet size 21" × 13" × 8½". Available through usual distributors.

RETAIL PRICE £21·15·0 TAX PAID

First of the new season's models, Strad 510 is an improvement on anything we have previously made. It incorporates entirely new coils, specially designed to increase gain with exceptionally low background noise. The attractive bow-fronted cabinet has unusual quartered grained walnut veneers and contrasting cream twin grilles and knobs.

It's sound—if it's

Strad

R.M. ELECTRIC LTD., TEAM VALLEY, GATESHEAD, 11.

MR. JOE PALMER, who runs a hairdressing saloon in Morden Court Parade, London Road, Morden, Surrey, thought his customers would find television interesting to watch while waiting their turn, or while sitting in the barber's chair. Knowing the difficulties that can arise about fixing up a television aerial when you are not a tenant of the whole building, Mr. Palmer decided to try the portable television sets made by Baird, which need no aerial. Two sets were installed by Baird dealers, K.V. Radio, of London Road, Mitcham, and, to quote Mr. Palmer " things have been happening ever since, and trade has gone up." He is now known as " the Television Barber."

OF people who buy television sets a B.B.C. estimate is that 15 per cent. have incomes of about £7 a week and another 45 per cent. about £12 a week.

PRIVATE television operators who are under licence and are so often blamed by televiewers for interference are not always responsible, says the Post Office.

IF anything televising the Test Match against the West Indies at Nottinghan helped to swell the gates, rather than having an adverse affect on attendances, according to Capt. H. A. Brown, Secretary of Notts County Cricket Club.

TELEVIEWERS between Carlisle and Crewe have already spent more than £500,000 on TV sets, judging by the number of licences the Post Office have issued. It is reckoned that there is now one television set to every 158 radio sets in the North-West.

PROGRESS report on the Holme Moss (Manchester) television station issued by the B.B.C.: " The peat has been cleared from those parts of the site which will be occupied by buildings, the mast and the roads. The main building is up to roof level, and the garage foundations are above ground. The mast foundations are complete."

TELEVISION classes are to be resumed in Glasgow in a few weeks, and more students are expected in view of the probable opening of the Kirk o'Shotts TV station in 1952. It is proposed to divide the classes into those students with definite technical background and those whose interest is more on the sales side.

THE Vatican radio station in Vatican City, just outside Rome, is now sending out regular television programmes.

TELEVISION Digest

QUESTION: Will Switzerland beat Britain in exchanging television programmes with the Continent? It seems more than possible. For months experiments have been going on between Bale, Switzerland, and Milan, Italy. Programmes may be relayed from station to station across the Alps, and there is a likelihood that Germany will join in the scheme.

A television–telephone that enables people who are talking to each other to see each other has just been developed in America. The electronic equipment consists of television-receiver screens built into specially made booths with a television camera located below the screen of each set. The device was demonstrated recently at Fort Monmouth, New Jersey, by the U.S. Army Signal Corps.

Photo shows a member of the U.S. Woman's Army Corps looking at an Army corporal while she talks to him on the television-telephone system.

THE number of television licences issued in Wales is more than Mr. Ness Edwards anticipated would be the case. Here are the distribution figures he gave in the House of Commons recently: Anglesey 4, Brecon 3, Caernarvon 67, Cardigan 2, Carmarthen 5, Denbigh 520, Flint 144, Glamorgan 110, Merioneth 5, Montgomery 46, Pembroke 1, Radnor 16, Monmouth 220, Total 1,143.

NORTHWICH, Cheshire, claims to be the town with the most " H " aerials in all the North-West.

TOTTENHAM (London) Council have decided to ban outdoor television aerials on all houses controlled by them, unless there are special circumstances. Reason given: " The Council consider that the H-type aerial is not generally necessary."

IN a speech in the House of Lords advocating sponsored television Lord Brabazon of Tara charged the B.B.C., the Post Office, the Treasury, and the newspapers with being the chief opponents of sponsored television. He suggested that big firms " like Guinness's Pills or Ford's Toothpaste " should be allowed to sponsor the televising of sports events for which the B.B.C. " could not afford to pay."

LIGHTWEIGHT portable television equipment was used to televise delicate eye operations at the Moorfields, Westminster, and Central Eye Hospitals, London, recently. It enabled about 1,200 delegates to the International Congress of Opthalmology to watch operations without having to crowd round the operating table.

HASTINGS Town Council have promised Hastings, St. Leonards and District Television Viewers' Club that they will fit interference suppressors to their vehicles providing the association undertakes a campaign in the town for all users of motor vehicles to fit suppressors.

PATIENTS in St. Leonard's Hospital, Sudbury, Suffolk, can now watch television programmes. A TV set has recently been installed.

DENCO (Clacton) Ltd., of Old Road, Clacton-on-Sea, Essex, have introduced a new series of television receivers—DTR4 and DTR5. The DTR4 has a 12in. cathode ray tube, and is a large, walnut, console model, with contrasting striped mahogany strips. This is an extremely high gain receiver, particularly suitable for reception up to 100 miles radius from the transmitter. Interchangeable R.F. units (price 15s. each) which can be fitted in a few moments, are available for this range of receiver. Price of the DTR4, including purchase tax, is £93 12s.

The DTR5 follows closely the design of the DTR4 but is a table model using 9in. picture tube. Retail price is £50 plus £11 3s. 7d. purchase tax.

Radio Flashes

WHEREAS Britain is the world's largest newspaper-reading nation America is the world's largest radio-listening nation—in ratio to population. One in every two of the population of Britain buys a daily newspaper ; one in every two of the population of America has a radio set.

These are among facts given in a report compiled at the request of a United Nations' Sub-Committee, which also says that only four countries in the world are broadcasting regular television programmes. They are : America 98 stations, more than 3,700,000 sets ; Britain two transmitters, 250,000 sets ; Russia two transmitters, 50,000 sets ; and France two transmitters, 25,000 sets. The figures are estimates.

* *

AT one recent meeting the Council of Rushden, Northampton, decided by a narrow majority on a radio relay service, and entered into a draft agreement with Northampton Wireless Relay, Ltd. But at the next meeting —after talk of overhead wires being a blot on the landscape—the idea was scotched. A motion that the matter be adjourned *sine die* was carried by ten votes to six.

* *

A RADIO amateur—Brian Oddy, who has a 30-watt transmitter at his home in Steyning, Sussex—was the vital link in operations to rescue a 400-ton ship which was drifting, with her engines disabled, towards rocks off Lundy Island recently. He was exchanging friendly greetings with a station he had not been able to identify when the other station suddenly interrupted with the signal " urgent " and asked Mr. Oddy to telephone the naval air station with a message that the station's air-sea rescue boat, then on a training cruise off the North Cornish coast had seen distress rockets and was proceeding to a distressed ship drifting towards rocks off Lundy Island.

Clovelly lifeboat was launched after receiving a message from the air station following Mr. Oddy's telephone call, and the disabled ship was taken in tow by a pilot's cutter.

* *

AFTER talking to a deputation from North Devon in his room at the House of Commons, Mr. Ness Edwards, Postmaster-General, promised to call in technical advisers from the B.B.C. and the Post Office to discuss the matter of bad radio reception in North Devon and North Cornwall. He admitted that people in the area had a genuine grievance, but said he saw little prospect of any improvement in reception of the West Regional programme in the immediate future.

* *

TYPE GEX. 45 is the newest addition to The General Electric Co.'s range of germanium crystal rectifiers. This rectifier has been introduced to meet the needs of designers who wish for a low reverse current but do not require the exceptionally low figure given by type GEX. 55, which has a reverse current of less than 10μA at—10 volts and costs 30s., whereas the new type, which has a reverse current of 10-30μA, is 16s. list price.

* *

A NEW-TYPE triple-purpose radio transmitter invented by a team of young engineers in Sydney is claimed to give Australia a world lead in aviation communications. It was primarily designed for radio teleprinter point-to-point communications, but by a switch can be used for ground-to-air transmissions either by voice or in morse.

* *

ORIENT liner *Oronsay*, largest ship launched in Britain this year, is to be fitted with Marconi Marine radio equipment and aids to navigation, including radar, which will enable her to maintain communication with all the world throughout her run. Permanent Marconi Marine lifeboat installations, each consisting of a transmitter and receiver, will be fitted in the liner's two motor lifeboats.

* *

E. K. COLE, LTD., offered extra facilities for art school students to enter the annual window display competition for Ecko radio dealers. Part of the prize money—£20, £10, £5, and two prizes of £2 10s.—was set aside for art students, and the Ecko Company sought the co-operation of dealers willing to let students design and dress their competition windows.

* *

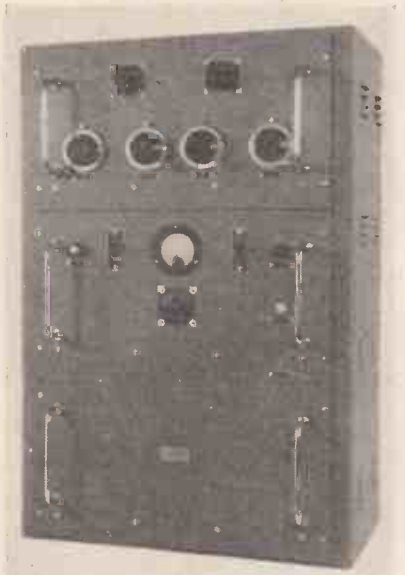
THE Tyne Improvement Commission are to install a special crystal drive unit in the radio beacon on the north pier of the harbour entrance, to eliminate any tendency for the beacon to get out of true tone. Cost of the installation is £150.

* *

A POST Office detector van has been investigating complaints of interference with radio reception made by people in Cranley Gardens and Onslow Gardens, Wallington, Surrey. The interference complained of usually happened in the early evening, and in the words of one listener " Reception is so bad we can hardly hear the 6 o'clock news."

* *

THE Plessey Co. Ltd., of Ilford, Essex, have received a contract to supply the Metropolitan Police with a quantity of Plessey transmitter-receivers, type P.TR.7, for use on motor cycles, and the associated control station installation. This equipment will play a valuable part in helping Scotland Yard to combat crime, and in aiding the police to control traffic. Frequency modulated, crystal controlled, and operating on a spot frequency within the 68.0-100.0 Mc/s. band, this transmitter-receiver has been specially designed for motor-cycle installation.



The Plessey 50-watt fixed station V.H.F. transmitter, type PT.15. Crystal controlled, operating on a spot frequency within the 118–132 Mc/s. band. Among its special features are 100 per cent. modulation 50-watt output carrier, complete meter indication for operation and servicing, remote speech and " Press to transmit " facilities over approximately 25 miles. Makers—the Plessey Co., Ltd., Ilford, Essex.

SHOW IN COMFORT
SELL WITH EASE

" What man has done man can do " is an old proverb that still holds true. Here L. A. LEE tells you how his firm demonstrates a radio set to a prospective buyer so that he can see it in comfort—and what his firm has done many other firms might find a useful thing to do.*

NOW that television production has caught up with the rate of sales (at least so it seems to us retailers), we have to think a little more seriously about *selling* television receivers, and not merely handing them from under the counter.

Two things at least we considered to be necessary: (a) a really good aerial system and (b) a demonstration room.

The former was not too difficult in view of the fact that our premises are in an area of good signal strength and that, although the Department is in a basement, the building itself is six stories high. After quite a lot of experimenting on the roof (using a standard 9in. receiver), a three reflector type aerial mounted on a 20ft. pole lashed to a chimney stack was selected.

We used standard 75 ohm coax. down lead, and wired up, in parallel, 20 points using Belling and Lee 3-pin sockets. Then came a series of coax. cables of about 8ft. each, with one end coupled to the 3-pin plug, and at the other, connectors to fit our manufacturers' various ideas! This scheme works very well and interaction between receivers is negligible. We realise, however, that this system is practicable only because we enjoy such a high degree of signal strength.

As far as the demonstration room is concerned, it was decided to convert the existing cine-projection room, and so make it serve a double purpose. This room is approximately 18ft. × 10ft. For projection reasons the walls were in dark panelling. These were stripped and re-papered with a light brown stippled wall paper, which makes a much better background for the television receivers themselves. The ceiling we made an off-white. For lighting eight standoff oak wall lamps with small shades were fitted, and powered by 40 watt lamps. These were connected to the mains by a large sliding resistor so that we could dim the lamps and produce different lighting degrees to order. Two more amber lamps were hidden, and used to illuminate gently the receiver directly under the screen. Finally a carpet on the floor, half a dozen comfortable basket chairs, and the job was done.

Television demonstration room of City Sales, Ltd.

It has proved a definite success. One of its most important uses is that of finally clinching the deal with a customer who has been wandering around all the television shops he can find, and has listened to quantities of so-called " advice " from all his acquaintances, and in consequence is so confused he just doesn't know which way to turn !

To see his narrowed down choice of not more than three models working together, and away from the distraction of the shop, usually has the desired effect, and makes the " kill."

Incidentally, we find it is a good thing to leave the customer to himself for a few minutes; often he makes up his mind during such a time.

In conclusion, we must not forget the satisfaction of being able to demonstrate a television receiver in pleasant surroundings, and to *know* that it is a good picture, and not have to apologise to the customer—who will probably not believe our story of interference anyway !

* *Of City Sales, Ltd.*

MUCH-IN-LITTLE CATALOGUE

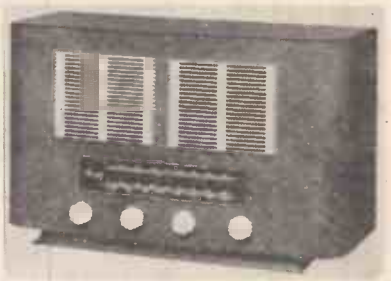
A NEW 16-page " digest " illustrated catalogue just issued by W. Edwards & Co. (London) Ltd., of Worsley Bridge Road, Lower Sydenham, S.E.26, has been compiled to serve the purpose of informing workers in research, education and industry of the many high vacuum products the firm manufacture. Brief references, with illustrations and performance figures, are made to each type of apparatus, thus giving within one cover a handy reference to all products, from which selections can be made without necessarily consulting the much bulkier main catalogues.

B.B.C. BIG CHIEF SAYS—

FROM " the Central Problem of Broadcasting," an article contributed to " Measure," a quarterly magazine founded by a group in the University of Chicago, by Sir William Haley, Director-General of the B.B.C.:

" In news, in talks, in music, in drama, in entertainment, in religion, in affairs, in all the ways in which broadcasting can communicate information and the raw material for the listener's individual judgment, is the trend of broadcasting going the right way? What does the year by year record show? That is the question those in charge of broadcasting and those among the listeners who care for civilization have to ask and answer."

R. M. Electric Limited, of Team Valley, Gateshead, have recently put on the market this new A.C. table receiver, Model 510, *priced at* £17 18*s.* 4*d.*, *plus purchase tax* £3 16*s.* 8*d. It is a five-valve superhet receiver for use on A.C. supply* 200/250 *volts. Other*



details are—Speaker: 11½in. *eliptical.* 10.000 *lines. Cabinet: Striped walnut. Highly polished finish. Bow fronted. Dial: Black background. Station names indicated in red, black, green, outlined in gold. Valves: " Mazda ". Output:* 4 *watts.*

The Mathematical Side of Wireless

by

Gerald I. Hitchcox,

A.M.I.E.E.

FUN IN PLACE OF FIGURES

In this, the second of a series of six articles, Mr. Hitchcox clarifies the mathematical "trade jargon," so that figures, instead of being fearsome, become fun.

WHEN I read over the testimonials which some advertisers seem to delight in publishing, especially in those few old "family" weeklies which are still left, sometimes I can't help laughing. One lady in Earlsfield wrote to a firm who sell bismuth anti-acid powders, saying that she was so delighted with the stuff that she had persuaded every single one of her friends to buy it; one can only assume that her social circle is entirely confined to people suffering from stomach-ache. And I expect you have all heard of the genuinely authentic case where a man wrote that before using this particular hair-restorer he had three large bald patches; now he has only one.

The fact remains, however, that critical letters are very useful both to a manufacturer and to an author; I know, because I am both of these things. Without readers' comments it is rather like working in the dark; one tends to over-emphasise points which caused exceptional personal difficulty, and to pass over others simply because one's own particular familiarity conceals their complexity.

THE ONE WAY

Several readers have mentioned that their greatest difficulty lies not in solving a problem, but in setting it out ready for solution. In other words, they can handle x and y but they run into difficulty in applying the technique to ordinary electrical quantities. The only remedy is constant and continuing practice—mental training is just as necessary as physical training is to the athlete—but one or two general hints may be found useful.

Algebra is rather like a skeleton key; it deliberately deals in general terms so that its practices may be applied to the solution of any suitable kind of problem no matter what kind of quantities may be included in it. The basis of the whole thing is the initial equation and its two essential first steps.

Firstly, make sure that you are clear about the actual quantity which you want to find out—this isn't at all so easy as it looks. Then when you have done this, use the facts you know to build an equation round it which is true for only one particular value of the unknown quantity, and then determine the class or type of the equation which you have been able to produce, so that you can apply the right technique to solve the thing.

For example, take a tuned stage in a television R.F. amplifier. Because it is complicated by mutual inductances and stray capacitances and so on, you cannot work it out from the simple resonance formula in the ordinary way. Now decide upon what you actually want to know—it may be the tuned frequency with the actual components you have got, or conversely it may be the values which you need to produce the resonance frequency which you know that you want. Now you know that at resonance, no matter how it is produced, the admittance of the parallel reactive paths is zero; you can therefore construct an equation for this overall resonance, putting a letter or symbol for that quantity which you don't know and which you are trying to find out, and equate the whole thing to zero. You now have something to get your teeth into. There will be only one frequency, or inductance, as the case may be, for which this statement is true, and when you have found that you have your answer. You can check it, of course, by substituting that value for the symbol in the original equation, and seeing if it holds good.

SO EASY . . .

Make sure that you do not accidentally produce an identity instead of an equation; it is a very easy thing to do by mistake. An equation is true for only one value of x while an identity is true for any value, and therefore it cannot be solved without some further facts. An example of an identity is something like this:

$$2.(21x + 26) = 6.(7x + 9) - 2$$

This statement is true for *any* value of x and if you try to solve it you will end up with $x = x$, which is certainly true but which doesn't help you. On the other hand a statement such as this:

$$15x - 12 = 5x + 38$$

is true if $x = 5$ and is not true for any other value, and therefore it is a genuine equation.

A simple equation is one that includes only one unknown quantity; a simultaneous equation includes two or more. Engineers very often run into trouble because they confuse the more awkward simple types with simultaneous. As an example, if you are told that you have two main units, one producing 50 more volts than the other, which develop 625 volts when connected in series, it might appear at first sight that you have two unknowns. Actually you have only one, because if you know one voltage you immediately know that the other is this same value plus 50; a genuine case of two unknowns arises with tuned circuits, where there are an infinite number of combinations of L and C which can resonate at any particular frequency.

RIGMAROLE

By the way, identities are the basis of the popular schoolboy trick where you think of any number, add something, and so on, and after the rigmarole, the questioner tells you the correct answer, because the whole thing was a concealed identity, true no matter what number you happened to select.

Two final important points are these: for every genuinely unknown quantity in a simultaneous equation, you must have an extra independent equation; in other words, there must be as many independent equations as there are unknowns. Secondly, while every quadratic equation (one involving x^2) must have two solutions, very often you can rule one of them out by your sense of probability; for example, if you are planning a large P.A. system, for any given available power there is an optimum number of loudspeakers to secure the most effective distribution of sound. Now when you have calculated their number and arrangement, if you get two solutions to a quadratic, one

giving 24 speakers and the other giving minus 116.7, it is perfectly clear that only one solution is in practice permissible. This example is taken from an actual calculation for a large racecourse installation, by the way.

Now let us get back to the calculus and its practical application to the solution of radio and television problems.

You will remember that the differential co-efficient of any expression is nothing more complicated than its rate of change ; speed is the differential co-efficient of the change in position of a body against time, and it is actually expressed in miles (of change in position) against time. Again, all that current means is change of electrical quantity against time ; current is really a mathematical relationship between two real quantities rather than a real quantity in itself. Gradient, of a road or railway, is change of height against horizontal distance ; a rise of 1 in 30 means that if you extend the horizontal distance by 30ft. (any units you like) you raise the vertical height by one foot, so that the differential co-efficient of the slope of the ground is one-thirtieth or 0.033.

WHY THE FUSS ?

Now if differentiation is as simple as all this, why is there so much fuss and difficulty about the calculus ? There is no difficulty in simple cases where the slope is constant ; it only creeps in when quantities are related to one another in a complicated or irregular manner.

The illustration shows a position-time graph for several kinds of motion. Curve (a) describes a stationary vehicle ; the horizontal character of the line means that position does not change with time, and therefore that speed (the slope or differential co-efficient of the graph) is zero—no matter what you do to time, it makes no change in position.

Now curve (b) shows a body moving at a uniform speed of roughly 5 miles an hour. Its speed is constant, as we have said, and its differential co-efficient is 5—that is, if at any point you add one to the time scale, you add five to the position scale. It doesn't matter if you take any other time ; if you add ½ (half an hour) to the time scale, you change the position by 2½ miles, and the differential co-efficient is 2½/½ or 5, the same as before. But when you come to curves (c) and (d) you run into trouble.

LAW OF CURVES

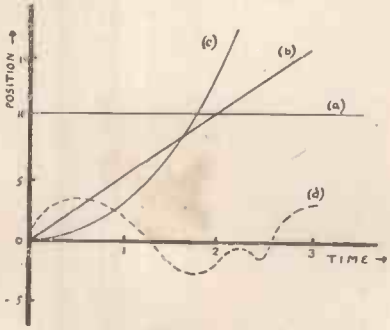
Curve (c) shows the path of a vehicle which is steadily accelerating ; all the time speed is increasing ; this means that the slope is no longer constant. Its value varies with every different point on the curve. Curve (d) is an even more complicated law ; purely as a point of interest, it is the motion diagram of a part of the valve link gear of a railway engine.

Now all that the differential calculus is becomes clear ; it is a technique for deriving the rate of change of a varying quantity at any point on its travel, and especially of quantities which follow a complicated kind of law or relationship with each other.

The enormous importance of this exciting and exhilarating technique is obvious enough ; in any mechanical motion, the force exerted on any part entirely depends upon the acceleration at any instant, and to find the acceleration you must find the differential co-efficient of speed. Coming to our own work, the voltage induced by a changing current in a coil depends upon how fast that current is changing at any instant—upon its differential co-efficient against time. In ordinary radio and audio work this is simple enough ; with television we have to deal with very irregular waveforms, where the graph of rate of change doesn't look a bit like the graph of the actual changing quantity, and only calculus can help us out.

A BOOK TO READ

In our next article we are going to consider the sine waveform, and to show how calculus clears up the mystery of those coil and condenser reactance formulae which so many of us have had to learn parrot-fashion without understanding why. In these short articles I cannot deal with the mathematical mechanism of calculus ; we shall only have time to apply its results. I would most strongly recommend you to read a most readable book called *Calculus Made Easy*, written by an American professor, Sylvanus P. Thompson ; since its original publication by MacMillan in 1910 it has run through dozens of editions. Its specific object is to debunk the idea that calculus is a difficult subject reserved for the professional experts ; you may remember that I have said that everybody who can read a speedometer is already applying calculus to his ordinary life. As a title-page introduction to his book Thompson repeats the Simian proverb : " What one fool can do, another can."



Curve (a) describes a stationary object ; the slope is constant at zero. Curve (b) describes uniform motion ; slope is constant at a positive value, and may be found by average methods. Curve (c) shows an accelerating motion ; slope is rising and any wide average method gives serious errors. Curve (d) is a complex law where any average method is impossible; slope can only be found by mathematical differentiation

The key of the whole business is simply this. If you look at curve (c) you will see that all the time the speed is rising. If you wanted to know the actual speed *at any particular moment* it would be no good taking the *total* distance and dividing it by the *total* time ; this would only give you the average over the whole distance. To get the true speed at any particular point you must measure the distance for a very short time only at that particular point ; the shorter the time, the more accurate you will be, because there will be less time for the speed to change while you are making your measurement. This is why it is sometimes called the infinitesimal calculus, because it can measure the ratio of effect to cause by taking bits of them so exceedingly small that for all practical purposes they are zero, and therefore no actual change can occur in the slope over this very small zone of measurement. It is just as well when you remember that a small R.F. current of one milliamp at 15 metres is changing its value at a maximum rate of 120,000 amperes a second ; no, that is not a misprint.

EVER DONE THIS ?

If you have ever taken a Jaeger or Smith chronometric speedometer to pieces you may have noticed that it forms an interesting practical application of the infinitesimal calculus ; the measurement steps are not infinitesimal at all, of course, but they are small enough to be insignificant practically. The meter is really an automatic clutch, operated at regular intervals by a balance wheel, which connects the pointer to the driving wheels for an accurately constant period. During this period the pointer is driven forward, and since the length of the time interval is fixed, the arc through which it moves is proportional to the speed of the vehicle. The whole process only lasts for a small fraction of a second and is repeated very frequently ; this is why most motor-cycle speedometers move in a series of barely perceptible jerks, each corresponding to slight readjustment of the pointer between one period and the next. Any speedometer is an automatic differentiator, and this particular type is an interesting and highly ingenious application of textbook first principles.

TECHNICAL GEN for SERVICING MEN

Edited by James Huxley

James Huxley will be glad to hear from you if you have experienced any unusual faults which may be of use to other servicing men.

THIS month Technical Gen presents a further selection of interesting faults and failures—with their cures. These columns are always open for your experiences—why not help others along the short-cuts you've found yourself? Technical Gen contributions should be, where possible, accompanied by a rough sketch—one picture is worth a thousand words, as the Chinese say—and our tame artists will re-draw them for reproduction.

Philips 563

TELEVISION fault-finding can be sufficiently brain-racking without the extra complications introduced only too often by "experts" of the know-all-about-it school; yet I am continually meeting cases where the unwelcome attentions of these gentlemen have rendered the task of solving a breakdown many times more difficult. It is no consolation at all to know that this is a condition common all over the country.

The most recent example of this that occurred to me was in connection with a Philips 563A radio and television table model. This set came in with a report of "picture trouble"—which might mean anything. As it happened, it meant almost everything! For a start, it was found that, although a picture of some kind was being produced (this consisted only of a gyrating tangle of lines and bars), no sound at all was to be heard. Investigation soon showed that this was due to a defective output valve, which had an open-circuited heater, and looked as if it had come from the dustbin, although the customer was quite sure that he had just paid the previous "engineer" to replace this item.

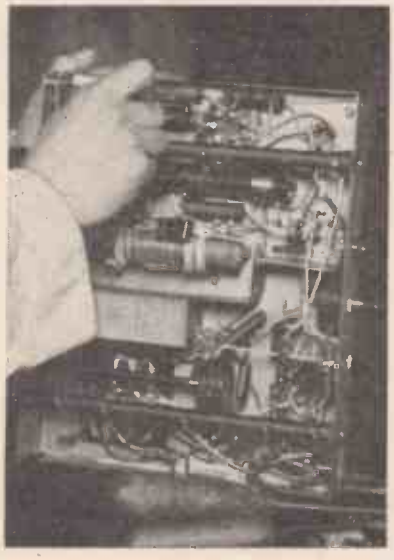
However, so far so good, and I turned my attention next to the vision side. The gyrating effect was obviously due to trouble in the frame circuit, and component checking proved the frame choke, S66, to be short-circuited. The receiver had to be shelved until a replacement was obtained, and then the fun commenced once more. With a new choke fitted a stable picture was obtained, but this was marred by a broad black strip on the *right* of the picture, and was also accompanied by a peculiar reflection effect. This was a baffling thing to describe, for the effect actually was that when a person or object moved one way on the screen, a distorted, whitish reflection moved in the *opposite* direction. To all appearances it was as though there was a light reflection on the lens of the scanning camera, although the effect was known to be peculiar to the set in question. A new tube was tried without avail, and the matter caused me the deepest thought. Although valves had been changed in the process of looking for the first vision fault, these were again tried, without curing the trouble.

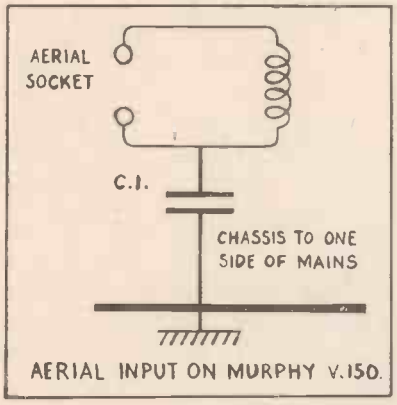
One thing however was noticed, and that was that it made no difference to the image if V8 were removed. This was an EB91 serving as a synch. separator. Now I felt that I was getting warm, and so proceeded to check this circuit carefully. I had not got very far with this before I realised that the actual circuit as far as this stage was concerned was very different from that shown in the service manual; in fact the whole thing seemed wrongly-wired. A phone call to the maker's service department provided the answer. I was told of a modification introduced on later versions of the chassis, and this entailed the re-designing of this valve circuit, and V8 in fact is, on the modified chassis, an EF91—quite a difference, an R.F. pen. instead of a double diode! I rushed from the phone to try out the suggestion, and sure enough that was the answer—it was a modified chassis and should have had an EF91 where the EB91 was. Fitting the correct valve cured that particular fault, and I was left to wonder just why the previous "doctor" had made this substitution. The Philips manual that I have makes no mention of this modification, so it will be worth remembering if you have to deal with one of these models. V8 is easily accessible from the back of the receiver, being placed centrally and at the rear of the chassis, next to V7, an EBL31.

But even then my troubles were not over, for it was found, after the controls had been set up for a good picture, that the brightness was a variable quantity, varying in fact to a great extent whenever the chassis was tapped anywhere on its surface. Patience at last revealed the cause; an electrolytic condenser, C132, of the usual Philips single-hole fixing was not making firm contact at the chassis end. Tightening this finally brought about a satisfactory end to my labours.

I am still wondering about that EB91 though. I have no doubt that the original fault was that of the s/c frame choke: the other troubles being doubtless introduced in the attempted (*sic*) cure'! Further regarding this modification, even the chart of valve positions inside the cabinet of the receiver in question showed V8 as an EB91, although the actual valve fitted by the makers was an EF91.

A NEW stock Murphy V150 was being tested in the showroom, and upon the aerial being plugged in, there was a flash, and bang went the shop fuses. The aerial, by the way,





AERIAL INPUT ON MURPHY V.150.

was co-axial with the screening earthed. The aerial input is as shown, and it was thought that C1 had gone down, but this was not so. Even with this condenser disconnected the AVO showed a reading of but a few ohms between one aerial socket and the set chassis (this being directly connected to one side of the mains).

Close investigation revealed that between the paxolin aerial strip and its cartridge-paper backing there was a film of grease. This had broken down under mains pressure, and the resultant arcing had burnt a path of low resistance between the socket and a chassis rivet. I was able to clean up this panel without having to fit a replacement.

Alba 807 A.C./D.C.

AN Alba 807 A.C./D.C. Superhet gave poor volume on all wavebands, and as the valves were O.K. the chassis was withdrawn for voltage tests.

All voltages were approximately normal however, but tests seemed to indicate that there might be a partial s/c across the speaker output transformer as the output stage seemed to lack sensitivity.

No such partial s/c was there, but it was found that the speaker field winding connected in parallel with the H.T. supply was not being energised.

The thin leading out wire had snapped where it joined the tag board, and the residual magnetism of the speaker alone was responsible for the set's functioning.

The broken wire was re-soldered and reproduction became normal. Of course, if the field winding had been in series with the H.T. supply, the usual procedure, it would have caused the receiver to stop working completely by depriving all the valves of H.T.

Philips 492 U

A SERVICE call to a Philips 492U table televisor led me to a rather queer effect. The set warmed up in the normal way, and a picture appeared, only to slowly fade away after a few minutes. There was no sound at all. Once the picture had disappeared, no raster could be obtained even with the brilliance knob turned to maximum. By dint of trial and error, coupled with many unprintable adjectives concerning people who make valves that need a contortionist to remove, I proved that the cause of trouble was V10, a UF42, which acts as frequency changer common to sound and vision. The heater of this valve was intact, and there was no internal short as far as I could ascertain, but yet it produced this strange effect.

Murphy AD94L

A MURPHY AD94L A.C./D.C. Superhet would intermittently go into oscillation on both wavebands, develop a " plopping " sound, whistle each side of the signal and only very faintly reproduce the actual station.

Valves were O.K. and when the chassis was withdrawn it was noticed that touching it when switched " on " —needless to say standing on rubber flooring—resulted in the whistle changing frequency.

The R.F. and I.F. decoupling condensers were naturally suspect, so each one was shunted in turn by a known good .1 condenser.

When this condenser was paralleled across the screen decoupler of the I.F. amplifier oscillation stopped, and the set played normally.

Removal of the condenser caused oscillation to recommence, while connecting it again made reproduction O.K.

Obviously, we decided, an o/c screen decoupler—and fitted a new one.

On re-testing however, results were as before, oscillation, whistles, and very little signal.

Knowing the fitted .1 mfd. condenser to be perfect, we decided that for some reason the snap application of the extra capacity had pulled the receiver below oscillation point, so we looked elsewhere for a faulty capacitor.

Eventually we found one of the electrolytic smoothing condensers to be intermittently o/c, and on replacing it we experienced no further symptoms of instability, but the experience proved that in radio service work you can never be too sure.

Alba A.C/D.C.

AN Alba A.C./D.C. Superhet for 110/230 volt operation was brought in " not working " and investigation showed that a 2 watt wire wound resistor in series with the valve heaters was burnt out.

A new resistor was fitted but before switching the set on for testing a careful examination was made to discover the cause of the resistor burning out.

Everything seemed in order till we noticed a sliver of solder almost bridging the mains voltage adjustment panel which short circuits the receiver's line-cord when set for 110 volts.

The blob of solder had probably just shorted the line-cord out on 230 volts, and although the resultant heavy heater current had burnt out the substantial wire wound resistor, all the valves worked as well as ever. This does once again show the importance of careful checking of all joints.

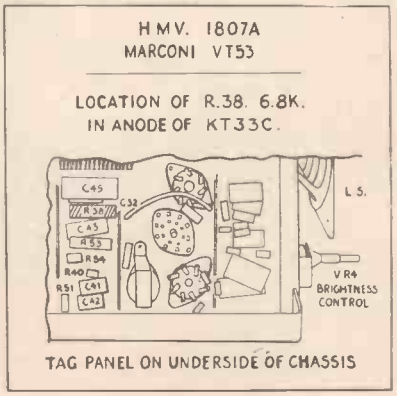
H.M.V. 1807 and 1807A

I HAVE traced several instances of intermittent frame failure in H.M.V. Models 1807 and 1807A (Marconi VT53DA) to R38 being defective. This is a wirewound resistor of 6.8k. and feeds the anode of the frame output valve, a KT33C. In each case I have so far investigated, the resistor has not gone open-circuit, but has taken to varying its resistance when hot. The symptoms are that the raster will suddenly close right up to a horizontal line, and then open out to an extent governed by the altered resistance of R38. In one particular case, this happened only after the set had been working for about 30 minutes, and the trouble was of short duration, righting itself again after a space of some two or three minutes. The resistor is situated under the time-base and power-back chassis below the brightness control. (See sketch.)

Pre-War Ferranti

A PRE-WAR A.C./D.C. Ferranti " Una " had a H30 Osram Detector with an o/c heater.

As this valve is obsolete and there is no direct equivalent, we decided to try a Brimar 8D2 instead.



TAG PANEL ON UNDERSIDE OF CHASSIS

Unlike the H30, which is a triode, the 8D2 is a R.F. Pentode, so we fed its screen pin from the H.T. line with a 300,000 ohm resistor, and decoupled it to chassis with a .1 mfd. condenser.

Results on testing were perfect, and after slightly re-trimming the set we found selectivity better than normal.

Pye. A.C Superhet

A PYE 5-valve A.C. Superhet completely failed to operate and after first checking that the set did not have a H.T. short circuit, we switched on.

Dial lamps lit, but no response or even hum came from the speaker.

With the v/c fully advanced we put a finger on the top cap of the TDD4, but again no response.

We then tested the Screen and Anode voltages on the PENA4 Output Pentode, both were O.K., but when we contacted the anode socket we noticed that there was no characteristic " click " from the speaker.

A break in the speech coil seemed possible and most likely, but before we unsoldered the speech coil leads from the output transformer to test them, we decided to try another PENA4 " just in case."

We hardly thought the valve was faulty as it was almost new, but still you never can tell.

We switched the set off and removed the valve, but as we did so, received a hearty shock from the valveholder.

That gave us the clue. None of the valves could be passing current or the Electrolitic Condensers would have been discharged.

Investigation then showed that there was no heater supply getting to the valves owing to a particularly bad dry joint which did not affect the dial bulbs.

Alba A.C./D.C.

A PRE-WAR Alba A.C./D.C. Superhet gave poor volume and tone, but it needed only a brief inspection to determine that the rectifier valve was the cause as it was giving a very low D.C. output.

When it was replaced by a new one, the receiver's volume and tone were restored 100 per cent. but on very strong signals such as the local Regional and Droitwich, the volume varied as though the v/c was being turned up and down two or three times per second.

After checking all suspect decoupling condensers without avail, we decided to re-align the set.

This effected no improvement so we tried a new Frequency-Changer, I.F. Amplifier, and Double Diode Detector, but again without removing the symptoms.

Eventually, however, we found the cause. The original breakdown resistor had developed a break and been replaced by a new one but it had been incorrectly adjusted as the heater current on test was found to be almost .26 Amp. instead of the correct figure of .2 Amp.

We altered the sliding tap and results then became normal.

H.M.V. 1807

NO RASTER, but check of E.H.T. proves this to be O.K., in fact, could be higher than usual. Also possible that a raster is obtained at critical setting of horizontal hold control—brilliance control may have no affect on brightness. Time base note apparently is missing, or very highly pitched.

Fault—failure of the horizontal hold potentiometer. This should be 25K, but is open circuit. Brightness (C.R.T. Grid) control is coupled to bottom end of horizontal hold, and the positive potential applied to the C.R.T. grid via brightness control is, of course, not present.

Pilot Universal

SOMETHING really unusual in receiver faults came our way this week. A pre-war A.C./D.C. Pilot was brought in with the complaint that

Huxley's Technical Gen (*continued*)

while it worked well on all wavebands, reception on medium waves was exceptionally noisy.

A bench test confirmed this, and as the noise on M.W. was present with or without an aerial, it seemed obvious that the receiver itself was to blame.

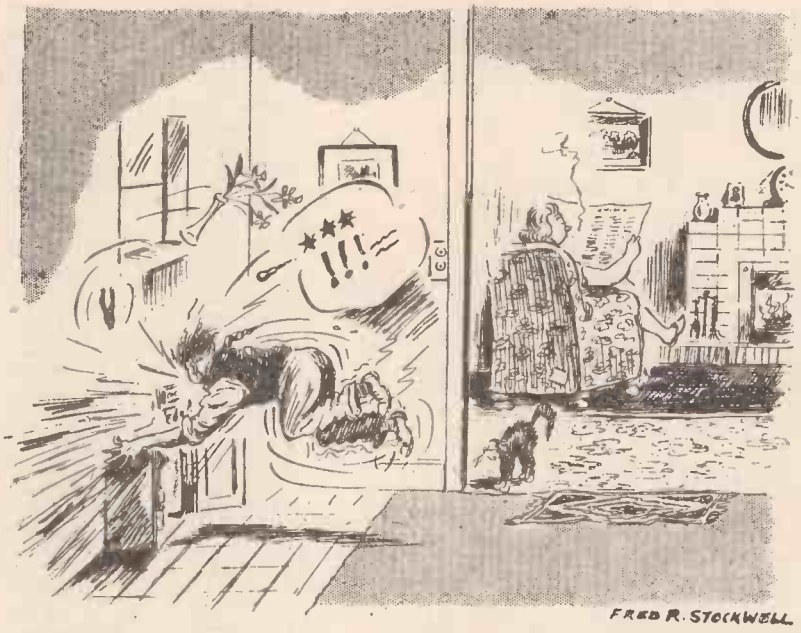
The wavechange switch was cleaned, and all suspect components checked without securing any improvement.

Then after some little time we noticed that the dial bulbs that illuminated the M.W. part of the dial and which came on only when the set was switched to M.W. were very dull compared to the others.

We replaced them with the recommended types, but even these glowed just as dully, and as we turned one of the bulb-holders over to check for good contact, we saw a small spot of red light, no larger than a full stop on this page, burning across the base of the bulb-holder.

It was a " spark-over," but the most insignificant " spark-over " we have ever seen or even imagined possible.

It never varied in size, could hardly be seen unless screened from daylight, and yet caused all the crackle and noise on the medium waveband.



" Here you are, Henry! Canada wants smart handymen able to do television repairs . . ."
(*With acknowledgments to the E.T.U. Journal* 'Electron')

Bush PB61

A BUSH PB61 Superhet would perform normally, fade out, and then come on again " in no time."

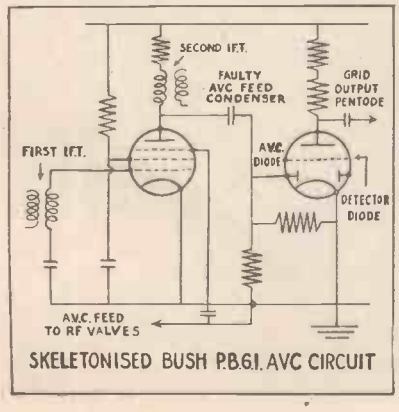
So brief was this fading out period that it didn't give us much of a chance to make any voltage tests, but we did ascertain the fault to be purely H.F.

We eventually found the trouble to be due to a component that we had never known break down before, the AVC diode feed capacitor which had developed an intermittent leak.

In many receivers of course, this would produce only slight effect but in this model the AVC diode is fed from the anode of the VP4B I.F. amplifier, and when the feed condenser developed its nternal leak a positive D.C. voltage was applied to the anode of the diode with three separate effects.

1. The anode voltage of the VP4B was brought down to about 85 volts.
2. The second IFT primary was shunted by the AVC feed condenser and diode.
3. A slight positive bias was applied to the AVC controlled valves.

The capacitor was replaced and no further intermittent operation was experienced.



SKELETONISED BUSH P.B.61. AVC CIRCUIT

Philco Universal

WE recently came across a modern Philco universal receiver which gave no results, and as it failed to light up when switched on, we first tested for continuity across the mains lead.

A quick ohm-meter check revealed continuity, so after ensuring that there was no H.T. short circuit we plugged in and switched on.

No results—no valves warming up either—but the breakdown resistor was getting overheated.

We switched off pronto and checked the heater circuit, but as everything appeared in order, no shorting connections etc., we suspected that the first valve in the heater supply chain from the breakdown resistor had a 100 per cent. heater cathode s/c.

Then the dial lamp-holder attracted our attention.

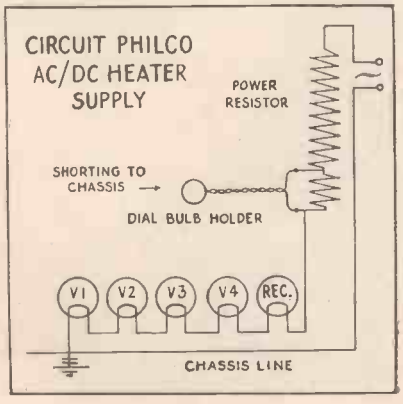
Although it appeared to be a " chassis return " clip-on job, it had two leads feeding it.

This of course is most unusual, as if a bulb-holder is of the " chassis return " pattern, there is only need for one wire to feed it.

Then close inspection revealed that the bulb-holder was really a fully insulated type, but one of the insulating washers had cracked and dropped off, so shorting one of the feed wires to chassis.

This lead unfortunately came straight off the breakdown resistor and also fed the chain of valve heaters.

We replaced the bulb-holder, and although the breakdown resistor had naturally been heavily over-run, we found that it was still in excellent condition and did not require replacing.



RTRA

News and Views

NEW PRESIDENT

MR. F. J. SMITH, of Leicester, was elected President for the year 1950–51 at a meeting of the Council of R.T.R.A. held recently, and Mr. S. R. Burbidge, of Brighton, was elected Vice-President. Mr. Smith has been on the council of the association since its formation in 1942 and has played an important part in the work of the association so far as the wages of radio service engineers are concerned. He has been for some years chairman of the labour Committee of the association.

The council passed a very hearty vote of thanks—which was carried unanimously—to the retiring President, Mr. G. Michelson, who devoted a considerable amount of time to the work of the association and spared himself no effort in the interests of the radio retail trade.

In acknowledging the vote of thanks Mr. Michelson said that he had been very happy to hold the office and he was conscious of and grateful for the splendid co-operation which he had been given by his fellow-members on the council and also by the staff at headquarters.

TELEMAGNET

BIG attraction at Gloucester County and West of England Industrial Exhibition, held in Gloucester, was undoubtedly the Television Theatre, which was made possible through the joint enterprise of eight of the retailers in the area. Somewhere about 60,000 people saw the programmes.

Thirty-seven receivers of different makes were working during the whole of the demonstration, and the interest of the visitors was considerable. A very good picture was received, and there is no doubt that the retailers aroused much enthusiasm for television. All visitors to the theatre were asked to fill in a card of admission, giving his or her name and address. Thus the retailers have a good mailing list, and many sales should result.

Those taking part in this joint effort were: Beaulys Radio, Gloucester; Foyles Ltd., Gloucester; Hickie and Hickie Ltd., Gloucester; L. C. Mitchell & Co., Gloucester; Ted Bird & Co., Gloucester; A. C. Cash Ltd., Tewkesbury; Clarke Bros. (Stroud) Ltd., Stroud; R. Lewis Stroud.

ENGINEERS' MEETING

THE 25th Annual General Meeting of the British Institution of Radio Engineers will be held in the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1, on Wednesday, September 27, at 6.30 p.m. (Members only). The presidential address will be given at 7.15 by Mr. Paul Adorian, and visitors are invited to this.

NEWCOMERS

WELCOME to these new members who joined R.T.R.A. during the month of July 1950:

Francis B. Johnson, Standlake, Witney, Oxfordshire.
Cotswold Electric Ltd., High Street, Burford, Oxfordshire.
Morgans of Muswell Hill, 9 The Exchange, Muswell Hill, N.10.
Electro-General Engineering Co., 253 Coombe Lane Parade, Raynes Park, S.W.20.
Stuart & Dorfman (Electrical) Ltd., 168/170 West Derby Rd., Liverpool 6.
Booth Bros, 127 Park Road, Liverpool 8.
J. Archer, Hoestock Road, Sawbridgeworth, Herts.
S. Brod & Co., Ltd., 1103 Finchley Road, N.W.11.
Dundalk Garage and Wireless Stores, 96a St. Asaphs Road, Brockley, S.E.4.
Streamlyne Electrics Ltd., 201 Kirkdale, Sydenham, S.E.26.
Unicorn Electric Co. Ltd., 101 Kensington Church Street, W.8.
E. J. Rogers, 28 Crawford Place, W.1.
J. G. W. James, Post Office Stores, Tintinhull, Yeovil, Somerset.
Bainbridges (Lincoln) Ltd., 233–237 High Street, Lincoln.
Henderson & Co. (Dundee) Ltd., 69–75 Wellgate, Dundee.

Stop Press!

Raymond Electric Ltd., announce a new model five-valve radio receiver —F55—with these features:

Appearance—a cabinet of contrasting walnut veneers, upright, with large glass multi-coloured tuning scale. Mains voltage—operates on A.C. 100/250 volts. Wave bands, 3. Loudspeaker, two matched 6in. high flux permanent magnet. Size, 17in. high. 20in. wide, 8¼in. deep.

Price: £21 13s. 9d. tax paid.

See picture above

R.T.R.A. BRANCH OFFICERS

HERE is a list of R.T.R.A. branch officers for the year 1950–51, elected or re-elected to office recently:

Branch	Secretary	Chairman	Council Member
N. Durham & Northumberland.	J. S. Penney. (Treas. T. Henderson.	D. B. Sonley.	G. Michelson.
N. Yorks & S. Durham.	H. R. McDermott.	F. Williams.	O. W. White
E. Yorks.	V. Coupland (also Treas.)	S. Scarborough.	C. Lister.
W. Yorks.	(Treas. C. B. Clayton)	A. Isherwood.	C. Stephenson.
S. Lincoln.	R. Makin (also Treas.)	C. R. Spouge.	C. R. Spouge.
Notts.	F. C. Woodward.	F. W. Cole.	L. Hall.
Derby.	G.F. Dyer (also Treas.)	A. B. Hulme.	A. B. Hulme.
N. Staffs.	E. D. Pimble.	R. Littler.	E. D. Pimble.
Leicester & Rutland.	E. E. Smith (also Treas.)	J. E. Shaw.	F. J. Smith.
Norfolk.		J. Pank.	N. G. Wolsey.
Suffolk.	R. K. Makinson.	F. A. Page.	F. A. Page.
Birmingham.	E. T. Pryce-Jones.	N. C. Walker.	T. R. Priest &
Warwicks.	Treas. W. J. Fennell.	W. Arrighi.	A. J. Shaw.
Berks.	F. J. Harding.	F. W. Evans.	T. R. Lascelles & R. C. Gilbert.
Bristol & Gloucester.	G. Ed. Palmer.	H. Burnham.	G. Ed. Palmer.
Wilts.	A. Clayton.	S. G. Huband.	S. G. Huband.
Surrey.	(Treas. M. Richards)	E. W. Gee.	E. W. Gee.
Kent.	J. V. Linnell.	D. J. W. Hickmott.	D. J. W. Hickmott.
Somerset.	W. S. Macmillan.	C. H. Gregory.	C. H. Gregory.
Cornwall.	E. Russell.	C. C. Gerry.	E. B. Jenkin.
Devon.	F. C. Roberts (also Treas.)	L. Braddick.	G. N. Pill.
S. Wales.	C. E. Ursell. (Treas. A. E. Price.)	A. H. Barry.	J. F. Paull.
N. Wales.	K. A. Knowlson. (Treas. A. Brown)	W. O. Jones.	A. Brown.

★★★ Strongly Recommended.
★★ Certain to Sell.
★ Stocks.

Brunswick

★★★ 04534: *Home Cookin'* (from "Fancy Pants"), and *Katrina* (from the Disney film "Ichabod"), both sung by the old maestro Bing Crosby.
★★ 04542: Evelyn Knight brings your customers the still-popular *Candy and Cake*, with, on the other side, the tuneful *Cherry Stones*.
★ 04549: Danny Kaye, still as excellent a seller as ever, here sings *The Wreck of the Old 97*, and the new *The Handout Song*.
★ 04547: *Roses*, and *I Still Get a Thrill*, sung by Dick Haymes, with the Four Hits and a Miss and Gordon Jenkin's orchestra.
★ 04551: When the M.G.M. war film "Battleground" was shown, everyone talked about the vocalised marching orders of the parachute battalion. Here they are, *Sound off*, played by Jerry Gray and his orchestra, with Bill Lee and the Lee Gordon Singers providing the words. On the other side is *The Lonesomest Whistle*.
★ 04550: Evelyn Knight, singing as movingly as ever, has two numbers on this disc, *Choc'late Ice-Cream Cone*, and *Hiawatha's Mittens*. On the first side she sings with The Ray Charles Singers and Bob Haggart and his Orchestra, and on the other with The Morganaires and Russ Morgan and his Orchestra.

Capitol

★★★ CL13348: Welcome back to Bob Hope. Here he is, with Margaret Whiting, singing the new summer hit of the States, *Blind Date*. On the reverse the two tackle *Home Cookin'*.
★★ CL13345: *Bonoparte's Retreat*, and *A Woman Likes to be Told*, both sung by Kay Starr. New, and quite different, this disc.
★ CL13346: Paul West and his orchestra play *Orchids in the Moonlight*, a strong orchestral hit everywhere, and the favourite of all time, *La Vie en Rose*.
★ CL13351: *River of Smoke*, and *The Prairie is Still*, with Gordon MacRae singing to Paul Weston's Orchestra.
★ CL 13350: *The Old Pianola*, and the perennial *St. Louis Blues*, a fine interpretation by the Jubilaires, with rhythm and instrumental accompaniments. The Jubilaires are rapidly climbing to popular acclaim.

Columbia

★★★ DX8345 and 8346: Perhaps the best "Carousel" Selection yet issued. Gems from the show sung by the principals themselves, with the Drury Lane Theatre Orchestra, conducted by Reginald Burston.
★★ DX8349 and 8350: Another first-rate, topical selection. The hit songs from the new show "Golden City", sung by the principals to Philip Green and his Orchestra.
★ LX8727 and 8728: This Automatic Coupling series is extremely fine. It is Beethoven's *Quartet No. 11 in F Minor, Op. 95*, played by the Schneiderhan Quartet.
★ DX1669: Cyril Smith has made this record. It is his interpretation of Schubert's *Impromptu in G Flat, Op. 90, No. 3*.
★ DB2721: *Let Me Sing in Echo Valley* and the *Tritsch Tratsch Polka*. Whistling, yodelling and singing by Ronnie Ronalde.
★ FB3570: Victor Silvester and his Ballroom Orchestra, playing *Bewitched*, and *The Cry of the Wild Goose*.
★ LX1304: Mozart's *Sonata in C, K545*, played by Walter Gieseking on the pianoforte.
★ DB2717: Felix Mendelssohn and his Hawaiian Serenaders, playing an attractive *Irish Waltz Medley*.

Decca

★★★ F9470: Cyril Stapleton and his orchestra play on the one side of this *Candy and Cake*, with Bob Dale vocalising, and on the other *One Wonderful Morning*. Two winners.
★★ F9467: This reissue is worthy of attention. It is Charlie Kunz's medley of *My Foolish Heart, Me and My Shadow, C'est si Bon, Dearie, Bewitched*, and *Let's do it Again*.
★ F9458: Billy Cotton and his band turn their attention to *Two on a Tandem* and *The Night the Floor Fell in*.
★ F9424: *Let's Do It Again* and *Somewhere at the End of the Rainbow*, sung by Dick James, with The Stargazers, and Malcolm Lockyer's Barnstormers.
★ 9473: Primo Scala and his Banjo and Accordion Band, playing his fifth *Medley* incorporating six popular tunes, with Alan Kane vocalising.

His Master's Voice

★★★ C3994: Violinist Ida Haendel, with Gerald Moore at the piano, plays Schubert's *Ave Maria*, and Mendelssohn's *On Wings of Song*.
★★★ B9948: *My Foolish Heart* and *Forever Mine*, both sung by Allan Jones.
★★ B9945: Donald Peers, singing *I Remember the Cornfields* and *Among the Hills of Wales*.
★ C3993: Bizet's *Carmen*, Preludes to Acts I and IV, played by the Berlin State Orchestra, conducted by Leopold Ludwig.
★ B9937: *I Don't Care if the Sun Don't Shine* and *Valencia*, both sung by Tony Martin.
★ B9940: An addition to the 1950 Swing Music Series. It is *Birmingham Bounce*, and *When the Saints go Marching in*, played by Sid Phillips and his Orchestra.

London Records

★★ L650: *When Your Old Wedding Ring Was New* and *Sugarfoot Rag*, played by Roy Stevens and his orchestra, with Patricia Laird.
★ L685: The Dave Apell Trio sing *Brother Bill* and *Sugar Baby*.

Parlophone

★★★ F2420: *Brumas, Brumas, Brumas* and *A Load of Hay*, by Billy Thorburn's The Organ, the Piano, and Me.
★★ F2422: Geraldo and his Orchestra playing the foxtrot *You're Only Dreaming*, from the film "Dance Hall", and *Candy and Cake*.
★ R3310: The Beguines *Torch Song* and *If I Loved You* (from Carousel), played by Roberto Inglez and his orchestra from the Savoy Hotel, London.
★ R3303: Two amazingly fine trumpet solos by George Swift. They are *Elfriede*, by Swift himself, and Arditi's *Il Bacio*.
R3304: *My Gal Sal* and *The Sunshine of Your Smile*, by the Five Smith Brothers.
★ R3307: *The Imperial Echoes March* (Signature Tune of Radio News Reel), and Sousa's *Semper Fidelis*, rousingly played by Sidney Torch and his Orchestra.

Financial News

Annual General Meetings of Pye and Oldham Companies

THE twenty-first Annual General Meeting of Pye, Ltd., was held on the 4th of last month. C. O. Stanley (Pye chairman), presented the accounts, which showed a gratifying balance despite, as their report for the year stated: "the efforts of the Lilliputians of State Control." Trading profit of the Pye group for the year ending March 31, 1950, was £400,559. This figure has risen steadily since 1939, and has, of course, been reflected in the dividends paid.

Oldham & Son, Ltd.'s thirty-first annual general meeting, was held in Manchester on the 18th of last month. John Oldham, O.B.E., J.P., chairman of the company, in addressing shareholders, referred to the ten-monthly period of the accounts necessitated by the change of accounting date to the March 31 each year, but pointed out that the profit of £210,161, when taken at the annual rate, showed a substantially proportionate rate to that of last year. He reported on the progress of the company's subsidiary companies, and made special reference to the establishment in India of the new company, Oldham & Son, India, Ltd., which is expected to start operations in 1951.

NEW COMPANIES

Argyll General Service Co., Ltd.—Private company. Registered in Edinburgh May 15. Capital £1,000 in £1 shares. Objects: To carry on the business of manufacturers, distributors, installators and repairers of electrical, sound, vision and television apparatus and equipment, etc. The directors are: James N. Robertson, 6 Grange Road, Bearsden, Dumbartonshire, shipping agent; John Duncan, 14 Broad Street, Campbeltown, Argyll, electrician. Registered office: 14 Broad Street, Campbeltown, Argyll.

R. E. Atkins Radio, Ltd.—Private company. Registered June 13. Capital £1,000 in £1 shares. Objects: To carry on the business of manufacturers, repairers and hirers of and dealers in electrical and mechanical apparatus and accessories, particularly wireless and television sets, etc. The directors are: Mrs. Molly J. James and John James, both of The Pines, Stoke Bishop, Bristol, and Fdk. Farley, 146 Whiteladies Road, Bristol 8. Secretary: W. E. Holly. Registered office: 34 Ripple Road, Barking, Essex.

Bestocks (Clacton), Ltd.—Private company. Registered June 23. Capital £500 in £1 shares. Objects: To carry on the business of wireless goods dealers. The directors are: Wm. H. L. Bettany and Doris M. Bettany, both of 232 Holland Road, Clacton-on-Sea, directors of St. Georges Chemical Co., Ltd. Secretary: Mrs. D. M. Bettany. Registered office: 175 Old Road, Clacton-on-Sea.

Brown (Llandudno), Ltd.—Private company. Registered June 14. Capital £10,000 in £1 shares. Objects: To carry on the business of manufacturers and repairers of and dealers in wireless and television sets, accessories and apparatus, etc. The permanent directors are: Arthur Brown (managing director), and Clarice E. Brown, both of Bro Gain, Gannock Park, Deganwy, directors of Brox, Ltd. Secretary: R. Thomas. Registered office: Midland Bank Chambers, Lloyd Street, Llandudno.

Central Electrical (Bristol), Ltd.—Private company. Registered May 18. Capital £5,000 in £1 shares. Objects: To carry on the business of electrical engineers and general electrical installation contractors, wireless engineers, etc. The directors are: Cecil R. Setter, Crossways, Stoke Hill, Bristol, 9; John B. Setter, The Spinney, Grange Close North, Westbury-on-Trym, directors of Stone & Co. (Bristol), Ltd., etc. Secretary: K. J. Crossley. Registered office: 140c Redland Road, Bristol 6.

Claridges Radio, Ltd.—Private company. Registered June 1. Capital £1,000 in £1 shares. The directors are: John James, "The Pines," Stoke Bishop, Bristol; and Fdk. Farley, 146 Whiteladies Road, Bristol 8, both directors of Delta Radio Co., Ltd., etc.; and Wm. E. Holly. 12 Carlow Road, Bristol 4, director of Whitbys Music & Radio, Ltd. Secretary: W. E. Holly, Registered office: 1 Redland Park, Bristol 6.

Connetts Radio, Ltd.—Private company. Registered June 1. Capital £1,000 in £1 shares. The directors and other particulars are similar to those of Claridges Radio Ltd. (q.v.).

Corkes Radio (Southampton), Ltd.—Private company. Registered June 28. Capital £1,000 in £1 shares. Objects: To carry on the business of manufacturers and repairers of and dealers in electrical and mechanical apparatus and accessories, particularly wireless sets, etc. The directors are: John James, "The Pines," Church Road, Bristol 9; and Wm. E. Holly, 12 Carlow Road, Knowle, Bristol 4. Registered office: Six Dials, Southampton.

Coulphone Productions, Ltd.—Private company. Registered July 1. Capital £100 in £1 shares. Objects: To carry on the business of manufacturers, repairers and distributors of electronic equipment, etc. The subscribers (each with one share), are: Clifford Coulborn, "Maesgwyn," Ruff Lane, Ormskirk, radio manufacturer and distributor; and Rex T. A. Wills, 55 Burscough Street, Ormskirk, managing clerk. Clifford Coulborn is the first director. Secretary: Rex T. A. Wills. Registered office: 53 Burscough Street, Ormskirk.

Daytime Manufacturing Co., Ltd.—Private company. Registered July 20. Capital £1,000 in £1 shares. Objects: To carry on the business of electrical, radio and general engineers, etc. The permanent directors are: John S. Kosak (managing director), 18 Evelyn Avenue, Ruislip, Middlesex; and Fredk. T. Lerwill, 47 Ruislip Court, West End Road, Ruislip. Secretary: F. T. Lerwill. Registered office: 18 Evelyn Avenue, Ruislip, Middlesex.

Berry Dicker, Ltd.—Private company. Registered June 27. Capital £2,500 in £1 shares (2,000 ordinary and 500 7% redeemable preference). Objects: To carry on the business of manufacturers of and dealers in wireless and television sets and components, electrical appliances, etc. The permanent directors are: Philip H. Berry, Quiet Corner, Firfield Road, Addlestone; and Robert E. Dicker, 85 Liberty Lane, Addlestone. Secretary: P. H. Berry. Registered office: 87 Station Road, Addlestone.

George Douglas & Co., Ltd.—Private company. Registered May 23. Capital £2,000 in £1 shares. Objects: To carry on the business of designers and manufacturers of and dealers in inter-telecommunication, telephone, telegraph, television and radio apparatus, etc. The directors are: Geo. W. A. Douglass, 109 Aldwick Road, Newcastle-on-Tyne 5; Norman C. Usher, 85 Howard Street, Jarrow, Co. Durham; and Walter Odell, 109 Aldwick Road, Newcastle-on-Tyne 5. Secretary: Geo. W. A. Douglass. Registered office: 124 Heaton Road, Heaton, Newcastle-on-Tyne 6.

Leonard S. Dyer, Ltd.—Private company. Registered July 8. Capital £10,000 in £1 shares. Objects: To carry on the business of manufacturers, hirers and repairers of and dealers in radio and television receivers, etc. The directors are: Leonard S. Dyer and Elsie Dyer, both of Highfield, Gawthorpe Drive, Bingley. Secretary: Elsie Dyer. Registered office: 87 Main Street, Bingley.

E. R. Electrics, Ltd.—Private company. Registered July 1. Capital £500 in £1 shares. Objects: To carry on the business of manufacturers and repairers of and wholesale and retail dealers in gramophones, sound reproducing machines, television apparatus, etc. The directors are: Mrs. Constance S. Read, 1 Greystoke Cottages, Ealing, W.5; and Albert J. Elliott, 52 Bush Grove, Kingsbury, N.W.9. Secretary: Edwd. Adams. Registered office: 141 Wembley Park Drive, Wembley, Middlesex.

Electronic Service (Hallamshire), Ltd.—Private company. Registered July 16. Capital £5,000 in £1 shares. Objects: To acquire the business of a tape recorder and television apparatus manufacturer carried on by David Sockett, at 93/5 Button Lane, Sheffield. The directors are: David Sockett, 141 Thornbridge Drive, Frecherville, Sheffield; and Ernest G. Summers 11 Norton Park Drive, Sheffield, director of E. G. Summers, Ltd. Secretary: David Sockett. Solicitors: J. Steele, Carr & Co., Sheffield. Registered office: 93 Button Lane, Sheffield.

Electronic Precision Equipment, Ltd.—Private company. Registered May 30. Capital £1,000 in £1 shares. Objects: To carry on the business of retail and wholesale merchants, manufacturers, importers, exporters and repairers of and agents for wireless apparatus, television and electronic apparatus, etc. The directors are: Jesse Bull and Mrs. Elsie L. Bull (directors of J. Bull (Ruislip), Ltd.), both of 4 Melbourne Drive, Ruislip, Middlesex. Secretary: Alfred A. Malnick. Registered office: 46 Windmill Hill, Ruislip Manor, Middlesex.

Elvin and Murray-Forbes Television Diffusion, Ltd.—Private company. Registered July 14. Capital £1,000 in £1 shares. The directors are: Edward S. Murray-Forbes, Flat 76A, Dures Brow, Blackburn; John K. Elvin, 19 Kimberley Street, Blackburn; Harold G. Thackery and Fred Norman. Registered office: 21A, Railway Road, Blackburn.

Herbert Fitch & Sons, Ltd.—Private company. Registered May 20. Capital £3,000 in £1 shares. Objects: To acquire the business of radio engineers carried on by Alice M. Fitch and George H. Budden at Chatteris, Cambridge, as H. Fitch and Sons. The directors are: Mrs. Alice M. Fitch and George H. Budden, both of Nunnery House, Victoria Street, Chatteris, Cambs.; Mrs. Dorothy Fitch, London Road, Chatteris, Cambs. Secretary: Phyllis M. Budden. Registered office: 16 High Street, Chatteris, Cambs.

L. H. Durrant & Co., Ltd.—Private company. Registered July 15. Capital £5,000 in £1 shares. Objects: To acquire the business of radio and electrical goods dealers and contractors carried on at 330 High Street, Harborne, Birmingham, as L. H. Durrant & Co. The directors are: Lawrence H. Durrant and Mrs. Mary T. Durrant, both of Westacre, Aise Lane, Droitwich. Secretary: Mary T. Durrant. Registered office: 330 High Street, Harborne, Birmingham.

J. Gough & Co., Ltd.—Private company. Registered June 22. Capital £2,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in electrical fittings and accessories, wireless and television sets, etc. The directors are: Jabez Gough and Mrs. Mabel Gough, both of 2 Glas Yorath, Whitchurch, Glam; and Clifford E. Ursell, 148 North Road, Cardiff, director of Radio Services (Cardiff) Ltd. Secretary: C. E. Ursell. Registered office: 148 North Road, Cardiff.

P. Greenwood, Ltd.—Private company. Registered June 12. Capital £100 in £1 shares. Objects: To deal with contracts for electrical work, to deal with electrical appliances, refrigerators, wireless equipment and television, etc. The subscribers (each with one share) are: Philip J. Grazin, 42 St. Martins Lane, W.C.2, accountant; and Mrs. Doris E. Sleigh, 53 Dartmouth Road, Willesden Green, N.W.2. The first directors are not named. Secretary: P. J. Grazin. Registered office: 42 St. Martins Lane, W.C.2.

Hankins (Radio), Ltd.—Private company. Registered June 12. Capital £1,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in electrical and mechanical apparatus and accessories, particularly wireless sets, etc. The directors are: Arthur W. Hankin, 20 Rydale Road, S.W.16; Molly J. James, The Pines, Stoke Bishop, Bristol; John James and Fredk. Farley. Secretary: W. E. Holly. Registered office: 401 North End Road, S.W.6.

Holly & Co., Ltd.—Private company. Registered June 12. Capital £1,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in electrical and mechanical apparatus and accessories, wireless sets, etc. The directors are: Wm. E. Holly, 12 Carlow Road, Knowle, Bristol; Molly J. James and John James, both of The Pines, Church Road, Stoke Bishop, Bristol. Secretary: W. E. Holly. Registered office: 41 Redland Park, Bristol 6.

W. H. Instruments, Ltd.—Private company. Registered July 19. Capital £100 in £1 shares. Objects: To carry on the business of manufacturers of and wholesale and retail dealers in electronic and precision instruments of all kinds, etc. The subscribers (each with one share), are: H. A. R. Holland, The Old Manor House, Littleton, Shepperton, Middlesex, Horologist; and I. R. Worsley, 139 Latchmere Lane, Kingston-on-Thames, electrical engineer. The first directors are to be appointed by the subscribers. Solicitors: Sandford Mervyn Taylor & Co., 5 and 6 Clements Inn, Strand, W.C.2.

W. J. H. Lambert, Ltd.—Private company. Registered July 7. Capital £1,000 in £1 shares. Objects: To carry on the business of electrical engineers, manufacturers of and dealers in all kinds of electrical apparatus, etc. The directors are: Edward C. Kent, "Rookery," Beach Road, Selsey, Sussex; Alfred D. Wells, 91 Boston Gardens, Boston Manor, Brentford, Middlesex; and Geo. A. Lackington, 25 Alderney Avenue, Hounslow, Middlesex, all directors of L.M.K. Manufacturing Co., Ltd. and associate companies. Secretary: G. A. Lackington. Registered office: Harlequin Avenue, Great West Road, Brentford, Middlesex.

M.A.B. Electrical Services, Ltd.—Private company. Registered June 22. Capital £200 in £1 shares. Objects: To carry on the business of electrical and electronic engineers and contractors, etc. The directors are: Mrs. Mabel B. Witham, 4 Athens Street, Stockport; and Clyde Witham, 73 Bankhall Road, Heaton Mersey, Stockport. Secretary: C. Witham. Registered office: 26 Upper Brook Street, Stockport, Ches.

Rees Mace (1950), Ltd.—Private company. Registered June 3. Capital £10,000 in £1 shares. Objects: To carry on the business of buyers, sellers, hirers, installers, fitters and maintainers of apparatus, equipment and accessories for telecommunication, sound reproducing, etc. The subscribers (each with one share) are: James A. Cowell, 11 Lichfield Road, Cambridge, solicitor's clerk; and Derek A. Povey, 77 Paget Road, Trumpington, Cambridge, solicitor's clerk. The first directors are not named. Solicitors: Few & Kester, Cambridge.

Miniature Radio, Ltd.—Private company. Registered June 29. Capital £7,500 in £1 shares. The directors are: Joseph Gulley (permanent), 45 St. John's Road, Clifton, Bristol; and Ronald S. Derry, 282 Canford Lane, Coombe Dingle, Bristol, both directors of Vasta Agencies, Ltd.; and Albert K. Grant (director of Ingleburn Products, Ltd.), and Wm. J. Saywell. Secretary: Harold N. Derry. Solicitors: Netcott, Barnett & Leonard, Bristol 1. Registered office: 142 Cheltenham Road, Bristol.

Modern Credits, Ltd.—Private company. Registered June 30. Capital £2,000 in £1 shares. Objects: To carry on the business of merchants and suppliers of and dealers in radios, television and parts and equipment, etc. The directors are: Wm. R. Baldwin, Mrs. Elsie L. Baldwin and Victor D. Baldwin, all of 13 Penrhyn Crescent, E.17. Secretary: W. R. Baldwin. Registered office: 49 Markhouse Road, E.17.

Polygon Record Co., Ltd.—Private company. Registered June 3. Capital £1,000 in £1 shares. Objects: To carry on the business of manufacturers, processors, exporters and importers of and dealers in all kinds of sound producing records, etc. The subscribers (each with one share), are: Herbert C. Riddlestone-Holmes, 58 Avondale Road, South Croydon, and Arthur W. Baxter, 261 Worcester Park Road, Worcester Park, solicitor's clerks. The first directors are to be appointed by the subscribers. Solicitors: Neish, Howell & Haldane, 47 Watling Street, E.C.4.

R. & G. Radiovision, Ltd.—Private company. Registered June 26. Capital £1,000 in £1 shares. Objects: To carry on the business of manufacturers and repairers of, agents for, and wholesale and retail dealers in electrical goods of all kinds, wireless and television sets, etc. The directors are: Morris Revere, 88 Cazenove Road, N.16; and Edwd. Greenwood, 39 Heathland Road, N.16. Secretary: E. Greenwood. Registered office: 120 Stoke Newington Road, N.16.

Tom Rogers, Ltd.—Private company. Registered July 11. Capital £2,000 in £1 shares. Objects: To acquire the business of a dealer in and repairer of electrical, wireless and television goods, carried on by Thos. Rogers at 24 Servia Road, Leeds. The directors are: Thomas Rogers, 18 Oak Road, Leeds 7; and Thomas Kirbitson, 4, Ashley Avenue, Ashley Road, Leeds, 8. Secretary: Pamela Corner. Solicitors: Joseph Lester & Co., 8 East Parade, Leeds 1. Registered office: 24 Servia Road, Leeds 6.

Television Services (Newcastle), Ltd.—Private company. Registered March 24. Capital £1,000 in £1 shares. Objects: To acquire the business of radio and television engineers and dealers carried on by V. C. Phillips and W. F. Reed at 23 Low Friar Street, Newcastle-on-Tyne, as "Television Services." The directors are: Victor C. Phillips, 11 Hillhouse Road, Trockley, Northumberland, and Wm. F. Reed, Greystones, Dalry, Ayrshire. Secretary: Jean A. Martin. Registered office: Faraday House. 17 Todd Street, Manchester 3.

T.E.P. Stores (Darlington), Ltd.—Private company. Registered March 23. Capital £5,000 in £1 shares. Objects: To carry on the business of wholesale electrical goods factors and dealers, television, radio and gramophone factors and dealers, etc. The directors are: Douglas S. Thompson (permanent) and Mrs. Irene A. Thompson, both of 19 Grantham Road, Norton-on-Tees. Secretary: Irene A. Thompson. Registered office: 38 Coniscliffe Road, Darlington.

Thornhill and Willsmere, Ltd.—Private company. Registered May 17. Capital £2,000 in £1 shares. Objects: To carry on the business of refrigeration, electrical and radio engineers, metal and alloy makers, etc. The permanent directors are: Victor R. Thornhill, 11 Royston Crescent, Newport, Mon.; and Roy A. Willsmere, 2 Dale Road, Ringwood, Newport, Mon. Secretary: Roy A. Willsmere. Registered office: 54 Emlyn Street, Newport, Mon.

Thorpes of Gosforth, Ltd.—Private company. Registered May 13. Capital £3,000 in £1 shares. Objects: To carry on the business of general electrical engineers, electrical installation contractors, etc. The directors are: Edward Thorpe, Mrs. Marjorie Thorpe and Edward Thorpe, Jnr., all of 84 Park Avenue, Gosforth, Newcastle-on-Tyne. Secretary: E. Thorpe, Jnr. Registered office: 14 Grey Street, Newcastle-on-Tyne.

Unicorn Electric Company, Ltd.—Private company. Registered March 4. Capital £100 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in wireless and television apparatus, electronic equipment, etc. The subscribers (each with one share) are: Leonard J. Mison and Thomas A. R. Pizzie, both solicitors' clerks, of 8 Queen Anne Street, Portland Place, W.1. The first directors are to be appointed by the subscribers. Solicitors: Evans Baker & Co., 8 Queen Anne Street, W.1.

Vision & Sound Radio Services (London), Ltd.—Private company. Registered April 15. Capital £1,500 in £1 shares. The directors are: Ralph K. Toby (permanent director and chairman), 16 Southside, Dalmeny Avenue, N.7; Dennis Standing (permanent), 19 Rowplatt Lane, Felbridge, East Grinstead, Sussex; and James Toby, White House, Albany Street, N.W.1, director of Film Theatres and Catering, Ltd. Secretary: D. Standing. Solicitors: Page, Moore & Page, 30 Ely Place, E.C.1. Registered office: 30 Ely Place, E.C.1.

Visual Sound Services, Ltd.—Private company. Registered in Belfast, April 12. Capital £2,000 in £1 shares. Objects: To carry on the business of radio and electrical engineers, cinematograph engineers, etc. The subscribers (each with one share), are: Miss Emily Martin, 4 Mayfair, Arthur Square, Belfast; and Herbert L. McCracken, 4 Mayfair, Arthur Square, solicitor's apprentice. The first directors are not named. Registered office: 4 Mayfair, Arthur Square, Belfast.

Welbeck Electrical Co., Ltd.—Private company. Registered May 17. Capital £100 in £1 shares. Objects: To carry on the business of electrical, radio, lighting, telephone, mechanical and general engineers and engineering contractors, etc. The directors are: Jas. M. Milne and Mrs. Margaret H. Milne, both of 3 Welbeck Court, Kensington, W.14. Secretary: Margaret H. Milne. Registered office: 32 Strand, W.C.2.

J. E. Wildbore, Ltd.—Private company. Registered April 28. Capital £5,000 in £1 shares. Objects: To carry on the business of lighting, electrical, wireless, gramophone and television engineers, electrical installation contractors, etc. The directors are: John E. Wildbore, Nellie Wildbore and Clara M. Wildbore, all of 26 Marlborough Street, Oldham. Secretary: J. E. Wildbore. Registered office: 6–12 Peter Street, Oldham.

Wolfson's Radio and Electrical, Ltd.—Private company. Registered April 26. Capital £1,000 in £1 shares. The directors are: Benjamin Wolfson and Mrs. Rose Wolfson, both of 37 Falkland Road, Southport. Secretary: Benjamin Wolfson. Registered office: 157 Eastbank Street, Southport.

BANKRUPTCY

Hyman Gold (formerly Gelkop), trading as "Radio and Electric Service," 193 Mare Street, Hackney, and "Goldway Electronics," 141 Park Road, St. John's Wood, N.W.8.

The adjourned public examination of the above debtor was held at the London Bankruptcy Court, Carey Street, W.C., on May 17, when it was disclosed that his liabilities amounted to £3,424. The assets, after deducting preferential claims of £183, were expected to produce £236.

Replying to the Official Receiver, debtor stated that in October, 1942, he took an annual tenancy of a shop at 193 Mare Street, Hackney, and with about £500 in cash and goods he started trading there as "Radio and Electric Service." In the course of the company's trading he advanced money for wages and materials and lent it £500 which he borrowed from his bankers. Early in 1948, he was pressed by trade creditors, many of whom obtained judgments against him. He managed to clear these debts and continue trading, but credit supplies were restricted with the result that early in 1949, a trade creditor obtained judgment for about £268, levied execution and seized most of his stock in satisfaction of the judgment debt and costs.

He attributed his present position to the failure of R.E.S., Ltd., now in liquidation, lack of capital, and heavy overhead expenses.

The Official Receiver said that as this was such a serious case, he would ask that the examination be adjourned *sine die*. The Registrar stated he would not adjourn the examination *sine die*, but would adjourn it generally to give the debtor just one further chance to fully disclose his affairs to the Court, and if at some later date the position was not fully clarified, he would then adjourn the examination *sine die*.

INCREASES OF CAPITAL

Plomer & Wilkinson, Ltd., electrical, radio, sanitary and general engineers, etc., 129 Charminster Road, Bournemouth.—Increased by £2,000 in £1 5% cumulative preference shares beyond the registered capital of £10,000.

Raymond Electric, Ltd.,—manufacturers of and dealers in radio instruments, etc., Brent Crescent, North Circular Road, N.W.10.—Increased by £40,000 in £1 ordinary shares beyond the registered capital of £20,000.

Teleradio News Agency, Ltd., Fernshaw House, Fernshaw Road, S.W.10.—Increased by £500 in £1 "A" ordinary shares beyond the registered capital of £1,500.

Three sets that SPEAK FOR Themselves

Model F. 53 is a table model Television Receiver A.C. 200/250v. 12" Tube.

Model F. 53 B . . . . . Birmingham

Price **£64 5s. 10d.** *Tax Paid*

Model F. 55 is a "Twin Speaker" Table Model in contrasting walnut veneer cabinet. 5 Valves. 3 Wave Bands. Large multi-coloured tuning dial. Output 4w. Tone control. 2 matched 6" high flux permanent magnet Loudspeakers.

Price **£21 13s. 9d.** *Tax Paid*

Model F. 52 R with beautiful cabinet of figured Walnut Veneers, enriched with exotic Thuya burr banding and Sycamore mouldings. 5 Valves. 13-2000 Metres. Garrard R.C. 70A Auto changer. Tone control. Four colour illuminated glass dial. Fitted with record compartment to hold 72 records.

Price **£69 19s. 2d.** *Tax Paid*

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BRITISH RADIO AND TELEVISION
(Incorporating "The British Radio Maker & Exporter")
92 Fleet Street, London, E.C.4

Published by British Radio and Television 92, Fleet Street, London, E.C.4 and Printed by Love and Malcomson, London and Redhill

Test Report—R8

Cossor All Dry Battery Portable Model 499

THE Cossor All-dry Battery Portable Model 499 is a four-valve superheterodyne employing four miniature all glass 1.4 volt valves.

The front and back of the receiver have a burnished metallised finish, the front having a window displaying the tuning scale. The finish of the ends is off maroon coloured moulded plastic and a carrying handle is fitted.

Batteries used are one Ever Ready All Dry 4 for L.T., giving approximately 1.5 volts, and two Ever Ready B104's connected in series to give 90 volts H.T. Consumption on L.T. is 250 mA., and 11 mA. on H.T.

Only three controls are incorporated in the receiver and these are illustrated on a diagram included in this test report. Cabinet dimensions are 11¾in. × 10½in. × 5¾in. with nett weight 12lb.

Price of the model 499 is 15 guineas tax paid.

CIRCUIT DETAILS

The incoming signal received on the frame aerial, which is also the grid coil, is tuned to resonance by one section of the twin gang condenser. The signal voltage is then applied directly to the control grid of the first valve, a heptode frequency changer.

For long-wave reception the frame aerial has a loading coil in series with it, and also an additional capacitance of **100 p.f.** (C.3) shunted across the two. This loading coil is short circuited whilst the receiver is operating on the medium waveband. Similarly, in the case of the oscillator coils, both medium and long-wave coils are series connected, one section of which is used for medium-wave reception, whilst both are used, together with an additional capacitance of **90 p.f.** (C.14), for long-wave reception. The oscillator coupling coil is common to both wave bands.

Output from the oscillator section and the incoming signal voltage are electronically mixed within the frequency changer and the resultant intermediate frequency is fed to the first I.F. transformer. The second valve, a variable mu R.F. pentode, amplifies the signal at the intermediate frequency and it is then fed by way of the second I.F. transformer to the diode of the third valve, a diode pentode.

At this point the audio frequency component of the signal is rectified and a voltage is developed across the network of resistors, **R4, R5, R10** and **R11,** the resistor **R11** being the receiver volume control.

A variable percentage of the voltage developed across the volume control is fed via **C30 (.001μF),** to the control grid of the pentode section of this valve, where further amplification takes place. From the junction of **R4** and **R5** a fixed percentage of the signal voltage is diverted to the I.F. amplifier grid and the frequency changer signal grid for the purpose of providing automatic gain control.

The audio output taken from the anode of the valve is resistance capacity coupled to the second audio stage, operating as the final output valve. This valve is a beam tetrode and the output from it is coupled via the speaker transformer to the speech coil of the 6in. P.M. loudspeaker. The resistance **R12 (910 Ω)** causes the correct bias of **−7 volts** to be applied to the grid of the output valve.

The current consumption of the receiver is approximately **15 mA.** H.T. and **250 mA.** L.T.

ALIGNMENT PROCEDURE

I.F. Transformer.—Inject a 470 Kc/s. signal from an accurately calibrated modulated signal generator into the control grid of **V1** via a **0.01 mfd.** condenser.

Connect an output meter with an impedance of 3 ohms across the secondary of the output transformer.

Using a trimming tool, adjust the iron cores of **L9, L8, L4** and **L3** for maximum response on the output meter, in the order given.

Keep the signal input as low as possible to prevent the A.V.C. from operating.

R.F. Alignment.—For R.F. alignment the signal should be introduced via an R.M.A. standard shielded coil*

Medium Waveband.—Switch to M.W. (anti-clockwise) and with the volume control at maximum set the tuning pointer to **206.5 metre** mark.

Inject a **1,450 Kc/s.** modulated signal via the shielded coil. Adjust calibration by means of the M.W. oscillator trimmer **C.11** for maximum response.

Adjust the aerial trimmer **C.3** for maximum response at **206.5 metre** mark.

Long Waveband.—Switch to L.W. (clockwise) and with the volume control at maximum set the tuning pointer to **1,875 metre** mark.

Inject a **160 Kc/s.** signal.

Adjust the Long wave padder **C.14** for maximum response.

The R.M.A. standard shielded coil specification is as follows: "This shall be a cylindrical coil, **5 cms.** in radius and **6 cms.** deep, wound with **20 turns** to an approximate inductance of **40 microhenries.** The whole coil shall be shielded by a wire cage arranged to avoid magnetic screening (i.e., there shall be no complete circuits whose planes are normal to the axis of the coil). The connecting leads shall also be screened.

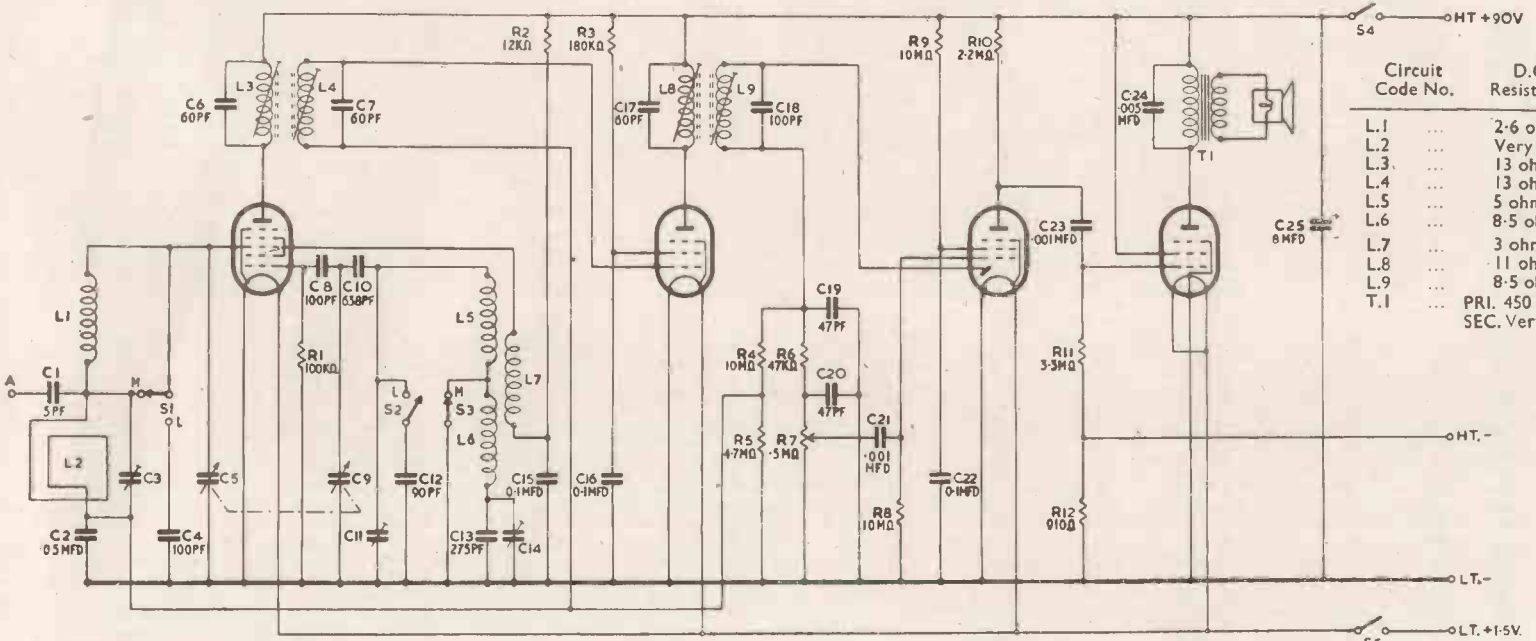
SERVICING

To remove chassis.—Loosen the knurled nuts under the case and withdraw the rear cover. Remove the battery plugs and take the batteries from their compartment. Remove paxolin protection piece by the medium-wave frame aerial trimmer. Remove the knobs. Remove the carrying handle and also the top metal strip. Unscrew the six screws (three each side) holding the chassis to the plastic end pieces. Placing the receiver on each side in turn simplifies this operation.

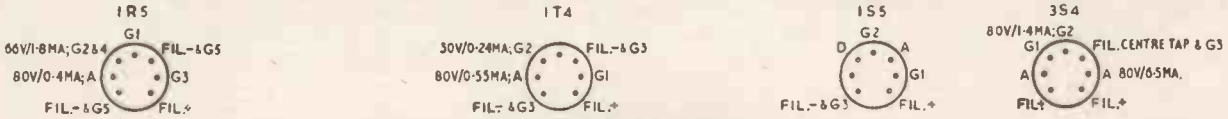
Hold the chassis by placing the thumb of the left hand on the speaker magnet and the four fingers along the bottom edge of the chassis. It can now be easily removed by manoeuvring the cabinet with the right hand. Care must be taken not to remove the chassis too far, since the connections to the medium wave frame aerial are still made. If it is found necessary to remove further from the case these leads may easily be unsoldered.

Carefully placing the chassis on its left-hand side, a screwdriver can be passed through the hole at the bottom of the chassis and the nut and bolt holding the clamping ring round the speaker magnet can be loosened, thus allowing the speaker to be withdrawn.

All the components are now accessible and voltage checks or component replacements can be carried out.



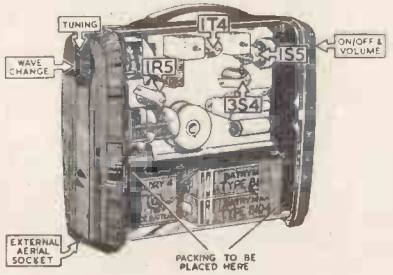
Circuit Code No.		D.C. Resistance
L.1	...	2·6 ohms
L.2	...	Very Low
L.3.	...	13 ohms
L.4	...	13 ohms
L.5	...	5 ohms
L.6	...	8·5 ohms
L.7	...	3 ohms
L.8	...	11 ohms
L.9	...	8·5 ohms
T.1	...	PRI. 450 ohms SEC. Very Low

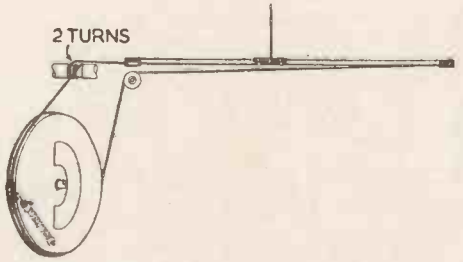


COSSOR

All Dry Battery Portable

MODEL 499





Test Report—TV7

Pye Black Screen Models LV30, LV30C

THE latest development from Pye, Ltd., Radio Works, Cambridge, is the "Black Screen" Models LV30 and LV30C, designed so that the dark areas of the picture are rendered really black. Specifications for both models are the same. Valves: 14 new-type high efficiency. Cathode ray tubes: Standard 9in. providing a picture approximately 6in. × 8in. Controls: Sound volume, including on/off switch and picture contrast. Pre-set controls at rear of chassis. Noise limiting: Efficient limiting circuits are incorporated on both vision and sound. Conversion: The separate R.F. unit enables the sets to be easily converted to operate from other stations, i.e., Holme Moss. Mains supply: 50 cycles, 200-250 volts A.C., and 200-250 volts D.C. Power consumption: 100-125 watts. Cabinet is attractively finished in walnut. Dimensions: Model LV30, 17½in. × 14¼in. × 12½in. Model LV30C, 17½in. × 14¼in. × 30¼in.

Price of the table model is 39 gns., and that of the console model 45 gns., both tax paid.

ALIGNMENT PROCEDURE

Before alignment of the R.F. unit is carried out, the following test apparatus will be required: A voltmeter to measure the vision channel output. This will measure the A.C. voltage at the cathode of the cathode ray tube. (See Fig. 5.)

An audio frequency power output meter to measure the sound channel output, having an impedance of approximately 2.5 ohms and a range on which an output power of 150 mw. can be measured.

A V.H.F. Signal Generator. (See General Information.) A suitable insulated trimming tool. a damping condenser of approximately 10 mmfd. capacity for use when trimming the bandpass transformers.

A termination for the concentric cable from the Signal Generator. When a signal has to be fed directly to a valve control grid, a resistor of approximately 75 ohms must be connected between the cable centre conductor and the braiding at the *receiver end* of the cable. The *free end* of the condenser is used to make connection to the valve control grid. A crocodile clip should be connected to the braiding of the concentric cable to make connection to the receiver chassis. The clip *must* be connected at the same point as the resistor. *Care must be taken to ensure that the signal generator is not earthed.*

USING THE EQUIPMENT

Diode voltmeter.—Connect the meter between cathode of C.R. tube and receiver chassis.

Output meter.—Connect meter in parallel with the loudspeaker speech coil; set impedance to 2.5 ohms.

Signal Generator.—Use as detailed in the instructions supplied with the instrument. Signal Generator must be modulated to a depth of 30% when adjusting the attenuator of the Signal Generator so as not to exceed the R.F. unit output level, care should be taken to ensure that no overloading occurs.

VISION/SOUND ALIGNMENT

Sections T4A, T5A.—Remove large screening can from R.F. unit. Set Contrast control (R4A) to maximum and the Sound Volume control (R24A) to minimum. Fit a damping condenser of 10 mmfd. between the anode of V1C (valveholder socket No. 7) and chassis. Set the diode voltmeter to the 2.5 volt range.

Inject a signal of 43.9 Mc/s. at the control grid of V1B (valveholder socket No. 2) using resistor and condenser termination of the Signal Generator output lead. Adjust upper section of T4A for maximum output. (Trimming point on the underside of chassis.)

Remove 10 mmfd. damping condenser from the anode of V1C and apply it between the junction C4D and the upper section of T5A and chassis. Adjust lower section of T5A (diode coil) for maximum output. (Trimming core on top side of chassis.)

Remove 10 mmfd. damping condenser from T5A and apply it between the junction of C4C and the upper section of T4A and chassis. Adjust lower section of T4A (anode coil) for maximum output.

Sections T2A, T3A.—Inject a signal of 43.9 Mc/s. at the control grid of V1A (valveholder socket No. 2). Replace screening can. Procedure for T2A and T3A as for T4A and T5A as above.

Connection to the grid of V1C with the screening can in position can be made on to the bare wire between coil can and screening can.

Sections T1A, L2A, L3A.—Set Signal Generator to 43.4 Mc/s. Apply 10 mmfd. damping condensor to the anode of V1A (valveholder socket No. 7) and adjust upper section of T1A (grid coil) for maximum output. (Trimming core on underside of chassis).

Remove the 10 mmfd. condenser from the anode of V1A and apply it to the control grid of V1B (valveholder socket No. 2) and adjust lower section of T1A for maximum output. (Trimming core on top side of chassis.)

Set the diode voltmeter to the 25 volt range and the Contrast control to mid-position. Inject a signal of 43.9 Mc/s. at the Intermediate aerial sockets. Adjust L2A for maximum output. Set Signal Generator to 41.5 Mc/s. Set diode voltmeter to 2.5 volt range and adjust L3A for *minimum* output.

Sections L8A, T6A (Sound).—Inject a signal of 41.5 Mc/s. at the *Intermediate* aerial sockets and set the Volume control to maximum and the Contrast control to mid-position.

Adjust L8A and T6A for maximum on the A.F. Power Output Meter for an output of approximately 50mW.

VISION BAND WITH CHECK

With the Contrast control at maximum, set the Signal Generator to 45 Mc/s. and the Signal Generator attenuator to approximately 65mV. Vary the input signal frequency from 45 Mc/s. to 42.3 Mc/s.; the attenuator settings to maintain 6.5 volts on the diode voltmeter should be within 1.3 times the attenuator reading at 45 Mc/s. At 45.25 Mc/s. the attenuator setting should be increased by 1.12 times (i.e., 1db).

VISION SENSITIVITY

When using the Pye Signal Generator, the sensitivity at 45 Mc/s. should be better than 65mV to obtain an output of 6.5 volts on the diode voltmeter.

SOUND SENSITIVITY

Using the above-mentioned generator, the sensitivity at 41.5 Mc/s. should be better than 25mV to obtain an output of 20mW. on the A.F. Power Output Meter.

SOUND REJECTION

With the Controls control at mid-position, the Volume control at *minimum*, set the Signal Generator to obtain a carrier frequency of 41.5 Mc/s. The Signal Generator attenuator setting to obtain an output of 0.5 volts should not be less than 70 times the setting required to obtain the same output with a 45 Mc/s. signal.

NOTE.—*A small deviation from this frequency will substantially alter the* sound *rejection figure obtained.*

MIDLANDS

The Midlands version of the LV30 and LV30C will be issued in supplement form in a later edition of *British Radio and Television*

MECHANICAL DATA

NOTE.—*After the receiver has been switched off and the mains plug removed from its socket, the anode* 2 *connector on the side of the C.R. Tube should be short-circuited to chassis by means of a screwdriver before any service work is carried out on the receiver. This is necessary since the E.H.T. smoothing condenser holds its charge for a short period after the receiver has been switched off.*

Removal of the chassis from the cabinet is facilitated by the Pye "Quick Release" arrangement which enables the chassis assembly to be

Continued on Page 6

RESISTORS

R1A-D 120 ohms ½ w.I. +10%−10%
R2A-C 220 ohms ½ w.I. 10%
R3A-B 150 ohms ½ w.I. 10%
R4A 3,000 ohms P.
R5A-C 5,600 ohms ½ w. N. 5%
R6A-G 33 ohms ½ w.I. 20%
R7A-B 3,300 ohms ½ w.I. 10%
R8A 27,000 ohms ½ w. N.I. 5%
R9A 560,000 ohms ½ w. N.I. 5%
R10A 4,700 ohms ½ w. N.I. 5%
*R11A 10,000 ohms ½ w.I. 20%
R12A-B 5,600 ohms 1 w.N.I. 10%
R13A 330 ohms ½ w. I. 10%
R14A 33,000 ohms 1 w. N.I. 10%
R15A-D 33,000 ohms ½ w. I. 10%
R16A 33,000 ohms ½ w. I. 20%
R17A-B 25,000 ohms W.W.P.
R18A-E 33 ohms W.W.
R19A 98 ohms W.W.
R20A 365 ohms W.W.
R21A T.
R22A 39 ohms 6 w. W.W. 5%
R23A 82,000 ohms ½ w. I. 20%
†R24A 3,000 P.
R25A-B 47 ohms ½ w. I. 10%
R26A 180 ohms ½ w. I. 10%
R27A-D 33,000 ohms ½ w. I. 20%
R28A 560,000 ohms ½ w. I. 20%
R29A 1 m/ohm ½ w. I. 20%
R30A 1,000 ohms ½ w. I. 20%
R31A-C 2.7 m/ohms ½ w. I. 20%
R32A-B 4,700 ohms ½ w. I. 20%
R33A 270 ohms ½ w. I. 10%
R34A 1.2 m/ohms ½ w. I. 20%
R35A 1,000 ohms 1 w. N.I. 20%
R36A 10,000 ohms ½ w. I. 20%
R37A-B 2.2 m/ohms ½ w. I. 20%
R38A 6,800 ohms ½ w. I. 20%
R39A 22,000 ohms ½ w. I. 20%
R40A 47,000 ohms ½ w. I. 10%
R41A 15,000 ohms ½ w. I. 10%
R42A 220,000 ohms ½ w. I. 20%
R43A 47,000 ohms ½ w. I. 10%
R44A 82,000 ohms ½ w. I. 10%
R45A 2,700 ohms ½ w. I. 20%
R46A 470,000 ohms ½ w. N.I. 5%
R47A 47,000 ohms ½ w. I. 20%
R48A 82,000 ohms ½ w. N.I. 5%
R49A 500,000 ohms P.
R50A 150,000 ohms P.
R51A 47,000 ohms ½ w. I. 20%
R52A 1,000 ohms ½ w. I. 10%
R53A 1,500 ohms 1 w. N.I. 20%
R54A 39,000 ohms ½ w. I. 10%
R55A 10,000 ohms ½ w. I. 10%
R56A 2,200 ohms 1 w. N.I. 20%
R57A 180 ohms ½ w. I. 20%

CONDENSERS

‡C1A-B 47pf. C. +5%−5%
C2A-B 0.001 mfd. T. 300 v. A.C.
C3A-H, J-N, P-Z, AA-AC 1,000 pf. T.
C4A-D 10 pf. C. +5%−5%
C5A 50 pf. M. +2%−2%
C6A 20 pf. Elec. 12 v. +50%−20%
C7A-E 5 pf. C. +25%−25%
C8A-C 12 mfd. Elec. 275 v. +50%−20%
C9A 1,000 pf. M. +10%−10%
C10A 2 mfd. Elec. 150 v. +50%−20%
C11A 0.01 mfd. T. 300 v. A.C.
C12A 60 mfd. Elec. 280 v. +50%−20%
C13A 100 mfd. Elec. 280 v. +50%−20%
C14A-C 0.05 mfd. T. 350 v.
C15A-B 0.02 mfd. T. 500 v.
C16A-C 0.01 mfd. T. 500 v.
C17A 8 mfd. Elec. 250 v. +50%−20%
C18A 25 mfd. Elec. 12 v. +50%−20%
C19A 0.02 mfd. T. 350 v.
C20A 0.05 mfd. T. 600 v. A.C.
C21A 220pf. M. +20%−20%
C22A-C 0.5 mfd. T. 350 v.
C23A 0.25 mfd. T. 350 v.
C24A 50 mfd. Elec. 25 v. +50%−20%
C25A 0.1 mfd. T. 350 v.
C26A 20 pf. M. +5%−5%
C27A 25 mfd. Elec. 25 v. +50%−20%

INDUCTANCES

‡L1A-B Aerial matching coil
L2A Aerial input coil
L3A Sound rejector coil
L4A-K R.F. choke
*L5A Compensating coil
L6A Compensating coil
L7A H.T. smoothing choke
L8A Sound input coil
L9A Loudspeaker speech coil
L10A Line scan hold control coil
L11A Line scan amplitude control coil
L12A Line scan linearity control coil
L13A-B Line scan deflector coils
L14A-B Frame scan deflector coils

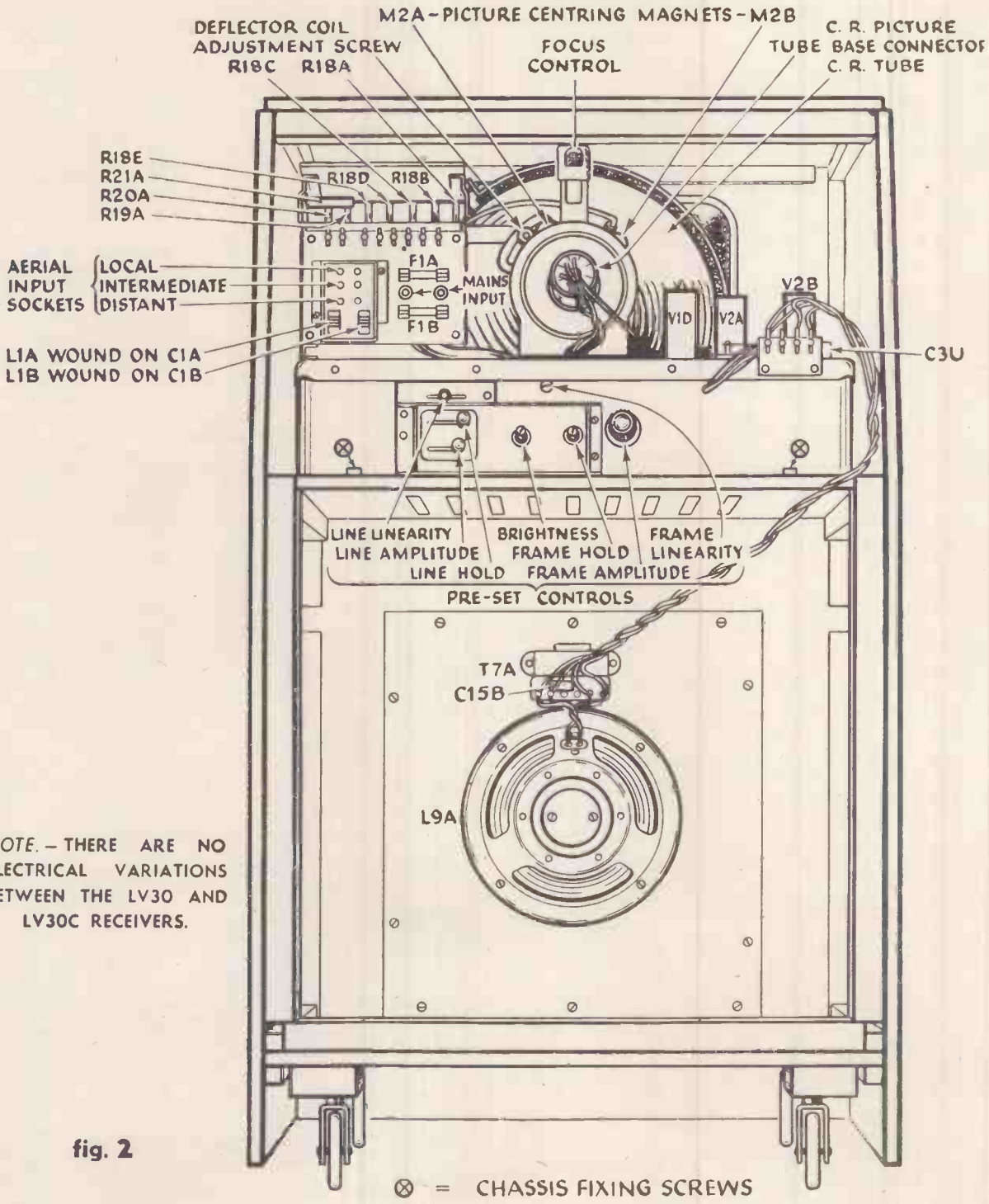
TRANSFORMERS

T1A Anode transformer
T2A Anode transformer
T3A Grid transformer
T4A Anode transformer
T5A Detector anode transformer
T6A Sound detector transformer
T7A Sound output transformer
T8A Frame scan oscillator transformer
T9A Frame scan output transformer
T10A Line scan oscillator transformer
T11A Line scan output transformer

* L5A Wound on R11A 780430.
† S1A-B Ganged to R24A.
‡ L1A Wound on C1A.
L1B Wound on C1B.

Note.—R15C is now 10,000 ohms, ½ watt Insulated +10%−10% 670530.

fig. 1



NOTE. – THERE ARE NO ELECTRICAL VARIATIONS BETWEEN THE LV30 AND LV30C RECEIVERS.

fig. 2

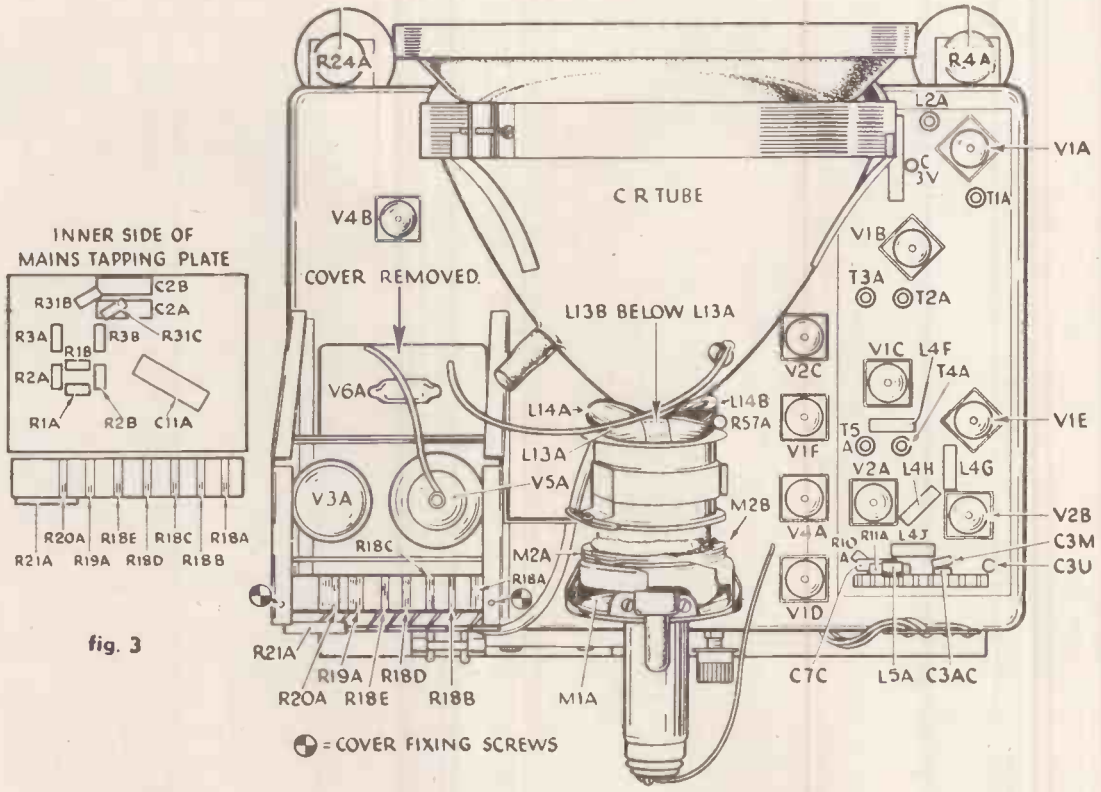

INNER SIDE OF
MAINS TAPPING PLATE
C2B
R31B
C2A
R3A
R3B
R31C
R1B
R2A
R1A
R2B
C11A
R20A
R18E
R18C
R18A
R21A
R19A
R18D
R18B
R24A
R4A
L2A
V1A
C.3V
T1A
C R TUBE
V4B
V1B
T3A
T2A
COVER REMOVED.
L13B BELOW L13A
V6A
V2C
V1C
L4F
T4A
L14A
L14B
R57A
V1F
T5
A
V1E
L13A
V5A
V2A
L4H
L4G
V3A
M2B
V4A
V2B
R18C
R10
R11A
L4J
C3M
M2A
R18A
A
C
C3U
V1D
R21A
R19A
R18D
R20A
R18E
R18B
M1A
C7C
L5A
C3AC
= COVER FIXING SCREWS

fig. 3

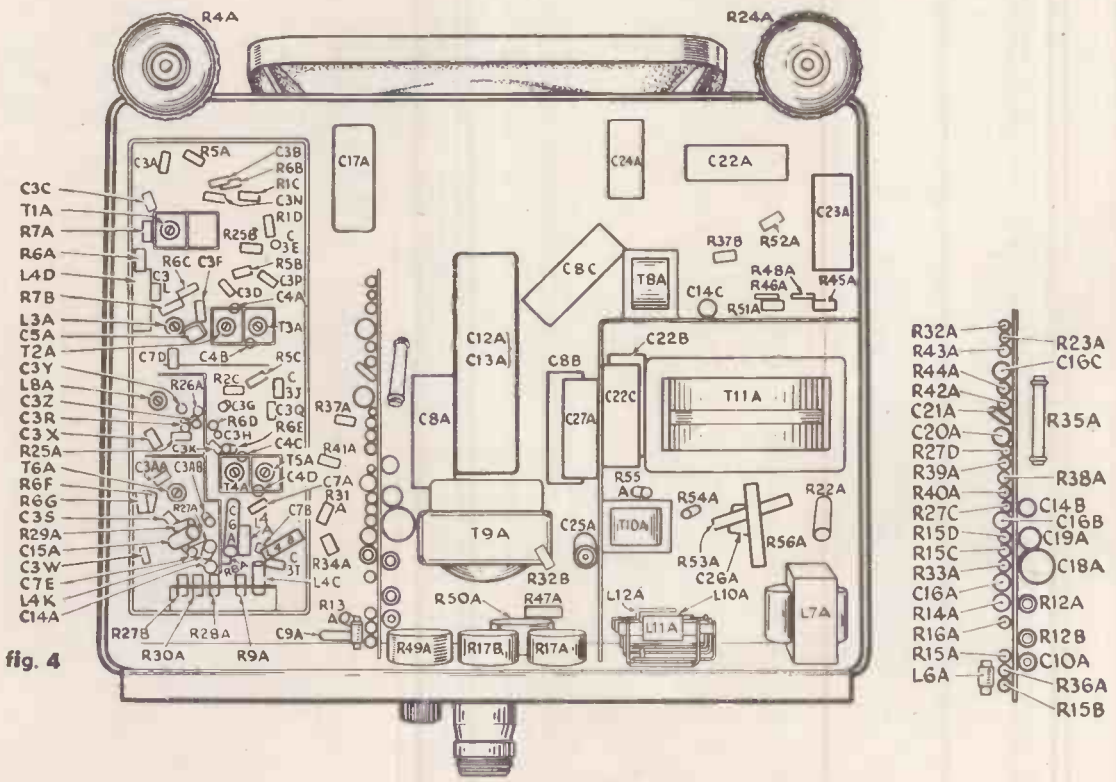
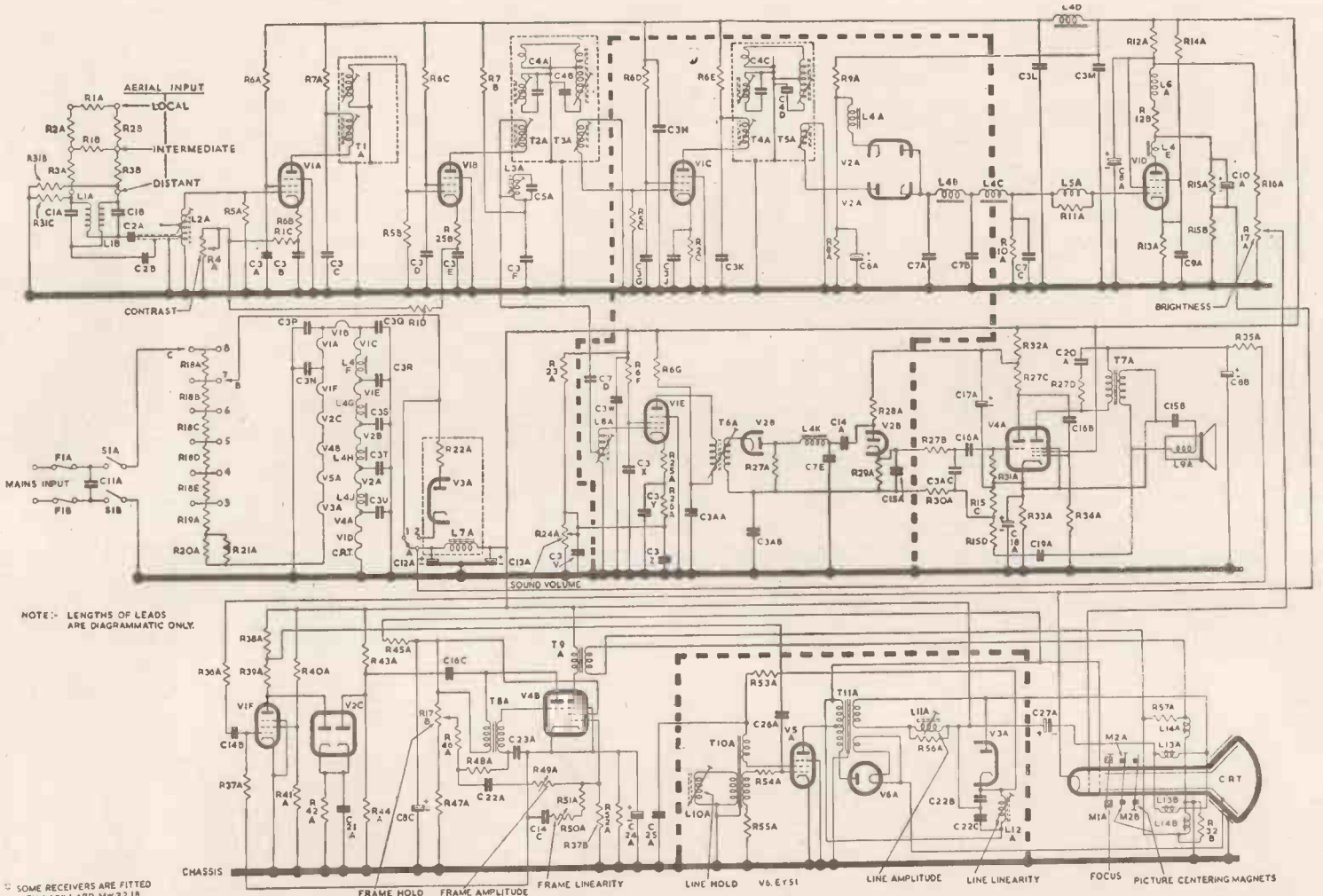

R4A
R24A
C3A
R5A
C3B
R6B
R1C
C3N
R1D
C3C
T1A
R7A
R25B
C
C3E
R6A
R6C
C3F
R5B
L4D
C3
C3P
R7B
C3D
C4A
L3A
T3A
C5A
T2A
C7D
C4B
R5C
C3Y
C
C3J
L8A
R26A
R2C
C3Z
C3G
C3Q
C3R
R6D
C3H
R6E
C3X
C3K
C4C
R25A
R41A
T5A
T6A
C3AA
C3AB
C4D
C7A
R6F
T4A
R31
R6G
R27A
A
C3S
C
C7B
L1
R29A
G
C15A
A
C
C3W
R34A
C3T
C7E
R27A
L4C
L4K
R13
C14A
A
R27B
R28A
C9A
R30A
R9A
R49A
R17B
R17A
C17A
C24A
C22A
C23A
R37B
R52A
C8C
T8A
R48A
C14C
R46A
R45A
R51A
C12A
C13A
C22B
C8B
C8A
C22C
C27A
T11A
R55
A
R54A
R22A
T9A
C25A
T10A
R56A
R53A
C26A
R32B
R50A
R47A
L12A
L10A
L7A
L11A
R32A
R43A
R44A
R42A
C21A
C20A
R27D
R39A
R40A
R27C
R15D
R15C
R33A
C16A
R14A
R16A
R15A
L6A
R23A
C16C
R35A
R38A
C14B
C16B
C19A
C18A
R12A
R12B
C10A
R36A
R15B

fig. 4



* SOME RECEIVERS ARE FITTED WITH A MULLARD MW 22-18 C.R.TUBE. THERE ARE NO ELECTRICAL VARIATIONS BETWEEN THE MW.22-14 AND THE MW.22-18

VALVE BASE CONNECTIONS

UNDERSIDE VIEW

V1 EF 80

V2. E891.

V3 PZ30

V4. ECL 80.

V5 PL 38

T.C.A.

C.R.T. MW.22-14

TC A2

C.R.T MW.22-18

TC A2

NOTE:

B	BLANK
H	HEATER
K	CATHODE
G1	CONTROL GRID
CG	
G²	TRIODE GRID
G₂	SCREEN GRID
G3	SUPPRESSOR GRID
A	ANODE
A²	TRIODE ANODE
A²	PENTODE ANODE
S	INTERNAL SHIELD
Tc	TOP CAP

removed from the cabinet without inverting the receiver or removing the Contrast and Volume control knobs. This is done in the following manner :

Remove the four loudspeaker leads from the tag plate situated on the rear of the chassis. Remove the two fixing screws situated on the rear chassis flange. The chassis assembly may now be removed from the cabinet. There are no fixing screws underneath the cabinet.

To replace the chassis assembly. Reverse the removing procedure and observe that : The Contrast and Volume control knobs are directly opposite the slots in the front of the cabinet. The two holes in the front of the chassis engage the two pins in the locating brackets situated at the front of the cabinet. The face edges of the C.R. Tube mask meet.

Important : The receiver should not be operated with the loudspeaker leads removed from the tag plate. Damage to the Sound Output valve (V4A) may result.

TO FIT NEW VALVES

It should be noted that the position of valves of the same type should not be altered. All the EF80, ECL80 and EB91 valves may be removed in the normal manner after the screening cans have been removed. The screening cans are removed by a direct pull. Care should be taken against cracking the glass base around the pins of the valves.

REMOVING V3A, V5A AND V6A

The Line Scan Efficiency and H.T. Rectifier valve (V3A) and the Line Scan Oscillator and Line Scan Output valve (V5A) can be removed in the normal manner after removal of the cover on the screening box situated on the left hand side of the receiver chassis. (See Fig. 3).

The E.H.T. Rectifier valve (V6A) is mounted on the Line Scan Output and E.H.T. transformer (T11A) situated in the screening box, and is removed by carefully unsoldering the three valve leads from the bushes on the valve mounting panel. (See Fig. 3).

When soldering the valve into position, great care should be taken to ensure that the soldered joints are *smooth and free from any sharp points.*

REMOVING THE C.R. TUBE

Remove the connector from the base of the tube. Disconnect the anode 2 lead from the connector on the side of the tube. Unscrew the 4BA screw on the clamp holding the tube mask. Slide the tube through the focus magnet assembly, deflector coil assembly and felt ring, until it is finally clear. Remove the rubber mask and " Black Screen " from the tube, making note of the position of the tube mask aperture with respect to Anode 2.

REPLACING THE C.R. TUBE

Reverse the operating procedure for removing the tube and observe that : The two earthing springs are making good contact with the "Aquadag" on the tube bulb. The deflector coil assembly is kept well up against the flare of the tube. Before tightening the tube mask clamp, ensure that the two longer edges of the tube mask aperture are parallel with the chassis.

If a new tube is fitted, it may, in some cases, be necessary to re-position the deflector coils in order that the coils meet the flare of the tube.

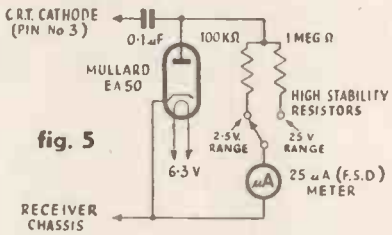


fig. 5

DIODE VOLTMETER

This is done by loosening the 4BA screw on the metal clamp surrounding the deflector coil assembly and then by sliding the coils through the clamp until they meet the flare of the C.R. Tube.

In some cases it may be necessary to re-position the picture after the tube has been replaced. To do this, first loosen the screw situated on the bracket screwed to the side of the screening box, then rotate the deflector coil assembly until the picture is square with the tube mask aperture. *Do not touch anode 2 connector.* Secondly, rotate the two picture centring magnets, situated between the deflector coil assembly and the focus magnet assembly, until the picture is in the centre of the tube mask aperture. Thirdly, re-focus the picture.

Centring the picture : *This is effected by means of two identical magnets (the Picture Centring Magnets, M2A-B), situated between the Focus Magnet and the Deflector coils. Each magnet is rotatable about the neck of the C.R. Tube independently of the other, and the position of the picture on the C.R. Tube screen depends upon their combined magnetic field. These magnets should be rotated independently until the picture is correctly positioned within the C.R. Tube aperture.*

TO REMOVE THE R.F. UNIT

To remove the R.F. Unit from the main chassis : Disconnect the six leads from the nine-way tag plate situated on the rear of the R.F. Unit. Make careful note of the positions of the leads before disconnecting. Disconnect the four leads from the four-way tag panel situated on the front of the R.F. Unit, again noting the relative positions of the leads before disconnecting. Disconnect the earth wire from the Contrast control. Unscrew the four fixing screws holding the R.F. Unit to the main chassis. The unit may now be completely withdrawn.

GENERAL DATA

Most of the screws used on the receiver are the P.K. self tapping type. These screws require special screwdrivers and the recommended types are the Phillips 301 and 302.

Make certain that the mains voltage adjustment leads on the voltage selector panel are set in accordance with the voltage of the supply being used.

When operating the receiver on D.C. mains, make certain that the mains plug is correctly inserted in the socket, i.e., connect the black lead to the negative side of the mains. Failure to observe this will cause the fuses to blow.

The focus magnet assembly and the strength of the magnet have been carefully adjusted. Under no circumstances should the asssembly be dismantled or a screwdriver or similar tool be allowed to come into contact with it, as this will affect the magnet.

VALVE VOLTAGE TABLE

MAINS INPUT : 220 volts. LINE H.T. : 195 volts. Total H.T. current : Contrast and Sound Volume controls at max. 190 mA. ; at min. 170 mA. The following conditions must be observed before any voltages or currents are measured : " No Signal " conditions on receiver. Contrast and Sound Volume controls set to mid position. Line and Frame Hold controls adjusted to obtain approximately correct Line and Frame Scan speed. Line and Frame Linearity controls adjusted to obtain approximately correct Line and Frame Scan linearity. Line and Frame Amplitude controls adjusted to obtain approximately correct Line and Frame Scan amplitudes. Voltage measured between each point and the receiver chassis with a 1000 ohms per voltmeter, with the exception of the C.R. Tube Anode 2 and Anode 1 voltages ; these voltages are measured with an electrostatic voltmeter.

Valve	Electrode	V.
(V1F)	Anode	85
EF80	Screen Grid	37
	Heater	6.3
(V4B)	Triode Anode	230
ECL80	Triode Grid	−20
	Pentode Anode	180
	Screen Grid	230
	Cathode	12
	Heater	6.3
(V5A)	Anode	‡
PL38	Screen Grid	210
	Heater	30
(V2C)	Anode 1	100
EB91	Anode 2	85
	Cathodes 1 & 2	100
	Heater	6.3
(V3A)	Anode 1	‡
PZ30	Anode 2	210
	Cathode 1	247
	Cathode 2	210
	Heater	55

Valve	Electrode	V
(V6A)	Anode	‡
EY51	Cathode	6500
	Heater	‡
(V4A)	Triode Anode	65
ECL80	Pentode Anode	180
	Screen Grid	195
	Cathode	6
	Heater	6.3
C.R. Tube	Anode 1	247
MW 22-14	Anode 2	6500
	Control Grid	0–70*
	Cathode	60†
	Heater	6.3
(V1A)	Anode	150
EF80	Screen Grid	190
	Cathode	2.2
	Heater	6.3
(V1B)	Anode	150
EF80	Screen Grid	190
	Cathode	2.2
	Heater	6.3
(V1C)	Anode	195

Valve	Electrode	V.
EF80	Screen Grid	195
	Cathode	2.7
	Heater	6.3
(V2A)	Heater	6.3
EB91		
(V1D)	Anode	117
EF80	Screen Grid	148

Valve	Electrode	V.
	Cathode	3
	Heater	6.3
(V1E)	Anode	192
EF80	Screen Grid	192
	Cathode	3
	Heater	6.3
(V2B)	Heater	6.3
EB91		

* Brightness control set to min./max. respectively.
† Brightness control set to minimum.
‡ Owing to a pulse voltage being present on V3A Anode 1, V6A Anode, V6A Heater and V5A Anode, it is not possible to measure these voltages by normal methods.

D.C. RESISTANCE OF WINDINGS

H.T. Smoothing Choke		75 ohms
Deflector Coils : Line Scan Coils		20 ohms +5%−5%
(Total for both Coils)		
Frame Scan Coils		
(Total for both Coils)		9.5 ohms +5%−5%
Line Scan Oscillator Transformer	Screen Grid winding :	53 ohms
	Control Grid winding :	60 ohms
	Control winding :	7.0 ohms
Line Scan Output Transformer	Primary :	55 ohms
	Secondary :	7.0 ohms
	E.H.T. winding	450 ohms
	L.T. Secondary	0.2 ohms
Line Scan Amplitude Control Coil		8.0 ohms
Line Scan Hold Control Coil		17.5 ohms
Line Scan Linearity Control Coil		7.1 ohms
Frame Scan Oscillator Transformer	Anode winding :	540 ohms
	Grid winding :	135 ohms
Frame Scan Output Transformer	Primary :	1500 ohms
	Secondary :	3.0 ohms
Sound Output Transformer	Primary :	720 ohms
	Secondary :	0.35 ohms
Compensating Coils (L5A)		5.0 ohms
(L6A)		8.2 ohms
Loudspeaker Speech Coil		3.0 ohms